CONGESTION MANAGEMENT PROCESS

for the

NASHUA, NEW HAMPSHIRE

TRANSPORTATION MANAGEMENT AREA

Prepared by the

Nashua Regional Planning Commission

Adopted by the

Nashua MPO Policy Committee

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INTRODUCTION

A congestion management process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet State and local needs. A CMP is required in metropolitan areas with population exceeding 200,000, known as Transportation Management Areas (TMAs). The Nashua Urbanized Area (UZA) exceeded this threshold following the 2010 Census. The initial CMP was conducted in that year and corridor updates have been done periodically since until the commencement of the comprehensive CMP update in 2019. Federal requirements state that in all TMAs, the CMP shall be developed and implemented as an integrated part of the metropolitan transportation planning process; however, Federal regulations are not prescriptive regarding the methods and approaches that must be used to implement a CMP.

The CMP uses an objectives-driven, performance-based approach to planning for congestion management. Through the use of congestion management objectives and performance measures, the CMP provides a mechanism for ensuring that investment decisions are made with a clear focus on desired outcomes. This approach involves screening strategies using objective criteria and relying on system performance data, analysis, and evaluation.

The statutory basis for the congestion management process is provided below and serves as an outline for the structure of this CMP report.

23 CFR Part 450.322 Congestion management process in transportation management areas.

(a) The transportation planning process in a TMA shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C. and title 49 U.S.C. Chapter 53 through the use of travel demand reduction (including intercity bus operators, employer-based commuting programs such as a carpool program, vanpool program, transit benefit program, parking cash-out program, shuttle program, or telework program), job access projects, and operational management strategies.

(b) The development of a congestion management process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the TIP.

(c) The level of system performance deemed acceptable by State and local transportation officials may vary by type of transportation facility, geographic location (metropolitan area or subarea), and/or time of day. In addition, consideration should be given to strategies that manage demand, reduce single occupant vehicle (SOV) travel, improve transportation system management and operations, and improve efficient service integration within and across modes, including highway, transit, passenger and freight rail operations, and non-motorized transport. Where the addition of general purpose lanes is determined to be an

appropriate congestion management strategy, explicit consideration is to be given to the incorporation of appropriate features into the SOV project to facilitate future demand management strategies and operational improvements that will maintain the functional integrity and safety of those lanes.

(d) The congestion management process shall be developed, established, and implemented as part of the metropolitan transportation planning process that includes coordination with transportation system management and operations activities. The congestion management process shall include:

(1) Methods to monitor and evaluate the performance of the multimodal transportation system, identify the underlying causes of recurring and non-recurring congestion, identify and evaluate alternative strategies, provide information supporting the implementation of actions, and evaluate the effectiveness of implemented actions;

(2) Definition of congestion management objectives and appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures should be tailored to the specific needs of the area and established cooperatively by the State(s), affected MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area, including providers of public transportation;

(3) Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute to determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area; and

(4) Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combinations of strategies, are some examples of what should be appropriately considered for each area:

(i) Demand management measures, including growth management, and congestion pricing;

(ii) Traffic operational improvements;

(iii) Public transportation improvements;

(iv) ITS technologies as related to the regional ITS architecture; and

(v) Where necessary, additional system capacity.

(5) Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation (these will be addressed in the 2022 MTP Update); and

(6) Implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures. The results of this evaluation shall be provided to decision makers and the public to provide guidance on selection of effective strategies for future implementation.

(e) In a TMA designated as nonattainment area for ozone or carbon monoxide pursuant to the Clean Air Act, Federal funds may not be programmed for any project that will result in a significant increase in the carrying capacity for SOVs (*i.e.,* a new general purpose highway on a new location or adding general purpose lanes, with the exception of safety improvements or the elimination of bottlenecks), unless the project is addressed through a congestion management process meeting the requirements of this section. The NRPC region is in attainment and therefore this provision is not applicable at present.

(f) In TMAs designated as nonattainment for ozone or carbon monoxide, the congestion management process shall provide an appropriate analysis of reasonable (including multimodal) travel demand reduction and operational management strategies for the corridor in which a project that will result in a significant increase in capacity for SOVs (as described in paragraph (d) of this section) is proposed to be advanced with Federal funds. If the analysis demonstrates that travel demand reduction and operational management strategies cannot fully satisfy the need for additional capacity in the corridor and additional SOV capacity is warranted, then the congestion management process shall identify all reasonable strategies to manage the SOV facility safely and effectively (or to facilitate its management in the future). Other travel demand reduction and operational management strategies appropriate for the corridor, but not appropriate for incorporation into the SOV facility itself, shall also be identified through the congestion management process. All identified reasonable travel demand reduction and operational management strategies shall be incorporated into the SOV project or committed to by the State and MPO for implementation.

