

Existing Conditions Report

Route 8 & Waterbury Branch Line Corridor
Transit-Oriented Development & Alternate
Transit Modes Assessment Project

October 2018

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EXECUTIVE SUMMARY

This Existing Conditions Report is part of the broader Route 8 Corridor Study¹ commissioned by the Naugatuck Valley Council of Governments (NVCOG). This report examines current transportation services along the Route 8 corridor, highlighting existing transit and rail services, parking facilities, the existing road network and the associated travel patterns within the corridor. This information is the framework that will be leveraged to help define broader system improvements and better position the corridor for alternative transit and rail service options to attract a growing customer base, which will be documented in

subsequent reports. The overall goal of the Route 8 Study is to identify and subsequently develop a cost effective means of providing enhanced transit and rail service along the Route 8 corridor between Waterbury and Bridgeport. The study corridor is generally defined by the region's transit network and a buffer of 500 feet along Route 8 and the Waterbury Branch Line between Waterbury and Bridgeport.

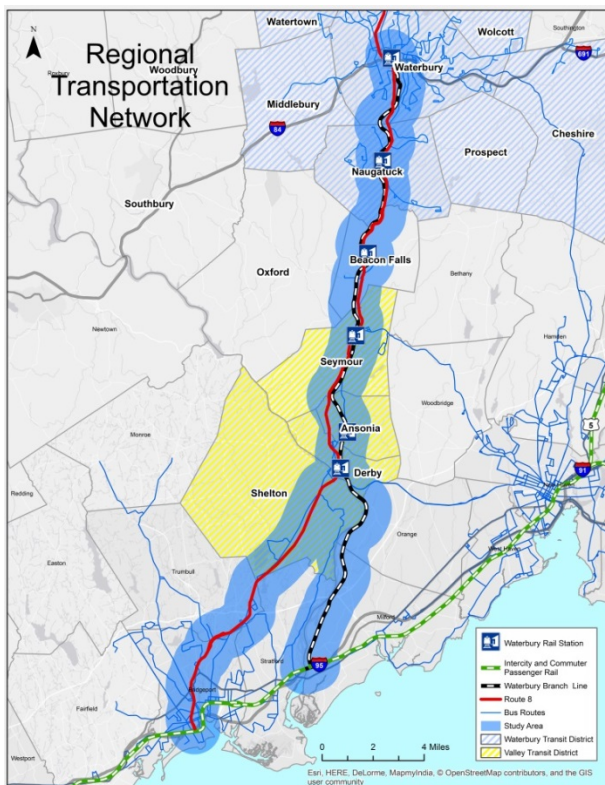
Transit and Commuter Rail Services

Transit Services

Within the defined corridor there are three local bus system operators, CTtransit Waterbury, CTtransit New Haven and Greater Bridgeport Transit. Collectively these three systems operate 12 routes which serve Waterbury Branch Line (WBL) stations and intermediate communities. It is clear from the travel time data that routes which operate along Route 8 have higher operating speeds and that the number of stops greatly impacts the speed of a route. Commute time from Waterbury to New Haven is currently 23 minutes less time by bus than by train, but 25 minutes greater on bus than rail between Derby and Bridgeport.

Buses provide over 6,000 passengers trips daily to WBL Train stations and Naugatuck Valley communities

In Waterbury only two routes provide service to the train station and both see very low ridership, particularly between the Waterbury Green and the train station. The routes serving Naugatuck are the two worst



Rt. 8 Corridor Study Area

¹ The Route 8 Study is formally called the Route 8 & Waterbury Branch Line Corridor Transit Oriented Development & Alternate Modes Assessment Project.

performing in the Waterbury system; however recommendations have been made as part of the Waterbury Area Transit Study (WATS) to improve service in Naugatuck. Long term recommendations identified in the study include:

- The need for commuter bus service between Waterbury and the Shelton Business Park via Route 8, with stops at the Derby and Seymour rail stations
- Improving the frequency and duration of service on routes that serve Naugatuck and the Waterbury Train Station.

The system has a low spare ratio of buses, meaning that expansion of service would likely require acquisition of additional buses. When CTtransit Waterbury moved into their new maintenance and storage facility in 2018, storage of additional buses became feasible as the new facility can accommodate an expanded fleet.

Waterbury to New Haven has the highest ridership amongst corridor routes

The two New Haven routes, which provide a more interregional style service, see strong and growing ridership figures and provide service from New Haven to several Naugatuck Valley communities. Ridership data shows that the demand is towards New Haven during morning peak hours. Ridership between Waterbury and New Haven is high enough to warrant using 60' articulated buses. Additionally there is substantial demand along the 255 route to Derby, Ansonia and Seymour. Service expansion along this corridor is currently not feasible due to funding shortages. CTtransit New Haven has been undertaking a study to develop and evaluate transit improvements within the broader New Haven area.

Greater Bridgeport Transit operates three routes which serve corridor communities. Unfortunately Greater Bridgeport Transit is suffering from funding reductions which has resulted in minor service cuts, as opposed to service increases as recommended in their recent Long Range Transit Plan. While funding for operations has been cut, GBT has several capital improvements programmed using 5307 federal funding, which is federal money that cannot be used for operations. Under this program the Bridgeport and Hartford systems will be the first transit providers in the state to operate fully electric buses.

Commuter Rail

Passenger service on the branch line has a rich history dating back to 1849. Today 15 trains operate daily. The majority of the passengers are traveling to destinations outside of the region. While ridership did decline between 2011 and 2016, daily ridership for 2017 is up 17% from the previous year with around 1,014 daily riders. However service disruptions and infrequent service limit the systems' usability. Additionally, the Waterbury Branch Line is currently not electrified, is not signalized, and has no passing sidings. Equipment is shared with the Danbury Branch Line. While the WBL has several capital improvements underway, including Positive Train Control (PTC), signalization, grade crossing and siding improvements, as well as planned use of real-time passenger information on platforms, it is the equipment, particularly the locomotives used, that are the limiting factor in reducing service disruptions. Currently equipment failures have occurred 3-5 times a month, according to CTtransit and Metro-North officials. When failures occur alternative bussing is provided by CTtransit New Haven. Efforts are ongoing to improve this performance.

While signalizing and installing sidings on the line would allow for additional trains to operate on the branch line, the fleet size, condition of the equipment and ability to service and store additional equipment, would remain

Existing Conditions

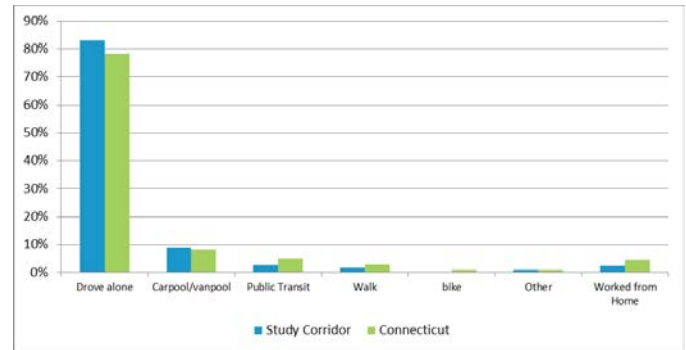
limiting factors in being able to improve reliability and expand service.

Parking

The corridor's parking was inventoried to understand its utilization and availability. This included parking directly at rail stations and all parking within a half mile of each of the Waterbury Branch Line stations. Approximately one-third of available parking is utilized, indicating that there is an ample supply of parking around the stations. The highest station utilization rate was at the Derby/Shelton station; the highest downtown utilization was in Ansonia; and Beacon Falls has the lowest utilization rate both at its station and throughout its downtown area. Results indicate that stations located closer to a community's downtown core or commercial areas have higher utilization. Parking at many of the stations has increased since last surveyed in 2001, which reflects the increase in ridership demonstrated by 2017 figures.

Travel Patterns

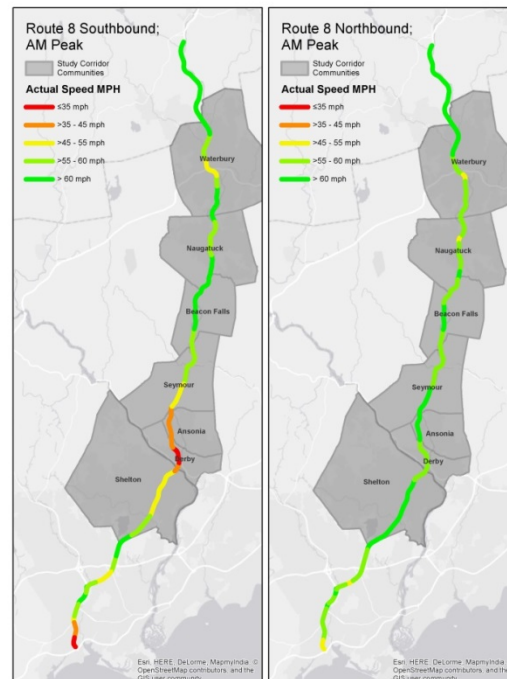
The travel pattern section assesses modes, travel time and journey to work data. These three metrics create a broad perspective on how and where people are traveling within and along the Route 8 corridor. The modal split analysis demonstrates that individuals overwhelmingly commute alone. The corridor has a lower than average rate of individuals who commute on the public transit network when compared to the state average. For those who commute outside of their community for work, it should be noted that more individuals travel to New Haven than Bridgeport for work. The majority of individuals living in a WBL community who work in one of the communities along the main line would be required to transfer in Bridgeport if they used the train.



Rt. 8 Corridor Mode Split for Commute to Work

Existing Road Network

The analysis of existing road conditions includes traffic volume and a travel time analysis. Average Daily Traffic (ADT) results demonstrate that traffic volume is greatest near Bridgeport and generally decreases the farther north on Route 8 that you travel. However traffic volume spikes at key interchanges along the corridor, including the Route 25 and Route 15 interchange zone, between exits 12 and 16, and at the interchange with I-84. Each of these roadway segments report increased volume when compared to adjacent sections, likely leading to roadway congestion and delays during peak commuting hours.



NPRDMS Data - AM Peak Travel Speeds

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1.INTRODUCTION

NVCOG has initiated the Route 8 Corridor Study to identify ways to reduce traffic congestion and to develop an effective plan for providing enhanced rail and transit service in the Route 8 corridor between Waterbury and Bridgeport. The purpose of this – *Existing Conditions Report* – is to identify current transportation services and infrastructure within the Study Corridor as well as present the results of an environmental survey. This aligns with the goals and objectives of the study which are presented in Figure 1.

Information within this report will serve as a basis for the analysis of existing deficiencies and current and future needs affecting mobility within this corridor. Using the data summarized within this report, the Study Team will perform a corridor-level analysis that evaluates the

potential benefits of rail/transit improvements that will address current and future demand in the Study Corridor.

The study area for the Route 8 corridor includes several components including a 30-mile portion of the Route 8 expressway, the Waterbury Branch Line (WBL) and local roads connecting the passenger stations to Route 8. The Route 8 expressway within the study area is between Interchange 30 in Waterbury and Interchange 2 in Bridgeport. The footprint of the area being studied includes 500 feet on either side of the WBL, Route 8 and connecting roads, plus one-half mile around all stations on the WBL. The study area is illustrated in Figure 2.

Goals and Objectives

- 1 Efficiently and effectively move commuters through the Region and establish higher density residential development, economic redevelopment and natural resource management
- 2 Evaluate and assess traffic operations and safety along Route 8 between Waterbury and Bridgeport
- 3 Determine the physical layout and right-of-way of Route 8, as well as the general land use at key interchange areas
- 4 Link the Derby-Shelton and Bridgeport rail stations, as well as, existing, planned and proposed transit oriented and supportive districts and neighborhoods
- 5 Develop short-, mid- and long-term transit service plans
- 6 Convert and transform the city-town center areas of Shelton, Derby, Ansonia, Seymour, Beacon Falls, Naugatuck and Waterbury from automobile dependent uses to those supported by transit access and into spatially connected districts with safe and convenient pedestrian linkages and transit-supportive densities
- 7 Promote and identify TOD-supportive land use development plans and identify alternative transit modes that facilitate travel to and from TOD areas
- 8 Advance HUD's livability principles and extend sustainable communities
- 9 Public transit connectivity

Figure 1. Goals and Objectives

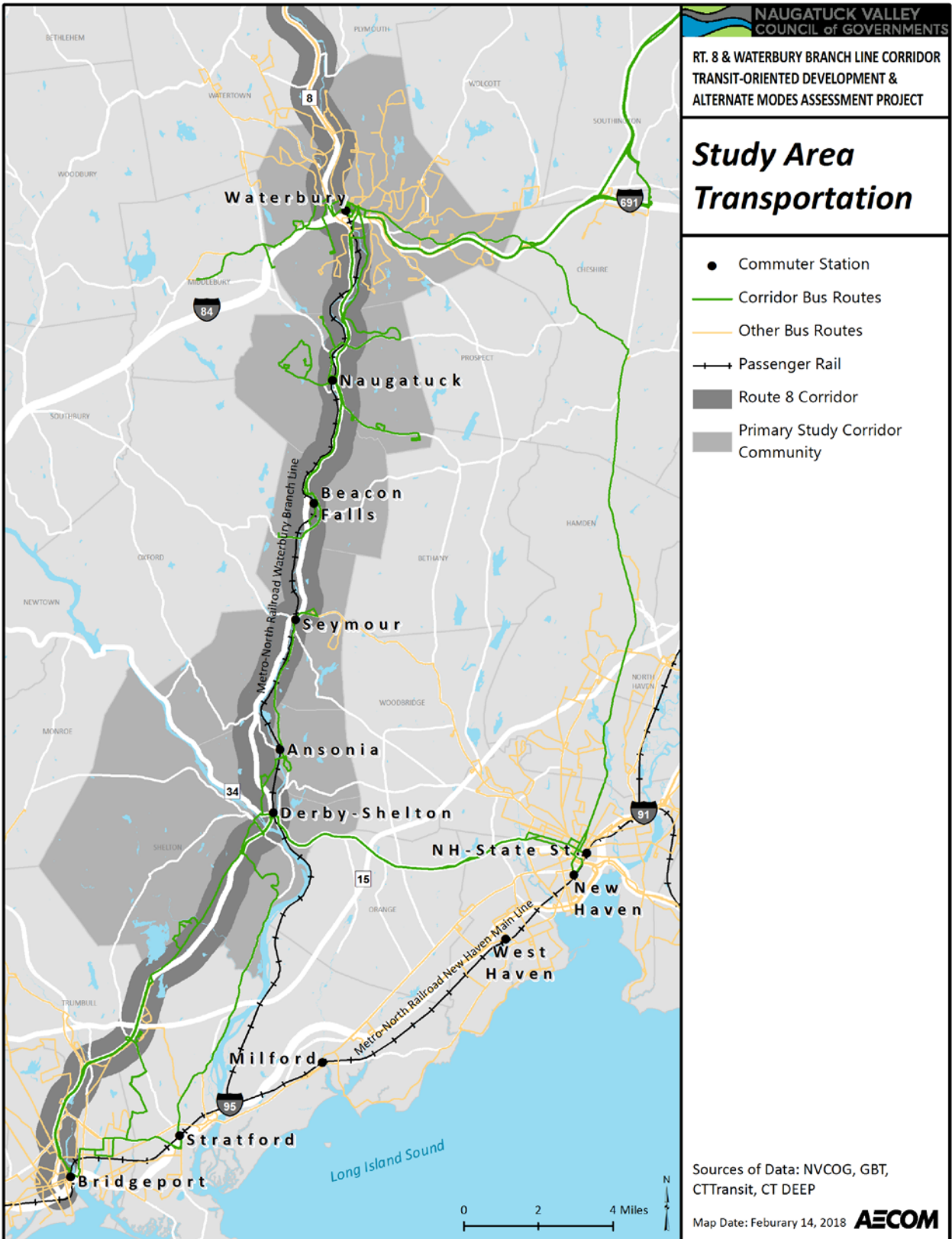


Figure 2. Existing Transit Services

2.EXISTING TRANSIT SERVICES

This section details the current transit services operating within the study corridor towns of Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia, Derby, Shelton, Orange, Milford, Stratford, and Bridgeport. Connecting service between Hartford, New Haven and the Study Corridor is

2.1 Local Fixed Route Bus Transit

There are three primary fixed route bus operators in the region that include CTtransit Waterbury and New Haven Divisions, and Greater Bridgeport Transit Authority. Operating and fare information is presented for each

provider and for each route in the study corridor. Route information presented includes the service span, peak headway, towns and rail stations served, one-way travel time, and average daily ridership. For routes which operate in the corridor communities, ridership counts were taken on board during peak trips, as identified by the provider, on typical weekday service types.

2.1.1 CTtransit Waterbury

CTtransit Waterbury contracts with North East Transportation (NET) to operate 22 local bus routes and six tripper² routes (operate during the peak hours only) in Waterbury and the surrounding communities (Figure 3). Service is provided seven days a week and generally operates from 6:00 AM to midnight on weekdays, 9:30 AM to midnight on Saturdays, and 9:30 AM to 5:00 PM on Sundays.

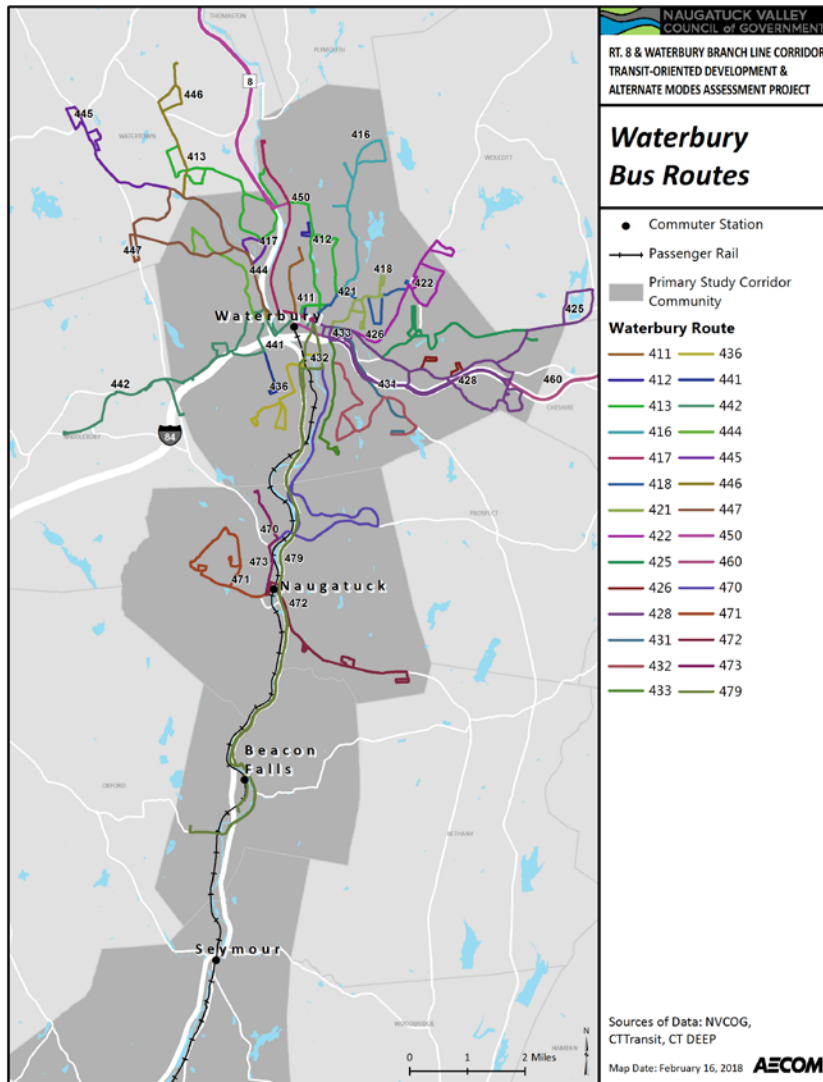


Figure 3. CT Transit Waterbury System Map

also examined. This assessment includes local fixed bus routes, rail passenger services, and connecting transportation services.

² Tripper service means regularly scheduled mass transportation service which is open to the public, and which is designed or modified to accommodate the needs of school students and personnel, using various fare collections or subsidy systems. (49 CFR 605.3)

In 2015 the system carried 2,721,399 passengers, 11% of which are on routes that serve Naugatuck, Beacon Falls or the Waterbury Train Station. During peak service 36 vehicles are in operation. Annual revenue miles are 1,102,218 and hours are 92,214. The passengers per revenue mile in 2015 was 2.5 and has been increasing since 2012 due to an overall increase in passengers. Since 2012 Waterbury has implemented several service changes including the addition of late night service and holiday service.

The system operates using a pulse (a timed transfer between multiple routes) at or near the Waterbury Green in downtown Waterbury. There are multiple bus stops located around and adjacent to the Waterbury Green on East and West Main Streets. Most routes pulse on the half hour or on the hour at the Waterbury Green. The routes that are operated by CTtransit Waterbury are presented in Table 1. The routes in bold either serve a rail station or one of the corridor communities and are displayed in Figure 4. Further analysis of these routes is presented on the next page.

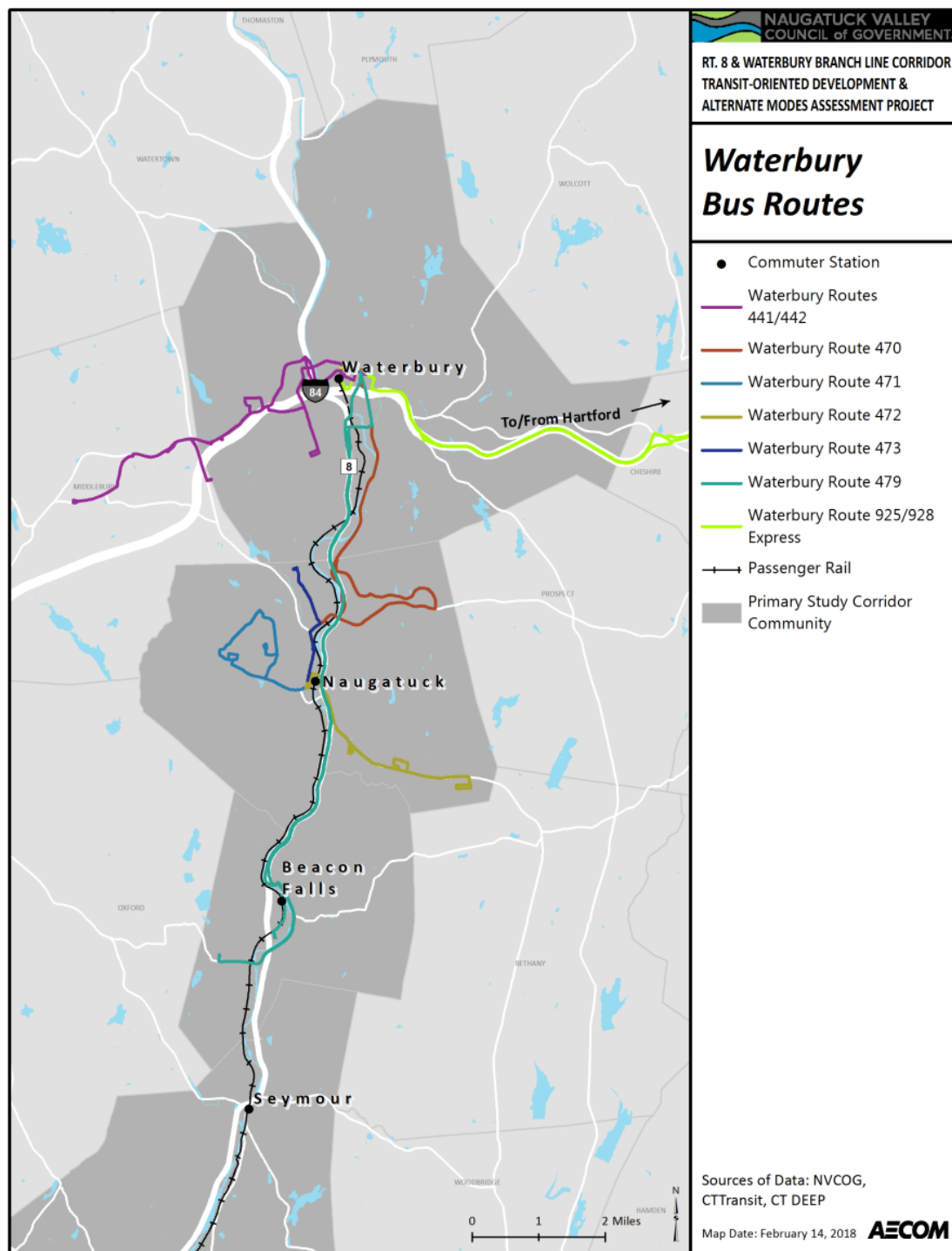


Figure 4. CT Transit Waterbury Corridor Routes

Existing Conditions

Route	Service Span (Days of the Week/Hours per Weekday)	Peak Headway (minutes)	Towns Served	Rail Stations Served	End to End Travel Time (minutes)	Average Daily Ridership
411 Overlook	7/18	30	Waterbury	----	15	532
412 Hill St	7/18	30	Waterbury	----	15	282
413 Oakville	7/18	60	Waterbury, Watertown	----	30	601
416 Bucks Hill/North Main St	7/18	30	Waterbury	----	30	846
418 Long Hill Rd	7/18.5	30	Waterbury	----	15	284
421 Walnut St	7/18	60	Waterbury	----	15	268
422 Wolcott St	7/18	60	Waterbury	----	30	856
425 Hitchcock Lake	7/18	60	Waterbury, Wolcott	----	30	527
426 East Main St – Fairlawn/Meriline	5/12.5	60	Waterbury	----	60	592
428 East Main St – Scott Rd	7/10	50	Waterbury	----	20	318
431 East Mountain	5/12	60	Waterbury	----	15	58
432 Hopeville/Sylvan Ave	5/12	60	Waterbury	----	15	81
433 Hopeville/Baldwin St	7/18.5	30	Waterbury	----	15	649
436 Town Plot/Congress Ave	7/18.5	30	Waterbury		15	363
441 Town Plot/Highland Ave	7/18	60	Waterbury	Waterbury	15	179
442 Chase Parkway	7/18	60	Waterbury, Middlebury	Waterbury	12-25	584
444 Bunker Hill Ave	7/18	60	Waterbury	----	15	383
445 Watertown Ave	7/13	60	Waterbury, Watertown	----	30	332
450X Torrington	5/14	90	Waterbury, Torrington, Thomaston	Waterbury	45-70	----
471 Naugatuck/Millville	5/7.5	80	Naugatuck	Naugatuck	40	7
472 Naugatuck/New Haven Rd	5/7	80	Naugatuck	Naugatuck	40	22
473 Naugatuck/Spring St	5/	80	Naugatuck	----	15	----
479X Beacon Falls	5/9.5	2 trips	Waterbury, Beacon Falls	----	25	127
417 Thomaston Ave	6/12	30	Waterbury, Waterville	----	15-20	284
447X Watertown/Straits Turnpike	5/9.5	2 trips	Waterbury, Watertown	----	20	26
446X Watertown Industrial Park	5/9.5	2 trips	Waterbury, Watertown	----	20	42
470X Naugatuck Industrial Park	5/9	3 trips	Waterbury, Naugatuck	----	30	83
460X Cheshire Industrial Park	5/10.5	3.5 trips	Waterbury, Cheshire	----	25	69

Table 1. Waterbury Bus Routes

Route 441

Route 441 is operated seven days a week with a 60-minute frequency from 5:45 AM to 12:17 AM on weekdays and Saturday and 9:30 AM to 5:00 PM on Sundays. Performance Statistics for this route are found in Table 2. On average the route underperforms compared to the other Waterbury routes.

Route 441 travels from the Waterbury Green to Town Plot via Highland Avenue. Service is provided to the Waterbury Train Station at the intersection of Freight Street and Meadow Street. It travels through a mix of residential and commercial land uses. The WATS recommended reducing the headway on this route to 80 minutes from 60 minutes. Figure 5 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does not experience vehicle traffic along the alignment.

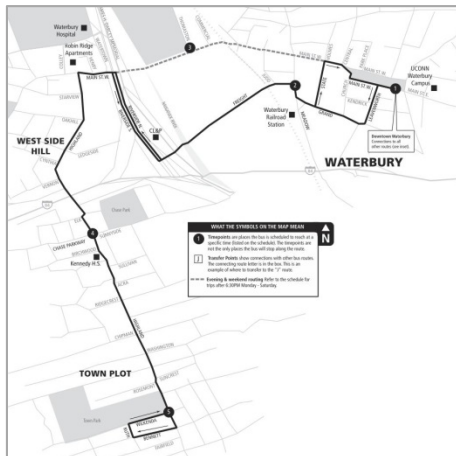


Figure 5. Route 441 Map

A boardings by trip chart is shown in Figure 6. Ridership is highest in both directions during the morning commute. Inbound (towards Waterbury) ridership drops off during the mid-day and peaks again in the afternoon commute, while the outbound ridership is sporadic throughout the day.

Metric	Route Value	Rank
Passengers/hour	26.8	19/30
Passengers/Mile	2.16	18/30
Passengers/Trip	7.17	25/30

Table 2. Route 441 Performance Statistics

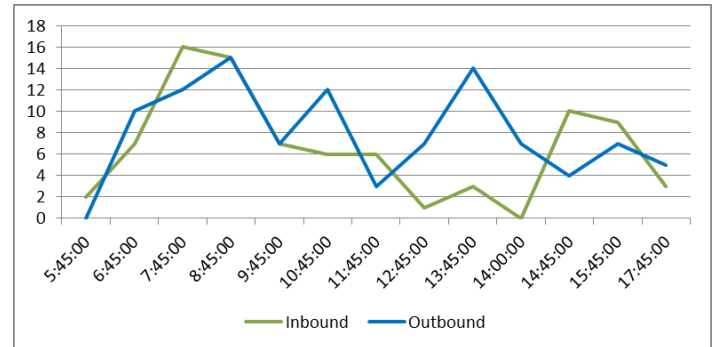


Figure 6. Route 441 Boardings by Trip

A sample PM peak-hour outbound and inbound run of the 441 was analysed to show rider activity (Figure 7³). Boardings and alightings (the sum of which is referred to as *activity by stop*) were highest at the Waterbury Green, but occurred sporadically throughout the entire route with the majority of alightings occurring in the outbound direction and boardings on the inbound trip.

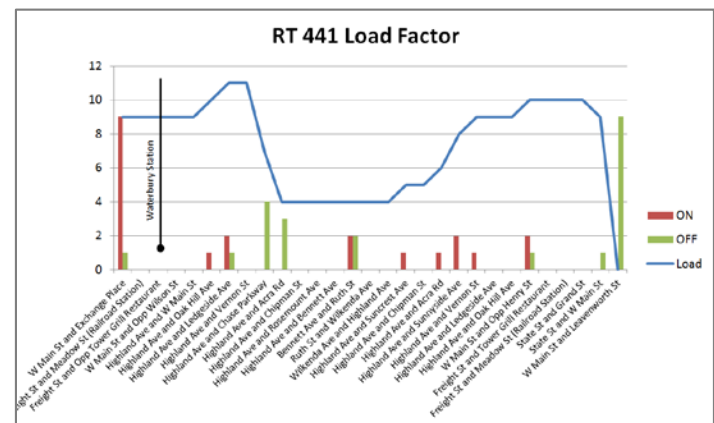


Figure 7. Route 441 activity by stop

Route 442

Route 442 is operated seven days a week with a 60-minute frequency from 6:30 AM to 12:17 PM on weekdays and Saturday and 9:30 AM to 5:00 PM on Sundays. Performance statistics for the route are found in

³ Load Factor is the capacity or utilization of a vehicle/route, full graphs can be found in Appendix C

Existing Conditions

Table 3. On average this route carries more passengers per trip and hour than most Waterbury routes.

Route 442 travels from the Waterbury Green to Middlebury via Route 64. Service is provided for the Waterbury Train Station at the intersection of Freight Street and Meadow Street on weekends and evening trips on inbound trips. It travels through a mix of residential and commercial land uses. The WATS study recommended truncating this route at the Harold Leever Regional Cancer Center. Figure 8 presents a map of the route, which travels the same path in both the outbound and inbound directions during the day but on nights and weekends serves Highland Avenue. This route does not experience vehicle traffic along the alignment.

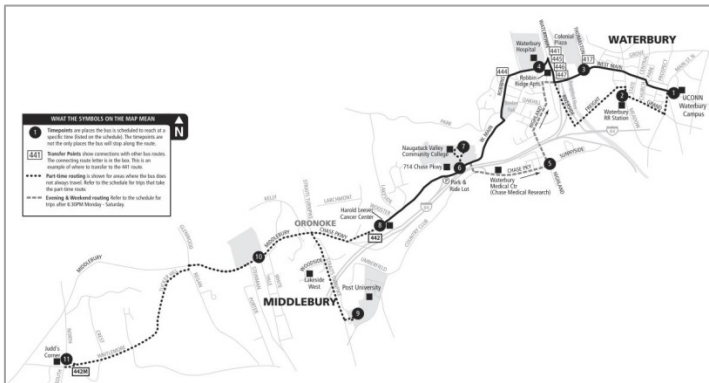


Figure 8. Route 442 Map

A boardings by trip chart is shown in Figure 9. Ridership is highest in the inbound direction at 11:00 AM and at 7:00 AM heading outbound. Overall ridership is greater in the AM heading outbound, but in the PM is relatively even in both directions.

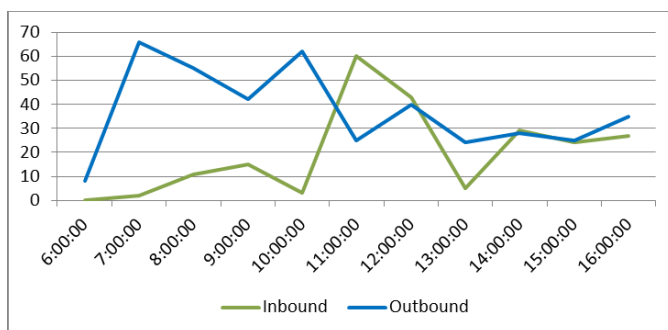


Figure 9. Route 442 Boardings by Trip

Activity by stop was examined for a PM peak trip, as this is when the route serves the Waterbury Train Station

Metric	Route Value	Rank
Passengers/hour	73.41	2/30
Passengers/Mile	4.78	11/30
Passengers/Trip	16.17	7/30

Table 3. Route 442 Performance Statistics

(Figure 10). Boardings were highest at the Waterbury Green, and alightings were highest at Naugatuck Valley Community College. Overall the route had very little ridership in the evening as compared to the AM peak, which can have as many as an additional 40 passengers per trip.

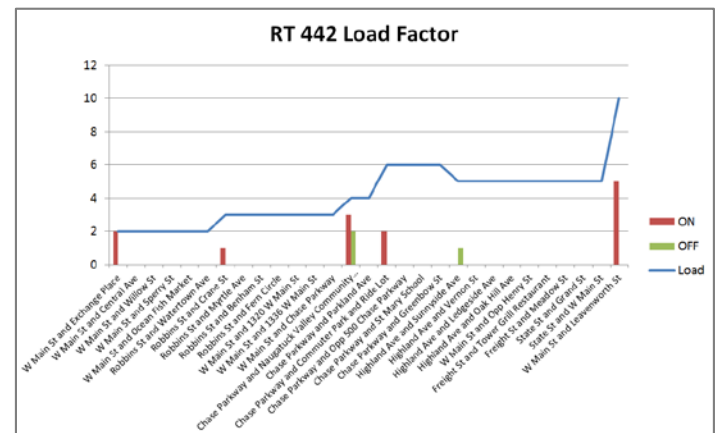


Figure 10. Route 442 activity by stop

Route 470X

Route 470X is a tripper route and operates on weekdays only with two trips in the morning and one in the afternoon. This route does not serve a train station but does service the Naugatuck Green a distance of 1,200 feet to the station. Performance statistics for this route are found in Table 4. This route performs above average on the number of passengers per trip but below on the number of passengers per mile and hour. This indicates that the route is long and most passengers are traveling longer distances.

Existing Conditions

Route 470X travels from Waterbury to Naugatuck through commercial, residential and industrial land uses. Figure 11 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does not experience traffic congestion during the AM peak but does between the Waterbury Green and Washington Street during the PM. The only issue exists at the Church Street opposite Division Street stop. At this location the stop is located just north of the Naugatuck Town Clerk Parking Lot, and the bus blocks the driveway (Figure 12). This is of particular concern as it is a layover location and the bus can be waiting there for up to 2 minutes

Metric	Route Value	Rank
Passengers/hour	27.67	21/30
Passengers/Mile	1.76	21/30
Passengers/Trip	13.83	11/30

Table 4. Route 470X Performance Statistics

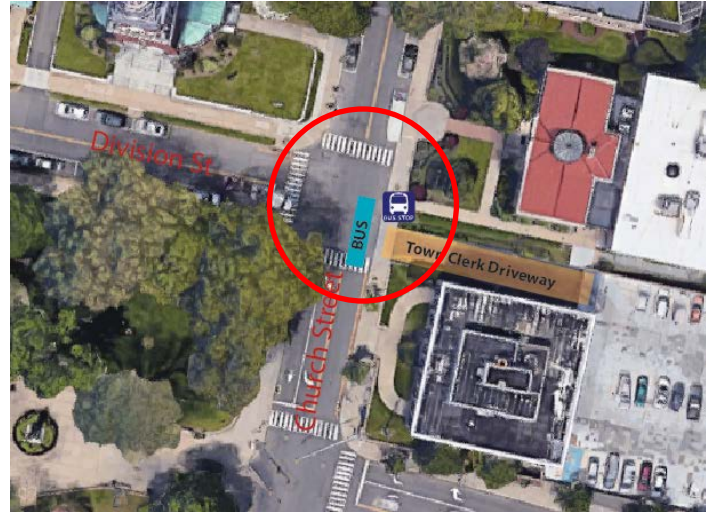


Figure 12. Map of Division Street/Church Street Bus Stop Issue

A boardings by trip chart is shown in Figure 13. Ridership is greater on the outbound trips towards Naugatuck than inbound towards Waterbury. The busiest trip is the 6:30 trip departing the Waterbury Green.

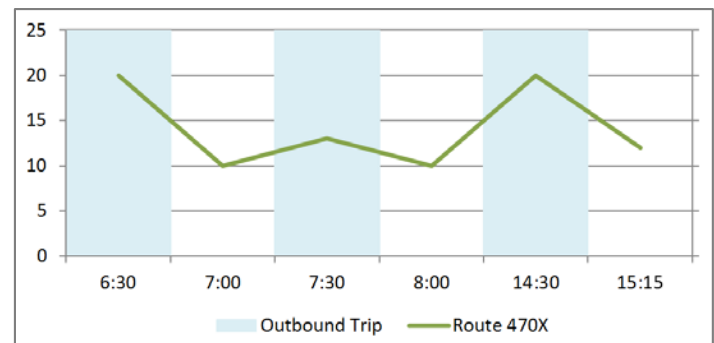


Figure 13. Route 470X Boardings by Trip

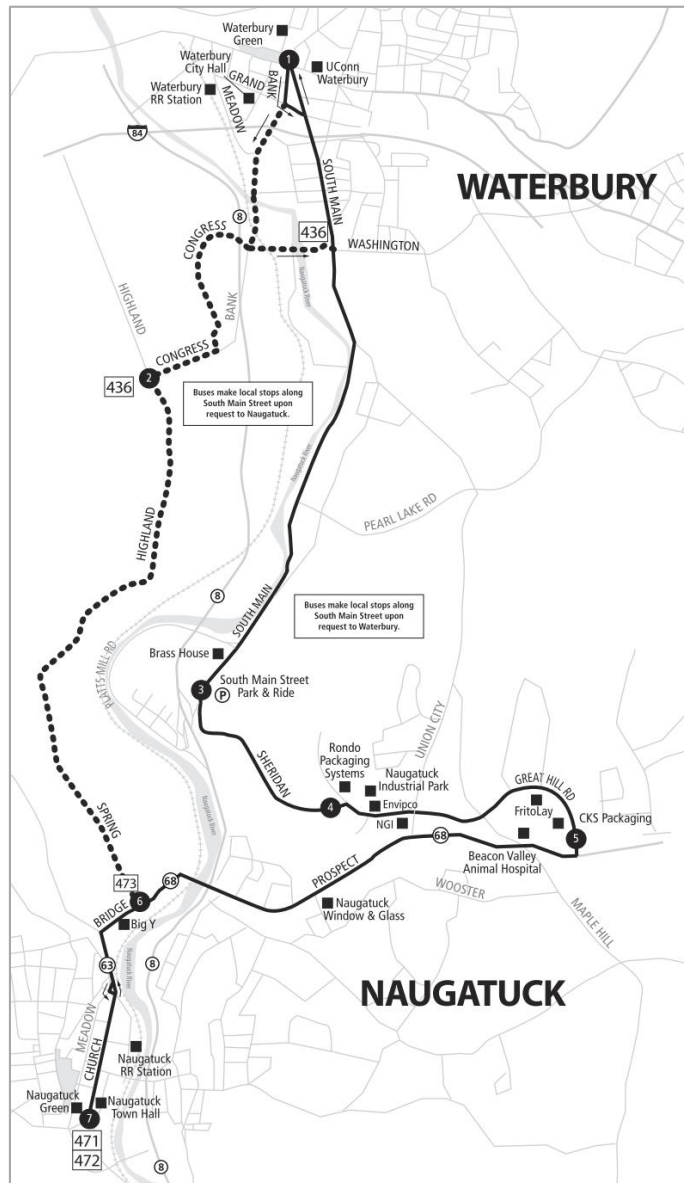


Figure 11. Route 470X Map

Activity by stop was examined for both an AM and a PM peak trip (Figure 14 and Figure 15). Overall ridership during each peak was relatively similar. Ridership loads peaked outbound between the Waterbury Green and Great Hill Road. Loads then begin to drop until the Naugatuck Green as passengers disembark. For the inbound trip the ridership loads climb steadily with boardings along Great Hill Road. This indicates that there is demand between Waterbury and Naugatuck; this

Existing Conditions

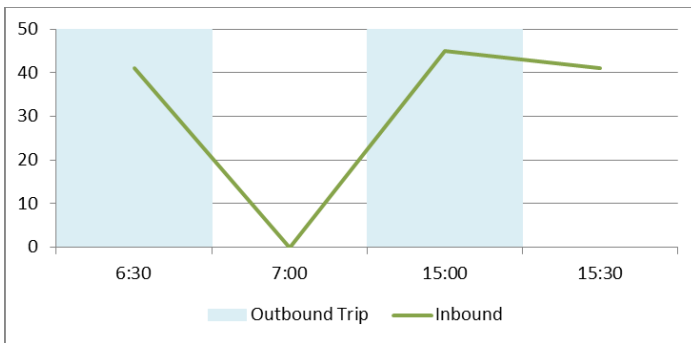


Figure 17. Route 479X Boardings by Trip

Activity by stop was examined for both an AM and a PM peak trip (Figure 18 and Figure 19). Overall ridership trends show passengers heading outbound in the morning and inbound in the afternoon. Nej Inc. at Pines Ridge Road had the greatest number of boardings and alightings outside of Waterbury. Ridership on the morning trip was high enough to warrant an additional vehicle.

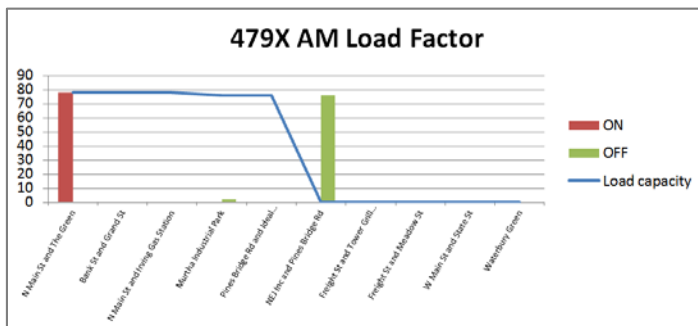


Figure 18. Route 479X AM activity by stop

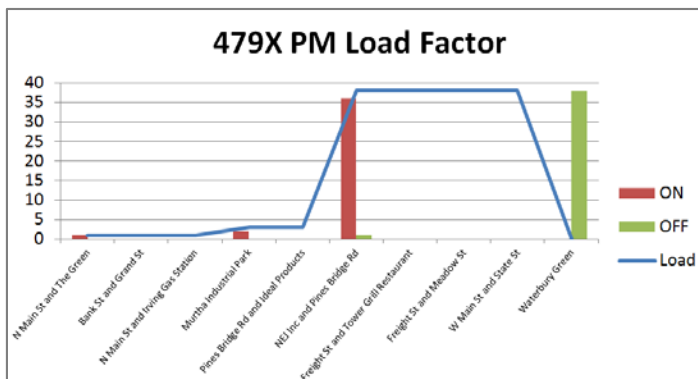


Figure 19. Route 479X PM activity by stop

Routes 471/473

Routes 471/473 operate on weekdays only with an 80-minute frequency from 9:20 AM to 4:38 PM. This route is interlined with the 472 and provides local service in Naugatuck. Performance statistics for the route are found

in Table 6. This route is one of the bottom performers and needs to be reconfigured.

Metric	Route Value	Rank
Passengers/hour	3.47	29/30
Passengers/Mile	0.52	29/30
Passengers/Trip	4.33	29/30

Table 6. Routes 471/473 Performance Statistics

The 471 begins in downtown Naugatuck and heads north to Oronoke Road and then heads south back to downtown Naugatuck and Rubber Avenue. This route circulates in the counterclockwise direction serving Oak Terrace, Field Street and Hoadley Street. The WATS recommendations included reconfiguring Routes 471, 472 and 473 to provide all day service between Waterbury and Naugatuck. Figure 20 presents a map of the route. Service to the Waterbury train station is provided with a stop at the corner of Maple Street and Water Street a distance of 750 feet to the station. The route travels through light residential and commercial areas and does not experience vehicle traffic along the alignment.

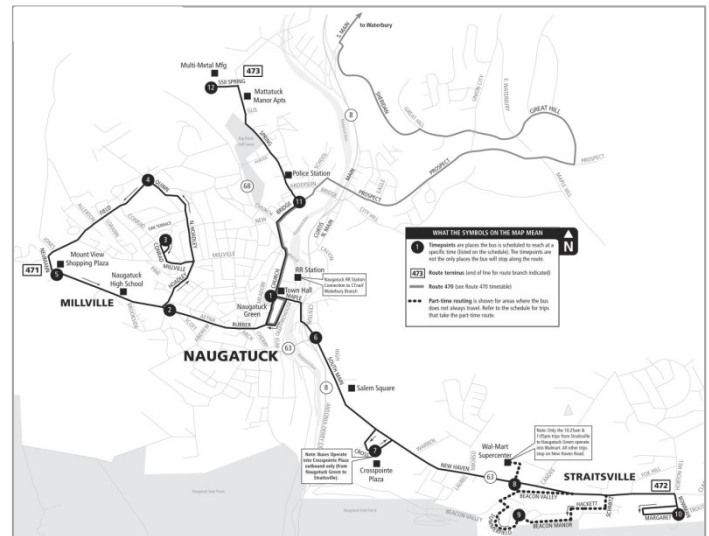


Figure 20. Routes 471/472/473 Map

A boardings by trip chart is shown in Figure 21. Ridership is greatest on the 9:20 AM and 2:40 PM trips and lowest on the 10:40 AM and 4:00 PM trips. This indicates trips are most likely not for work purposes.

Existing Conditions

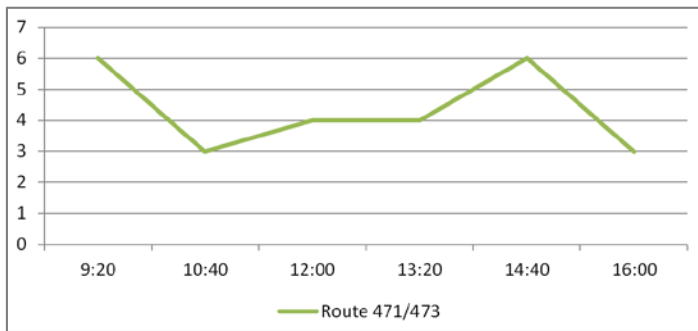


Figure 21. Routes 471/473 Boardings by Trip

Activity by stop was examined for an AM trip (Figure 22). Boardings occurred throughout the route with the majority of passengers alighting at the Mount View Shop Plaza. Three passengers did stay on to continue onto the 472 route west of the Naugatuck River.

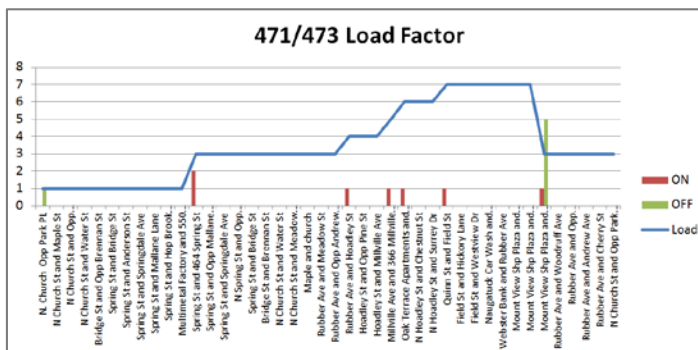


Figure 22. Routes 471/473 activity by stop

Route 472

Route 472 operates on weekdays only with an 80-minute frequency from 10:00 AM to 5:10 PM. This route is interlined with the 471/473 and provides local service in Naugatuck. Performance statistics for the route are found in Table 7. This route is the worst performer in the Waterbury system.

Route 472 travels from the Naugatuck Green to Bowman Drive on the west side of the river. It travels through rural areas with interspersed commercial developments. The WATS recommendations included reconfiguring Routes 471, 472 and 473 to provide all day service between Waterbury and Naugatuck. Figure 20 presents a map of this route, which travels the same path in both the outbound and inbound directions. This route does not experience traffic congestion.

A boardings by trip chart is shown in Figure 23. Ridership is greatest in the morning and then drops significantly later in the day. All trips after 11:20 AM had two passengers or less, the 3:20 PM trip had no passengers.

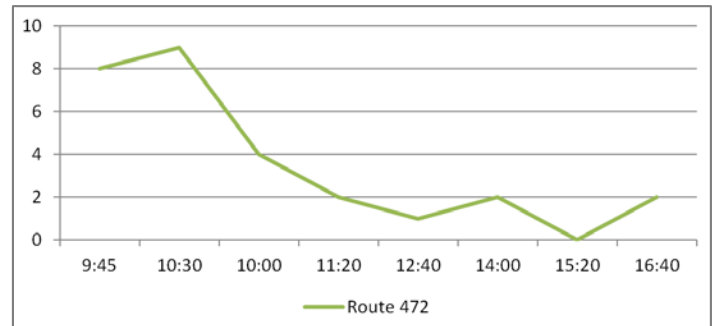


Figure 23. Route 472 Boardings by Trip

Activity by stop was examined for an AM trip (Figure 24). There were three passengers, which were a carryover from the Routes 471/473 interline; the route had no boardings and only one alighting occurred west of the Naugatuck River.

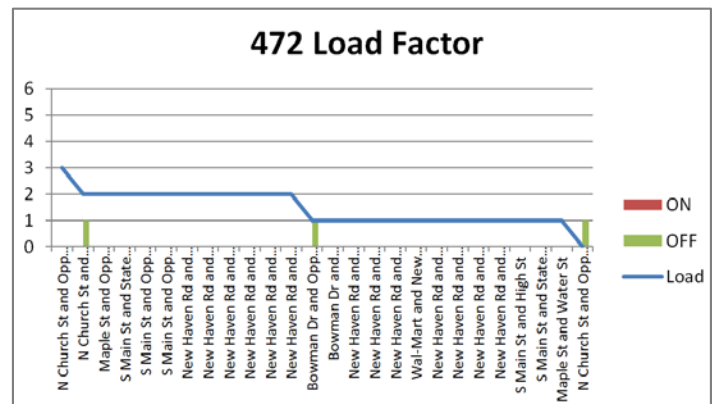


Figure 24. Route 472 activity by stop

Metric	Route Value	Rank
Passengers/hour	3.73	30/30
Passengers/Mile	0.56	30/30
Passengers/Trip	3.50	30/30

Table 7. Route 472 Performance Statistics

Funding

Funding sources for CTtransit Waterbury include local and state programs for operating assistance funds, as well as

capital funding available through the state and federal governments. Local funding is from municipal grant programs. State funding is provided by the Connecticut Department of Transportation (CTDOT) through state contract assistance and formula funds. All state funding for transit in Connecticut comes from the Special Transportation Fund; which funds all transportation systems in the state except the Bradley International Airport. Revenue is generated through fares and the gas tax but at the moment is not fully dedicated to the Special Transportation Fund; portions go into the general fund. Farebox revenue is collected from cash fares and pass sales and accounts for 22.8% of revenue needed to operate the fixed route service; this is slightly less than the national average for urban systems operating fixed route service of 25.7%⁴. Other revenue includes advertising revenue, municipal grant programs, and others. CTtransit Waterbury's operating budget covers three areas of expense: fixed route bus, demand response and administration.

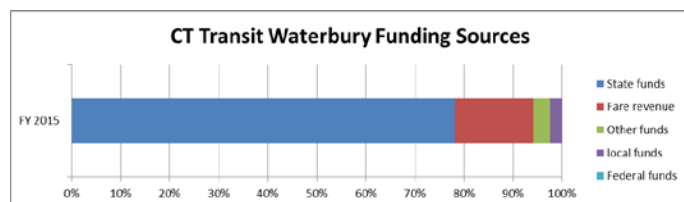


Figure 25. FY2105 CTtransit Waterbury Funding

CTtransit Waterbury offers a wide range of fares and passes (Table 8). The base fare is \$1.75 with free transfers and half fares (\$0.85) offered to seniors 65 years of age and older and individuals with disabilities. A reduced fare of \$1.40 is offered for youth ages 5- to 18 and free fares are offered to children 4 years of age and younger when accompanied by an adult. CTtransit offers a variety of short-term passes which are valid for calendar days only, beginning at the time the pass is purchased. Passes can be purchased online, through the mail, the NET office at 1717 Thomaston Avenue, Waterbury and at The Travel Center in downtown Waterbury. CTtransit offers the U-Pass to all CT community and state college students. The

pass allows students to ride all bus and intrastate commuter rail for free. The program is funded through a \$20 semester fee paid by all students regardless of utilization of the program.

Single Fare	Price
Adult	\$1.75
Youth (5-18)	\$1.40
Child (under 5)	Free
Transfer	Free
Passes	
10-Ride Ticket	\$15.75
1-day	\$3.50
3-day	\$8.75
5-day	\$14.00
7-day	\$19.25
31-day	\$63.00

Table 8. CTtransit Fares

CTtransit is in the process of upgrading the fare system with contactless smartcard technology and fare capping. Fare capping guarantees that an individual will not pay more than the lowest fare for any given period of time. To eliminate barriers to bankless population groups, individuals will be able to load dollar amounts onto the card at ticket vending kiosks and at certain retail networks. The new technology has been deployed system wide with a mobile application anticipated in the near future. With the smartcard release there will also be an increase in the different types of pass options available including reduced multi-day youth and senior passes.

Fleet

As of March 2017, the CTtransit Waterbury fleet consisted of 40 fixed route vehicles, comprising primarily 35- to 40-foot buses, all of which were manufactured in 2004 or later (Table 9). During peak periods 36 vehicles are needed, leaving a ten percent spare ratio. Seventeen of the buses are hybrid diesel-electric. In addition, all vehicles are wheelchair accessible in accordance with requirements of the Americans with Disabilities Act of 1990 (ADA). During snow and ice events chains are put on the tires of all buses to help with traction because of the hilly nature of Waterbury.

⁴ From the National Transit Database 2015 National Transit Summary and Trends

Existing Conditions

The oldest buses in the fleet, with the most miles, are the 40' New Flyer D40LF, heavy duty buses and are past their useful life of 12 years but not useful mileage of 500,000. Overall the fleet is in good condition with many of the older vehicles scheduled to be replaced over the next couple of years.

Year	Make	Model	Length	Capacity	Count
2004	New Flyer	D40LF	40	63	5
2008	StarTrans	Senator	25	27	1
2010	New Flyer	XDE35	35	63	17
2010	New Flyer	XD35	35	63	17

Table 9. CTtransit Waterbury Fleet Summary

Year	Make	Model	Vehicle Count	Condition		
				Fair	Good	Excellent
2004	New Flyer	D40LF	40	X		
2008	StarTrans	Senator	25	X		
2010	New Flyer	XDE35	35		X	
2010	New Flyer	XD35	35		X	

Table 10. CTtransit Waterbury Fleet Condition

Waterbury Transit Key Findings for the Corridor

- Two routes (441 and 442) serve the Waterbury Train Station.
- Routes 471/472 serve the Naugatuck Train Station.
- There is very little ridership between the Waterbury Green and Train Station.
- There are location issues with the Division Street/Church Street bus stop in Naugatuck; it blocks the Town Hall Driveway and is in the middle of a T intersection.
- Ridership is higher on the west side of the river in Naugatuck.
- There is large demand from Waterbury to Nej Inc. in Beacon Falls.
- There has been a lack of consistent funding for service improvements.
- A low spare vehicle ratio indicates that expanding service would require additional vehicles.

2.1.2 CTtransit New Haven

CTtransit New Haven contracts with HNS Management to operate 21 local bus routes and two commuter shuttles in New Haven and the surrounding communities. Service is provided seven days a week and generally operates from 5:00 AM to 1:00 AM on weekdays and Saturdays, and 6:00 AM to midnight on Sundays. In 2014 the system carried 9,526,684 passengers. During peak service 97 vehicles are in operation. Annual revenue miles are 3,688,395 and hours are 333,660. The passenger per revenue mile is 2.6.

The system operates using a radial system with most routes beginning and ending at the green in downtown New Haven, traveling outward from the city center on major roadways. Several routes are interlined at the green to provide crosstown connections and reduce running times but eliminating the need to turn around. Several of the routes operate along a main corridor and then branch out in outlying areas creating several deviations. The routes, which are operated by CTtransit New Haven are presented in Table 11. The routes in bold either serve a rail station or one of the corridor communities and are displayed in Figure 27. Further analysis of these routes is presented below. There are an additional 19 routes not presented below which operate in New Haven.

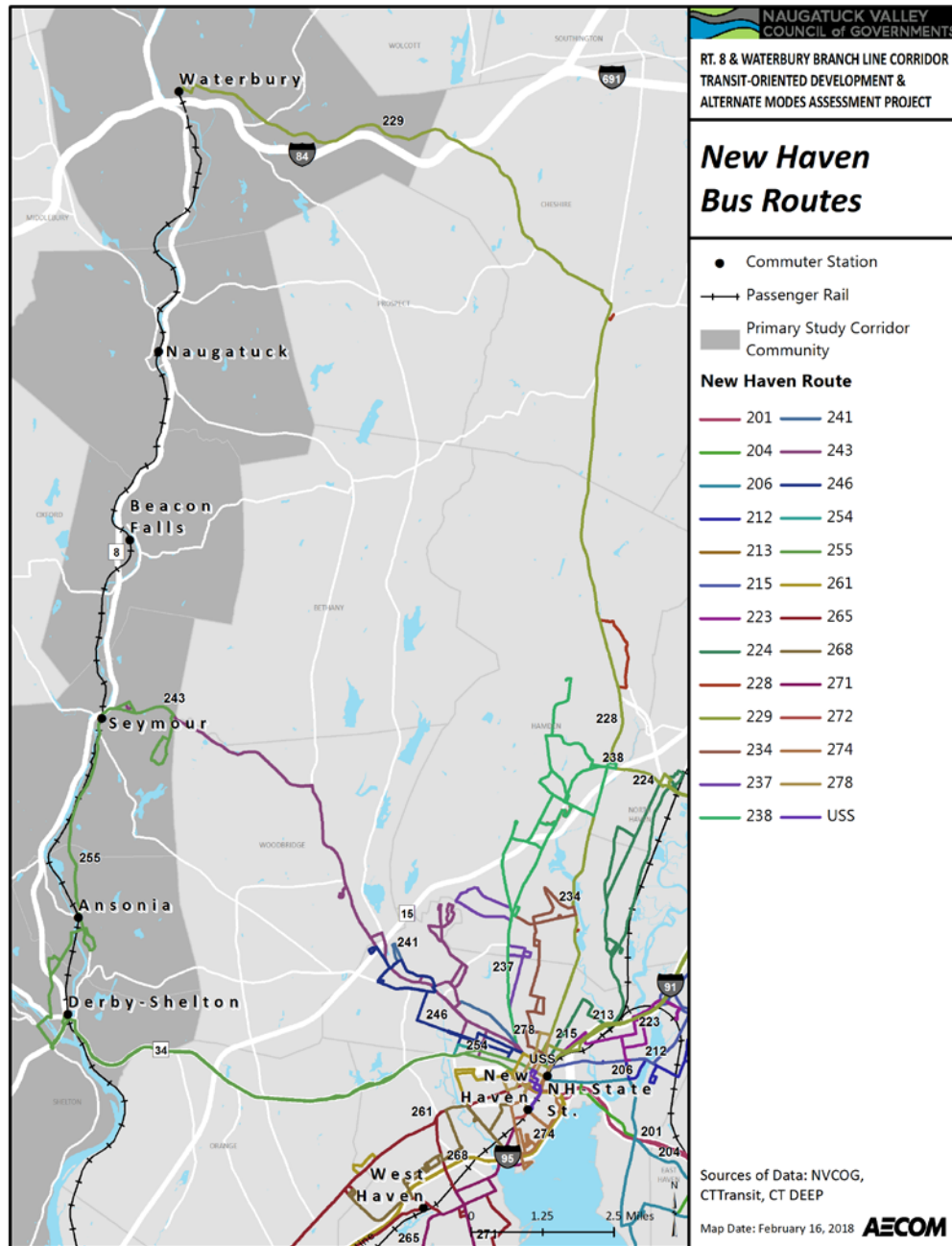


Figure 26. CTTransit New Haven System Map

Route	Service Span (Days of the Week/Hours per Weekday)	Peak Headway (minutes)	Towns Served	Rail Stations Served	End to End Travel Time (minutes)	Average Daily Ridership
229 Waterbury/Whitney Ave	7/16	30	New Haven, Hamden, Cheshire, Waterbury	New Haven	73	2139 (J)
255 Ansonia-Seymour	6/15.5	30	New Haven, West Haven, Orange, Shelton, Derby, Ansonia, Seymour	Derby-Shelton, Ansonia, Seymour	58	1876 (FW)

Table 11. New Haven Bus Routes in Study Corridor

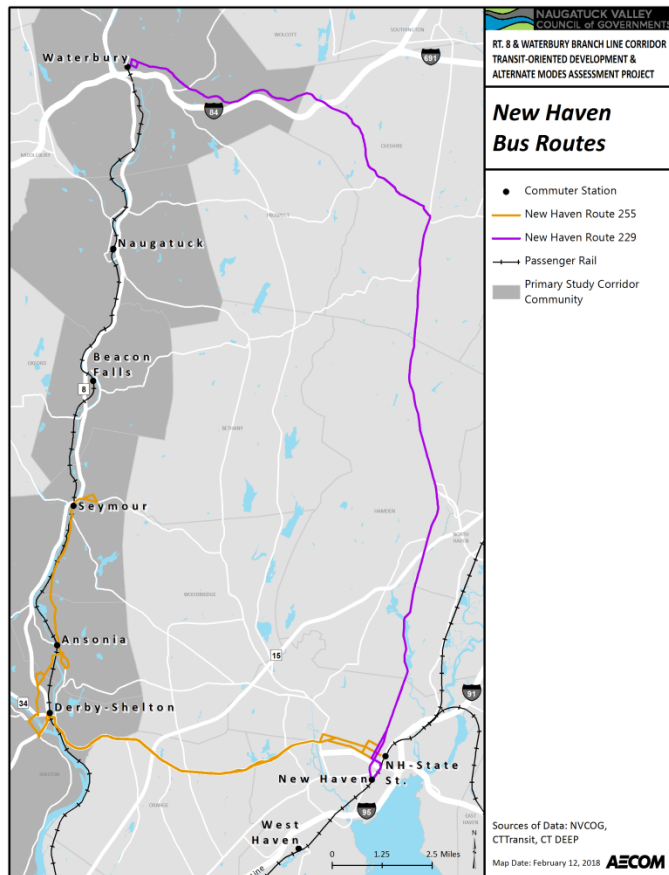


Figure 27. CTtransit New Haven Corridor Routes

Route 255

Route 255 is operated Monday through Saturday. There is no Sunday service but CTtransit New Haven has received requests to provide it. There are 16 round trips daily to Seymour with a 30-minute headway during the peak and 60-minute in the off-peak on weekdays. The Saturday frequency is 60 minutes. Performance Statistics for the route are found in Table 12. Route 255 performs above average with the number of passenger per trip and the max load but below the system average for passengers/hour and mile. This indicates that passengers are traveling longer distances.

Route 255 has two deviations plus one express route. Route 255 serves Derby/Shelton, Ansonia and Seymour, and the express route, which has limited direct service between New Haven and Seymour (Figure 28). In Derby the route stops at the train station and downtown along Elizabeth Street. In Shelton the route serves Howe Avenue

between the Route 8 Bridge and Bridge Street. This route does not pull into the train station in Ansonia but serves it from Main Street, with the nearest stop a walking distance of 400 feet from the platform. In Seymour the route stops at the train station and serves downtown along Main Street. It travels through a mix of built up residential and commercial land uses as well as open /rural areas. This route experiences traffic congestion on Route 34 heading towards Derby.

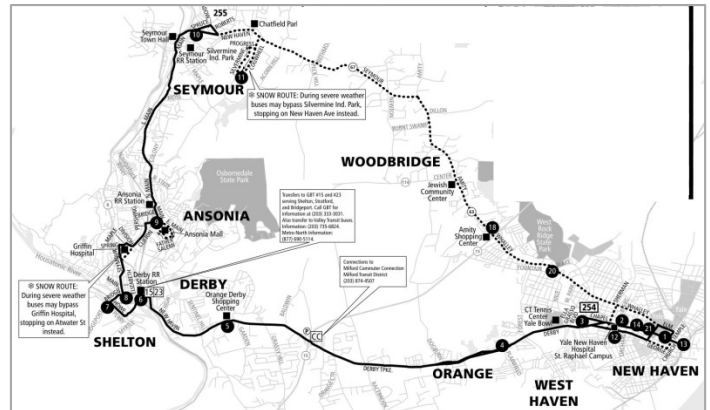


Figure 28. Route 255 Map

The first non-express trip from Seymour is at 5:30 AM and the last return trip is 6:25 PM; the 7:30 PM trip only goes as far as Ansonia. There are 18 trips to New Haven and 16 to Waterbury daily, with a 30-minute headway during the peak and a 60-minute headway in the off-peak. Performance statistics for the route are found in Table 12.

Metric	Route Value	Rank
Passengers/hour	42.8	13/21
Passengers/Mile	2.7	15/21
Passengers/Trip	22.88	7/21
Average Max Load	14	8/21

Table 12. Route 255 Performance Statistics

A boardings by trip chart is shown in Figure 33. Ridership to New Haven is higher in the morning and mid-day, similar in the afternoon, and higher to Seymour in the off-peak. Ridership is highest during the mid-day in both directions.

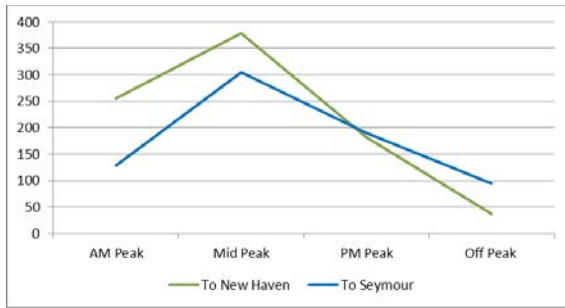


Figure 29. Route 255 Boardings by Trip

Activity by stop was examined for an peak trip in both the outbound and inbound directions (Figure 30 and Figure 31). Boardings and alightings were highest at the New Haven Green, but occurred sporadically throughout the entire route with the majority of alightings occurring in the outbound and boarding on the inbound. Boardings in the outbound occurred along Elizabeth Street in Derby. Alightings in the inbound occurred in downtown Shelton.

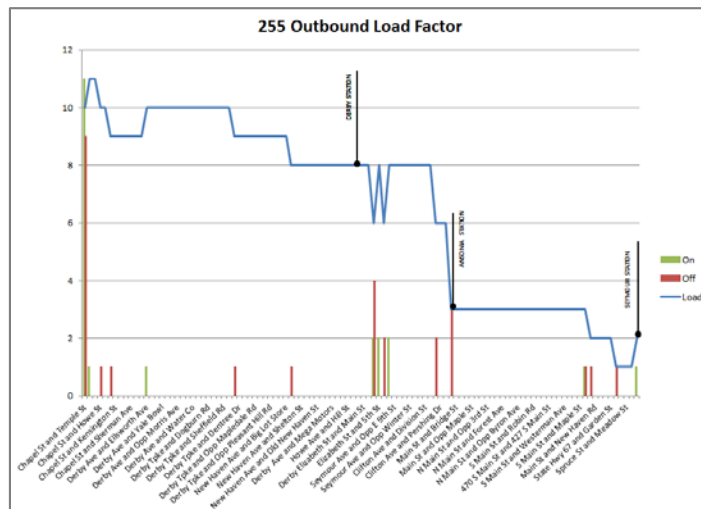


Figure 30. Route 255 activity by stop Outbound

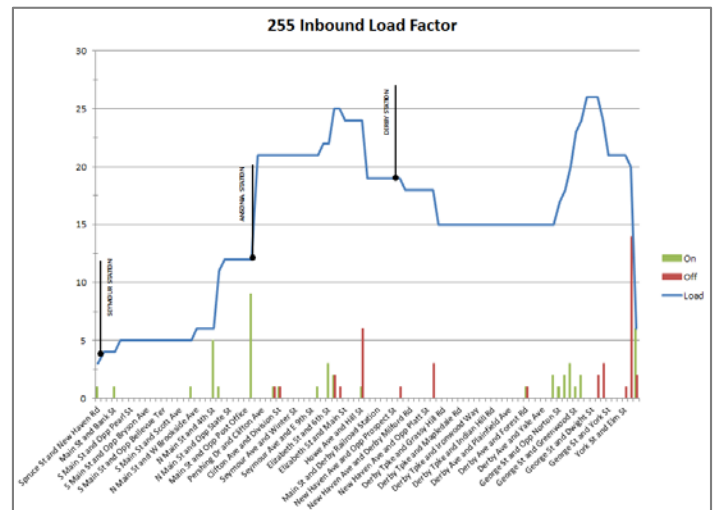


Figure 31. Route 255 activity by stop Inbound

Route 229

Route 229 is operated Monday through Sunday. There are 18 round trips daily with a 30-minute headway during the peak and a 60-minute headway in the off-peak on weekdays. Saturday frequency is 60 minutes. Performance statistics for the route are found in Table 13. Route 229 performs above average with the number of passengers per trip and the max load but below the system average for passengers/hour and mile. This indicates that the trips carry many passengers but are long and many passengers are traveling longer distances.