(g) State laws, rules, or regulations pertaining to congestion management systems or programs may constitute the congestion management process, if the FHWA and the FTA find that the State laws, rules, or regulations are consistent with, and fulfill the intent of, the purposes of 23 U.S.C. 134 and 49 U.S.C. 5303.

(h) ***Congestion management plan.*** A MPO serving a TMA may develop a plan that includes projects and strategies that will be considered in the TIP of such MPO.

(1) Such plan shall:

(i) Develop regional goals to reduce vehicle miles traveled during peak commuting hours and improve transportation connections between areas with high job concentration and areas with high concentrations of low-income households;

(ii) Identify existing public transportation services, employer-based commuter programs, and other existing transportation services that support access to jobs in the region; and

(iii) Identify proposed projects and programs to reduce congestion and increase job access opportunities.

(2) In developing the congestion management plan, an MPO shall consult with employers, private and nonprofit providers of public transportation, transportation management organizations, and organizations that provide job access reverse commute projects or job-related services to low-income individuals.

The CMP observes the eight-step framework for federal compliance:

1. **Develop Regional Objectives**: Objectives should help reach the congestion management goals.
2. **Define CMP Network**: The CMP must define both a geographic scope and system elements for analysis.
3. **Develop Multimodal Performance Measures**: The CMP must define the measures that will monitor and measure congestion on a regional and local scale.
4. **Collect Data/Monitor System Performance**: There must be a plan to collect and analyze data to evaluate the defined performance measures. The NRPC conducts a regular traffic count program for NHDOT to satisfy the requirements of the Highway Performance Monitoring System (HPMS). These counts will continually update congestion indicators such as volume-to-capacity (v/c) ratios and level of service (LOS). Speed and travel time data are updated annually for each corridor to update statistics at the route segment level.
5. **Analyze Congestion Problems and Needs**: The CMP must define how congestion issues will be analyzed, presented, and anticipated.
6. **Identify and Assess Strategies**: There must be a toolbox for selecting congestion mitigation strategies and evaluating potential benefits at congested locations.
7. **Program and Implement Strategies**: There must be a plan for implementing the CMP as part of the regional transportation planning process. Congestion management strategies that are identified and evaluated in this report are considered for inclusion in the Nashua MPO Metropolitan Transportation Plan (MTP), which is updated on a four-year schedule. The next MTP update is scheduled for completion in December 2023. The CMP analysis and strategies are incorporated into the MTP project planning process which also includes local and statewide priorities and the financial constraints analysis. The Public Involvement Process that will be initiated with the MTP update will include a summary of CMP analysis and strategies.
8. **Evaluate Strategy Effectiveness**: The strategies must be regularly monitored to gauge the effectiveness. The effectiveness of congestion management strategies will be evaluated in future updates of the CMP report. The various performance measures discussed in the next section will indicate the degree to which strategies are impacting the intended facilities. The current report provides estimates of project effectiveness, which will serve as the benchmark for evaluating CMP strategies effectiveness.

This CMP report was prepared by NRPC staff with input from the Transportation Technical Advisory Committee (TTAC), which contributed toward the update of the Goals and Objectives Statement and conduced a review of the data analysis of existing conditions and project impacts. The Nashua Transit System (NTS) contributed in a very substantial manner by conducting analysis of on-time performance of its bus routes. It is the intent of NRPC to update the CMP report on a five-year cycle.

REGIONAL GOALS AND OBJECTIVES

The CMP is a component of the MPO's long-range transportation planning process, documented in the 2019-2045 Metropolitan Transportation Plan (MTP). With the next MTP update in December 2022, CMP components will be integrated into the plan. This includes the following CMP Goals and Objectives:

Goal 1: Reduce congestion and improve efficiency of the transportation network

Objectives

- Maintain travel time reliability (TTR) above 90% on NRPC National Highway System facilities and raise the TTR performance target to this level with the next Metropolitan Transportation Plan update in 2022.
- Maintain volume-to-capacity (V/C) ratios to achieve level of service (LOS) C or better in the urban area where operational conditions are now found to exist. Achieve reductions in v/c and improvement in LOS where roadways operate at D or lower.
- In rural portions of the NRPC region, seek to maintain LOS at B for arterial highways.
- Work toward reduction of single-occupancy vehicle travel.
- Slowing the rate of increase, or achieving reductions in, vehicle miles of travel (VMT) and vehicle hours of travel (VHT).
- Identify highway segments that can achieve reduced congestion through changes in geometry or capacity increases.
- Improved traveler information that will enable the selection of alternative routes to avoid bottlenecked highway segments.