Metric	Route Value	Rank
Passengers/hour	34.9	16/21
Passengers/Mile	1.9	19/21
Passengers/Trip	22.23	8/21
Average Max Load	13	9/21

Table 13. J Whitney Avenue Performance Statistics

Route 229 has five deviations and travels from Union Station in New Haven to Waterbury via Cheshire and Hamden. In Waterbury the route stops at the Waterbury Green at the corner of West Main and Leavenworth. The first trip to Waterbury is at 5:15 AM and the last return trip is 8:05 PM. It travels through a mix of built up residential and commercial land uses as well as rural areas. Figure 32 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does not experience vehicle traffic congestion.

Existing Conditions

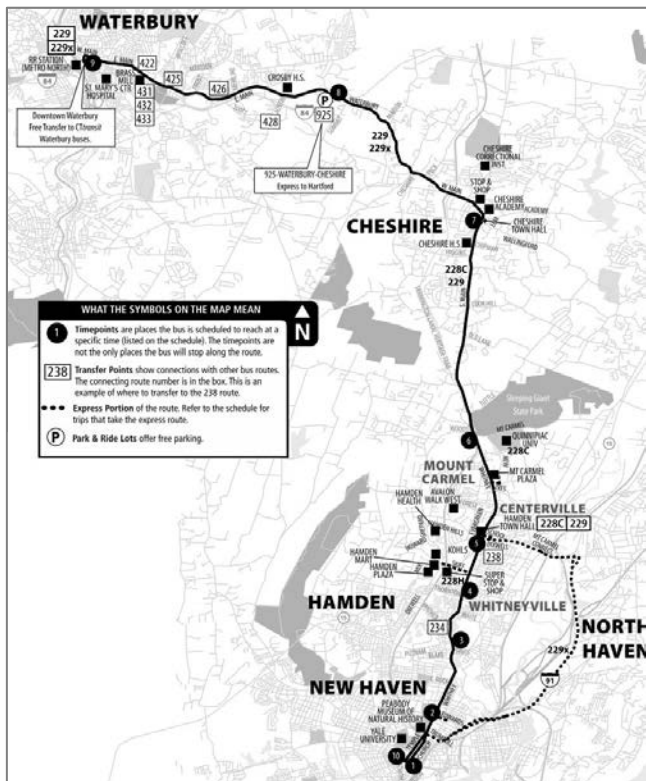


Figure 32. Route 229 Map

A boardings by trip chart is shown in Figure 33. Ridership to New Haven is higher in the morning and mid-day, similar in the off-peak and higher to Waterbury in the afternoon. Ridership is highest in the inbound in the morning and in the mid-day in the outbound.

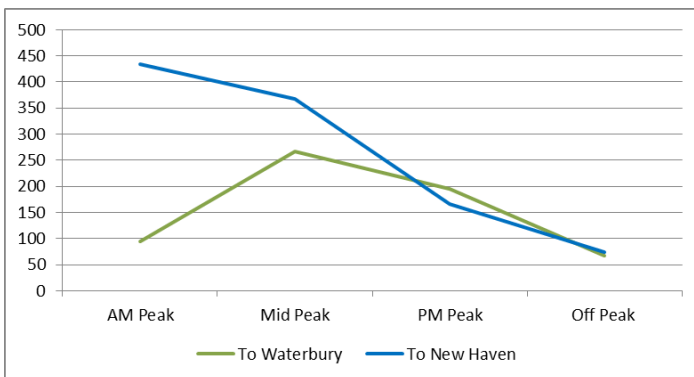


Figure 33. Route 229 Boardings by Trip

Activity by stop was examined for an AM peak trip in both the outbound and inbound directions (Figure 34 and Figure 35). The majority of alightings occurred in the outbound trip and boardings on the inbound trip. In the outbound direction, the New Haven Green had the

highest number of boardings with alightings sporadically between the Green and Whitney Ave/Day Spring Ave. The greatest concentration of alightings in the outbound direction was in Waterbury. There was very little passenger activity between Whitney Ave/Day Spring Ave in Hamden and Waterbury downtown. In the inbound direction, boardings were highest in downtown Waterbury and alightings at the Green in New Haven.

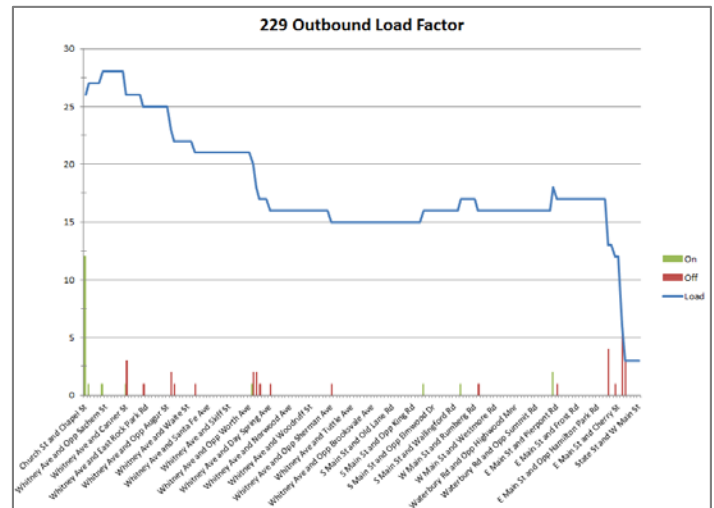


Figure 34. Route 229 activity by stop Outbound

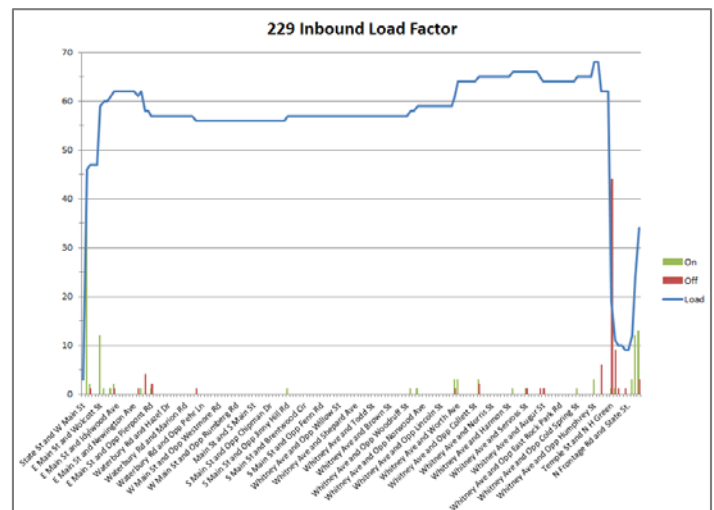


Figure 35. Route 229 activity by stop Inbound

Funding

Funding sources for CTtransit New Haven include farebox revenues, state programs for operating assistance funds, as well as capital funding available through the state and federal governments. State funding is provided by CTDOT

through state contract assistance and formula funds. Farebox revenue is collected from cash fares and pass sales and accounts for 20.7% of revenue needed to operate the fixed route service. This is below the national average for urban systems operating fixed route service with a 25.7% fare box recovery ratio.

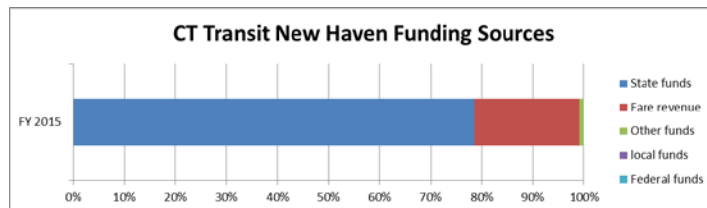


Figure 36. FY2105 CTtransit New Haven Funding

CTtransit New Haven offers a wide range of fares and passes (Table 8). The base fare is \$1.75 with free transfers and half fares (\$0.85) are offered to seniors 65 years of age and older and individuals with disabilities. A reduced fare of \$1.40 are offered for youth ages 5 to 18 and free fares are offered to children 4 years of age and younger when accompanied by an adult. CTtransit offers a variety of short-term passes, which are valid for calendar days only, beginning at the time the pass is purchased. Passes can be purchased online, through the mail, and at the CTtransit Customer Service and Sales Outlet on the New Haven Green. As with the CTtransit Waterbury Division, the New Haven Division will be upgrading its fare technology and passes as well.

Fleet

As of 2015, CTtransit New Haven fleet consisted of 134 fixed route vehicles consisting primarily of 40- to 60-foot buses, all of which were manufactured in 2001 or later

(Table 14). Nine of the buses are hybrid diesel-electric. In addition, all vehicles are wheelchair accessible in accordance with requirements of the Americans with Disabilities Act of 1990 (ADA). The oldest buses in the fleet, with the most miles, were the 40' New Flyer D40LF, heavy duty buses and are past their useful life of 12 years but not useful mileage of 500,000.

Year	Make	Model	Length	Capacity	Count
2001	New Flyer	DL40	40	38	12
2003	New Flyer	DL40	40	38	44
2004	New Flyer	DL40	40	38	42
2010	New Flyer	XDE40	40	38	14
2010	NOVA	LFS ArTic	60	57	12
2012	New Flyer	XDE35	35	30	1
2014	NOVA	LFS ArTic	60	57	4
2014	New Flyer	XDE40	40	38	5

Table 14. CTtransit New Haven Fleet Summary

Year	Make	Model	Vehicle Count	Condition		
				Poor	Fair	Good
2001	New Flyer	DL40	12	4	8	0
2003	New Flyer	DL40	44	0	44	0
2004	New Flyer	DL40	42	0	42	42
2010	New Flyer	XDE40	14	0	0	14
2010	NOVA	LFSArTic	12	0	0	12
2012	New Flyer	XDE35	1	0	0	1
2014	NOVA	LFS ArTic	4	0	0	4
2014	New Flyer	XDE40	5	0	0	5

Table 15. CTtransit New Haven Fleet Condition

New Haven Transit Key Findings for the Corridor

- During the morning peak travel times ridership is greater on inbound transit buses heading towards New Haven.
- On Route 255 there is demand for travel between Seymour, Ansonia and Derby.
- Ridership is highest during the mid-day peak.
- Ridership between Waterbury and New Haven is high requiring 60' articulated vehicles.
- Shelton does not allow CTtransit New Haven to stop in downtown due to parking issues.
- If funding were available service on the 255 route would be increased.
- Ridership on Route 229 has been increasing.
- There is no service on Sundays on Route 255 but there is demand.
- CTtransit New Haven provides bus service along the WBL when the trains are out of service. This occurs 3-4 times a month and requires them to keep four vehicles in contingent.

2.1.3 Greater Bridgeport Transit

Greater Bridgeport Transit Authority (GBT) operates 17 local bus routes, two express routes, and the interregional Coastal Link in Bridgeport and surrounding communities. Service is provided seven days a week and generally operates 5:30 AM to 11:30 PM on weekdays, 5:00 AM to 11:30 PM on Saturdays, and 8:00 AM to 8:00 PM on Sundays

In 2014 the system carried 6,082,763 passengers. During peak service 43 vehicles are in operation. Annual revenue miles are 2,111,594 and hours are 171,834. The passengers per revenue mile is 2.9 and has been steadily increasing since 2011 due to an overall increase in passengers.

The system is a radial system with most routes beginning and ending at the Bridgeport Transportation Terminal using a pulse on the hour and the half hour, which allows for transfers. The bus terminal has 17 bus bays, a 3,000 square foot in-door waiting area, heated shelters on the platform, and real time information signs. Real-time schedule information is available on-line through their bus tracker.

The routes that serve one of the corridor communities are highlighted in Table 16 and displayed in Figure 38. Further analysis of these routes is presented below.

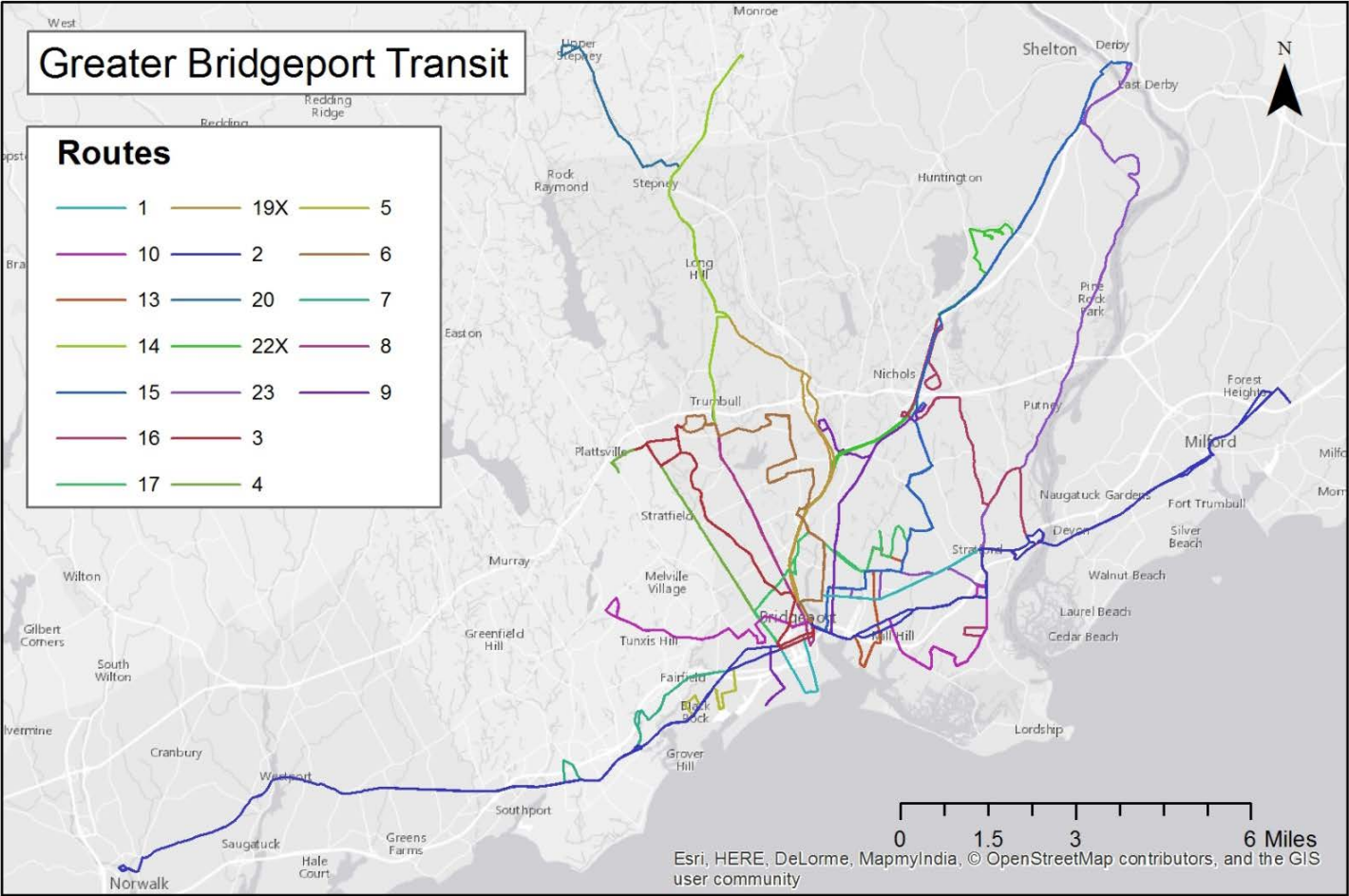


Figure 37. Greater Bridgeport Transit System Map

Existing Conditions

Route	Service Span (Days of the Week/Hours per Weekday)	Peak Headway (minutes)	Towns Served	Rail Stations Served	End to End Travel Time (minutes)	Average Daily Ridership
Route 1 - Dock Shopping Center Via Barnum Ave.	7/18	30	Bridgeport, Stratford	Bridgeport	47	2730
Coastal link	7/17.5	20	Fairfield, Bridgeport, Stratford, Milford, Norwalk, Westport	Fairfield, Bridgeport, Stratford, Milford	113	3215
Route 3 - Westfield Trumbull Mall via Madison Ave	7/17.25	30	Trumbull, Bridgeport, Fairfield	Bridgeport	39	937
Route 4 - Westfield Trumbull Mall via Park Ave	7/16.5	30	Trumbull, Bridgeport, Fairfield	Bridgeport	25	1384
Route 5 - Black Rock via Fairfield Ave	7/17.75	30	Bridgeport	Bridgeport	48 (round trip)	1531
Route 6 - Westfield Trumbull Mall via Trumbull Ave	7/17.75	30	Trumbull, Bridgeport	Bridgeport	36	1156
Route 7 - Carolton Hospital via Commerce Drive	5/9	3 trips/day	Bridgeport, Fairfield	Bridgeport	25	96
Route 8 - Westfield Trumbull Mall via Main St.	7/17.5	20	Trumbull, Bridgeport	Bridgeport	30	3278
Route 9 - Hawley Lane via East Main St.	7/16.75	30	Bridgeport, Trumbull	Bridgeport	36	2431
Route 10 - Main St. and Barnum Ave. (Stratford) via Hollister Ave.	7/16.75	30	Bridgeport, Stratford, Fairfield	Bridgeport	25	1953
Route 13 - Success Park via Central Ave	7/17	30	Bridgeport	Bridgeport	30	1367
Route 14 - Monroe Goodwill - Westfield Trumbull Mall	5/6.5	4 trips/day	Trumbull, Monroe	---	17	113
Route 15 - Hawley Lane/Shelton/Derby	7/15.75	60	Bridgeport, Stratford, Trumbull, Shelton, Derby	Bridgeport, Derby	54	1071
Route 16 - Hawley Lane to South Stratford via Dock Shopping Center	5/8	60	Stratford, Trumbull	Stratford	25	N/A
Route 17 - Success Park via North Ave. & Boston Ave.	6/13	30	Bridgeport	Bridgeport	36	1339
Route 19X - Express Monroe Goodwill via Route 25	5/12	5 trips/day	Monroe, Trumbull, Bridgeport	Bridgeport	28	36
Route 20 - Westfield Trumble Mall - Upper Stepney	5/10.25	4 trips/day	Stratford, Trumbull	---	21	52
Route 22X - Downtown Shelton via Route 8	5/11.75	3.5 Trips/day	Bridgeport, Trumbull, Shelton	Bridgeport	37	N/A
Route 23 - Shelton via Rt. 110	5/13.5	60	Derby, Shelton, Stratford, Bridgeport	Derby, Stratford, Bridgeport	45	393

Table 16. Greater Bridgeport Transit Bus Routes

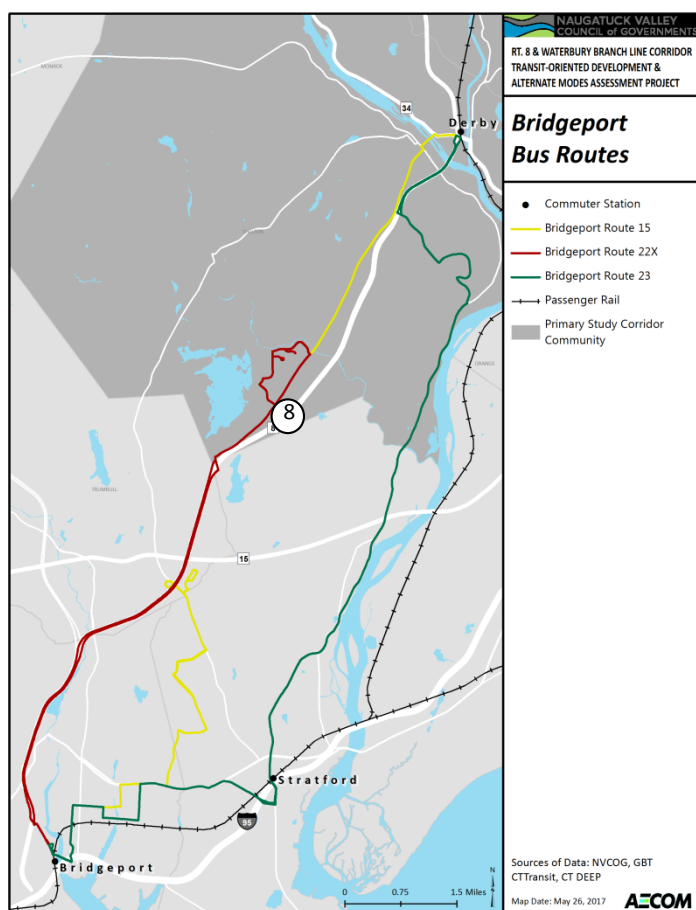


Figure 38. GBT Corridor Routes

Route 15

Route 15 operates seven days a week with 60-minute frequencies from 6:50 AM to 9:57 PM. Performance statistics for the route are found in Table 17. The route ranks towards the middle for performance statistics.

Metric	Route Value	Rank
Passengers/Hour	33.83	9/20
Passengers/Mile	2.02	10/20
Passengers/Trip	30.7	6/20

Table 17. Route 15 Performance Statistics

Route 15 travels from Bridgeport to Derby and serves the Bridgeport Rail Station, Bridgeport Avenue and the Derby-Shelton Station via Bridgeport Avenue. It travels through highly developed areas in the town and city centers as well as suburban areas in-between. This route was recommended to be converted to limited stop between the Hawley Lane Mall and Derby-Shelton Station as part

of the one- to three-year recommendations in the GBT Transit Master Plan.

Figure 39 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does experience frequent traffic congestion going over the Derby-Shelton Bridge and in downtown Shelton.

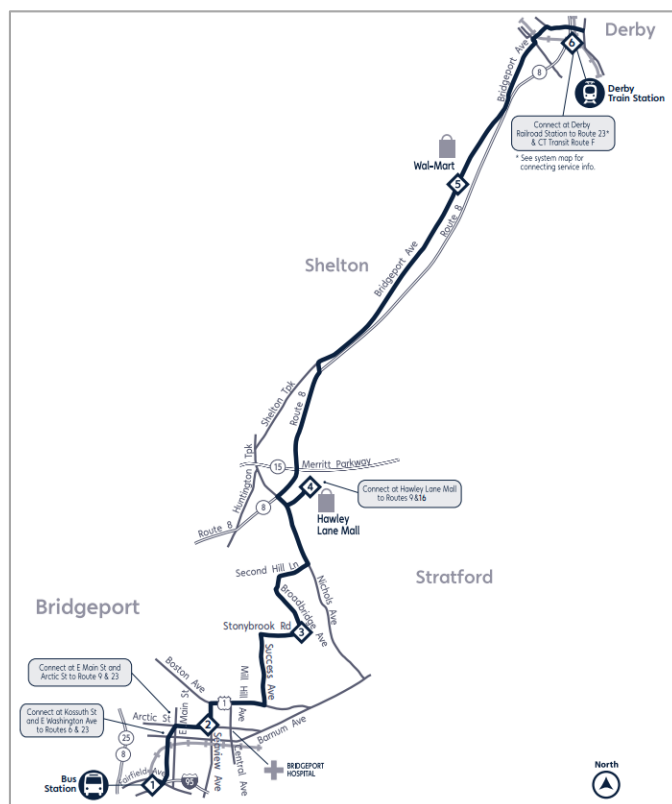


Figure 39. GBT Route 15 Map

A boardings by trip chart is shown in Figure 40. Ridership is highest in the inbound (towards Bridgeport) direction during the even hour trips. This suggests individuals travel to Bridgeport for employment. Outbound ridership drops off during the mid-day and peaks again in the afternoon commute. Ridership is greatest on the 10:50 AM trip.

Existing Conditions

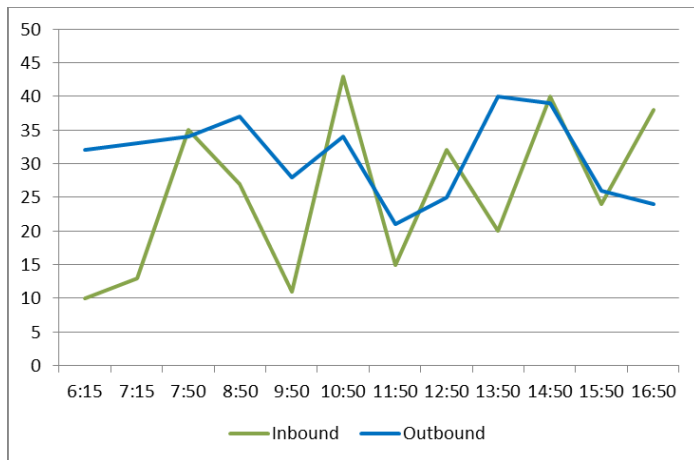


Figure 40. Route 15 Boardings by Trip

Activity by stop was examined for an AM peak trip (Figure 41). For the outbound trip, boardings were highest at the Bridgeport Transportation Center (BTC) with the largest group of passengers alighting between the Hawley Lane Mall and Walmart, a heavily commercialized corridor. For the inbound trip boardings were highest between the Derby-Shelton Station and Oak Avenue in Shelton. The largest number of boardings and alightings was at the BTC.

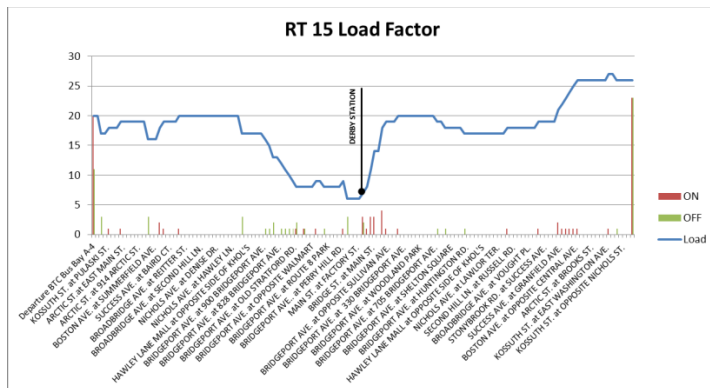


Figure 41. Route 15 activity by stop

Route 22x

Route 22X is a commuter route and operates on weekdays only with three trips in the morning and three in the afternoon.

The route provides service from downtown Bridgeport to the Shelton Business Park via Route 8, circulating clockwise through the business park. As part of the GBT Transit Master Plan this route was recommended to have

improved frequencies as part of the three- to ten-year recommendations.

Figure 39 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does experience traffic along Route 8 at the Route 15 exit.

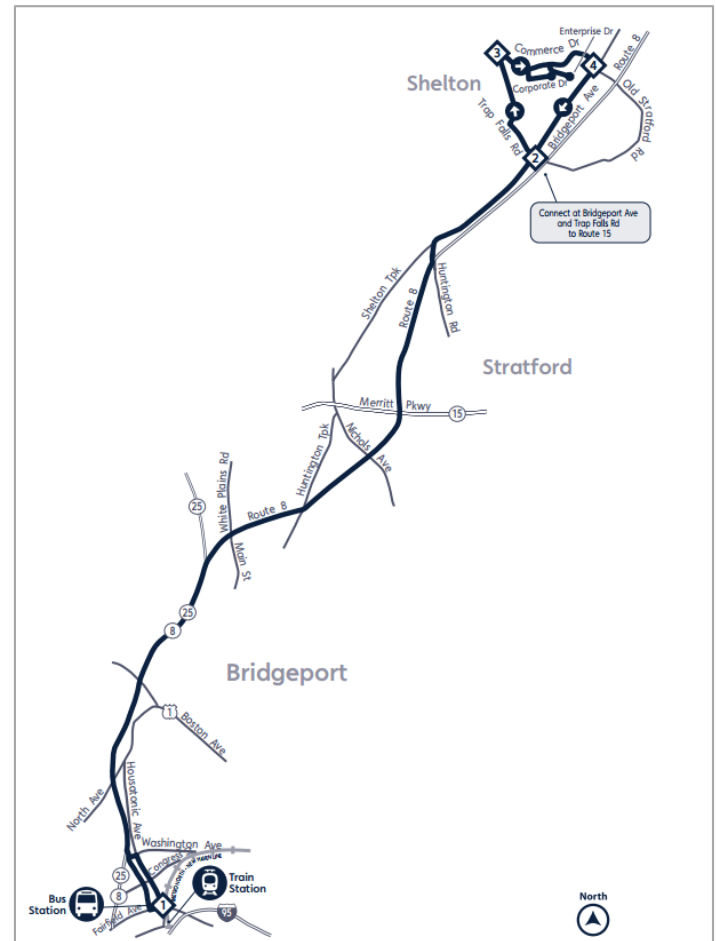


Figure 42. GBT Route 22x Map

Activity by stop was examined for an AM peak trip (Figure 41). Boardings were highest at the Bridgeport Transportation Center, with passengers primarily alighting at stops within the Shelton Business Park. The largest number of alightings was at the Research Drive/Progress Drive stop.

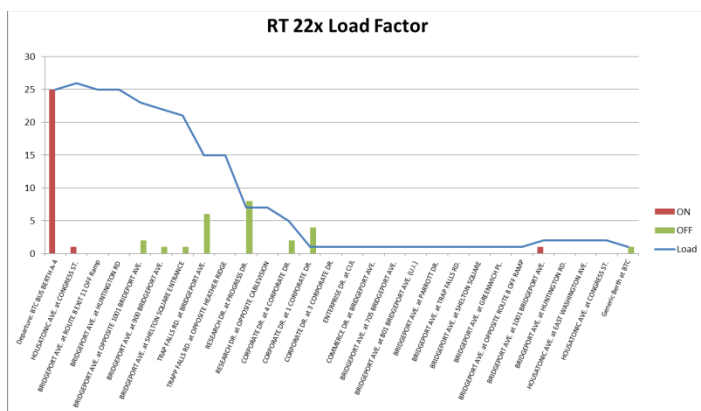


Figure 43. Route 22x activity by stop

Route 23

Route 23 operates seven days a week with approximately 60-minute frequencies during the peak periods, there is no mid-day service between 9:00 AM and 1:30 PM. Performance Statistics for the route are found in Table 18. The route performs worse than average compared to other GBT routes

Metric	Route Value	Rank
Passengers/Hour	20.84	15/20
Passengers/Mile	0.80	15/20
Passengers/Trip	13.2	14/20

Table 18. Route 23 Performance Statistics

Route 23 travels from Bridgeport to Derby and serves the Bridgeport Train Station, Stratford Train Station, and the Derby-Shelton Station via Route 110. It travels through developed commercial areas and residential areas. As part of the GBT Transit Master Plan, this route was recommended to be terminated at the potential Barnum Station as part of the three- to ten-year recommendations.

Figure 44 presents a map of the route, which travels the same path in both the outbound and inbound directions. This route does experience traffic congestion as it passes through Bridgeport residential neighborhoods due to the multiple stops signs and signals, as well as in Stratford along Main Street at the Route 15 Exit 53 ramps.

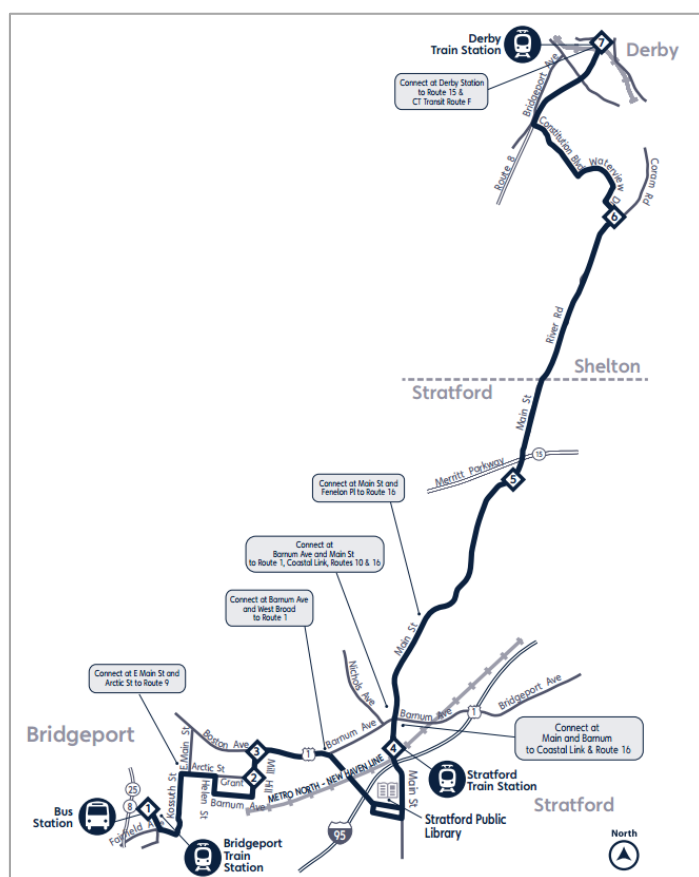


Figure 44. GBT Route 23 Map

A boardings by trip chart is shown in Figure 45. Ridership is highest in the outbound direction (towards Derby) during the PM peak hour of 7:00 PM. During the AM peak period, ridership is highest between 7:00 AM and 8:00 AM. Outbound ridership drops off during the mid-day and peaks again in the afternoon commute. Ridership is greatest on the 6:00 PM trip.

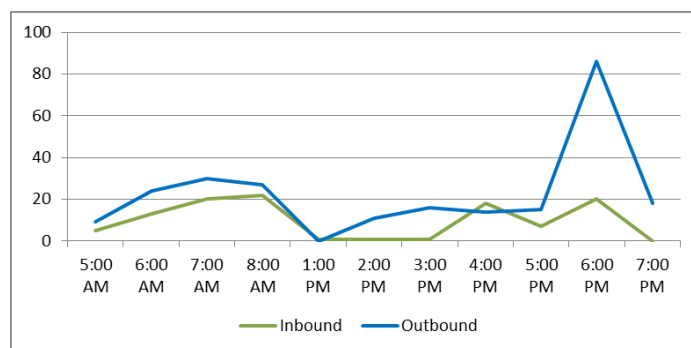


Figure 45. Route 23 Boardings by Trip

Activity by stop was examined for a PM peak trip (Figure 46). Boardings and alightings were highest at the BTC, but

Existing Conditions

occurred sporadically throughout the entire route in both the inbound and outbound directions.

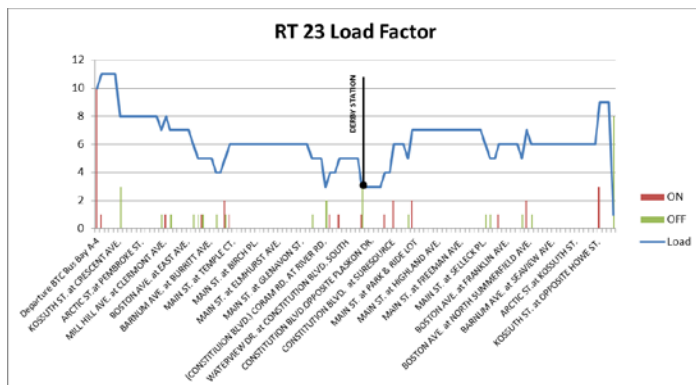


Figure 46. Route 23 activity by stop

The greatest challenge the GBT has with servicing the rail stations (Bridgeport, Milford, Stratford, Fairfield and Derby) is the frequency of service; most routes operate on 20-, 30- and 60-minute headways. Creating and maintaining connections with Metro North trains is challenging as their schedules change seasonally depending on roadway and rail projects, demand, and other factors.