Goal 2: Increase mobility for alternative modes

Objectives

- Facilitate bicycle and pedestrian modes through implementation of recommended projects in the NRPC 2021 Bicycle and Pedestrian Plan.
- Increase mode share on the Nashua Transit System.
- Fill accessibility gaps, including the first and last mile connections to transit.
- Encourage use of intercity transportation modes on bus and rail modes.

Goal 3: Improve safety performance on the transportation network

Objectives

- Achieve improvements in annual safety performance measures for the regional highway system.
- Improve ability to measure crash rates along specific segments of the transportation network.

- Identify high risk highway segments and intersections.
- Reduction of vehicle crashes, with particular emphasis on those involving pedestrians and non-motorized modes.
- Provide adequate paved shoulders for bicyclists or dedicated paths parallel to roadways.
- Improvement in Bicycle Level of Traffic Stress (BLTS) ratings along highway corridors, with priority to those exceeding 3.0.
- Maintain the transportation system in a state of good repair.

THE NRPC REGIONAL CMP NETWORK

HIGHWAY NETWORK

NRPC has evaluated all state-numbered highways and other important arterials in the region for potential inclusion in the CMP highway network. Those which have been found through the analysis of the National Performance Monitoring Research Data Set (NPMRDS) to have at least some level of measurable congestion on some segments are included in the CMP network for consideration of mitigating strategies. NH 111A in Nashua is not included because NPMRDS data are not available.

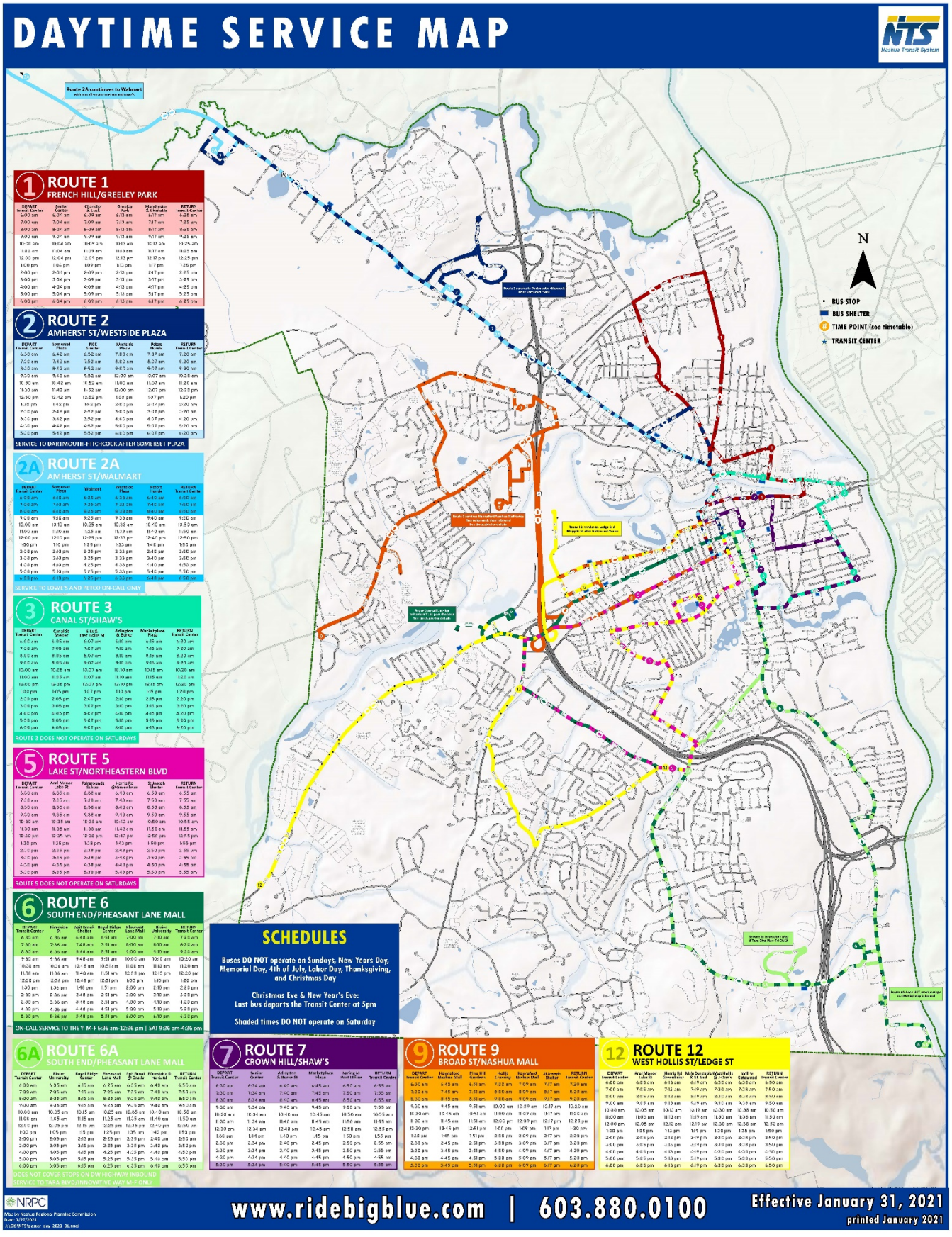
The congestion analysis chapter of this report describes the characteristics and functionality of each highway and provides the congestion measures for each.