Funding

The 2015 GBT annual operating budget was \$23.2 million. Funding sources for GBT include local and state programs for operating assistance funds, as well as capital funding available through the state and federal governments. Local funding from the municipalities is roughly \$129,000. The contribution levels were set in the 1990s as the local match for FTA operating funds, and has not increased since. State funding is provided by CTDOT through state contract assistance and formula grants. Farebox revenue is collected from cash fares and pass sales and accounts for 32% of revenue needed to operate the fixed route service. The GBT operating budget covers three areas of expense: fixed route bus, complementary ADA paratransit service, and administration.

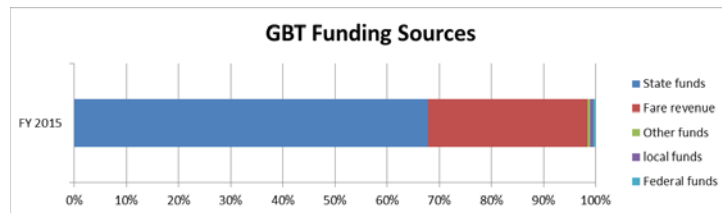


Figure 47. FY2105 GBT Funding

GBT offers a wide range of fares and passes through their Ziptrip program. The base fare is \$1.75 with free transfers and half fares (\$0.85) are offered to seniors 65 years of age and older and individuals with disabilities. GBT also offers a variety of short-term passes which are valid for calendar days only, beginning at the time the pass is purchased. One-day passes can be purchased on board, and 7-day and 31-day passes can be purchased through the mail, the GBT bus station and at various Stop & Shop grocery stores in the region.

Single Fare	Price
Adult	\$1.75
Elderly/disabled	\$0.85
Transfer	Free
Passes	
1-day	\$4.00
7-day	\$17.50
31-day	\$70.00

Table 19. GBT Fares

Fleet

As of March 2017, the GBT fixed-route fleet consisted of 57 active fixed route vehicles and 13 spares. The fleet consists of 35- to 40-foot buses, many of which were manufactured before 2010 (Table 20). Two of the buses are hybrid diesel-electric. In addition, all vehicles are wheelchair accessible in accordance with requirements of the Americans with Disabilities Act of 1990 (ADA). The oldest buses in the fleet, with the most miles, are the 2003 New Flyer's, heavy duty buses, they are past their useful life of 12 years and many are approaching their useful mileage of 500,000. Those past their useful life are scheduled to be replaced by Fall 2017 with 20 hybrid diesel-electric vehicles and 22 clean diesel vehicles (Table 21). Approximately six of the 2003 New Flyer's will be put

into a contingency fleet for emergency only; the rest will be sold off. GBT is also pursuing a pilot program for five to six electric buses. Once the new vehicles arrive, the fleet is expected to be in good condition (Table 22).

Year	Make	Model	Length	Capacity	Count
2003	New Flyer	D40LF	40	79	13
2003	New Flyer	D35LF	35	64	25
2003	New Flyer	D40LF	40	79	2
2011	New Flyer	Xcelsior H	40	78	2
2012	Gillig	LF	40	80	15

Table 20. GBT Fleet Summary

Year	Make	Model	Length	Capacity	Count
2011	New Flyer	Xcelsior H	40	78	2
2012	Gillig	LF	40	80	15
2017	New Flyer	Xcelsior H	40	79	10
2017	New Flyer	Xcelsior	40	79	7
2017	New Flyer	Xcelsior H	35	64	10
2017	New Flyer	Xcelsior	35	64	15

Table 21. GBT Fleet Summary by the End of 2017

Year	Make	Model	Vehicle Count	Condition		
				Fair	Good	Excellent
2011	New Flyer	Xcelsior H	2011		X	
2012	Gillig	LF	2012		X	
2017	New Flyer	Xcelsior H	2017			X
2017	New Flyer	Xcelsior	2017			X
2017	New Flyer	Xcelsior H	2017			X
2017	New Flyer	Xcelsior	2017			X

Table 22. GBT Fleet Condition

New Haven Transit Key Findings for the Corridor

- GBT has undergone several minor service reductions in the past few years due to a decrease in state funding.
- It is difficult to serve the rail stations, due to the low frequency of most bus routes. Creating and maintaining connections to the WBL is challenging as their schedules change regularly.
- Route 15 will be converted to limited stop service between the Hawley Lane Mall and Derby Train Station as part of the one- to three-year recommendations.
- Along Route 15 ridership is consistent throughout the day with peaks and valleys.
- Route 23 ridership peaks during the peak commuting hours.
- On the Route 22X the majority of passengers depart in the morning at locations in the Shelton Business Park indicating this is a commuter route.
- Only two routes (23 and 15) service stations along the WBL. All routes

2.1.4 Programed Improvements

CTtransit Waterbury

The Waterbury Area Transit Study (WATS) was recently completed and provides recommendations for immediate, short-term, mid-term and long-term modifications. The recommendations build upon each other and are dependent on previous phase recommendations being implemented. Short-term recommendations that impact corridor communities or service to the rail stations include restructuring the Naugatuck routes, providing all-day service between Naugatuck and Waterbury and improving on-time performances on the Routes 441 and 442. Long-term recommendations included a potential commuter bus route from Waterbury to Shelton via Route 8. In order for the recommendations to be implemented, funding would need to be identified and CTDOT would be responsible for the implementation of service changes.

There have been several operational changes to service within the last five to six years including the addition of evening service and holiday service. In 2011 service was extended from 6:00 PM to midnight on many routes through a pilot program funded by the colleges with a UPass program. Holiday Service was implemented in 2015 on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas with the introduction of CTfastrak.

Recent capital improvements in development include a new maintenance facility and new fare system. The new maintenance facility is located at 761 Frost Bridge Road in Watertown, approximately a mile and a quarter away from the former facility. The new fareboxes include automatic vehicle location and automatic passenger counters.

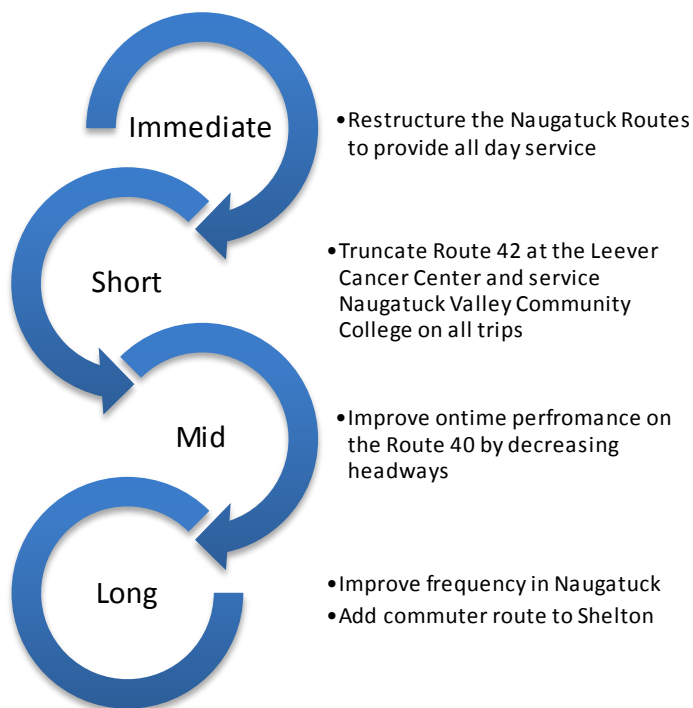
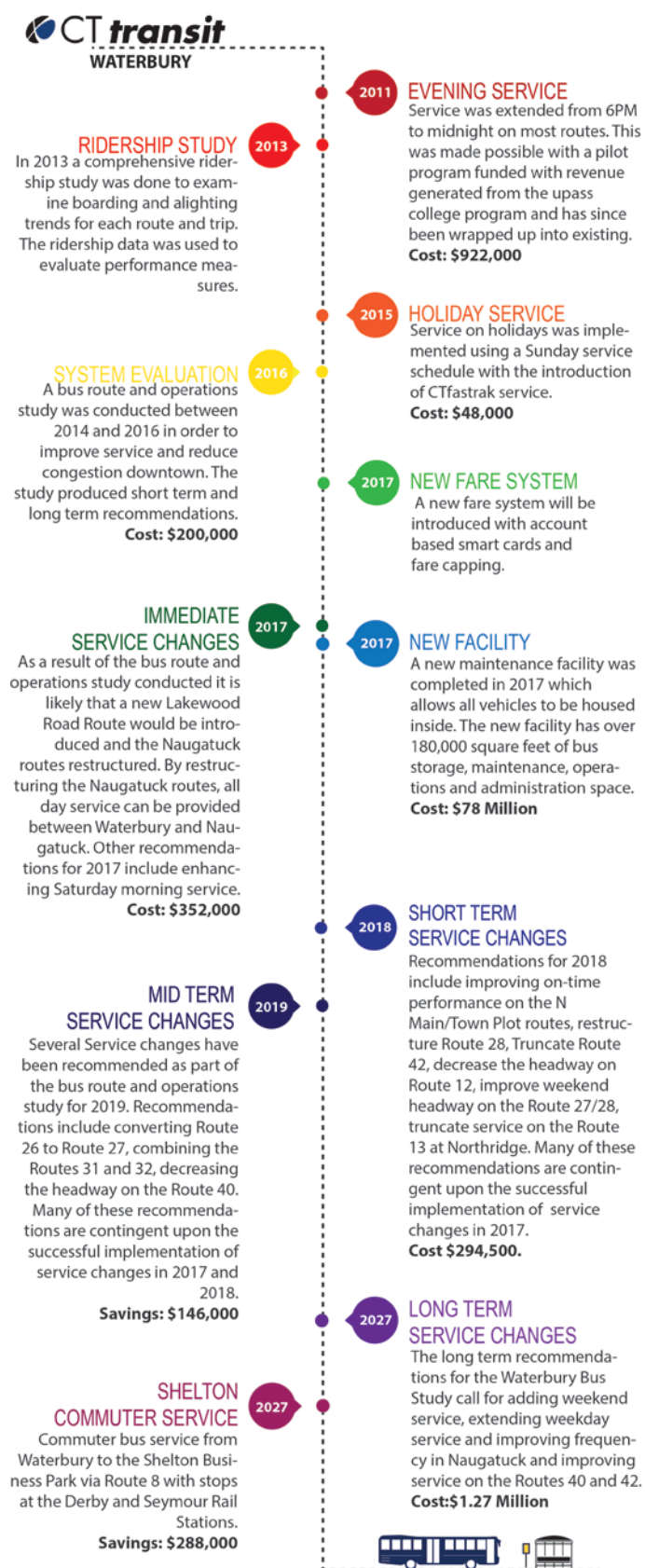


Figure 48. Waterbury Service Improvements for Corridor Communities



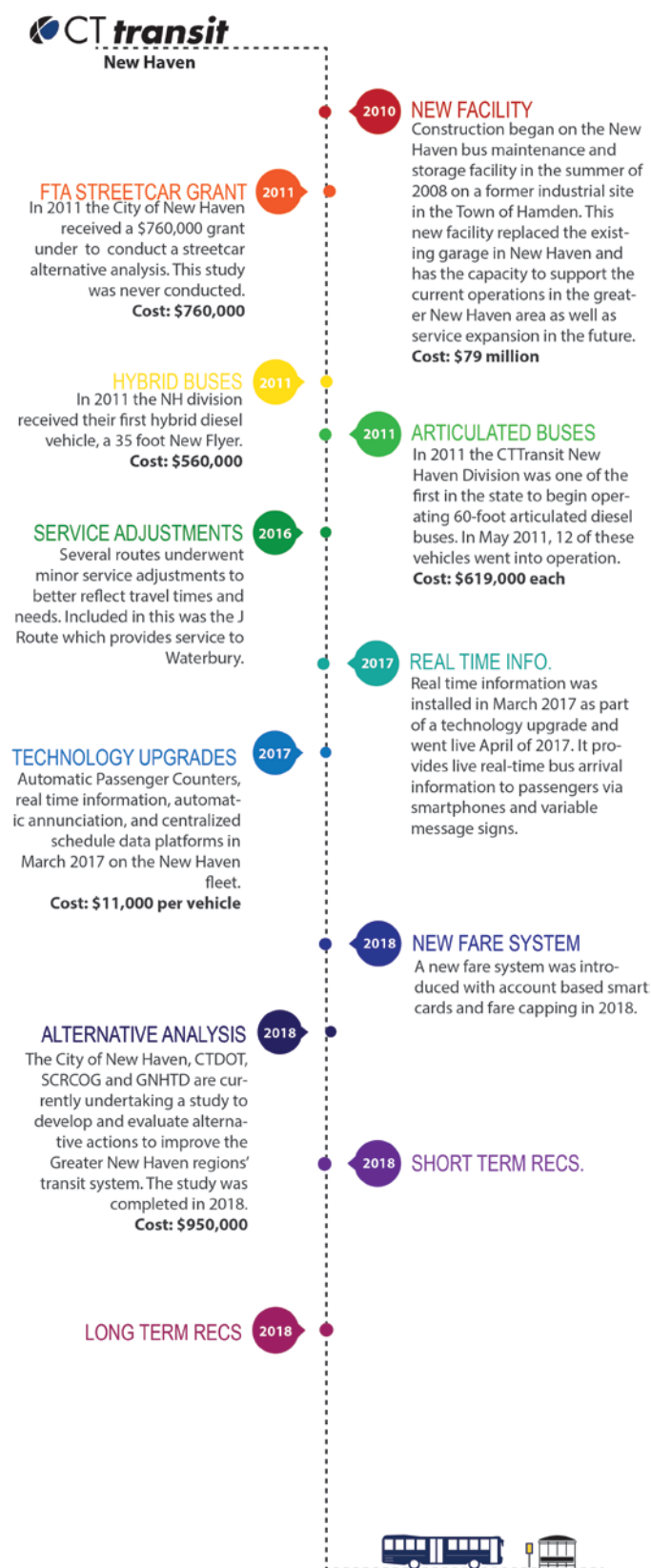
CTtransit New Haven

CTtransit New Haven conducted an alternatives analysis - bus study called the "Move New Haven Transit Mobility Study" to develop and evaluate transit improvements for the Greater New Haven Region. The study was broken into two phases. Phase 1 was a combination of public input, stakeholder coordination and data collection. The Second Phase defined the specific corridor-based alternatives for capital investment and service recommendations. The study findings have been under review and are slated to be completed in 2018. The study is the result of a 2011 FTA Streetcar study grant to the City of New Haven.

There have been very few capital improvements since the construction of the new maintenance and operations facility in 2010. The new 285,000-square-foot facility is equipped with modern equipment, 12 maintenance bays and indoor storage for up to 140 buses. The state is in the process of deploying technology upgrades to the entire CTtransit fleet. In April 2017 real-time bus arrival information on the New Haven fleet was made available to smartphone holders. Other technologies being installed include automatic passenger counters, automatic annunciation, and centralized schedule data using Trapeze. CTtransit is upgrading its fare system with contactless smartcard technology, fare capping, and mobile payments. New fareboxes have been installed on CTtransit New Haven buses. The new technology was deployed system wide and a mobile application is anticipated in the near future.

CTtransit in New Haven is a leader in the state with equipment. In 2011 they were the first in Connecticut to begin operating hybrid diesel vehicles. That same year they became the first to operate 60-foot-articulated buses thereby increasing the capacity on core routes.

Figure 49. CTtransit Waterbury Programmed Improvements Timeline



Greater Bridgeport Transit

GBT has a long range transit plan that provides a blueprint for the next 10 years, but due to reduction of funding at the state level it may take longer for recommendations to be implemented. Unfortunately GBT had to reduce service as a result of the reduction in state investment in bus operations. GBT is currently looking to eliminate routes 14, 16 and 20, reduce service on the Route 10 and Coastal Link and make minor scheduling and routing adjustments on the Routes 5, 7, 3, and 23.

There have been very few operational changes to service within the last five years, mainly minor schedule adjustments. In February 2014 Route 20 was added (two round trips during both the PM and AM peaks). Most recently, (October 2016) GBT underwent a service reduction to eliminate underutilized trips on most of the routes. Several early morning and evening trips were eliminated.

Capital improvements have included a new intermodal center in 2007 with a pedestrian bridge to the rail station and ferry terminal, the addition of dynamic message signs at the transit center in 2009 and the installation of heated shelters on the bus terminal platform in 2011. In 2007 when the new \$26 million intermodal was opened, service was restructured to improve coverage and reduce duplication. At the same time the new center opened the ziptrip pass program was created and the system underwent rebranding. In 2017 GBT will replace 73% of their fixed route fleet with new hybrid diesel-electric buses. While the replacement of vehicles is the opportune time to expand service, the current maintenance facility is at its capacity and any additional vehicles must be stored outside. Figure 51 provides an outline of capital improvements and service changes within the last 10 years and future changes as outlined in the long range transit plan.

Figure 50. CTtransit New Haven Programed Improvements Timeline

2.2 Passenger Rail Service

The Waterbury Branch Line (WBL) is one of Metro-North Railroad's (MNR's) three branches off of the New Haven Main Line in Connecticut. The line is 27.1 miles long, has no active passing sidings, is not signalized, has 6 stations, and there are 16 grade crossings. The WBL begins in Bridgeport and includes stops at Derby-Shelton, Ansonia, Seymour, Beacon Falls, Naugatuck, and Waterbury. Some weekday trains also stop in Stratford between Bridgeport and Derby-Shelton.

Passenger rail service on the WBL dates back to 1849. Service was originally provided by the Naugatuck Railroad, later purchased by the New York, New Haven & Hartford Railroad (NYNH&H) in 1885. In 1969 the NYNH&H went bankrupt and merged into Penn Central Transportation. The new entity declared bankruptcy one year later and the New York Metropolitan Authority (MTA) and State of Connecticut began subsidizing the New Haven line and its branches. In 1976 Conrail was formed to operate the service, but by 1983 Conrail became a non-financially viable operation. With the passage of the Northeast Rail Service Act in 1981 MTA and CTDOT formed the Metro-North Commuter Railroad.⁵

In 1976 there were only eight trains daily (four in each direction), this increased to twelve by 1993. Today the WBL passenger train schedule consists of 15 weekday trains (Figure 52)⁶ between Waterbury and Bridgeport. There are eight northbound and seven southbound trains daily Monday through Friday. With the exception of one AM Peak train, service to Grand Central Terminal (GCT) requires a transfer at Bridgeport Station to synchronized New Haven Main Line trains. The AM Peak for the New Haven Line and its Branches is defined as trains arriving at GCT between 5:00AM and 10:00AM or departing from GCT between 5:30AM and 9:00AM. There are two southbound AM peak trains and one northbound. The PM Peak is defined as trains that depart GCT between 4:00PM and 8:00PM; there are two trains which meet this

⁵ http://railfan.com/archive/rf_archive_0694_MetroNorth.php

⁶ This schedule is effective October 2, 2016 through April 1, 2017.

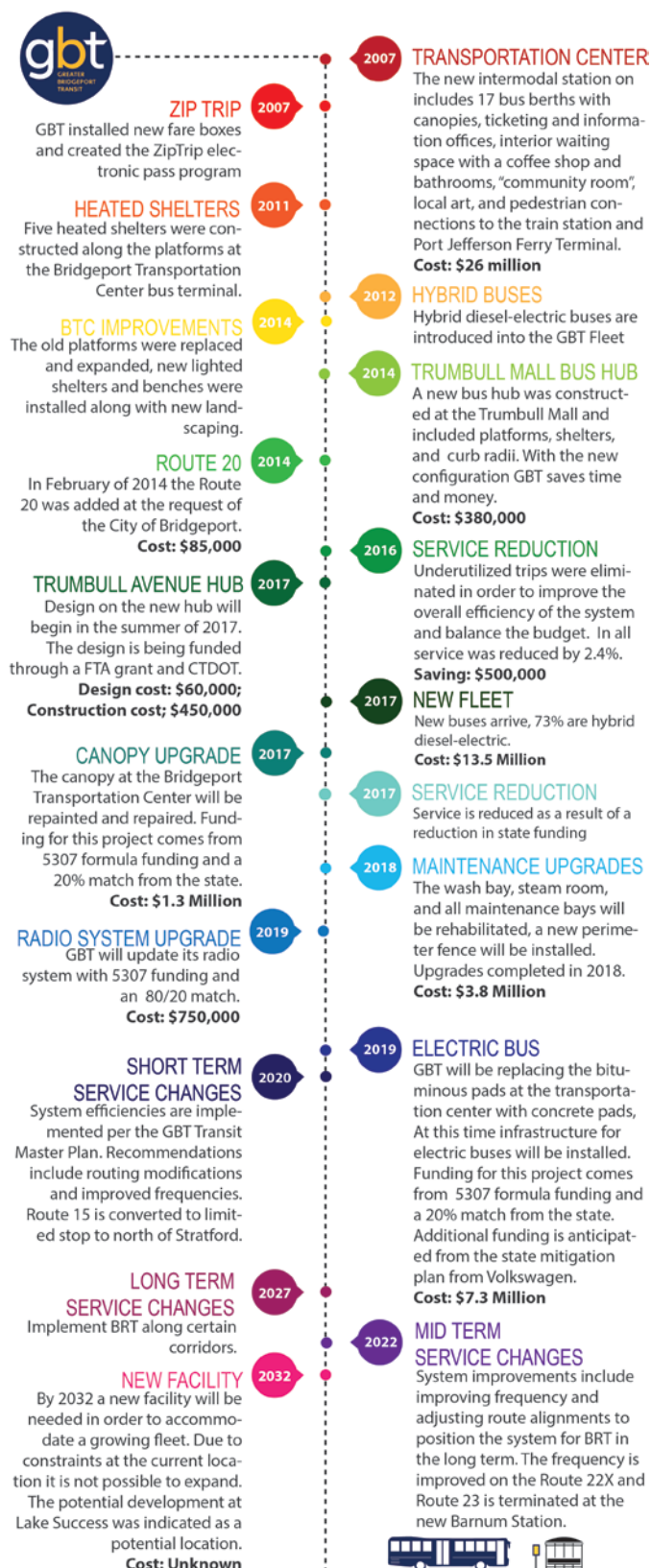


Figure 51. GBT Programed Improvements Timeline

Existing Conditions

definition. All WBL trains stop at Derby-Shelton, Ansonia, Seymour, Beacon Falls, Naugatuck, and Waterbury Stations. One southbound peak hour morning train, one northbound peak hour afternoon train, and one northbound evening train also stop at the Stratford station. One morning peak hour train continues to Stamford.

NEW YORK – WATERBURY MONDAY – FRIDAY											
MILES	TO NEW YORK	AM PEAK				OFF-PEAK					
		1923	1935	1951	1961	1971	1981	1991	1997		
		1819	1533	1551	1561	1571	1581	1591	1497		
		AM	AM	AM	AM	PM	PM	PM	PM		
88	Waterbury	C 5 40	C 6 38	C 9 12	C 11 51	C 2 10	C 4 51	C 7 17	C 10 05		
83	Naugatuck	C 5 49	C 6 47	C 9 21	C 12 00	C 2 19	C 5 00	C 7 26	C 10 14		
78	Beacon Falls	C 5 55	C 6 54	C 9 27	C 12 06	C 2 25	C 5 06	C 7 32	C 10 20		
75	Seymour	C 6 00	C 6 59	C 9 32	C 12 11	C 2 30	C 5 11	C 7 37	C 10 25		
71	Ansonia	C 6 06	C 7 05	C 9 38	C 12 17	C 2 36	C 5 17	C 7 43	C 10 31		
70	Derby-Shelton	C 6 11	C 7 10	C 9 43	C 12 22	C 2 41	C 5 22	C 7 48	C 10 36		
59	Stratford		CH 7 30								
55	Bridgeport Ar.	C 6 38	C 7 38	C 10 07	C 12 46	C 3 05	C 5 46	C 8 12	C 11 00		
55	Bridgeport Lv.	Y 6 44	X 7 53	10 12	12 51	3 12	5 55	8 17	11 08		
41	South Norwalk	Y 7 12	X 8 11	10 39	1 13	3 39	6 17	8 44	11 38		
33	Stamford	Z 7 09	8 21	10 55	1 25	3 55	6 28	9 00	11 54		
4	Harlem - 125th St. →	Y 8 11	D 8 59	D 11 34	D 2 04	D 4 34	D 7 10	D 9 39	D 12 35		
0	Grand Central Terminal	8 08	9 12	11 45	2 15	4 45	7 21	9 50	12 46		
		AM	AM	AM	PM	PM	PM	PM	AM		

MILES	TO WATERBURY	PEAK		OFF-PEAK		PM PEAK		OFF-PEAK	
		1506	1516	1524	1534	1548	1574	1588	
		1906	1916	1924	1934	1948	1974	1988	
		AM	AM	AM	PM	PM	PM	PM	
0	Grand Central Terminal	6 20	9 04	11 34	2 04	4 42	6 53	9 39	
4	Harlem - 125th St. →	R 6 30	R 9 14	R 11 44	R 2 14	R 4 52	R 7 03	R 9 49	
33	Stamford	7 11	9 53	12 24	2 53	5 29	7 40	10 26	
41	South Norwalk	7 27	10 07	12 36	3 07	5 21	7 56	10 42	
55	Bridgeport Ar.	7 56	10 36	12 58	3 36	5 57	8 25	11 12	
55	Bridgeport Lv.	C 8 02	C 10 41	C 1 01	C 3 41	C 6 00	C 8 31	C 11 17	
59	Stratford					C 6 06		R 11 23	
70	Derby-Shelton	C 8 23	C 11 02	C 1 22	C 4 02	C 6 25	C 8 52	C 11 40	
71	Ansonia	C 8 27	C 11 06	C 1 26	C 4 06	C 6 29	C 8 56	C 11 44	
75	Seymour	C 8 34	C 11 13	C 1 33	C 4 13	C 6 36	C 9 03	C 11 51	
78	Beacon Falls	C 8 39	C 11 18	C 1 38	C 4 18	C 6 41	C 9 08	C 11 56	
83	Naugatuck	C 8 45	C 11 24	C 1 44	C 4 24	C 6 47	C 9 14	C 12 02	
88	Waterbury	C 8 57	C 11 36	C 1 57	C 4 36	C 6 59	C 9 26	C 12 14	
		AM	AM	PM	PM	PM	PM	AM	

Figure 52. WBL Weekday Schedule⁷

Weekend and holiday service on the WBL includes 12 trains (Figure 53). As with weekday service, all service to GCT requires passengers to transfer trains at Bridgeport Station to synchronized New Haven Main Line trains.

⁷ Schedule effective July 1, 2018

MILES	TO NEW YORK	6913	6925	6937	6949	6961	6971
		6513	6425	6537	6549	6561	6571
		AM	AM	PM	PM	PM	PM
88	Waterbury	C 7 10	C 10 02	C 1 10	C 4 10	C 7 10	C 10 10
83	Naugatuck	C 7 19	C 10 11	C 1 19	C 4 19	C 7 19	C 10 19
78	Beacon Falls	C 7 25	C 10 17	C 1 25	C 4 25	C 7 25	C 10 25
75	Seymour	C 7 30	C 10 22	C 1 30	C 4 30	C 7 30	C 10 30
71	Ansonia	C 7 36	C 10 28	C 1 36	C 4 36	C 7 36	C 10 36
70	Derby-Shelton	C 7 41	C 10 33	C 1 41	C 4 41	C 7 41	C 10 41
55	Bridgeport Ar.	C 8 05	C 10 57	C 2 05	C 5 05	C 8 05	C 11 05
55	Bridgeport Lv.	8 12	11 03	2 12	5 12	8 12	11 12
41	South Norwalk	8 39	U 11 39	2 39	5 39	8 39	11 39
33	Stamford	8 55	U 11 55	2 55	5 55	8 55	11 55
4	Harlem - 125th St. →	D 9 39	D 12 13	D 3 39	D 6 39	D 9 39	D 12 39
0	Grand Central Terminal	9 50	12 24	3 50	6 50	9 50	12 50
		AM	PM	PM	PM	PM	AM

MILES	TO WATERBURY	6506	6518	6530	6542	6554	6566
		6906	6918	6930	6942	6954	6966
		AM	AM	PM	PM	PM	PM
0	Grand Central Terminal	7 02	10 02	1 02	4 02	7 02	10 02
4	Harlem - 125th St. →	R 7 12	R 10 12	R 1 12	R 4 12	R 7 12	R 10 12
33	Stamford	7 54	10 52	1 52	4 52	7 52	10 52
41	South Norwalk	8 10	11 08	2 08	5 08	8 08	11 08
55	Bridgeport Ar.	8 39	11 37	2 37	5 37	8 37	11 37
55	Bridgeport Lv.	C 8 44	C 11 42	C 2 42	C 5 42	C 8 42	C 11 42
70	Derby-Shelton	C 9 05	C 12 03	C 3 03	C 6 03	C 9 03	C 12 03
71	Ansonia	C 9 09	C 12 07	C 3 07	C 6 07	C 9 07	C 12 07
75	Seymour	C 9 16	C 12 14	C 3 14	C 6 14	C 9 14	C 12 14
78	Beacon Falls	C 9 21	C 12 19	C 3 19	C 6 19	C 9 19	C 12 19
83	Naugatuck	C 9 27	C 12 25	C 3 25	C 6 25	C 9 25	C 12 25
88	Waterbury	C 9 42	C 12 40	C 3 40	C 6 40	C 9 40	C 12 40
		AM	PM	PM	PM	PM	AM

Figure 53. WBL Weekend/Holiday Schedule⁸

2.2.1 Travel Times

A weekday trip between Waterbury and GCT is around 87 miles, takes an average of two hours and 31 minutes in both directions and travels at an average speed of around 35 MPH (Table 23 and Table 24). Since 1976 the travel time has increased slightly each year as more service is added to the main line tracks. The 1976 one-way travel time between Waterbury and GCT was two hours and 22 minutes. A trip between Waterbury and Bridgeport takes an average of 55 minutes. The average northbound trip on the WBL takes a minute longer than its southbound counterpart. The transfer wait time in Bridgeport is 5-7 minutes on weekends and 3-10 on weekdays. **If a transfer is missed heading towards Waterbury, there is a three-hour wait for the next train. Missed transfers to New York have a 30-minute wait for the next train.**

⁸ Schedule effective July 1, 2018

Train	Waterbury to Bridgeport	Waterbury to GCT
1923 1819	0:55	2:24
1935 1533	0:58	2:30
1951 1551	0:55	2:33
1961 1561	0:55	2:24
1971 1571	0:55	2:35
1981 1581	0:55	2:30
1991 1591	0:55	2:33
1997 1497	0:55	2:41
Average	0:55	2:31

Table 23. WBL Weekday Travel Times to NYC

Train	Bridgeport to Waterbury	GCT to Waterbury
1506 1906	0:55	2:37
1516 1916	0:55	2:32
1524 1924	0:56	2:29
1534 1934	0:55	2:32
1548 1948	0:59	2:17
1574 1974	0:55	2:33
1588 1988	0:57	2:35
Average	0:56	2:31

Table 24. WBL Weekday Travel Times to Waterbury

Travel time and speeds vary between stations (Table 25 and Figure 54) and are correlated to the length of the segment, track conditions, and number of at-grade crossings. The maximum operating speed for the track is 59 mph per Federal Railroad Administration (FRA) rules because the line is currently not signalized. This also limits the amount of service that can be provided as only one train set can be on the tracks at a time. The line is currently in the process of becoming signalized. However, even with signalization, passing sidings would be needed to accommodate more frequent bidirectional service.

Track charts show that the class of track, which impacts speed, fluctuates between Class 3 and Class 2 with a short segment of Class 1 at the Devon Wye. Class 3, which allows for the highest speed on the WBL, accounts for roughly 82% of the tracks. Table 25 provides a breakdown of speed by mile post and track class; overall the average operating speed is 38 miles per hour. The segment with the greatest speed is between the Devon Wye and Derby-Shelton Station because it is the largest segment, allowing the train to operate at higher speeds longer and has the greatest length of Class 3 tracks. The segment with the lowest speed is between Ansonia and Derby, since the

short distance limits the maximum achievable speed to 45 mph even though the tracks are capable of higher speeds.

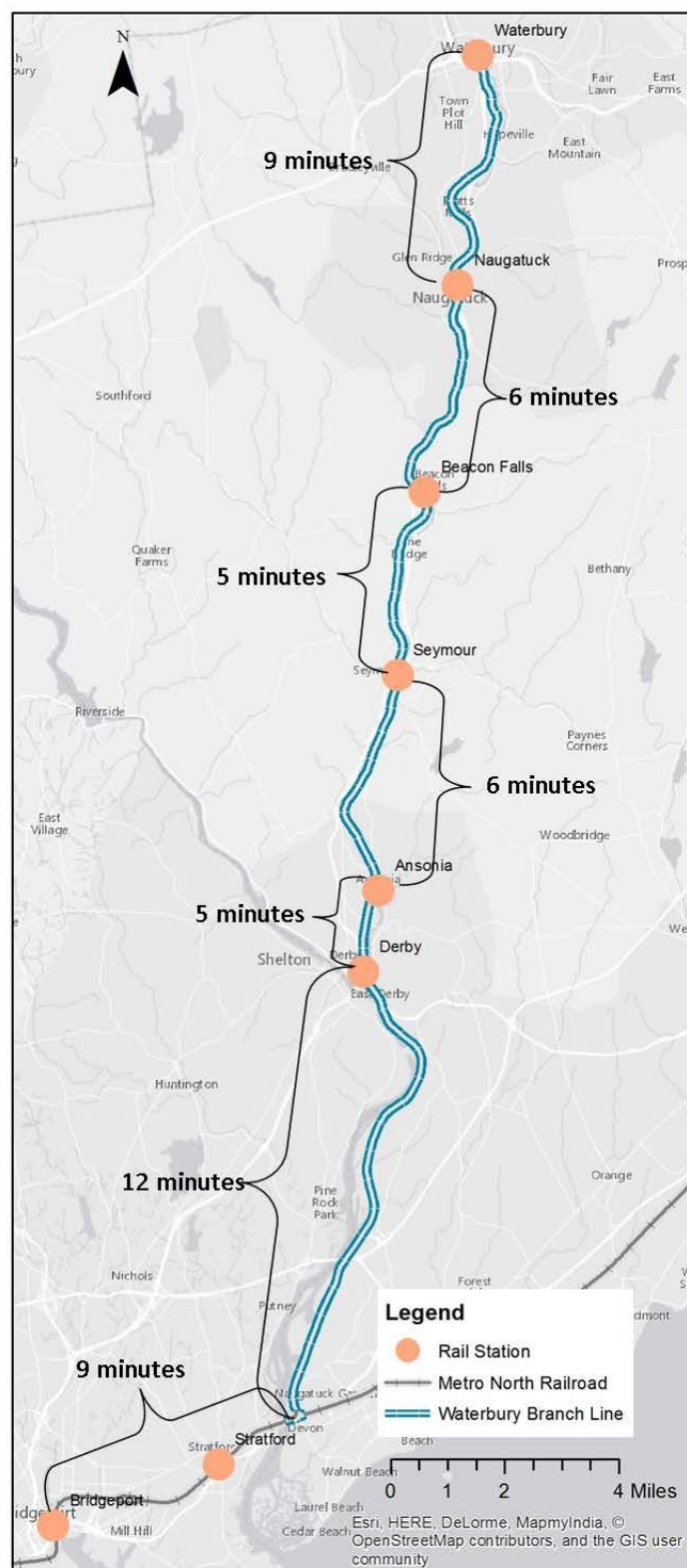


Figure 54. Travel Time between WBL Stations

Between	Speed	Track Class
CP 261- Through East & West Legs of Wye	10	1
East & West Legs of Wye to MP 7.7	59	3
MP 7.7 – MP 8.1	45	3
MP 8.1 – MP 8.9	25	2
MP 8.9 – MP 10.4	45	3
MP 10.4 – MP 11.2	25	2
MP 11.2 – MP 12.3	45	3
MP 12.3 – MP 13.5	59	3
MP 13.5 – MP 14.4	50	3
MP 14.4 – MP 14.7	30	2
MP 14.7 – MP 14.9	50	3
MP 14.9 – MP 17.8	59	3
MP 17.8 – MP 18.5	40	3
MP 18.5 – MP 19.5	50	3
MP 19.5 – MP 20.3	45	3
MP 20.3 – MP 21.8	50	3
MP 21.8 – MP 22.6	40	3
MP 22.6 – MP 24.2	50	3
MP 24.2 – MP 25.4	59	3
MP 25.4 – MP 25.6	50	3
MP 25.6 – MP 27.1	30	2

Table 25. Speed and Track Class Data for WBL

2.2.2 Equipment

The WBL and Danbury Branch Line are the two branch lines that are not electrified. Equipment is shared between the two lines. While there are three train sets between the two branch lines, the WBL only utilizes two of the three train sets. Each train set consists of 2008 Brookville locomotives and three coaches. The small fleet size and sharing between branches limits the ability to add service once signalization of the line is complete. Under Federal Railroad Administration (FRA) rules each locomotive must undergo an inspection daily. The inspection takes two hours and requires maintenance facilities with bays and pits for diesel equipment. Stamford and New Haven are the only two yards designed to handle diesel equipment and which have fueling capabilities. Currently all WBL locomotives, coaches, and cab cars are stored at the Stamford yard.

In the morning, two trains depart Stamford Yard deadheading to Waterbury. The first set clears the end of block at Waterbury Station and waits for the second trainset to arrive. The second trainset becomes revenue train 1923 (the first AM train) to Bridgeport and continues onto South Norwalk where it then does one round trip on the Danbury Branch. Once it completes its run on the

Danbury Branch it travels to the Stamford Yard to be fueled and have the toilets serviced and then returns to Bridgeport where it then runs five round trips as trains 1924/1971, 1934/1981, 1948/1991, 1974/1997 and 1988/DH1185. The first set runs as trains 1935/1906, 1951/1916 and then 1961 and deadheads to Stamford to be fueled. It is then used on the Danbury Branch Line for three round trips.

Trains that operate between Bridgeport and Waterbury reverse direction in Bridgeport just west of interlock 255 (by the Hubbard Ball Park). In Waterbury the shuttles reverse direction at the station. Equipment used on the WBL is stored in Stamford and deadheads to the station. The equipment returns to Stamford after the last northbound train arrives in Waterbury.

In the event of equipment/mechanical issues, planned outages or issues on either the Danbury or Waterbury Branch Line tracks, bussing is instituted along the corridors. While the MTA relies on the CTtransit divisions and districts to provide bussing during outages they are not equipped to do so. An on-call RFP for vehicles and operators was issued by CTDOT but there was very little response. Bussing is currently provided by the CTtransit New Haven garage as they have the largest spare ratio. Unplanned outages occurred as many as 3-5 times a month before January, 2018. Communication issues have been reported between MTA and CTtransit New Haven resulting in last minute needs and/or unneeded buses. Recently, there have been improvements to reduce these outages.

2.2.3 Funding

Fares on the WBL are based on distance and time of day and whether they are purchased on board or not. Fares between the stations on the WBL are classified as intermediate at all times and are \$2.50 if purchased ahead of time and \$9.00 on board. Table 26 shows fares between the WBL and key main line stations during both the peak and off peak times.

Destination	Peak	Off-peak
Bridgeport	\$2.75	\$2.75
Stamford	\$6.50	\$6.50
Grand Central Station	\$20.50	\$15.50

Table 26. WBL Fares (2017)

Waterbury is the only station on the branch line where ticket kiosks are available. In 2016 the MTA launched a mobile ticketing app called MTA eTix which allows users to purchase mobile tickets directly from their smartphone or mobile device.

CTDOT funds the operations of the New Haven Main Line, its branches, Shoreline East and the Hartford Line. Commuter rail and commuter bus in Connecticut are funded with 90.3% state funding and 9.7% farebox revenue⁹. The operating cost per revenue hour is \$737.03 and the WBL operates approximately 5,100 revenue hours a year resulting in an annual operating cost of \$3.76 million.

2.2.4 Infrastructure

The WBL has numerous crossings including culverts, streams/riders, roadways, pedestrian paths, and pipelines. Detailed maps can be found in Appendix A. Track charts provided by Metro-North Railroad for 2017 showed that there were approximately 51 below-grade structures on the WBL. The below grade structures include culverts (70%), pipes (24%) and other underground structures (6%). The majority of the pipes and culverts carry water under the rail line but there are several gas pipes and underground powerlines.

There are 19 roadway overpasses, 9 roadway underpasses and 16 at grade crossings. The at-grade crossings include two railroad, nine private road and five public road crossings. The private road crossings have no protection aside from signage; the public road crossings offer a combination of flashing lights and gates (Table 27). The WBL crosses Route 8 at four locations, at all instances the rail line passes under the road.

Town	Street	Protection
Milford	Caswell Street	Flashing lights and gates
Milford	Oronoke Road	Flashing lights and gates
Milford	Great River Road	Flashing lights and gates
Derby	Division Street	Flashing lights and gates
Waterbury	Eagle Street	Flashing lights

Table 27. At Grade Public Road Crossings WBL

In addition to roadway crossings there are 28 other crossings of non-roadway above ground structures. Nine of the crossings are structures that pass over the roadway and include pipes, walkways and trusses. Six of these structures are located in Ansonia at the site of the old Farrel Corporation and include walkways, a truss, a monorail and pipes. The remaining locations include an overhead pedestrian footbridge in Seymour, a pipeline at the former US Rubber Manufacturing site in Naugatuck, and in Waterbury the Meriden Railroad Bridge. There are 19 railroad bridges over non-roadway structures: 16 are over waterways, including stream/river crossings, spillways and canals. The WBL crosses the Naugatuck River at four locations. The remaining three bridges are for pedestrian access.

There are 16 interlockings along the WBL; six which are active and ten are inactive. The interlockings provide access to connecting rail lines, sidings and spurs. There is one active siding of ballast track between mile points 0.6 and 1.1 and one inactive siding in Waterbury between mile posts 26.5 and 26.8. In addition to the siding there are three active spurs to provide access to O&G Industries, Hubbard Hall, and Kerrite and six inactive spurs. The WBL connects to two other rail lines using a wye. The Devon Wye provides access to the New Haven Main Line tracks and is operable in both the northbound and southbound directions. The Maybrook Line connects to the WBL at the Derby Wye, but it is currently inactive. It could, however, be reactivated at any time. The Maybrook Line is owned by the Housatonic Railroad Company with trackage rights granted to the Providence & Worcester (now owned by Genesee & Wyoming

⁹ Connecticut Department of Transportation 2014 Annual Agency Profile - NTD

Existing Conditions

Railroad). In 2010 the 12-mile segment of track between Botsford and Derby was taken out of service.

2.2.5 Ridership

During the summer 2017 the Naugatuck Valley Council of Governments surveyed WBL passengers over a three day period between September 19th and the 21st. Overall the Waterbury Branch has approximately 1,014 daily riders; this is a 17% increase from 2016 and is on par with 2011 ridership. The inbound (towards GCT) 7:38 AM and outbound (towards Waterbury) 6:00 PM have the greatest number of riders (Table 28 and Table 29). Fifteen percent of the riders are traveling between WBL stations; this is up from 9% in 2016. Inbound, the Waterbury Station accounts for the highest number of boardings, accounting for 60.8% of all riders. Beacon Falls has the lowest boardings of any WBL station, accounting for only 3.3% of ridership. The most common destination for inbound riders is Bridgeport, which records the greatest number of alightings, accounting for 49.8% (Table 30 and Table 31).

Train Number	Bridgeport Time	Maximum Load	Way Riders ¹⁰	Total Riders
1923	6:39 AM	95	3	98
1935	7:38 AM	78	35	113
1951	10:07 AM	71	8	79
1961	12:46 PM	42	16	58
1971	3:05 PM	27	15	42
1981	5:46 PM	31	15	46
1991	8:12 PM	44	4	48
1997	11:00 PM	20	7	27
			103	511

Table 28. Summer 2017 Average WBL Inbound Ridership by Train

Train Number	Bridgeport Time	Maximum Load	Way Riders	Total Riders
1906	8:02 AM	42	13	54
1916	10:41 AM	43	7	50
1924	1:01 PM	49	9	52
1934	3:41 PM	64	21	82
1948	6:00 PM	132	16	147
1974	8:31 PM	70	9	79
1988	11:17 PM	35	4	39
			79	503

Table 29. Summer 2017 Average WBL Outbound Ridership by Train

Station	Boarding	Alighting
Waterbury	311	0
Naugatuck	69	16
Beacon Falls	17	4
Seymour	23	16
Ansonia	46	23
Derby-Shelton	45	21
Stratford	0	23
Bridgeport	0	408
Total	511	511

Table 30. Waterbury Branch Station Inbound Ridership Summer 2017

Station	Boarding	Alighting
Waterbury	0	305
Naugatuck	18	79
Beacon Falls	4	10
Seymour	15	34
Ansonia	14	35
Derby-Shelton	25	39
Stratford	3	1
Bridgeport	424	0
Total	503	503

Table 31. Waterbury Branch Station outbound ridership summer 2017

Figure 55 and Figure 56 show maps of boardings and alightings for both the inbound and outbound directions. In the outbound direction one-third of the activity at the intermediate stops are boardings, indicating travel amongst the WBL stations. The Derby-Shelton Station has the greatest number of boardings for an intermediate station while Stratford records the lowest.

¹⁰ Way riders is the number of passengers who get off inbound trains or board outbound trains north of Bridgeport

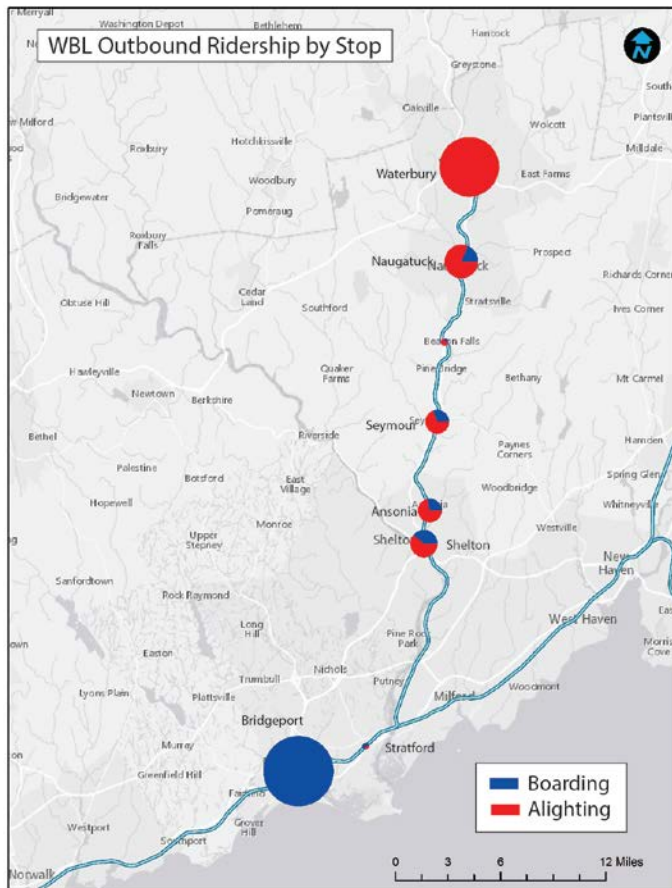


Figure 55. WBL Outbound Ridership Map

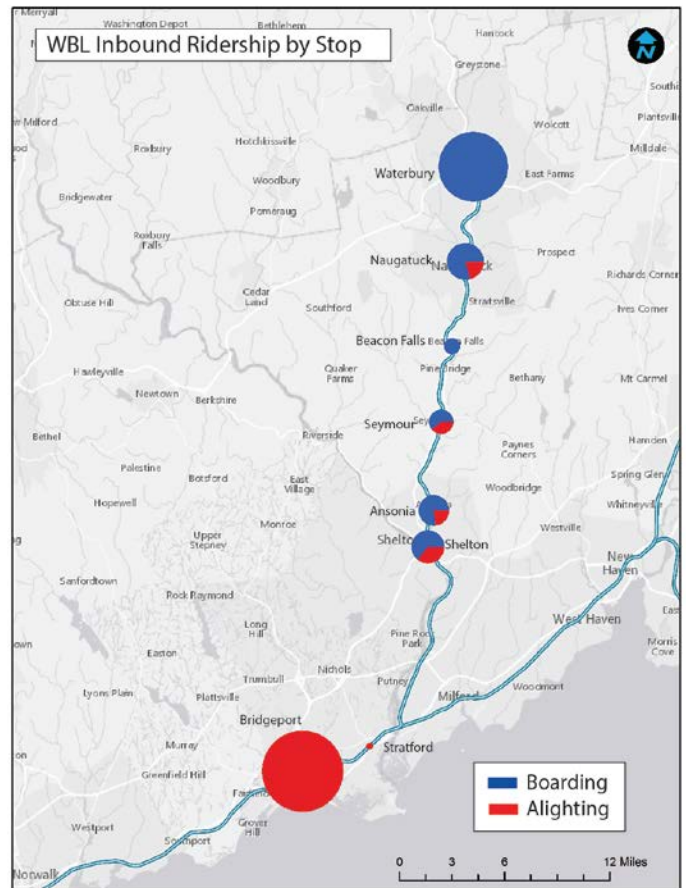


Figure 56. WBL Inbound Ridership Map

Along the inbound direction 40% of the activity at intermediate stations, not including Stratford, are alightings, further indicating travel between WBL stations. The Ansonia Station has the greatest number of alightings for an intermediate station.

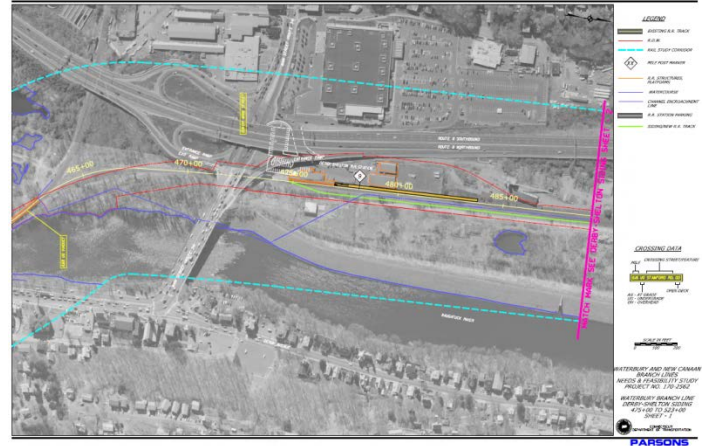
2.2.6 Programed Improvements

The WBL is currently undergoing several capital improvements including signalization, passing sidings and improved railroad crossings. Signalization will be installed concurrently with positive train control and will allow an increase in the number of trains that can safely operate along the branch line at the same time. In addition to the new signal system there will be four passing sidings in Devon, Derby, Beacon Falls and Waterbury; each will have interlockings at both ends. The Beacon Falls passing siding will be completed first. Crossings, both private and public, will either be closed or upgraded to receive full protection with active warning devices.



Figure 57. WBL Programmed Improvements

WBL improvements are currently nearing final design approval with construction anticipated to begin in 2019 and completed within two years. Routine maintenance such as rail and tie replacement and crossing upgrades are ongoing. Preliminary cost estimates for the WBL



improvements (4 passing sidings, signalization, and PTC) are \$7 million for design, \$10 million for material procurement and \$63 million for construction. Additional WBL long term improvements include station improvements and increased service frequency.

System wide programmed improvements to Metro North, which will impact the WBL, include real-time information at the stations, new coaches and locomotives, and upgraded ticket vending machines. Real-time information is scheduled to be installed at all Main Line stations by the end of 2020. CTDOT is reviewing funding available to purchase new push-pull diesel-hauled coaches and locomotive for the Hartford, Danbury and Waterbury lines, with the procurement process beginning in late 2018.

Long term programmed improvements, as part of the 30-year plan for Let's Go CT!, include improving service on the branch lines, providing feeder bus routes to rail stations, new diesel fleet equipment, fleet expansion, and maintenance facilities and yards on the branch lines. To improve service along the main line and branch lines the fleet of diesel equipment will be replaced and expanded at a cost of \$530 million over the next 30 years. CTDOT is analyzing diesel hauled equipment purchases to replace

Key Findings for the WBL Corridor

- There are several major capital improvements underway on the WBL including Positive Train Control (PTC), signalization, crossings and sidings.
- System wide improvements are aimed at improving the passenger experience and include real time information and mobile ticketing.
- The WBL is largely at-grade with several crossings. Most grade crossings are not signalized and lack protection, but with the new signalization project many more will receive flashing lights and gates.
- Mechanical issues with the locomotives have led to numerous service disruptions each month, resulting in the need to provide replacement bussing. Often little notice can be given to CTtransit, the designated emergency service provider, and there is often lack of communication between MTA and CTtransit New Haven to provide updates if the situation changes and the buses are no longer needed.
- Travel time on the WBL between Derby and Bridgeport is 21 minutes.
- The station with the greatest number of boarding and alighting passengers, aside from Bridgeport, is Waterbury, followed by Naugatuck.
- Fleet size and lack of service/storage facilities are the primary limitations in being able to expand service on the WBL once signalization and additional passing sidings are complete. CTDOT is analyzing the potential to add rail cars to the WBL.
- The WBL has a long history of providing passenger service.

the aging fleet and is planning to phase in purchases based on need and funding availability.

Recent capital improvements include creating a new passenger entrance and off-street passenger drop zone at the Waterbury Station, improvements to the New Haven Storage Yard, upgrading of crossings, and the deployment of a mobile ticketing platform. In 2014 the former SNET Building was demolished at the Waterbury Station and a new passenger entrance was added; also including increased parking.

2.3 Connecting Services

This section examines connecting transportation services to the corridor communities. It includes paratransit services, commuter bus, intercity bus, ferry, taxi, Transportation Network Companies (TNCs) such as Uber and Lyft, and rideshare services.

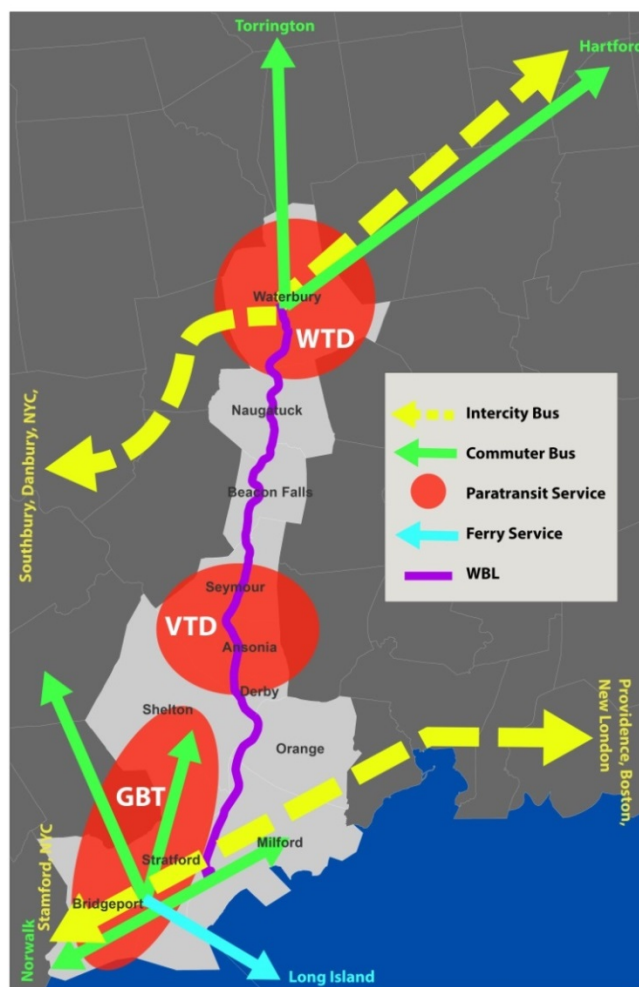


Figure 58. Connecting Transportation Services in the Corridor

2.3.1 Paratransit

North East Transportation (NET) provides complementary ADA paratransit service in Waterbury, Middlebury, Naugatuck, Prospect, Southbury, Cheshire, Thomaston, Wolcott and Waterbury under contract to CTtransit for the Greater Waterbury Transit District. Paratransit service operates during fixed route service hours and will pick up and discharge passengers within a $\frac{3}{4}$ -mile radius of fixed route local bus services in Waterbury. New in 2017, NET coordinates with the Greater New Haven Transit District and Valley Transit District to provide inter-district service.

Valley Transit District (VTD) provides complementary ADA paratransit service in the communities of Ansonia, Derby, Seymour and Shelton. The paratransit service operates during the fixed route service hours of the GBT Route 15 and CTtransit New Haven Route 255 and will pick up and drop off passengers within $\frac{3}{4}$ mile of either route. The service is also open to the general public using a shared ride system Monday-Friday between 6:00 am and 5:30 pm. On Saturdays complementary ADA paratransit service in the region is provided by the Greater New Haven Transit District. The one-way fare for seniors, riders with ADA Certification, and those taking work or school trips is \$3.50 and the general public riders fare is \$4.50 (2017).

VTD is located adjacent to the Derby-Shelton Station. It is currently being upgraded and expanded. The improved facility will lower operating costs, help to better maintain vehicles, improve vehicle flow in the yard, and consume less energy.

GBT provides complementary ADA paratransit service through a demand response service known as GBT Access. GBT Access operates in the communities of Bridgeport and portions of Fairfield, Stratford, Trumbull, Milford, Monroe, Shelton, Derby, Westport and Norwalk through an operating contract with Transdev. The paratransit service operates during the fixed route service hours and will pick up and drop off passengers within $\frac{3}{4}$ mile of all GBT bus routes. The one-way fare is \$3.50.

In addition to ADA paratransit services there are several other programs which provide transportation in the region. Many of the communities operate their own minibus service for elderly residents. The Greater Waterbury Transit District (operated by NET) provides a dial-a-ride service to the elderly and disabled Monday through Friday from 9:00 AM to 4:30 PM. The Northwest Region Access to Jobs (JobLinks) provides people of low income work related transportation; this program helps fund the CTtransit T74, T114, T74, T49, and T81 tripper routes to industrial parks.

2.3.2 Commuter Bus Service

Commuter bus service is provided by CTtransit and GBT. The commuter service differs from the local fixed route services in that its routes are designed to meet the needs of inter-city commuters. In Waterbury the service to Hartford is operated by DATTCO and to Torrington by NET. Two routes operate between Hartford and Waterbury, the 925 and the 928. These routes are part of the CTfastrak service and connect to the busway in New Britain. The 925 operates during weekday peak hours only while the 928 operates during the off peak and on weekends. The primary difference between the two routes is that the 925 does not stop at the Cheshire Milldale Park & Ride or the Southington Plantsville Park & Ride.

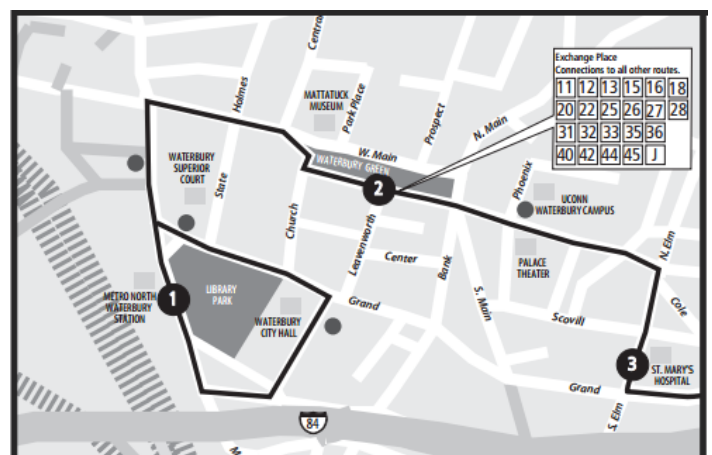


Figure 59. Downtown Waterbury Hartford Express Bus Circulation

In Waterbury both routes serve the Waterbury Green and train station in both the inbound and outbound

directions. At the train station the route stops on Meadow Street adjacent to the train station. Express route fares are zonal based on upon the distance traveled. A trip between Hartford and Waterbury is \$6.00, and between the Waterbury Green and Train Station is \$3.20. The 410 Torrington/Waterbury Flyer is a weekday express bus which serves the Waterbury Train Station, when heading inbound towards the Waterbury Green.

The Coastal Link is a regional route between the Connecticut Post Mall in Milford and the Wheels Hub in Norwalk and is jointly operated between GBT, the Milford Transit District (MTD) and the Norwalk Transit District (NTD). Service is operated seven days a week from 5:30

AM to 11:00 PM on weekdays, 6:00 AM to 10:30 PM on Saturdays and 8:30 AM to 7:30 PM on Sundays. The fare for this route is \$1.75.

GBT operates two express/commuter bus routes, the Route 19X and 22X. Both routes operate during the peak hours only and on weekdays. The Route 19X is an express bus service to Monroe from the BTC. The Route 22X operates from the BTC to the Shelton Research Industrial Park; it does not connect to downtown Shelton. The fare for both of these routes is \$1.75.

Route	Operator	Days operated	Weekday Service Span (hrs)	Round Trips Daily	Towns Served	Rail Stations Served	Ridership Per Day
410 Torrington-Waterbury Flyer	CTtransit Waterbury NET	M-F	15	9.5	Torrington, Thomaston, Waterbury	Waterbury	40
925 Waterbury Express	CTtransit–Hartford DATCO	M-F	5.5	5	Waterbury, Cheshire, New Britain, Hartford	Waterbury	130
928 Southington-Cheshire-Waterbury Express	CTtransit–Hartford DATCO	M-Su	20	17.5	Waterbury, Cheshire, Southington, New Britain, Hartford	Waterbury	98
Coastal Link	GBT & MTD & NTD	M-F	18	44.5	Milford, Stratford, Bridgeport, Fairfield, Westport, Norwalk	Milford, Bridgeport, Fairfield	3,215
22X Bridgeport Avenue	GBT	M-F	7	3.5	Bridgeport, Stratford, Shelton	Bridgeport	
19X	GBT	M-F	4.5	4.5	Bridgeport, Trumbull, Monroe	Bridgeport	36

Table 32. Corridor Commuter Bus Service

2.3.3 Intercity Bus Service

Intercity transit in the region is provided by Peter Pan Bus Lines, Inc. and Greyhound Lines, Inc. with stations in Waterbury and Bridgeport. The Waterbury intercity bus station (served by Peter Pan Bus Lines) is located at 188 Bank Street, approximately 1,000 feet from the Waterbury Green and local bus route pulse point and 1,800 feet from the Waterbury train station. Direct service from Waterbury is provided to and from Hartford, Farmington, Southbury, Danbury and New York City. The route that runs between Hartford and New York City, with

stops in Waterbury, offers 15 trips daily, seven to Hartford and eight to New York.

The Bridgeport Greyhound Bus Terminal is located at the Bridgeport Transportation Center (BTC), at 710 Water Street, providing direct access to transfer with local GBT bus routes. The train station is connected to the bus terminal via an elevated covered walkway. Peter Pan Bus Lines provides direct service between Bridgeport and New York City, New Haven, and Hartford. One trip daily is provided to New Haven and Hartford and two trips to New York City. Greyhound operates seven trips a day which service the Bridgeport Station. Three trips daily are

to Stamford, White Plains and New York City, and four to New Haven, New London, Mohegan Sun, Foxwoods, Providence and Boston.

2.3.4 Ferry Service

The Bridgeport Terminal at the Water Street Dock is located 1,000 feet south of the train station and is maintained and operated by the Bridgeport Port Authority. Passenger and vehicle ferry service is operated by the Bridgeport & Port Jefferson Steamboat Company between Bridgeport and Port Jefferson Long Island New York. The ferry provides 11 round trips daily with increased service during the summer months, Fridays and on weekends. Travel time between the two ports is approximately one hour and 15 minutes. The one-way passenger fare is \$17 and for vehicles under 20' in length it is \$56.00 (2017).

2.3.5 Taxi/TNC Services/Car-Sharing

There are several taxi companies operating in the corridor and include the following:

- Metro Cab - Bridgeport
- Yellow Taxi – Bridgeport
- Ace Cab Co - Bridgeport
- Valley Cab Company – Ansonia
- Brass City Taxi Car Service – Waterbury Yellow Cab - Waterbury

The fares for the taxi companies vary greatly and a trip from the Waterbury Train Station to the Bridgeport Station is from \$70 to \$85. One taxi company, Metro Taxi, has wheelchair accessible taxis.

TNCs use online platforms to connect passengers with drivers for a fee. Uber and Lyft operate in this corridor. An Uber trip between Bridgeport and Waterbury ranges between \$38 and \$50; a trip using Lyft is approximately \$41.

Car sharing programs in the US have become increasingly popular in cities and allow users to rent a car for short periods of times. In the study corridor Zipcar is the only car sharing program available. Zipcar has three cars available at two locations on the University of Bridgeport Campus.

2.3.6 Rideshare Services

The Connecticut DOT created CTrides to administer ridesharing services. CTrides consists of a network of employers and employees who seek alternative commute options. Interested users can find a ridesharing partner through the free NuRide online matching site at www.ctrides.com. In addition to these CTDOT-sponsored programs, several private organizations operate shuttles for their employees. These shuttles are entirely employer-funded (or the employer identifies funds) and include:

- University of Bridgeport

- This service is operated by campus security, and provides free shuttles between campus and popular destinations.
- Sacred Heart University
 - Sacred Heart operates a shuttle service through the student union office to provide a shuttle from the campus to the Bridgeport Train Station.

Connecting Services Key Findings

- There is coordinated paratransit service between the Waterbury Transit District, Valley Transit District and New Haven Transit District to provide rides across jurisdictional boundaries.
- The Commuter bus between Waterbury and Hartford is the only route to directly service the Waterbury Train Station.
- Both Bridgeport and Waterbury have intercity bus service but there is no direct intercity bus service between the two cities. Each station is located in proximity to the primary fixed route transit center in their respective cities.
- Five taxi companies operate within the corridor, one is ADA accessible.
- TNCs are half the cost of taxis for travel between Bridgeport and Waterbury. The cost for a TNC is four times greater than the WBL.
- Car sharing has not taken off in the corridor.
- There are only two private employer-funded shuttles. Both are operated by local universities.

3. PARKING

3.1 Methodology

Parking was inventoried in order to understand current parking utilization and availability within half a mile of the Waterbury Branch Line Stations for commuters. At each station the downtown core is within a half-mile and the parking was included in the inventory. Parking with time limitations were excluded from the inventory.

A field inventory was conducted around half a mile of all Waterbury Branch Line Stations for parking. All public municipal, state and privately owned surface lots, garages and on-street parking, which allowed for eight hours or more of occupancy were surveyed. Parking was surveyed Wednesday April 26th, 2017 in order to represent a typical day. Parking counts were taken between 10:00 AM and 4:00 PM, which was presumed to be the peak parking period for the commuter rail stations.

At each location parking spaces were counted and occupancy recorded, restrictions noted, and fees accounted for. For on-street parking where there were no painted parking stalls, capacity was calculated by dividing the length of the road segment by the length of a typical parallel parking space (20').

3.2 Station Parking Capacity and Utilization

The WBL has 557 parking spaces at the rail stations and an additional 5,259 within half a mile of the stations. At the time of inventory station parking utilization was 36.1%. The Derby/Shelton station has the highest utilization at the station, and Ansonia has the highest in the downtown. Beacon Falls has the lowest utilization at both the station and downtown. All parking at the WBL stations is free; outside of the stations it varies by municipality. A summary of findings are in Table 33.

Station	Station				½ Mile			Total		
	Capacity	Occupied	% Utilized	Utilization Increase from 2002	Capacity	Occupied	% Utilized	Capacity	% Utilized	Utilization
Waterbury	248	45	18.1%	Yes	3,253	1,195	36.7%	3,451	1,240	35.9%
Naugatuck	30	28	22.4%	Yes	382	51	13.3%	412	79	15.6%
Beacon Falls	54	8	14.8%	Yes	314	23	7.3%	368	31	8.4%
Seymour	23	14	60.9	No	328	79	24.8%	351	93	26.5%
Ansonia	80	33	41.3%	No	357	147	41.2%	437	180	41.2%
Derby/Shelton	77	73	94.8%	Yes	661	253	38.3%	738	326	44.2%
Total	557	201	36.1%	--	5,259	1,748	33.0%	5,825	1,949	33.3%

Table 33. Waterbury Branch Line Parking Capacity and Utilization

3.2.1 Waterbury

The City of Waterbury has 3,451 parking spaces available within half a mile of the station, which are open to the public for parking up to 10 hours or more. Parking is a mix of on-street, lots and garages. Figure 60 provides information regarding parking areas. In the direct vicinity of the rail station there are 150 spaces plus six handicap spaces available for surface parking, plus 42 on-street

parking spaces with 10-hour time limits. Downtown Waterbury is within half a mile of the train station. In the downtown area, there are an additional two surface parking lots, four garages and two streets with 10-hour limits. The Buckingham Garage (P2) on Grand Street is the largest parking structure with 1,400 spaces followed by the Scovill Street Garage (P5) and Courtyard Marriott Garage (P8) with 843 and 630 parking spaces respectively. Surface parking includes the East Main Street Lot (P4),

Center Street Lot (P3) and West Main Street Lot (P6) with 200, 90 and 51 spots respectively. In Waterbury there are approximately 630 on-street parking spaces, but only 89 spaces (including the 42 by the train station) allow for parking up to eight hours, locations include Meadow Street, State Street, and Union Street.

Name	Capacity	Occupied	Utilization
P1 Rail Station	206	41	19.9%
P2 Buckingham Garage	1400	624	44.6%
P3 Center St Lot	90	74	82.2%
P4 East Main St Lot	200	71	35.5%
P5 Scovill St Garage	853	255	29.9%
P6 West Main Street Lot	53	21	39.6%
P8 Courtyard Marriott Garage	630	132	21.0%
P11 Meadow Street	23	1	4.3%
P12 Meadow Street	10	2	20.0%
P13 Meadow Street	9	1	11.1%
P14 State Street	7	7	100.0%
P15 Union Street	6	6	100.0%
P16 Union Street	12	2	16.7%
P17 Union Street	2	3	150.0%
Total	3501	1240	34.9%

Table 34. Waterbury Parking Utilization

The usage rate for all parking observed was 34.9%. The utilization rate at the train station is 18.1%, lower than the average. Parking downtown in garages and surface lots is slightly higher than the overall utilization. On-street parking in the downtown has the highest utilization at 66%, but at the rail station is just 10%. The 2001 station parking inventory, as part of the Rail Governance Study by CTDOT and conducted by Urbitran, listed utilization at 15.4%, indicating that utilization of the train station lot has increased slightly. The 2001 study only examined the parking at the station lot, which included 156 spots. Parking was expanded in 2014 with the demolition of the adjacent former SNET building.

Parking Area Ownership

Parking adjacent to the tracks at the Waterbury Rail Station is owned by the State of Connecticut. This accounts for the majority (78.8%) of the parking directly at the train station. The City of Waterbury owns the Buckingham, Scovill Street and Courtyard Marriott

Garages as well as the West Main Street Lot. The Center Street and East Main Street Lots are privately operated Public Parking Lots.

Fee Structure

Parking at the rail station lot is free for passengers but all other parking is paid. Table 35 provides a breakdown of costs.

Name	Cost
P1 Rail Station	Free
P2 Buckingham Garage	\$2.00/hour
P3 Center Street Lot	\$3.00 for the first hour, \$2.00 each additional hour, or \$10.00 per day
P4 East Main Street Lot	\$5.00/day
P5 Scovill Street Garage	\$2.00/hour
P6 West Main Street Lot	Metered
P8 Courtyard Marriott Garage	\$2.00/hour; max \$12/day
P11 Meadow Street	Metered
P12 Meadow Street	Metered
P13 Meadow Street	Metered
P14 State Street	Metered
P15 Union Street	Metered
P16 Union Street	Metered
P17 Union Street	Metered

Table 35. Waterbury Parking Costs

Waterbury Station Parking - Key Findings

- Parking at the rail station is underutilized.
- Parking at the Waterbury Station has increased slightly since 2001.
- All parking outside of the rail station is paid.
- There is ample supply of parking in downtown Waterbury.
- Parking ownership varies. The station parking is owned by the state, all on-street parking is owned by the municipality and parking garages/lots are owned by either Waterbury or private operators.

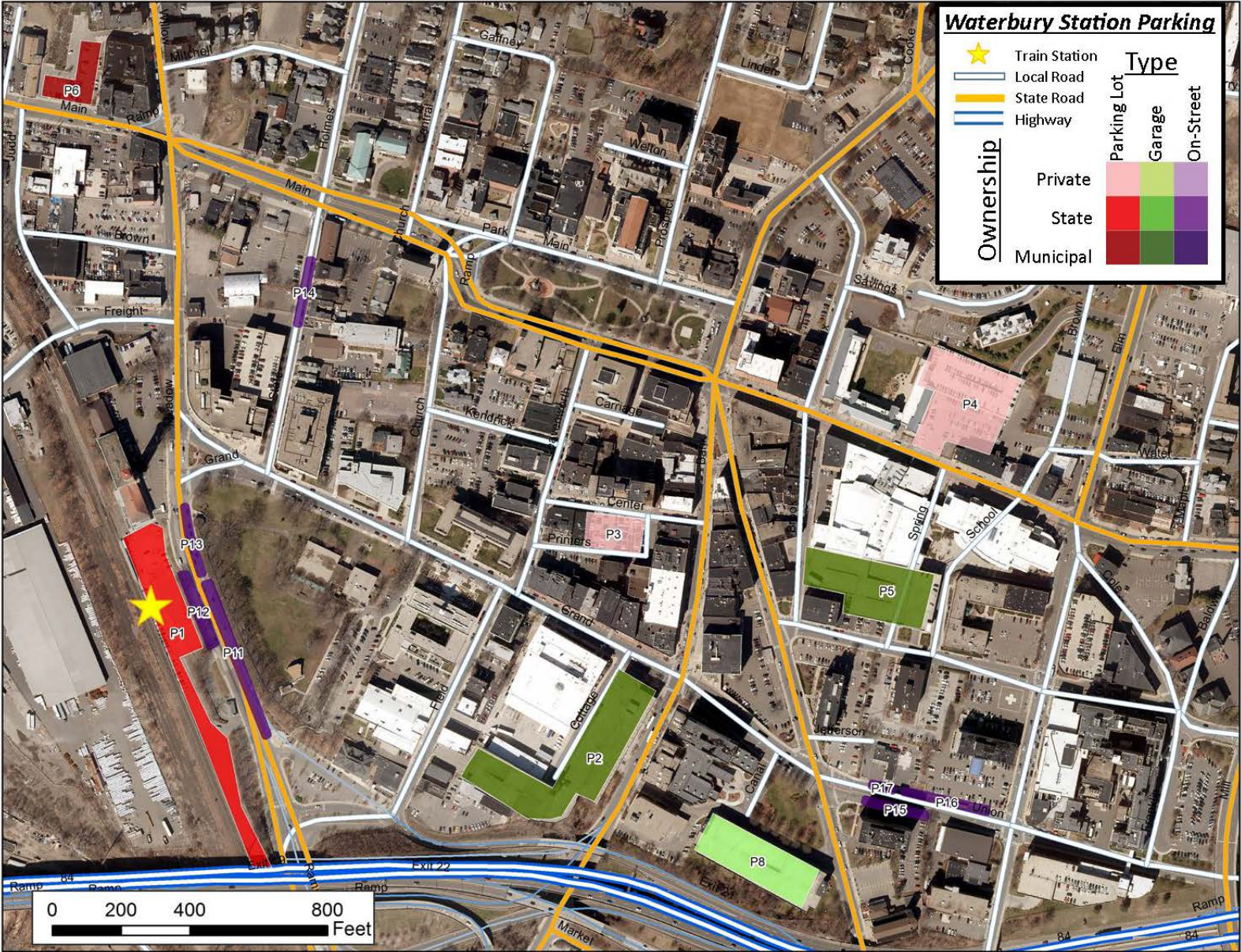


Figure 60. Waterbury Rail Station Parking Map

3.2.2 Naugatuck

The Borough of Naugatuck has 412 parking spaces open to the public available within half a mile of the station without time restrictions. Most of this parking is on-street mixed-use parking within the vicinity of the downtown. Figure 62 provides information regarding parking areas. The historic Naugatuck rail station building and property is privately owned and houses a restaurant. Through agreement with Metro-North, 30 spaces at the site are marked reserved for the use of rail travelers. The remaining 384 spots are on-street parking with a mix of painted stalls and wide shoulders.



Figure 61. Naugatuck Station Parking

The usage rate for all parking observed was 15.6%. At the Naugatuck Rail Station surface lot the utilization was 22.4%. On-street parking utilization is highest along Cedar Street and Church Street from Cedar Street to Maple Street. The 2001 station parking inventory, as part of the Rail Governance Study by CTDOT and conducted by Urbitrans, listed utilization at 10.3%, indicating that utilization of the train station lot has increased. The 2001 study only examined the parking in the direct vicinity of the station.

Parking Area Ownership

All parking at and around the Naugatuck Train Station is owned by the City of Naugatuck.

Fee Structure

Parking at the Naugatuck Train Station and surrounding on-street parking is free.

Name	Capacity	Occupied	Utilization
P18	30	28	22.4%
P19	12	2	16.7%
P20	24	4	16.7%
P21	8	3	37.5%
P22	9	6	66.7%
P24	7	2	28.6%
P25	3	3	100.0%
P26	3	2	66.7%
P27	4	1	25.0%
P28	12	3	25.0%
P29	3	1	33.3%
P30	2	2	100.0%
P31	13	3	23.1%
P32	7	0	0.0%
P33	3	2	66.7%
P34	4	0	0.0%
P38	1	1	100.0%
P39	2	0	0.0%
P41	4	3	75.0%
P50	2	2	100.0%
P53	9	0	0.0%
P67	10	0	0.0%
PCL_10	40	2	5.0%
PCL_11	45	3	6.7%
PCL_16	20	0	0.0%
PCL_21	9	2	22.2%
PCL_22	9	1	11.1%
PCL_23	41	0	0.0%
PCL_25	76	3	3.9%
Total	412	79	15.6%

Table 36. Naugatuck Parking Utilization

Naugatuck Station Parking - Key Findings

- Parking at the rail station is underutilized.
- Parking at the Naugatuck Station has increased slightly since 2001.
- All parking is free
- In Downtown Naugatuck most parking is on street
- Parking at the rail station is owned by the state.

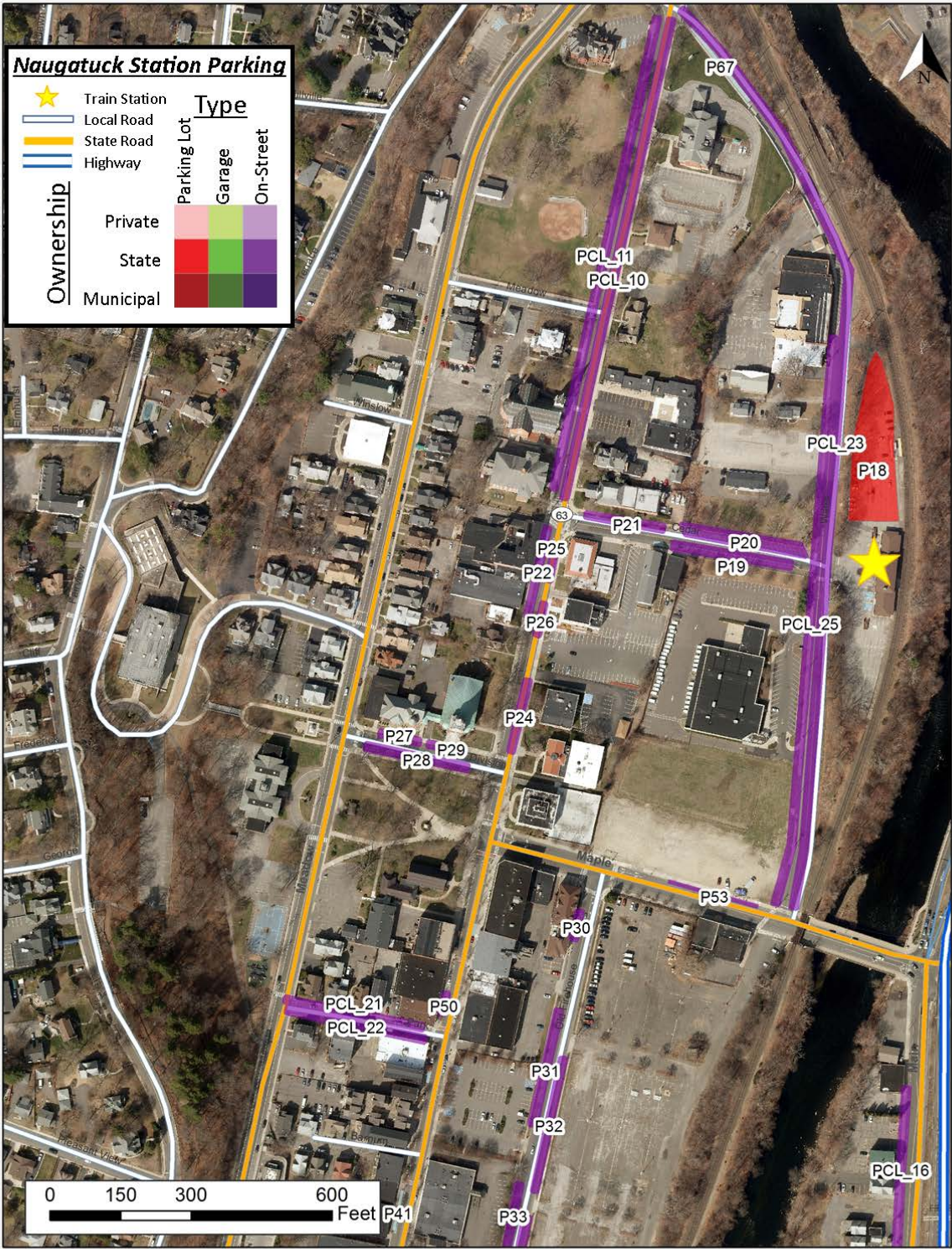


Figure 62. Naugatuck Rail Station Parking Map

3.2.3 Beacon Falls

The Town of Beacon Falls has 368 parking spaces available within half a mile of the station, which are open to the public without time restrictions. Most of this parking is on-street parking along Route 42 where the shoulder is wide enough to accommodate parking. The parking along the northern section of North Main Street primarily serves local businesses. Figure 64 provides information regarding parking areas. In the direct vicinity of the Train Station there are 51 spaces available for surface parking plus three handicap spaces.



Figure 63. Beacon Falls Station Parking

The usage rate for all parking observed was 8.4%. At the Beacon Falls Train Station surface lot the utilization was 14.8%. On-street parking along Route 42 averaged 7.3%, with higher rates in the vicinity of the downtown. The 2001 station parking inventory, as part of the Rail Governance Study by CTDOT and conducted by Urbitran, listed utilization at 21.4%. The 2001 study only examined the parking in the direct vicinity of the station and at the time had a capacity of 28. The lot has since been expanded to 54 spaces and paved. Occupancy from 2001 to 2017 has increased slightly from six to eight percent.

Name	Capacity	Occupied	Utilization
P54	54	8	14.8%
P55	5	1	20.0%
P56	2	1	50.0%
P57	3	2	66.7%
P65	18	3	16.7%
P66	8	2	25.0%
PCL_1	12	2	16.7%
PCL_2	15	2	13.3%
PCL_3	22	3	13.6%
PCL_4	80	0	0.0%
PCL_5	37	1	2.7%
PCL_6	55	0	0.0%
PCL_7	25	0	0.0%
PCL_8	17	1	5.9%
PCL_9	15	5	33.3%
Total	368	31	8.4%

Table 37. Beacon Falls Parking Utilization

Parking Area Ownership

Parking at the Beacon Falls Train station is owned by the State of Connecticut. The Town of Beacon Falls owns the remaining on-street parking inventoried.

Fee Structure

Parking at the Beacon Falls Train Station and surrounding on-street parking is free.

Beacon Falls Station Parking - Key Findings

- Parking at the rail station is underutilized.
- Parking at the Waterbury Station has increased slightly since 2001 but due to a recent parking lot expansion the utilization has decreased as more spaces were added.
- All parking outside of the rail station is on-street.

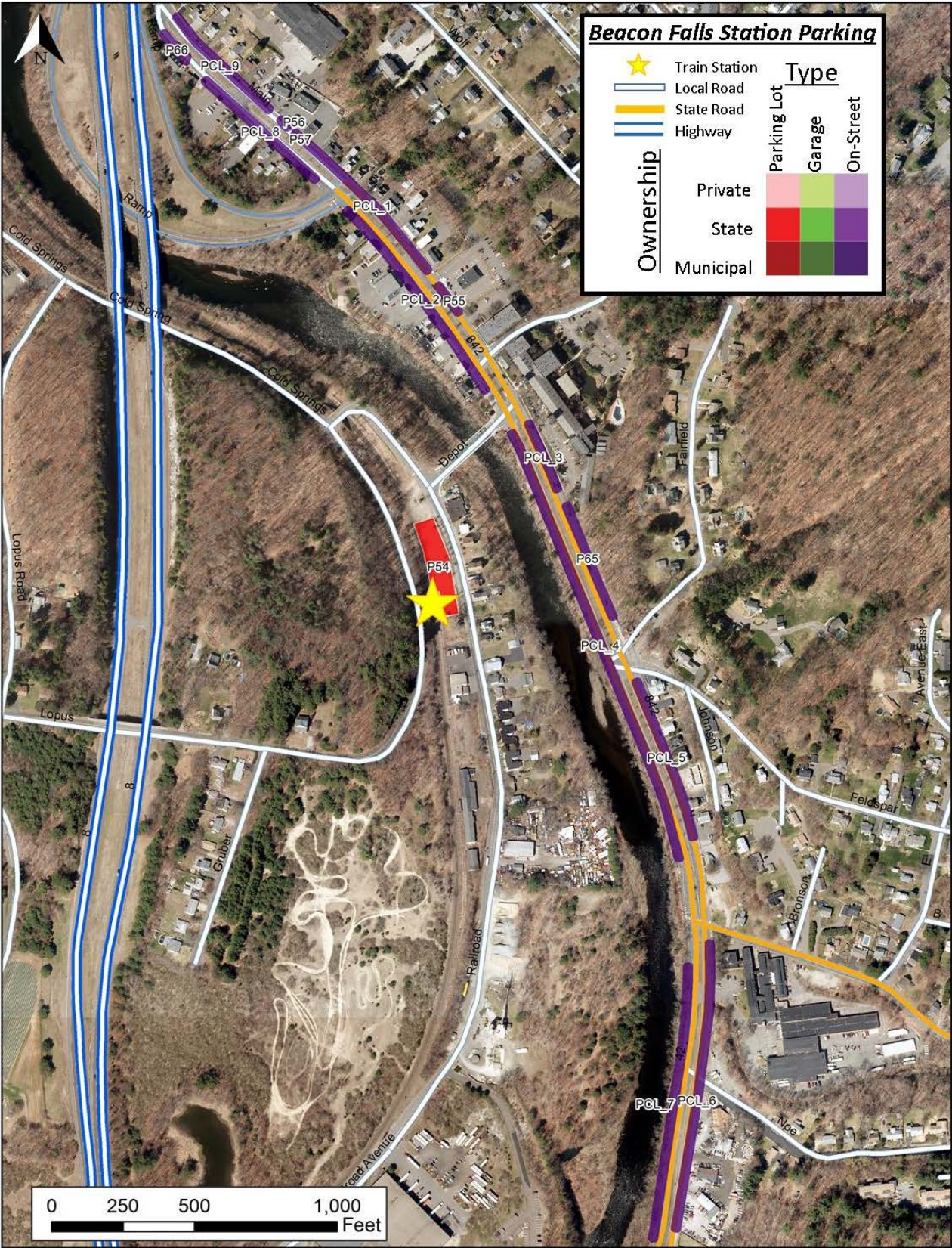


Figure 64. Beacon Falls Station Parking

3.2.4 Seymour

The Town of Seymour has 351 parking spaces available within half a mile of the station, which are open to the public without time restrictions. Parking is a mix of on-street and surface parking. Due to the mixed-use nature of the downtown it is impossible to determine which spaces are utilized by rail station users. Figure 66 provides information regarding parking areas. At the rail station there is no long term public parking; the spaces adjacent to the track are limited to two hours and just south of the platform along the tracks are restricted to Bank of America customers. The majority of on-street parking within downtown Seymour is limited to two hours. There are four public parking lots without time limits but permits are required to park Monday-Friday between 5:00 AM and 10:00 AM. The closest lot is at the intersection of Main Street (P58) and Route 67, a walking distance of 300 feet to the train station, and has a capacity of 21 plus two handicap spots. Parking was also counted along Humphrey Street and Washington Avenue because there are no time constraints or required permits and access to the rail station is provided by the overhead pedestrian walkway. Both streets are within a residential area. Parking was counted along both sides of Washington Avenue. Humphrey Street is a one-way street.

The usage rate for all parking observed was 26.5%.



Figure 65. Seymour Station Parking

Parking at the closest lot (P58) had a utilization of 60.9% and downtown parking was 38.7%. On-street parking outside of the downtown had a utilization of 17.4%. The 2001 station parking inventory, as part of the Rail Governance Study by CTDOT and conducted by Urbitran, listed utilization at 72.7%. The 2001 study examined the parking adjacent to the rail station.

Name	Capacity	Occupied	Utilization
P58	23	14	60.9%
P59	29	7	24.1%
P60	27	8	29.6%
P61	64	27	42.2%
P62	7	2	28.6%
PCL_19	51	19	37.3%
PCL_20	150	16	10.7%
Total	351	93	26.5%

Table 38. Seymour Parking Utilization

Parking Area Ownership

Parking at the Main Street/Broad Street and Main Street/Route 67 lot is owned by the State of Connecticut. The Town of Seymour owns the remaining parking around the station and all other lots and on-street parking inventoried.

Fee Structure

Parking at the Seymour Train Station and surrounding municipal lots is free.

Seymour Station Parking - Key Findings

- There is no long-term parking available at the station but there are several lots within 1,000 feet and on street parking along Humphrey Street and Washington Ave.
- Parking at the Seymour Station has increased slightly since 2001.
- All parking is free.
- The majority of on-street parking in downtown Seymour has time limits that prevent commuters from parking there.

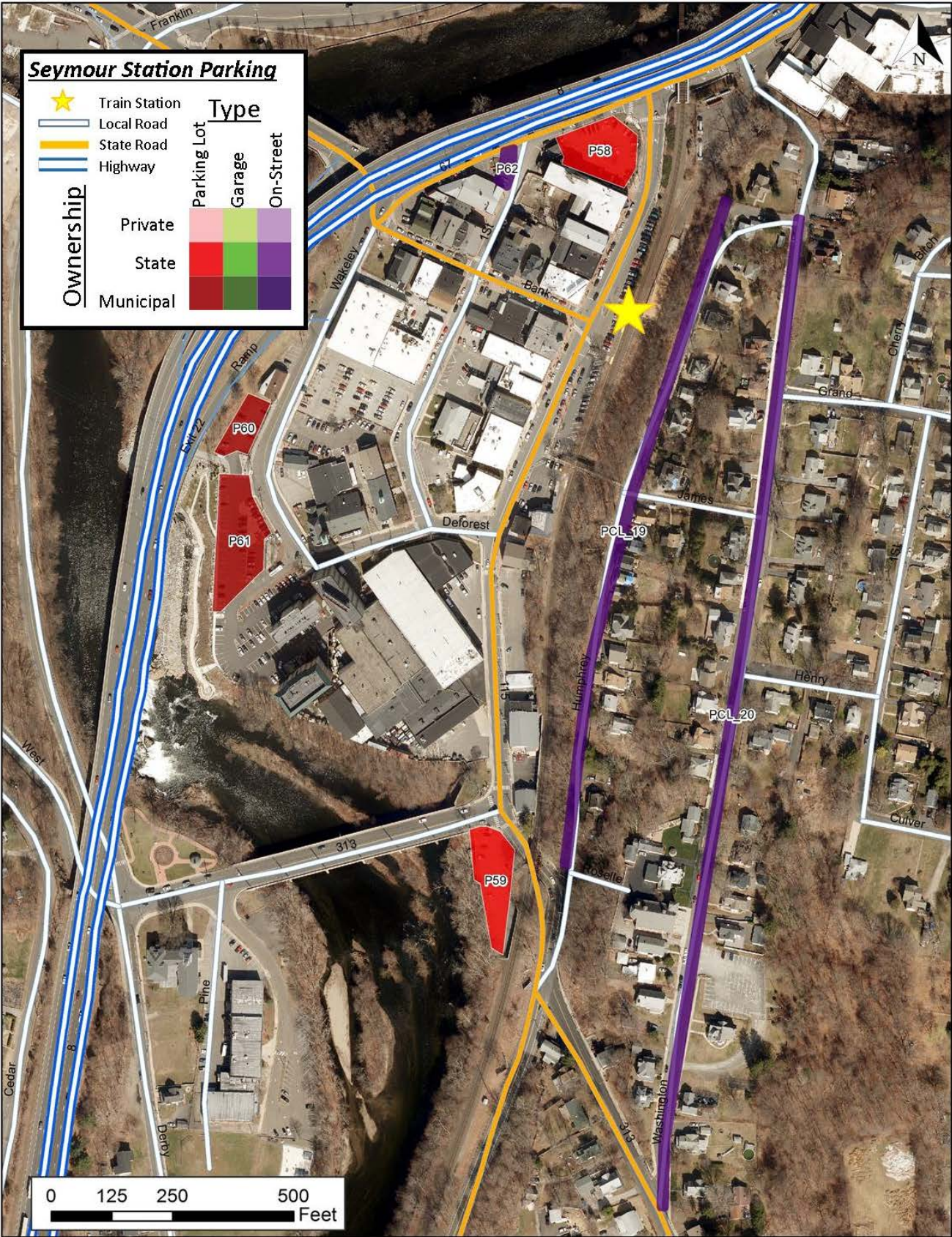


Figure 66. Seymour Station Parking Map

3.2.5 Ansonia

The City of Ansonia has 441 parking spaces available within half a mile of the station, which are open to the public without time restrictions. All parking is within parking lots and is mixed-use parking for the rail station and downtown. Figure 68 provides information regarding parking areas. In the direct vicinity of the train station there are 77 spaces available for surface parking plus three handicap spaces. Just south of the train station is a large municipal lot (P68) with 138 spaces, including six handicap spaces. There are two other municipal lots in Downtown Ansonia. The first lot is between Main Street and East Main Street by Maple Street (P74) with a capacity of 112, including five handicap spaces. The second lot is located on East Main Street (P73), behind City Hall. This lot has a capacity of 107, including six handicap spaces.

parking utilization in the direct vicinity of the rail station (41.3%) and area lots (41.2%). The 2001 station parking inventory, as part of Rail Governance Study by CTDOT and conducted by Urbitran, listed utilization at 68.8%. The 2001 study only examined the parking in the direct vicinity of the station.

Name	Capacity	Occupied	Utilization
P68	138	25	18.1%
P69	26	10	38.5%
P70	10	0	0.0%
P71	26	13	50.0%
P72	5	3	60.0%
P73	107	90	84.1%
P74	112	32	28.6%
P79	13	7	53.8%
Total	437	180	41.2%

Table 39. Ansonia Parking Utilization

Parking Area Ownership

Parking adjacent to the tracks at the Ansonia Rail station is owned by the State of Connecticut. This accounts for approximately 45% of the parking directly at the train station. The Town of Ansonia owns the remaining parking around the station and all other lots inventoried.

Fee Structure

Parking at the Ansonia Rail Station and surrounding municipal lots is free.

Ansonia Station Parking - Key Findings

- Parking at the rail station is underutilized.
- Parking at the Ansonia Station has decreased slightly since 2001.
- All parking is free.
- The majority of on-street parking in downtown Ansonia has time limits that prevent commuters from parking there.
- The majority of parking around the station is owned by the municipality.



Figure 67. Ansonia Station Parking

The usage rate for all parking observed was 41.2%. The overall rate corresponds closely to the breakdown of

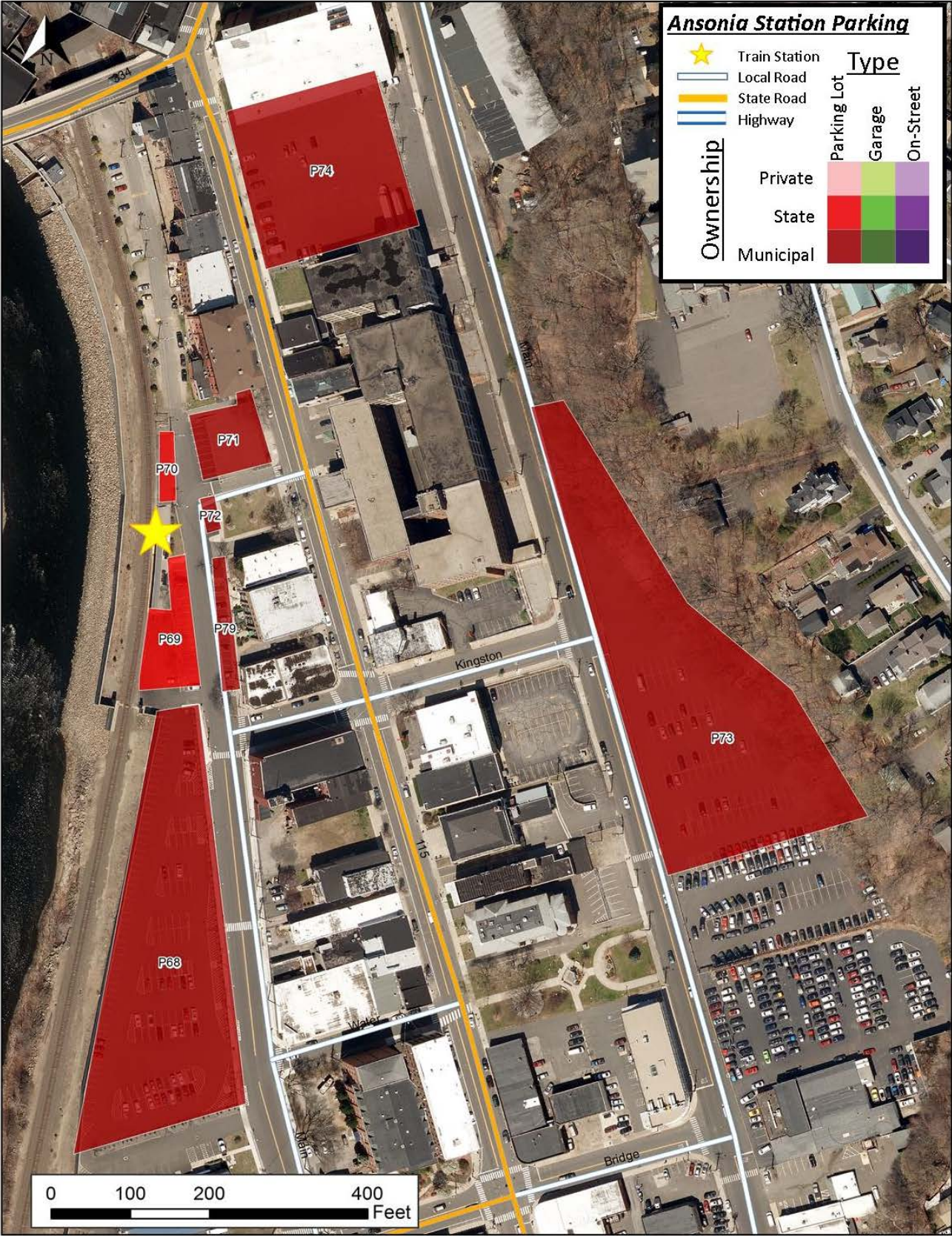


Figure 68. Ansonia Station Parking Map

3.2.6 Derby/Shelton

The Cities of Derby and Shelton have 738 parking spaces available within half a mile of the Derby/Shelton Rail Station, which are open to the public without time restrictions. Parking is a mix of on-street, garage and surface parking lots and mixed-use parking is most prevalent for the rail station and downtown. Figure 70 provides information regarding parking areas. In the direct vicinity of the rail station there are 72 spaces available for surface parking plus five handicap spaces. Within a half mile there are two other surface parking lots, one parking garage and on-street parking available. The first lot is in Derby on Hallock Court (P77) with a capacity of 110. The second lot is located in Shelton at Canal Street West (P78). This lot has a capacity of 124, including ten handicap spaces. The Derby Municipal Parking Garage (P76) has a capacity of 310 spaces. On-street parking is available along both sides of Howe Avenue in Shelton and parking in Derby is restricted to two hours.



Figure 69. Derby Station Parking

The usage rate for all parking observed was 44.2%. The utilization rate at the train station is 94.8%, higher than the average. The 2001 station parking inventory, as part of the Rail Governance Study by CTDOT and conducted by Urbitrans, listed utilization at 38.7%, indicating that utilization of the train station lot has increased. The 2001 study only examined the parking at the station lot. Parking in Derby had a higher rate (45.8%, than parking in

Shelton (41%). The distributions of utilization between on-street, surface and garage is similar to the overall rate of 44.2%

Name	Capacity	Occupied	Utilization
P75	77	73	94.8%
P76	310	140	45.2%
P77	100	10	10.0%
P78	124	49	39.5%
PCL_26	12	5	41.7%
PCL_27	5	2	40.0%
PCL_28	10	0	0.0%
PCL_29	9	7	77.8%
PCL_30	18	11	61.1%
PCL_31	15	14	93.3%
PCL_32	13	0	0.0%
PCL_33	8	3	37.5%
PCL_34	21	5	23.8%
PCL_35	16	7	43.8%
Total	738	326	44.2%

Table 40. Derby Parking Utilization

Parking Area Ownership

Parking adjacent to the tracks at the Derby Train Station is owned by the State of Connecticut. Derby and Shelton own the remaining parking around the station and all other lots/garages inventoried.

Fee Structure

Parking at the Derby Rail Station is free. Parking at the Derby Municipal Garage ranges from \$2.50 for the first hour up to \$10 for more than eight hours, monthly passes are available. The municipal surface lot at Hallock Court is free. All parking in Shelton is free.

Derby Shelton Station Parking - Key Findings

- Parking at the rail station is almost 100% utilized.
- All parking in Shelton is free; in Derby there is a cost for the municipal garage.



Figure 70. Derby/Shelton Station Parking Map

3.3 Parking Key Findings

- The WBL has 557 parking spaces at its six rail stations and an additional 5,259 within half a mile of the stations. At the time of inventory station parking utilization was 36.1% and all other was 33%.
- The Derby/Shelton Station has the highest utilization at the station, and Ansonia has the highest in the downtown.
- Beacon Falls has the lowest utilization at both the station and downtown.
- All parking at the WBL stations is free; outside of the stations it varies by municipality.
- Parking at many of the stations has increased since 2001.
- The Derby/Shelton Station parking is shared with the DMV office parking resulting in almost 100% utilization. Parking expansion at this location would be difficult.
- Parking at most stations is underutilized.
- Seymour is the only station without a direct parking lot.
- Station parking property at all locations is owned by the State of Connecticut.
- The majority of on-street parking in downtown Seymour has time limits which would prevent commuters from parking there.
- There is ample supply of parking in downtown Waterbury.
- Parking ownership varies in Waterbury. The station parking is owned by the state, all on-street parking is owned by the municipality and parking garages/lots are owned by either Waterbury or private operators. Waterbury is the only one with private parking.
- Parking at the Beacon Falls Station has increased slightly since 2001 but utilization has decreased due to parking lot expansion.
- In downtown Naugatuck most parking is on street.

4. TRAVEL PATTERNS

4.1 Modal Split

Modal split is a breakdown of the modes – single-occupancy vehicle, carpool, public transit, walk, bicycle, etc. – that workers use to travel to work each day. For home-based work trips, residents of the Study Corridor have a similar modal split to that of the overall state population (Figure 71). While workers in the Study Corridor drive alone and carpool more than the state average, they also walk and take public transit less. While the Connecticut rate of driving alone to work is 78.3%, the corridor rate ranges from 77.7% in Derby to 92.7% in Shelton, for an average of 83.1%. The percentage of workers in Connecticut who take public transit to work is 4.8%, as compared to the corridor rate of 2.7%. Only Waterbury, with 4.3% of its workforce commuting via transit, comes close to the state rate.

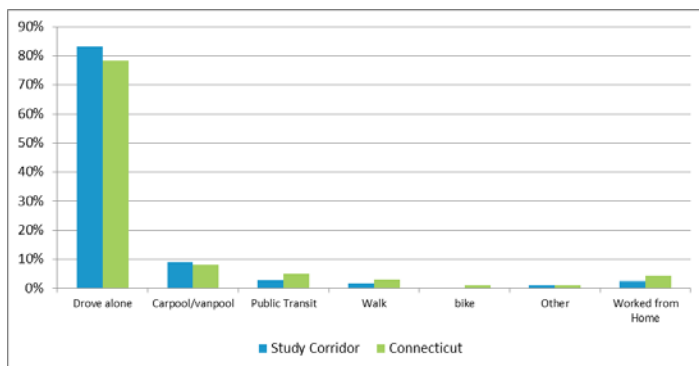


Figure 71. Mode Split for Commute to Work

4.2 Travel Time

Travel time to work is the total number of minutes that it usually takes each individual to go from home to work. Overall the commute to work time in the corridor is similar to the overall state distribution (Figure 72). While the study corridor has a higher percentage of individuals with commute times less than ten minutes or greater than 60, the state has a greater percentage of mid-range time trips. The average commute time in the corridor, 25.4 minutes, is slightly lower than the state wide average

of 25.6 minutes. The corridor average commute times range from 24.1 minutes in Waterbury to 28 minutes in Seymour.

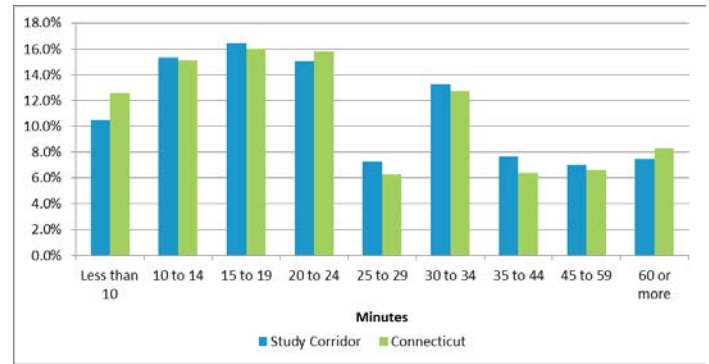


Figure 72. Travel Time for Commute to Work

4.3 Journey to Work

Journey to Work data refers to commuting patterns determined by workers' home and work locations. When analyzing this data, it is important to look both at the work locations of people who live in the Study Corridor as well as the home locations of people who work in the Study Corridor. By looking at both of these aspects, a clearer understanding of travel patterns to, from, and within the study corridor emerges.

As shown in Table 43, in terms of work locations of people who live in the study corridor, in 2014 19.8% of study corridor residents worked in the same town in which they lived. While most of the communities in the study corridor have a large percentage of residents who live and work in the same community, the corridor is largely used for transportation to other employment centers within and outside of the study corridor. In addition to those who live and work in the same community, 10.9% live and work within the seven corridor communities. Figure 73 shows the travel patterns of residents who live and work in the corridor and Table 41 presents the data in matrix form.

Place of Work

Home Town	Waterbury	Naugatuck	Beacon Falls	Seymour	Ansonia	Derby	Shelton	Total
Waterbury	14,251	1,421	114	314	100	119	401	16,720
Naugatuck	1,836	1,939	60	267	107	216	591	5,016
Beacon Falls	245	88	111	125	52	75	184	880
Seymour	222	103	28	869	214	326	743	2,505
Ansonia	184	107	23	261	558	534	856	2,523
Derby	84	52	13	111	116	537	609	1,522
Shelton	134	88	23	176	124	416	3,214	4,175
Total	16,956	3,798	372	2,123	1,271	2,223	6,598	

Table 41. Travel Patterns Within the Corridor

outside of the study area are New Haven (4.2%), Bridgeport (3.9%), and New York City (3.0%). It is interesting to note that outside of Waterbury the greatest number of the city's residents work in New York City.

As shown in Table 44, the home locations of people who worked in the Study Corridor in 2014 are similar to the work locations of Study Corridor residents at the time. The following category's from Table 44: Same Town, New Haven County, elsewhere in the Study Corridor, and Litchfield County accounted for 24.1%, 19.7%, 13.3%, and 9.4% of home locations for Study Corridor workers, respectively. Figure 74 shows the concentrations of where corridor employees live. Thirty-four percent of employees who work within the corridor are residents and an additional 50.9% live within 10 minutes of the corridor communities. The communities where employees who do not live in the corridor but work in it are Bridgeport (3.7%) and New Haven (1.7%).

Corridor Community	Community Where Largest % of Residents Work Outside of Corridor
Waterbury	New York City
Naugatuck	New Haven
Beacon Falls	New Haven
Seymour	New Haven
Ansonia	New Haven
Derby	New Haven
Shelton	Bridgeport

Table 42. Top Municipality for Employment Outside the Study Corridor

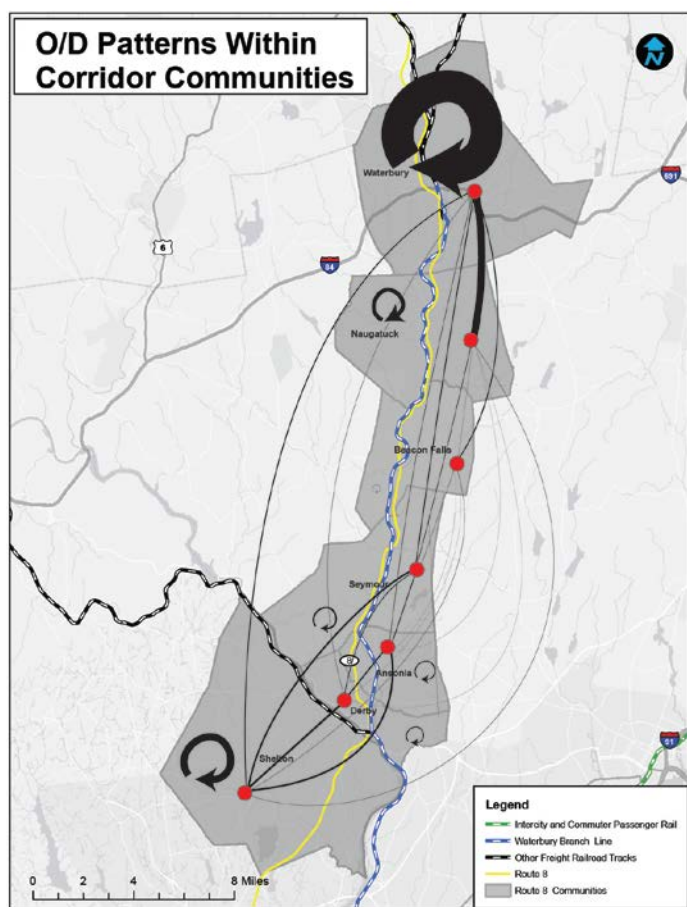


Figure 73. Origin Destination Patterns Within Corridor Communities (Correlates with Table 41)

Outside of the corridor the next most common work places were New Haven County, Fairfield County and Hartford County, with 18.8%, 10.7%, and 8.9% of study corridor residents working in each of these counties, respectively. The communities where the greatest percentage of corridor residents who are employed

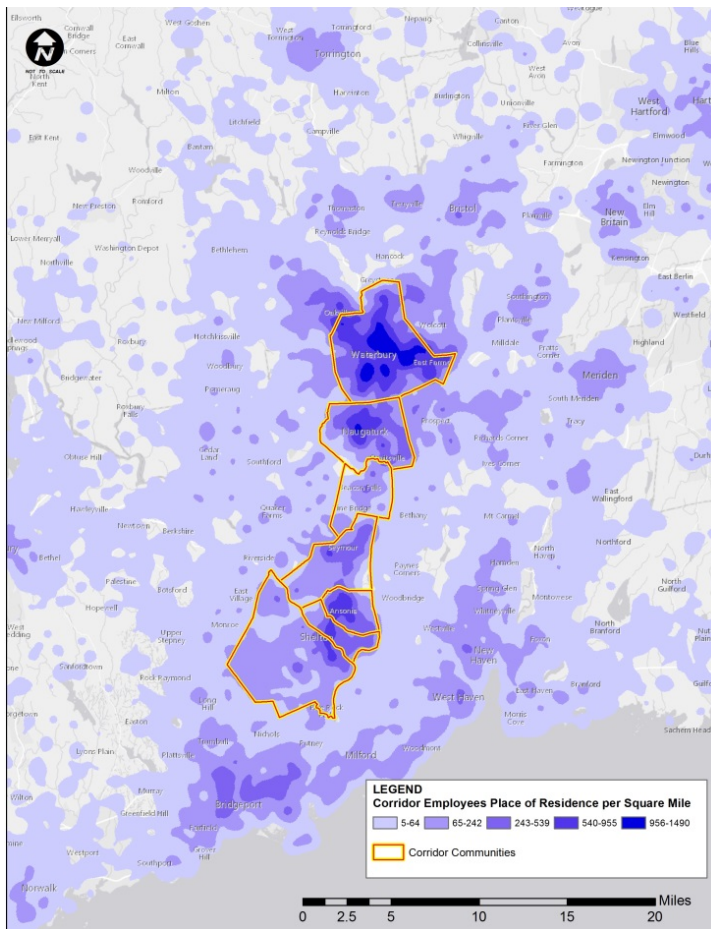


Figure 74. Corridor Community Employees Place of Residence

- Derby and Shelton are adjacent communities but 77.7% of Derby residents drive alone to work compared to the 92.7% in Shelton.
- WBL communities use public transportation less on average than the state to access work.
- Waterbury has the highest rate of public transit users amongst the WBL communities.
- 19.8% of study corridor residents worked in the same town in which they lived.
- All communities except Beacon Falls, Ansonia and Derby have the greatest percentage of residents working in the community they reside in. The highest percentage of these residents are working in New Haven.
- In addition to those who live and work in the same community, 10.9% live and work within the seven corridor communities.

4.4 Key Findings for Corridor

- Among the WBL corridor communities, the number of workers going to New Haven (4,566) is greater than Bridgeport (4,191).
- Among those living in the WBL communities approximately 9,300 work in either Bridgeport, Stamford or New York City. This indicates that approximately half of the passengers on the WBL may require a transfer (Figure 75).
- Approximately 3,283 workers live in Bridgeport and work in one of the WBL corridor communities; this is double the number that live in New Haven but work along one of these corridors (Figure 75).

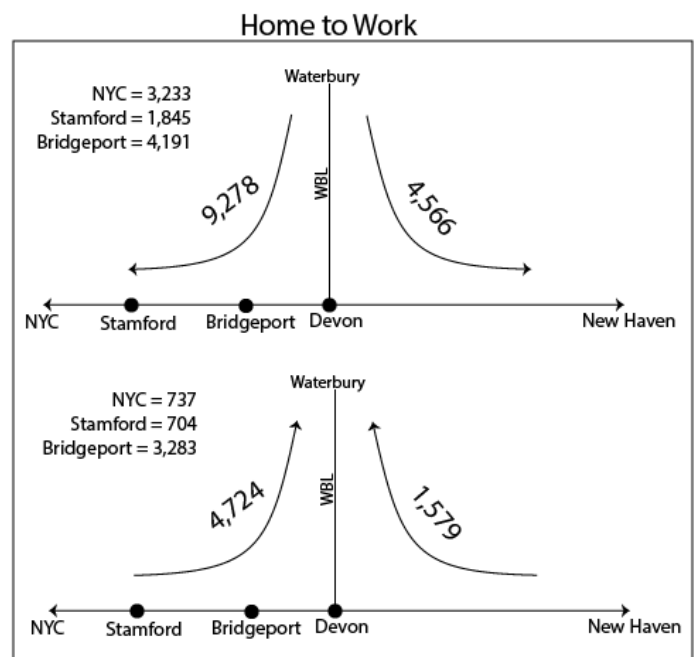


Figure 75. Corridor Flow Patterns

Existing Conditions

		WORK LOCATION																	
		Same	Study	Bridgeport	New	Stamford	Hartford	Danbury	NYC	Hartford	NH Cty*	Fairfield	Litchfield	CT	Westchester	NY	Massachusetts	Other*	TOTAL
		Town	Corridor*		Haven					Cty*									
HOME TOWN	Waterbury	14251	2469	561	1072	419	1240	956	1435	5509	8237	2383	3787	1375	208	598	341	696	45537
		31.30%	5.42%	1.23%	2.35%	0.92%	2.72%	2.10%	3.15%	12.10%	18.09%	5.23%	8.32%	3.02%	0.46%	1.31%	0.75%	1.53%	
	Naugatuck	1939	3077	375	647	182	455	453	411	1760	3487	1695	953	449	83	159	117	179	16421
		11.81%	18.74%	2.28%	3.94%	1.11%	2.77%	2.76%	2.50%	10.72%	21.24%	10.32%	5.80%	2.73%	0.51%	0.97%	0.71%	1.09%	
	Beacon Falls	111	769	66	160	41	99	72	71	262	770	451	124	94	12	27	22	46	3197
		3.47%	24.05%	2.06%	5.00%	1.28%	3.10%	2.25%	2.22%	8.20%	24.09%	14.11%	3.88%	2.94%	0.38%	0.84%	0.69%	1.44%	
	Seymour	869	1636	336	556	104	170	71	105	494	1781	1551	123	230	22	49	67	87	8251
		10.53%	19.83%	4.07%	6.74%	1.26%	2.06%	0.86%	1.27%	5.99%	21.59%	18.80%	1.49%	2.79%	0.27%	0.59%	0.81%	1.05%	
	Ansonia	558	1965	416	720	141	187	84	114	555	2013	1535	101	285	28	58	66	88	8914
		6.26%	22.04%	4.67%	8.08%	1.58%	2.10%	0.94%	1.28%	6.23%	22.58%	17.22%	1.13%	3.20%	0.31%	0.65%	0.74%	0.99%	
	Derby	537	985	218	482	98	111	50	77	381	1275	960	71	190	20	36	42	75	5608
		9.58%	17.56%	3.89%	8.59%	1.75%	1.98%	0.89%	1.37%	6.79%	22.74%	17.12%	1.27%	3.39%	0.36%	0.64%	0.75%	1.34%	
	Shelton	3214	961	2219	929	869	117	413	1020	600	2797	3024	133	3422	219	292	92	280	20601
		15.60%	4.66%	10.77%	4.51%	4.22%	0.57%	2.00%	4.95%	2.91%	13.58%	14.68%	0.65%	16.61%	1.06%	1.42%	0.45%	1.36%	
	TOTAL	21479	11862	4191	4566	1854	2379	2099	3233	9561	20360	11599	5292	6045	592	1219	747	1451	108529
		19.79%	10.93%	3.86%	4.21%	1.71%	2.19%	1.93%	2.98%	8.81%	18.76%	10.69%	4.88%	5.57%	0.55%	1.12%	0.69%	1.34%	

Table 43. Work Location of People Who Live in the Study Corridor, 2014

		HOME LOCATION																	
		Same	Study	Bridgeport	New	Stamford	Hartford	Danbury	NYC	Hartford	NH Cty*	Fairfield	Litchfield	CT	Westchester	NY	Massachusetts	Other*	TOTAL
		Town	Corridor*		Haven					Cty*									
WORK TOWN	Waterbury	14251	2705	465	445	201	384	365	347	4460	8075	1481	6258	1758	111	318	354	456	42434
		33.58%	6.37%	1.10%	1.05%	0.47%	0.90%	0.86%	0.82%	10.51%	19.03%	3.49%	14.75%	4.14%	0.26%	0.75%	0.83%	1.07%	
	Naugatuck	1939	1859	108	90	32	35	83	53	622	1526	363	869	336	29	76	72	57	8149
		23.79%	22.81%	1.33%	1.10%	0.39%	0.43%	1.02%	0.65%	7.63%	18.73%	4.45%	10.66%	4.12%	0.36%	0.93%	0.88%	0.70%	
	Beacon Falls	111	261	5	7	4	3	8	0	48	220	37	57	26	1	8	4	5	805
		13.79%	32.42%	0.62%	0.87%	0.50%	0.37%	0.99%	0.00%	5.96%	27.33%	4.60%	7.08%	3.23%	0.12%	0.99%	0.50%	0.62%	
	Seymour	869	1254	124	117	13	10	53	30	196	1043	323	249	123	5	50	46	35	4540
		19.14%	27.62%	2.73%	2.58%	0.29%	0.22%	1.17%	0.66%	4.32%	22.97%	7.11%	5.48%	2.71%	0.11%	1.10%	1.01%	0.77%	
	Ansonia	558	713	130	126	14	15	28	22	133	754	317	132	139	7	39	25	45	3197
		17.45%	22.30%	4.07%	3.94%	0.44%	0.47%	0.88%	0.69%	4.16%	23.58%	9.92%	4.13%	4.35%	0.22%	1.22%	0.78%	1.41%	
	Derby	537	1686	202	220	48	27	62	38	228	1275	477	225	170	14	64	24	53	5350
		10.04%	31.51%	3.78%	4.11%	0.90%	0.50%	1.16%	0.71%	4.26%	23.83%	8.92%	4.21%	3.18%	0.26%	1.20%	0.45%	0.99%	
	Shelton	3214	3384	2249	574	392	256	351	247	1441	4661	5252	546	953	179	321	184	377	24581
		13.08%	13.77%	9.15%	2.34%	1.59%	1.04%	1.43%	1.00%	5.86%	18.96%	21.37%	2.22%	3.88%	0.73%	1.31%	0.75%	1.53%	
	TOTAL	21479	11862	3283	1579	704	730	950	737	7128	17554	8250	8336	3505	346	876	709	1028	89056
		24.12%	13.32%	3.69%	1.77%	0.79%	0.82%	1.07%	0.83%	8.00%	19.71%	9.26%	9.36%	3.94%	0.39%	0.98%	0.80%	1.15%	

Table 44. Home Location of People Who Work in the Study Corridor, 2014

5. EXISTING ROAD NETWORK

5.1 Traffic Analysis

Traffic volume data was gathered from existing sources to document the traffic patterns and flows in the study area. Several types of traffic volume data are typically analyzed. Average Annual Daily Traffic (AADT) represents the total traffic flow in both directions on a roadway during an average day. AADT includes the count of all vehicle types, including cars, trucks and buses, and is expressed in terms of vehicles per day (vpd).

Since traffic fluctuates throughout the day, studies often focus on the peak periods of traffic flow, which typically occur during the morning and afternoon commute hours. In areas where there is significant shopping traffic, the Saturday mid-day peak hour may also be critical. Peak hour volumes represent the highest overall traffic flow actually observed during the peak period, and are expressed in terms of vehicles per hour (vph).

Data compiled for this study along Route 8 includes AADT's based on counts taken at permanent counting stations by the Connecticut Department of Transportation (CTDOT). The most recent data available on Route 8 is for 2012, and is summarized in Figure 76. It shows that the highest overall traffic volumes are nearest to the Waterbury and Bridgeport City centers, which is typical due to the increased population density and commuting needs. As one moves farther from these cities, traffic volumes gradually decrease, with the lowest highway volume of 40,000 vpd observed near the Seymour/Beacon Falls town line. Moving south from this point, the AADT increases to 56,000 vpd crossing into Ansonia, 71,000 vpd in Derby, 76,000 vpd in Trumbull, and 104,000 vpd in Bridgeport. Moving to the north, the AADT increases to 59,000 vpd in Naugatuck, and 62,000 vpd in Waterbury.

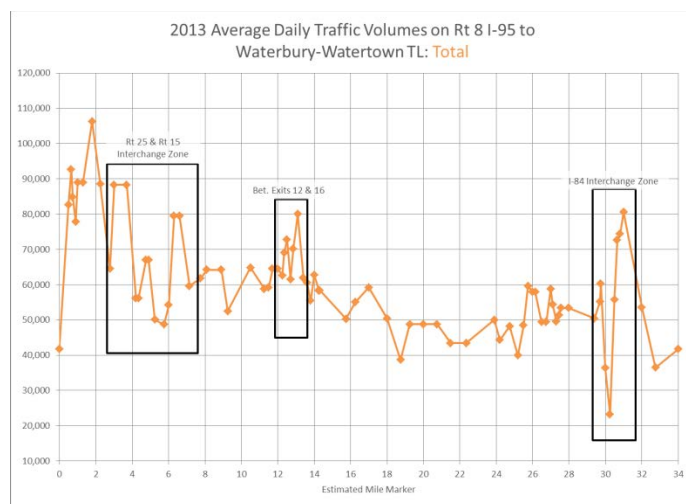


Figure 76. Route 8 ADT by Mile Post

AADT data was also compiled along Route 34 (Main Street) in Derby between the Route 8 interchange and Bridge Street (which connects Derby to Shelton) for the period between 2003 and 2012, and is presented in Table 45. The 2012 data shows AADT's of approximately 12,000 vpd on Bridge Street, west of the Derby downtown area. East of Bridge Street, the AADT is 17,200 vpd. Moving east through downtown, traffic feeds to and from the side streets (Elizabeth Street, Minerva Street, Caroline Street, Water Street and Factory Street), and the AADT steadily increases to 22,300 vpd just west of the Route 8 interchange. East of the interchange, nearly twice as much daily traffic (44,200 vpd) crosses the bridge to and from East Derby.

Annual Average Daily Traffic Volumes Route 34 Corridor				
	2003	2006	2009	2012
Route 34 west of SB Route 8 Ramps	21,300	22,300	21,900	22,300
Route 34 east of Elizabeth Street	18,300	19,200	19,200	18,500
Route 34 west of Elizabeth Street	16,500	16,600	17,400	17,200
Route 34 northwest of Bridge Street	11,800	12,900	13,100	12,400
Bridge Street west of Route 34	13,500	13,900	13,200	12,600

Table 45. Route 34 AADT

Existing Conditions

A comparison of the AADT's from previous years shows minor fluctuation in traffic patterns throughout the period, and a fairly consistent overall increase in traffic of between 3.8% and 5% throughout the corridor between 2003 and 2012. (The sole exception is a 3.7% decrease in traffic on the Derby/Shelton bridge.) This represents an annual growth factor of approximately 0.75%, which is

fairly consistent with low growth rates seen throughout Connecticut.

Peak hour traffic counts were also provided along Route 34 in Derby between Bridge Street and the Route 8 interchange. The AM and PM Peak hour volumes are depicted in Figure 77.

Turning Movement Patterns -- AM and PM Peak Hour: May 28, 2015								
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at NB Route 8 Ramps	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	N/A	1,158	491	1,649	N/A	1,041	522	1,563
Eastbound	N/A	1,179	37	1,216	N/A	1,136	132	1,268
Route 8 NB Off-Ramp	141	N/A	620	761	160	N/A	787	947
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at SB Route 8 Ramps	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	614	623	88	1,325	356	796	102	1,254
Eastbound	40	654	229	923	39	690	81	810
Route 8 SB Off-Ramp	31	23	468	522	89	40	497	626
Ausonio Drive/Home Depot	41	37	16	94	76	40	39	155
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at Water St & Factory St	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	20	636	48	704	13	842	83	938
Eastbound	4	791	9	804	10	813	2	825
Factory Street	1	2	1	4	6	10	3	19
Water Street	93	17	31	141	69	3	38	110
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at Caroline St	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	5	621	N/A	626	11	819	N/A	830
Eastbound	N/A	819	6	825	N/A	771	11	782
Caroline Street SB	3	1	3	7	2	1	9	12
Caroline Street NB	4	N/A	0	4	4	N/A	11	15
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at Minerva St	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	N/A	592	38	630	N/A	782	44	826
Eastbound	1	797	N/A	798	4	766	N/A	770
Minerva Street SB	27	N/A	6	33	8	N/A	24	32
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at Elizabeth St	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	N/A	525	106	631	N/A	693	76	769
Eastbound	26	676	N/A	702	27	537	N/A	564
Elizabeth Street SB	81	N/A	28	109	100	N/A	32	132
	AM PEAK HOUR				PM PEAK HOUR			
Route 34 at Bridge St & Olivia St	Left Turn	Through	Right Turn	Total Approach	Left Turn	Through	Right Turn	Total Approach
Westbound	224	326	12	562	314	413	32	759
Eastbound	7	455	221	683	6	374	118	498
Olivia Street SB	19	145	8	172	16	116	7	139
Bridge Street EB	84	69	223	376	364	256	353	973

Figure 77 AM and PM Peak Hour Volumes

Existing Conditions

The morning peak hour traffic pattern shows approximately 800 vph travelling east on Main Street toward Route 8. About 25% of this traffic comes over the Bridge Street bridge from Shelton. Roughly one-third of this traffic enters Route 8, and the remainder continues east on Route 34. Westbound traffic flows on Main street number approximately 600 vph, with roughly one-third exiting from Route 8 and the remainder coming from the east on Route 34. Nearly 40% of this traffic turns toward Shelton on Bridge Street. In addition, approximately 1,100 vehicles exit Route 8 and head east on Route 34, and another 1,100 vehicles enter Route 8 from Route 34 westbound during the morning peak hour.

During the afternoon peak hour, there are approximately 800 vehicles travelling each way on Main Street between Route 8 and Bridge Street. Between 35% and 40% of these vehicles turn to or from Shelton on Bridge Street. At the Route 8 interchange, about one-fourth of the eastbound vehicles enter the highway. The remainder are joined by 1300 vehicles exiting Route 8 to head east on Route 34. Approximately 25% of the westbound traffic is from Route 8. In addition, approximately 1300 vehicles exit Route 8 in an easterly direction on Route 34, and nearly 900 vehicles enter the highway from Route 34 from the east.

Traffic Key Findings

- Overall increase in traffic of between 3.8% and 5% throughout the corridor between 2003 and 2012.
- Exit 15 (Route 34 Main Street) off of Route 8 sees high amounts of traffic either entering or exiting the expressway that ultimately cause delays on Route 8.
- Highest overall traffic volumes are nearest to the Waterbury and Bridgeport City centers.

5.2 Travel Times and Speeds

5.2.1 Highway

As a first step to determine comparable travel times for the corridor using the highway system, sample travel time runs were conducted in the outbound and inbound directions along Route 8 between the Waterbury Train Station and Bridgeport Train Station. Intermediate times were taken along Route 8 in the vicinity of the Derby, Ansonia, Seymour, Beacon Falls and Naugatuck train stations, as well. For Waterbury and Bridgeport, the times were recorded at the stations themselves, and a time point was located at the highway entrance/exit. For the intermediate stations, a point along the highway was chosen in proximity to the station location. “Door to door” times are therefore only calculated for the entire

corridor; intermediate stations do not have time calculated for local roads.

The measurements were taken using the “floating car” technique, where the test vehicle attempts to replicate the average (50th percentile) speed by passing the same number of vehicles as the vehicles that pass the test car, thus placing the test vehicle in the center of the observed traffic. One early morning run was taken in each direction as traffic was building, and a second run was taken within the peak traffic flow period. A noontime run was taken in each direction to provide non-peak information, and then afternoon runs were taken as traffic built and during the peak period. A summary of the traffic data is reproduced in Figure 78, and supports the following conclusions:

During off-peak hours, the overall travel time of 31

10/11/2017 Southbound AM

Distance Distance((Mi) ft)			1	Start time:	6:59 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp		
C	0.51	2671	Exit 17 Gore point exit 17	02:30.00	02:30.00 56.30
D	0.98	5179	Exit 15 Gore point exit 15	03:33.00	01:03.00 56.05
E	0.25	1344	Exit 14 Gore point exit 14	03:54.00	00:21.00 43.64
F	1.04	5491.2	Exit 13 Gore point exit 13	05:02.00	01:08.00 55.06
G	2.11	11140.8	Exit 12 Gore point exit 12	07:11.00	02:09.00 58.88
Trip	6.73	35,541		07:11.00	

Distance Distance((Mi) ft)			2	Start time:	7:21 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp	02:37.00	02:37.00 42.19
C	0.51	2671	Exit 17 Gore point exit 17	03:07.00	00:30.00 60.70
D	0.98	5179	Exit 15 Gore point exit 15	04:15.00	01:08.00 51.93
E	0.25	1344	Exit 14 Gore point exit 14	04:46.00	00:31.00 29.56
F	1.04	5491.2	Exit 13 Gore point exit 13	05:57.00	01:11.00 52.73
G	2.11	11140.8	Exit 12 Gore point exit 12	08:10.00	02:13.00 57.11
Trip	6.73	35,541		08:10.00	

Distance Distance((Mi) ft)			3	Start time:	7:44 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp	06:25.00	06:25.00 17.21
C	0.51	2671	Exit 17 Gore point exit 17	07:13.00	00:48.00 37.94
D	0.98	5179	Exit 15 Gore point exit 15	09:02.00	01:49.00 32.40
E	0.25	1344	Exit 14 Gore point exit 14	09:31.00	00:29.00 31.60
F	1.04	5491.2	Exit 13 Gore point exit 13	11:01.00	01:30.00 41.60
G	2.11	11140.8	Exit 12 Gore point exit 12	13:01.00	02:00.00 63.30
Trip	6.73	35,541		13:01.00	

Distance Distance((Mi) ft)			4	Start time:	8:12 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp		
C	0.51	2671	Exit 17 Gore point exit 17	03:28.00	03:28.00 31.85
D	0.98	5179	Exit 15 Gore point exit 15	03:57.00	00:29.00 62.80
E	0.25	1344	Exit 14 Gore point exit 14	05:58.00	02:01.00 29.18
F	1.04	5491.2	Exit 13 Gore point exit 13	06:21.00	00:23.00 39.84
G	2.11	11140.8	Exit 12 Gore point exit 12	07:32.00	01:11.00 52.73
Trip	6.73	35,541		09:47.00	02:15.00 56.27

Distance Distance((Mi) ft)			5	Start time:	8:36 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp	01:50.00	01:50.00 60.22
C	0.51	2671	Exit 17 Gore point exit 17	02:19.00	00:29.00 62.80
D	0.98	5179	Exit 15 Gore point exit 15	03:49.00	01:30.00 39.23
E	0.25	1344	Exit 14 Gore point exit 14	04:14.00	00:25.00 36.65
F	1.04	5491.2	Exit 13 Gore point exit 13	05:18.00	01:04.00 58.50
G	2.11	11140.8	Exit 12 Gore point exit 12	07:24.00	02:06.00 60.29
Trip	6.73	35,541		07:24.00	

Distance Distance((Mi) ft)			6	Start time:	8:56 AM
			Stopwatch Recording	Elapsed Time	Miles/Hour
A	0	0	Exit 19: Gore point Exit	00:00.00	
B	1.84	9715.2	Exit 18: Gore point on ramp	01:58.00	01:58.00 56.14
C	0.51	2671	Exit 17 Gore point exit 17	02:25.00	00:27.00 67.45
D	0.98	5179	Exit 15 Gore point exit 15	03:18.00	00:53.00 66.63
E	0.25	1344	Exit 14 Gore point exit 14	03:41.00	00:23.00 39.84
F	1.04	5491.2	Exit 13 Gore point exit 13	04:42.00	01:01.00 61.38
G	2.11	11140.8	Exit 12 Gore point exit 12	06:47.00	02:05.00 60.77
Trip	6.73	35,541		06:47.00	

Figure 78 Trip Times for Route 8

Existing Conditions

minutes outbound and 34 minutes inbound equates to a door-to-door travel speed of 58 mph (NB) and 53 mph

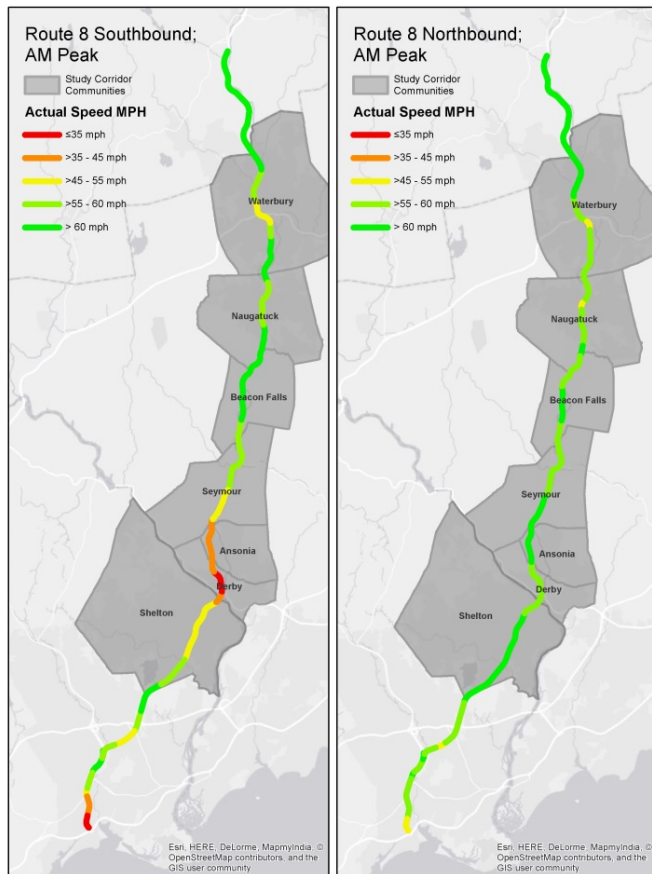


Figure 79 NPRDMS Data - AM Peak Travel Speeds

(SB) between Waterbury and Bridgeport. It was noted that the outbound direction experiences some delay between Derby and Ansonia and between Beacon Falls, Naugatuck and Waterbury. Inbound traffic maintains an operating speed of 60 mph or greater all along Route 8 during this off-peak period.

During the morning commuter peak period, outbound delays occur between Derby and Ansonia, and again between Beacon Falls and Naugatuck, resulting in an average operating speed of 57 mph and a travel time of 32 minutes. Inbound delays are significant between Seymour and Derby (through Ansonia) resulting in an average operating speed of less than 30 mph in that section of highway, and a door-to-door travel speed of 51 mph (36 minute travel time).

During the afternoon peak commuter period, outbound delays occur from Derby, through Ansonia to Seymour, and again from Beacon Falls through Naugatuck to Waterbury, resulting in an average travel speed of 50 mph and a travel time of 36 minutes. Inbound traffic experiences minor delays from Waterbury to Naugatuck, and more significant delays from Seymour through Ansonia and Derby to Bridgeport. The door-to-door average speed is 55 mph, with a travel time of 33 minutes.

However, this information did not reflect the more comprehensive data found in the National Performance Management Research Data Set (NPMRDS) data. This data was used to supplement other data collected to better illustrate congestion along the study corridor. Figure 79 and Figure 80 show a break down of traffic speeds throughout the study corridor. The data represents traffic

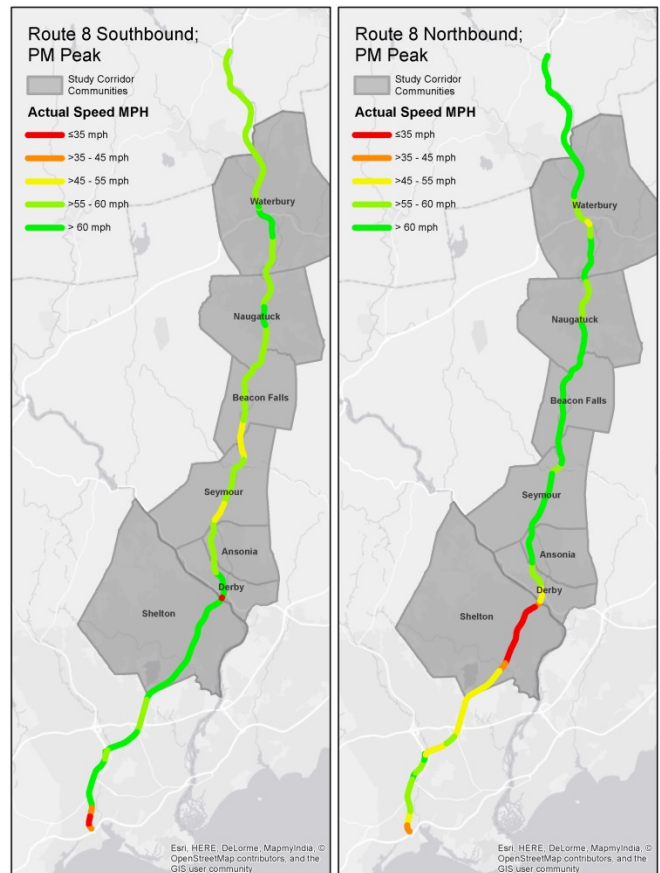


Figure 80 NPRDMS Data - PM Peak Travel Speeds

seen in May of 2017, using Tuesday through Thursday to display the most typical traffic speeds experienced corridor wide. Vehicles traveling southbound on Route 8 during the morning peak see intermittent congestion through Waterbury and Naugatuck and heavier congestion through Seymour, Ansonia, Derby, and Shelton. Vehicles traveling northbound on Route 8 during the morning peak see light intermittent congestion throughout the study corridor. Vehicles traveling northbound on Route 8 during the afternoon peak see heavy congestion through Shelton and Derby and becomes intermittent until Waterbury. Vehicles traveling southbound on Route 8 during the afternoon peak see light congestion from Waterbury down to Beacon Falls with more moderate delays spiking in Seymour and at the Derby/Shelton town line.

Highway Travel Time Key Findings

- Vehicles traveling during off-peak hours experience operating speeds equal to or greater than posted speeds.
- Heavy congestion during the morning peak can be seen while driving southbound from Seymour through Shelton and being heaviest through Derby.
- Heavy congestion during the afternoon peak can be seen while driving northbound through Shelton up to Derby.

5.2.2 Transit

To provide a better understanding of the travel times for the existing bus routes, schedule and General Transit Feed Specification (GTFS) data was analyzed between major timepoints and compared to travel time observations (Rail travel times can be found in section 1.2). Travel time observations were taken while conducting ridership counts. The average weekday travel time and speed for each route analyzed is presented in Table 46.

Each route was then mapped and broken down into smaller sections and speed and on-time performance were analyzed. Figure 81 through Figure 92 show how each route was broken down and the scheduled distance, speed, and travel time for each. Overall the slowest

segments of each route were found to be in the urban cores where the stop density was the highest and there were greater numbers of traffic signals.

Route	One-way distance (miles)	Average one-way travel time (min)	Avg speed (mph)
Route 15	14.3	54	15.9
Route 22X	18.9	45	30.7
Route 23	12.7	46	16.6
Route 255	18.9	58	19.6
Route 229	24.4	76	19.1
Route T114	12.8	25	30.7
Route T74	8.5	27.5	18.5
Route 40	2.7	13	12.5
Route 42	4.1	18.5	13.3
N1	9.7	38	15.2
N2	3.6	17.5	12.5
925/928¹¹	1.5	10	9.2

Table 46. Fixed Route Travel time and Speeds

On-time performance was analyzed for both the inbound and outbound of each route by comparing the scheduled service times to the observed field time. Overall Waterbury routes were late but routes serving rail stations were on time. Bridgeport and New Haven routes were also late. Table 47 provides a summary of the results, route tables can be found in Appendix B.

Route	Met OTP ¹²	INBOUND Actual Travel Time (+Longer, -Shorter)	OUTBOUND Actual Travel Time (+Longer, -Shorter)
Route 15	No	59(+3)	57 (+5)
Route 22X	No	49(+12)	Round Trip
Route 23	No	53(+6)	47(+2)
Route 255	No	56(+4)	64(+4)
Route 229	No	89(+21)	80(+9)
Rt. T114	Yes	54(+4)	Round Trip
Route T74	No	26(+1)	27(-3)
Route 40	Yes	13(+2)	16(+1)
Route 42	Yes	14(+2)	16(-9)
N1	Yes	44(+6)	Round Trip
N2	Yes	18(+3)	14(-2)
925/928	--	--	--

Table 47. On-time Performance Summary Table

¹¹ Between the Waterbury Green and Train Station only

¹² On-time performance is defined as leaving a stop no more than 5 minutes past the scheduled time and zero minutes before the scheduled time

Route 15

The Route 15 outbound travel time is 56 minutes, the inbound is 52. The average speed on the route is 15.9 miles per hour. The segment with the slowest speed is in downtown Bridgeport between the Bridgeport Transportation Center and the intersection of Arctic Avenue and Seaview Avenue. A cross reference with stop spacing shows that this segment has the greatest number of bus stops per mile.

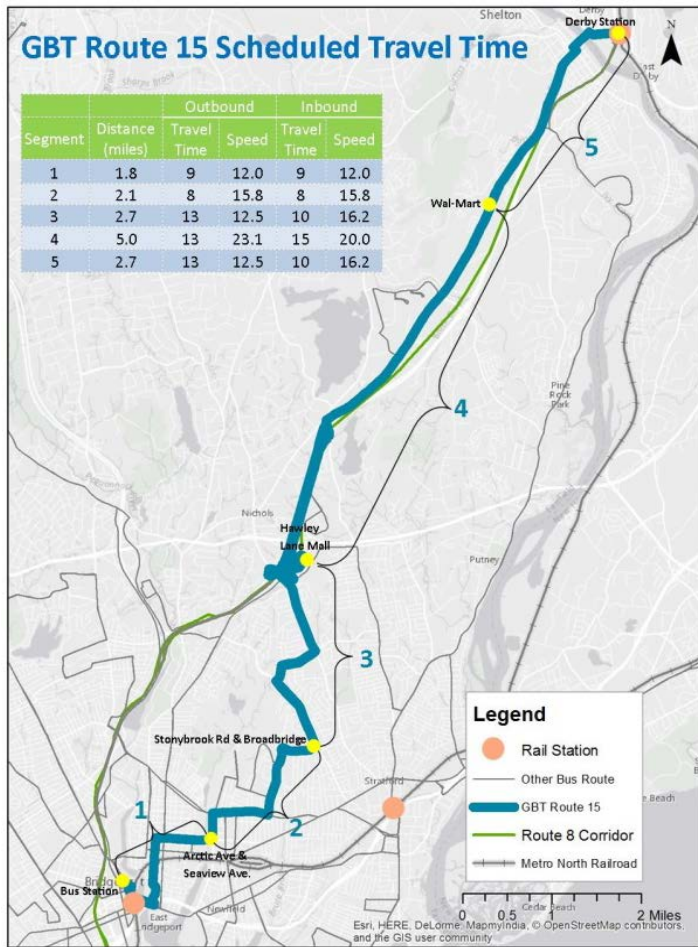


Figure 81. GBT Route 15 Schedule Travel Times

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 59 minutes, arriving at the Derby/Shelton station three minutes late but within the five minute buffer definition of on-time. In the outbound, the route was considered on-time at all time points except the Arctic Avenue and Seaview Avenue

schedule time point from which the vehicle departed 2 minutes early. The schedule has 4 minutes of layover time built into the Derby Train Station time point, which allowed the route to depart for the inbound trip on time. The inbound trip took 57 minutes, resulting in the bus arriving 5 minutes late to the Bridgeport Transportation Center. The Route 15 bus ran consistently behind schedule and did not meet the on-time performance parameter at the Artic Avenue and Enterprise Park scheduled stop.

Route 22X

The Route 22X roundtrip travel time is 45 minutes. The average speed on the route is 30.7 miles per hour. The segment with the highest speed is along Route 8, and the slowest at the Shelton Corporate Park.

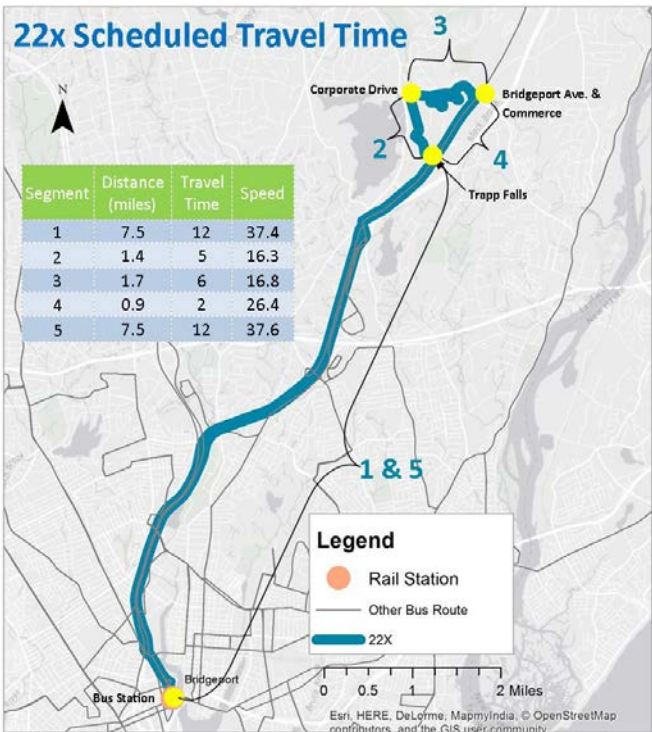


Figure 82. GBT Route 15 Schedule Travel Times

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed round trip travel time was 49 minutes, arriving back at the Derby Station twelve minutes late. The route was consistently late to each time point and on segments three, four and five did not meet on-time performances

parameters. The segment between the Corporate Drive schedule time point and the Bridgeport Avenue and Commerce Drive schedule time point had the slowest speed and resulted in the route falling behind schedule. The schedule has 28 minutes of layover time built into the Bridgeport Transportation Center, allowing it to leave for the next trip on time.

Route 23

The Route 23 outbound travel time is 45 minutes, the inbound is 47. The average speed on the route is 16.6 miles per hour. The segment with the slowest speed is between the Bridgeport Hospital and the intersection of Boston Avenue and Bruce Avenue. A cross reference with stop spacing shows that this segment has the greatest number of bus stops per mile.

Derby/Shelton Station two minutes late but within the five minute buffer definition of on-time. In the outbound, the route was considered on-time at all time points. The schedule has 2-15 minutes of layover time built into the Derby/Shelton Station depending on the trip. The surveyed trip had two minutes of layover, leaving the station two minutes late. The inbound trip took 53 minutes, therefore being six minutes late to the Bridgeport Transportation Center. The route was consistently behind schedule in the inbound but met all on-time performance parameters except at the Greater Bridgeport Transportation Center.

Route 470

The travel time for the Route 470 to the Naugatuck Industrial park varies greatly between the morning and afternoon peak, most likely due to traffic in the PM. A round trip in the morning takes 55 minutes (30 minutes outbound, 25 inbound), but in the afternoon takes 85 minutes (45 minutes outbound, and 45 inbound), an additional 30 minutes longer. The greatest difference in travel time between the peaks and timepoints is between the intersection of Route 68 and Great Hill Road and the Naugatuck Green. This trip takes approximately 3-5 minutes in the morning but 15 minutes in the afternoon. The average speed on the route in the morning is 18.4 miles per hour and 11.9 miles per hour in the afternoon.

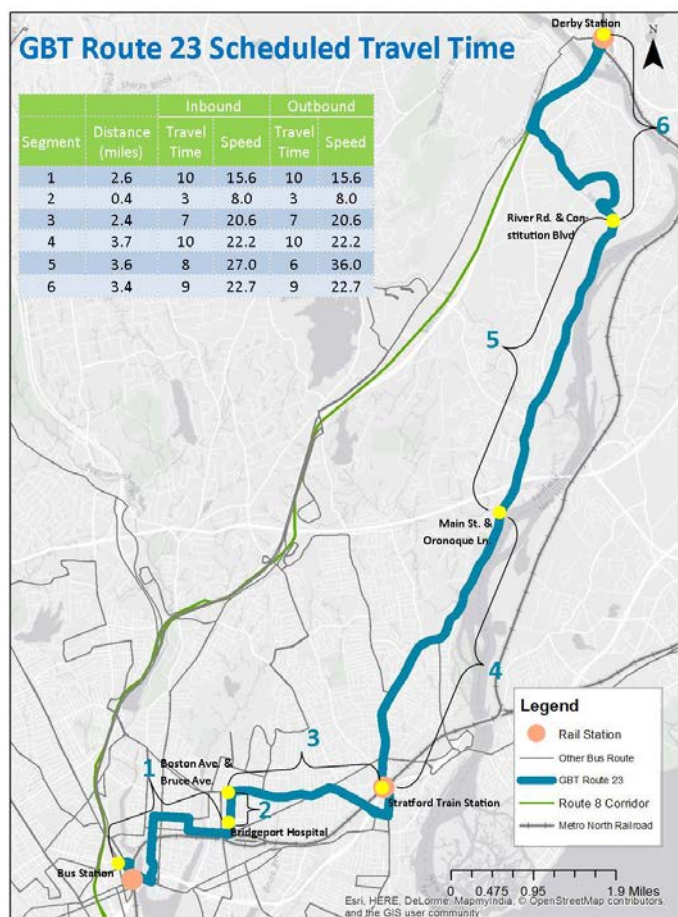


Figure 83. GBT Route 23 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during a PM trip. The field timed outbound travel time was 47 minutes, arriving at the

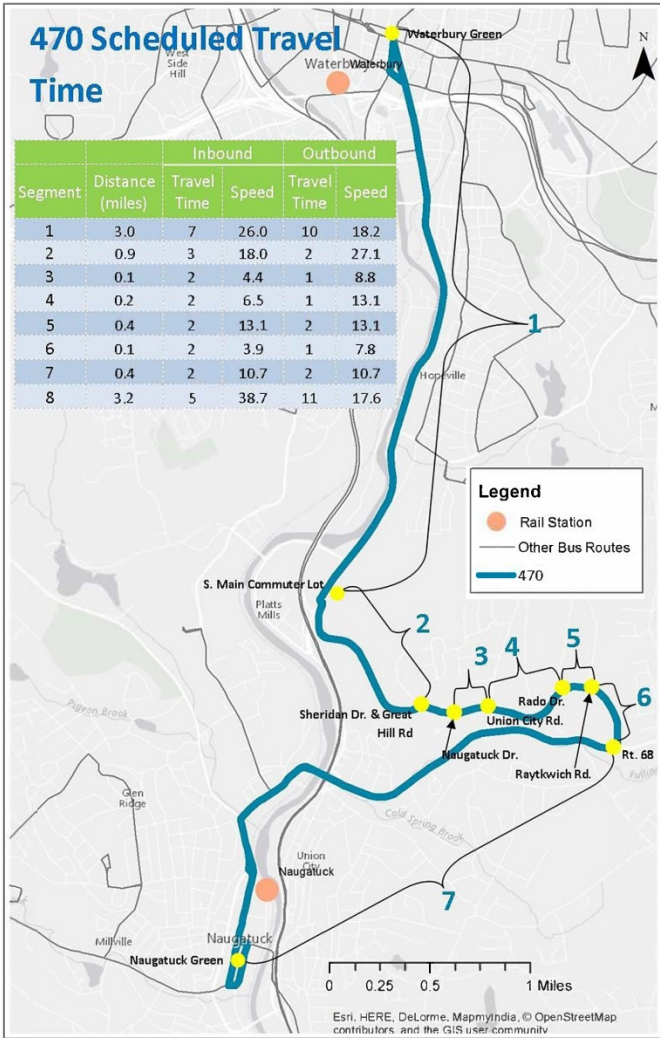


Figure 84. CTtransit Waterbury Route 470 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 27 minutes, arriving in Naugatuck one minute early, despite the route departing the Waterbury Green two minutes late. The outbound route arrived early to all time points. The inbound trip took 26 minutes, therefore being one minute late to Waterbury. The route was consistently ahead of schedule in the inbound until the last time point where the travel time took twice as long as the scheduled time.

Route 472

The Route 472 outbound travel time is 20 minutes, the inbound is 15. The average speed on the route is 12.5 miles per hour. The segment with the slowest speed is

between downtown Naugatuck and the intersection of Route 63 and South Main Street. This section has the greatest number of traffic signals per mile.

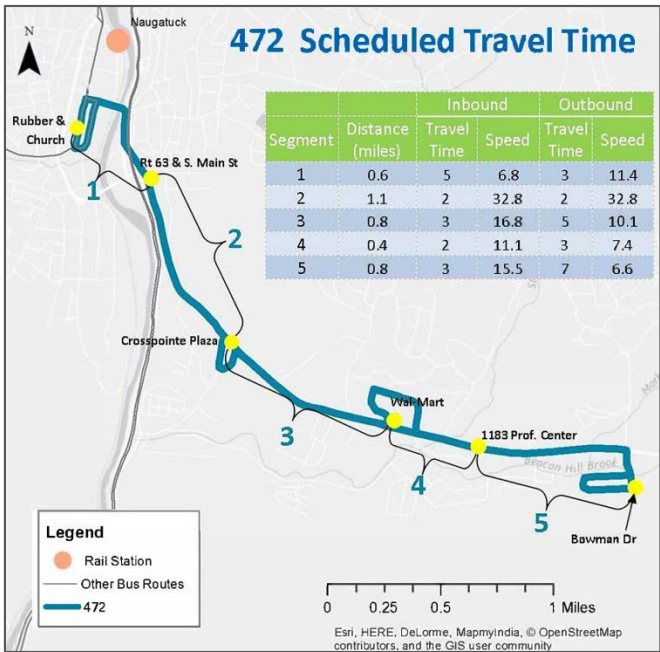


Figure 85. CTtransit Waterbury Route 472 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 14 minutes, arriving in Naugatuck two minutes early, despite the route departing the Waterbury Green four minutes late. The outbound route was considered on-time for all timepoints except at Route 63/South Main Street due to a detour from construction. The inbound trip took 18 minutes, therefore being three minutes late to Naugatuck. The route was on-time for all timepoints in the inbound.

Route 471

The Route 471 bus travels out to 550 Spring Street and back and then in a counter clockwise loop to the Mountain View shopping center. Overall the operating speed along the route is 15.2 miles per hour and takes 38 minutes to complete. Travel out to 550 Spring Street and back takes 15 minutes and operates at an average speed of 15.6 miles per hour. The loop out to the shopping center takes 23 minutes and has a slightly lower operating speed of 14.9 miles per hour.

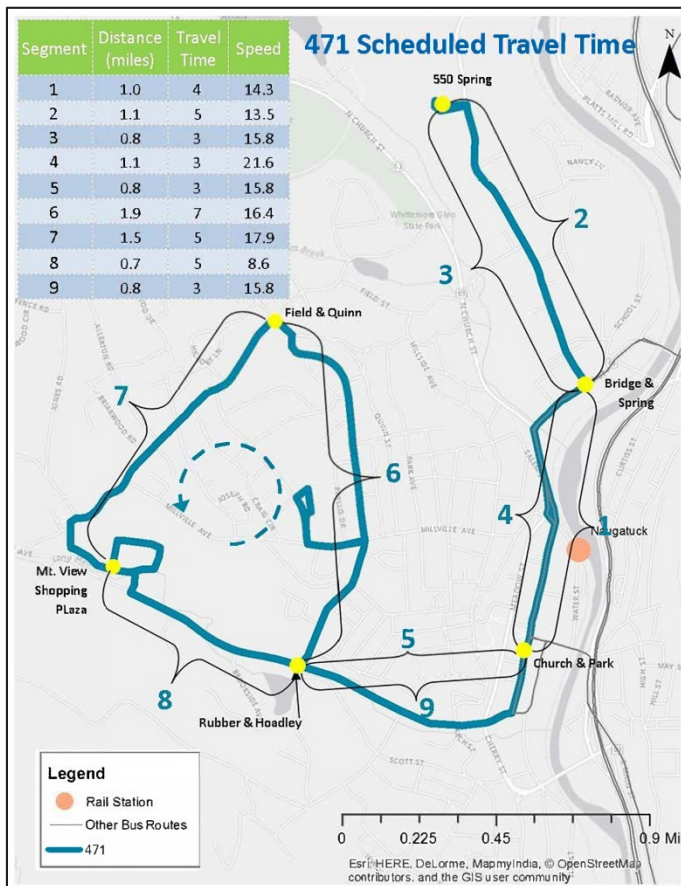


Figure 86. CTtransit Waterbury Route 471 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed round trip travel time was 44 minutes, arriving back at the Naugatuck Green six minutes late. The segment between the shopping plaza and Rubber Avenue/Hoadley Street had the slowest speed and resulted in the route falling behind schedule. The route is interlined with the N2 and the schedule has five minutes of layover time built into the Downtown Naugatuck stop at Rubber Avenue & Church, allowing it to leave for the next trip on time.

Route 479X

The Route 479X travel time in each direction is 25 minutes with an average speed of 30.7 miles per hour. This route has minimal stops and operates along the Route 8 corridor allowing it to travel at higher speeds.

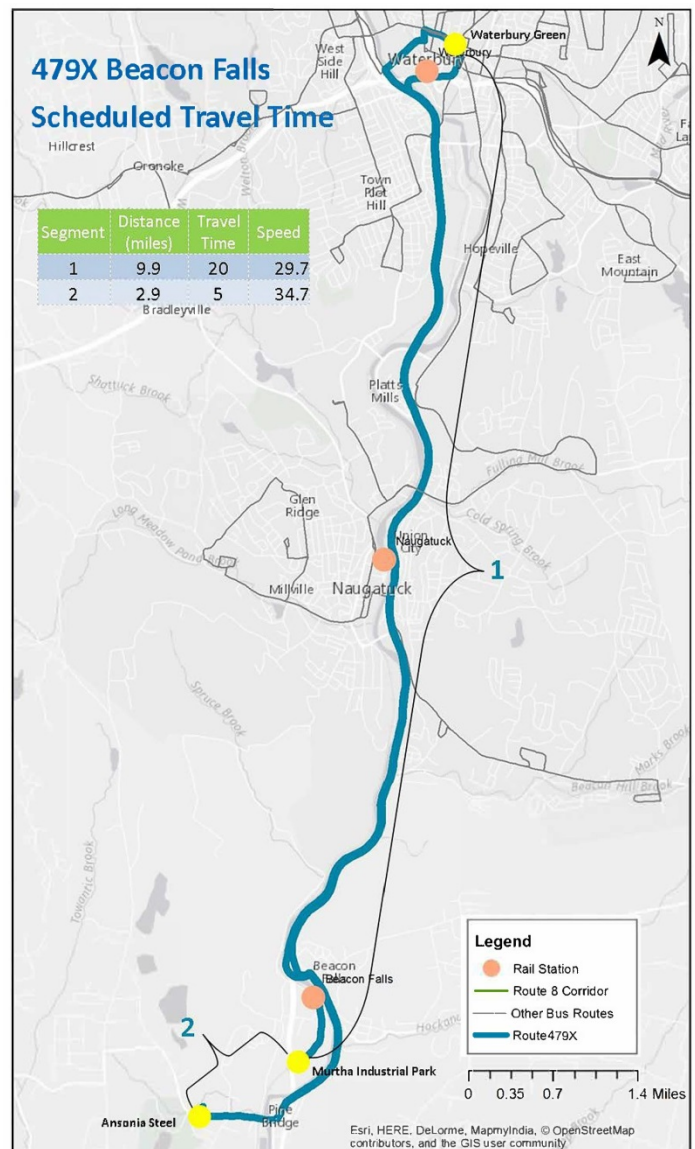


Figure 87. CTtransit Waterbury Route 479X Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during two AM trips. The field timed round trip travel time was 54 minutes, arriving at the Waterbury Green three minutes early.

Route 441

The Route 441 outbound travel time is fifteen minutes, the inbound is eleven minutes. The average speed on the route is 13.4 miles per hour. The segment with the slowest speed is outbound between the Naugatuck Community College and the Harold Leever Cancer Center.

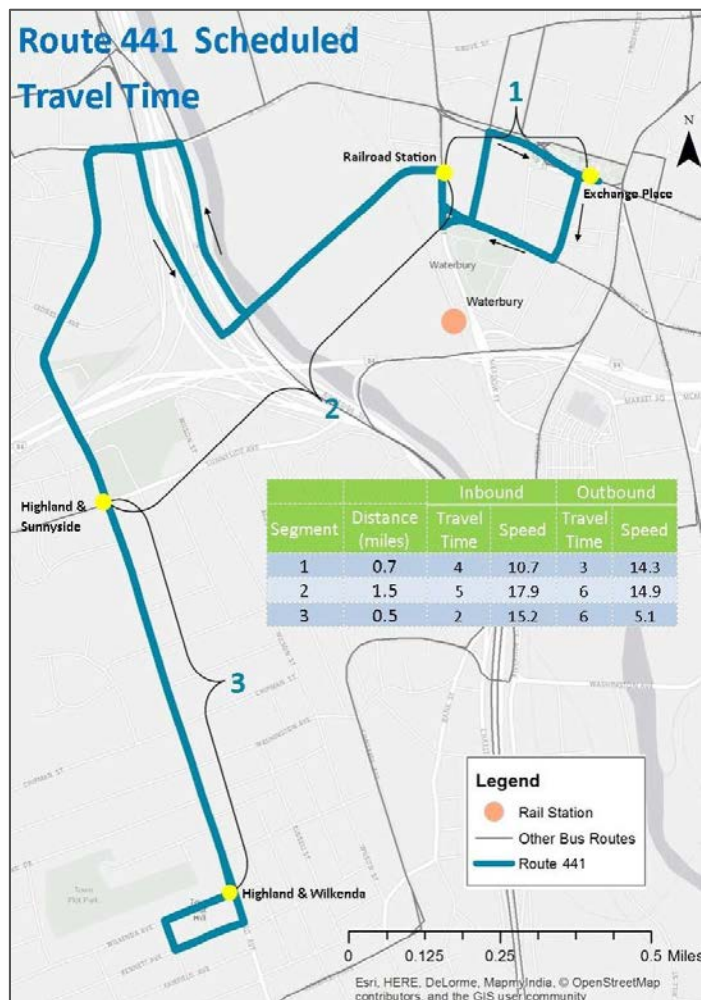


Figure 88. CTtransit Waterbury Route 441 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 25 minutes, arriving at the Wilkenda Avenue and Highland Avenue schedule time point one minute early. The outbound trip arrived on-time all time points. The inbound trip took thirteen minutes, therefore being two minutes late to the Waterbury Green.

Route 42

The Route 42 outbound travel time is 25 minutes, the inbound is twelve minutes. The average speed on the route is 12.5 miles per hour. The segment with the slowest speed is between the Waterbury Station and the intersection of Highland Avenue and Sunnyside Avenue.

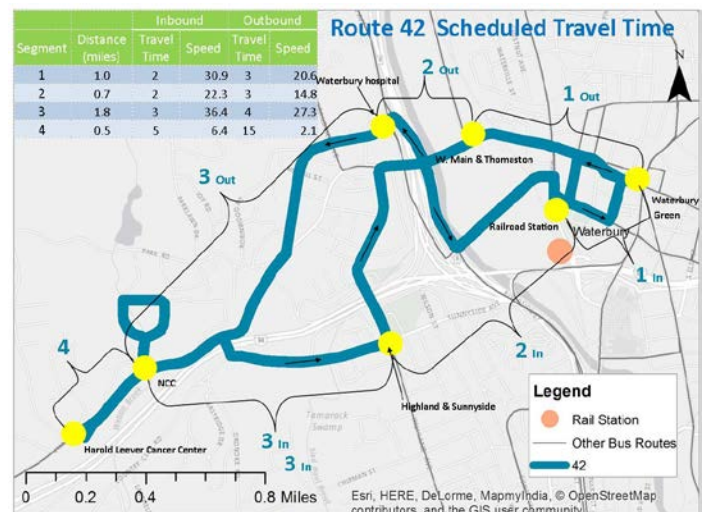


Figure 89. CTtransit Waterbury Route 42 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during a PM trip. The field timed outbound travel time was 16 minutes, arriving at the Harold Leever Cancer Center nine minutes early. Due to layover time at the Harold Leever Cancer Center the route left on-time. The outbound trip arrived on-time all time points. The inbound trip took 14 minutes, therefore being two minutes late to the Waterbury Green.

Route 925/928

Express Route 925 and 928 operate between Waterbury and Hartford with service to both the Waterbury Green and rail station. The average speed on the route between these two destinations is 9.2 miles per hour. The segment heading towards the rail station has a higher operating speed than towards the Green by 2.7 miles per hour. On-time performance was not collected for this route.

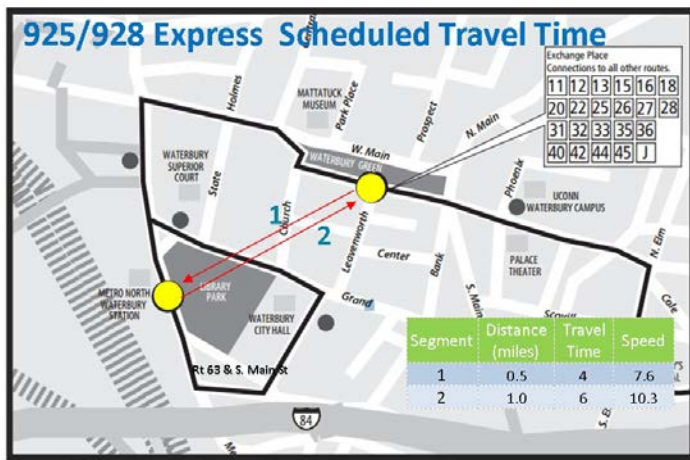


Figure 90. Express Route 925/928 Scheduled Travel Time Between the Green and Waterbury Station

Route 229

The Route 229 travel time outbound varies between 72 and 76 minutes and in inbound between 76 and 86 minutes. The average speed on the route is 19.1 miles per hour. The segment with the slowest speed is between Union Station and the New Haven Green. This segment experiences high traffic volumes and has several traffic signals.

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 80 minutes, nine minutes longer than the scheduled time. The route departed the New Haven Green four minutes late and arrived in Waterbury at the green eleven minutes late. While the schedule appears to have 15 minutes of layover time in Waterbury, the route utilizes six minutes of this time to change direction via Grand and State Streets. In the outbound the route arrived late to all time points, if the route had left the New Haven Green on-time it would have only arrived late to the Cheshire Town Hall, I-84 commuter lot and Waterbury Green. Construction in Cheshire may be responsible for late arrivals. The inbound trip took 89 minutes, 21 minutes longer than the schedule time. The route did leave the Waterbury Green nine minutes late due to a late arrival and heavy boardings. In the inbound the route arrived late to all time points, if the route had left the Waterbury Green on-time it would have arrived at most stops 2-6 minutes late

and at the New Haven Green and Union Station over ten minutes late.

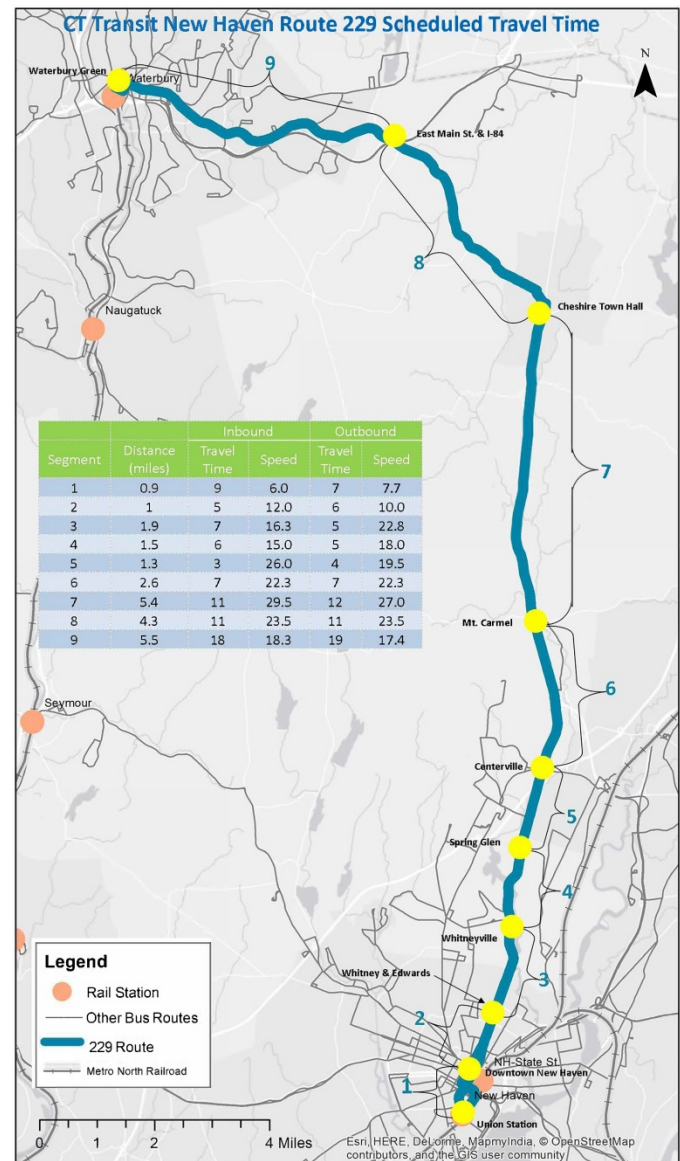


Figure 91. CT Transit New Haven Route 229 Scheduled Travel Time

Route 254

The Route 254 average travel time in each direction is 58 minutes. The average speed on the route is 19.6 miles per hour. The segment with the slowest speed is between St. Raphael and the intersection of West Chapel and Ella Grasso Boulevard. A cross reference with stop spacing shows that this segment has the greatest number of bus stops per mile.

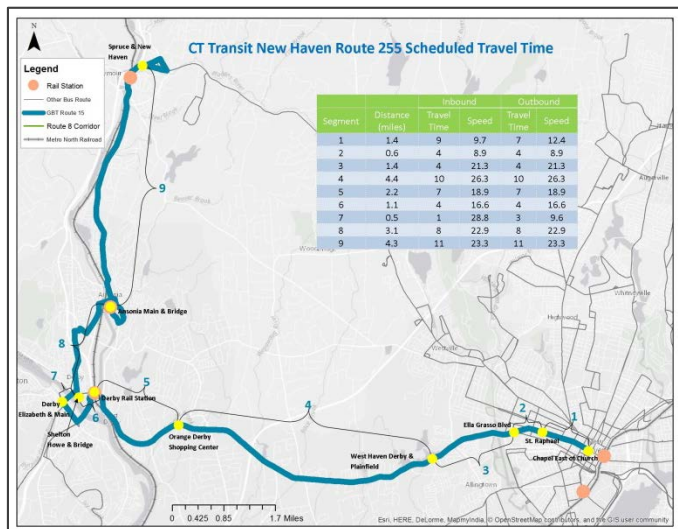


Figure 92. CTtransit New Haven Route 255 Scheduled Travel Time

On-time performance was calculated for the route based on schedule time points during an AM trip. The field timed outbound travel time was 56 minutes, four minutes longer than the scheduled time. The route arrived in Ansonia at the Rail Station nine minutes late and then at the Seymour rail station four minutes late. The bus arrived at all stops before Ansonia between two and five minutes early. There are four minutes of layover time built into the schedule in Seymour allowing the route to depart on time for the inbound trip. In the outbound the route arrived at several timepoints early. The inbound trip took 64 minutes, four minutes longer than the schedule time. In the inbound, the route arrived on-time to all timepoints.

Transit Travel Time Key Findings

- Routes which operate on Route 8 have the highest operating speed, approximately 30 mph.
- New Haven routes had the highest operating speed amongst those that did not operate on the highway.
- The greater the stop density, the slower the route segment was.
- Travel between Derby/Shelton and Bridgeport via bus takes 46-54 minutes depending on the route; this is twice as long as via train.