- F.E. Everett Turnpike, Nashua-Merrimack
- NH 101, Wilton-Milford-Amherst
- NH 101A, Milford-Amherst-Hollis-Merrimack-Nashua
- U.S. 3, Merrimack-Nashua
- NH 3A, Hudson-Litchfield and Sagamore Bridge Road, Nashua-Hudson
- NH 102, Hudson
- NH 111, Hollis-Nashua-Hudson
- NH 130, Nashua
- NH 38, Pelham
- NH 128, Pelham
- NH 111A, Pelham
- NH 13, Mont Vernon-Milford
- NH 122, Amherst-Hollis
- Main Street, Nashua
- Daniel Webster Highway, Nashua
- Greeley Street/Continental Blvd, Merrimack

TRANSIT NETWORK

The Nashua Transit System (NTS) is the only public transit provider based and operated within the Nashua Region. NTS currently operates ten permanent fixed transit routes which run weekdays between the hours of 6:15 a.m. and 6:45 p.m. and three weekday evening (6:45pm - 10:45pm) fixed routes within the City of Nashua. NTS also operates eight daytime Saturday (9:00am – 5:15pm) fixed routes and three Saturday evening (5:45pm – 9:45pm) fixed routes. The system does not operate on Sundays.

Bus service to Boston and Logan Airport is operated by Boston Express from the Southwood Drive park-and-ride lot off the Turnpike Exit 8. Ten roundtrips per day are operated, three of which are southbound in the AM commuting period and three northbound in the PM (plus two northbound evening buses).


DAYTIME SERVICE MAP
NTS
Nashua Transit System
Route 2A continues to Walmart
1 ROUTE 1
FRENCH HILL/GREELEY PARK
2 ROUTE 2
AMHERST ST/WESTSIDE PLAZA
SERVICE TO DARTMOUTH-HITCHCOCK AFTER SOMERSET PLAZA
2A ROUTE 2A
AMHERST ST/WALMART
SERVICE TO LOWE'S AND PETCO ON CALL ONLY
3 ROUTE 3
CANAL ST/SHAW'S
ROUTE 3 DOES NOT OPERATE ON SATURDAYS
5 ROUTE 5
LAKE ST/NORTHEASTERN BLVD
ROUTE 5 DOES NOT OPERATE ON SATURDAYS
6 ROUTE 6
SOUTH END/PHEASANT LANE MALL
ON-CALL SERVICE TO THE Y: M-F 6:36 am-12:36 pm | SAT 9:36 am-4:36 pm
6A ROUTE 6A
SOUTH END/PHEASANT LANE MALL
DOES NOT COVER STOPS ON DW HIGHWAY INBOUND
SERVICE TO TARA BLVD/INNOVATIVE WAY M-F ONLY
SCHEDULES
Buses DO NOT operate on Sundays, New Years Day, Memorial Day, 4th of July, Labor Day, Thanksgiving, and Christmas Day
Christmas Eve & New Year's Eve:
Last bus departs the Transit Center at 5pm
Shaded times DO NOT operate on Saturday
7 ROUTE 7
CROWN HILL/SHAW'S
9 ROUTE 9
BROAD ST/NASHUA MALL
12 ROUTE 12
WEST HOLLIS ST/LEDGE ST
N
BUS STOP
BUS SHELTER
TIME POINT (see timetable)
TRANSIT CENTER
NRPC
Map by Nashua Regional Planning Commission
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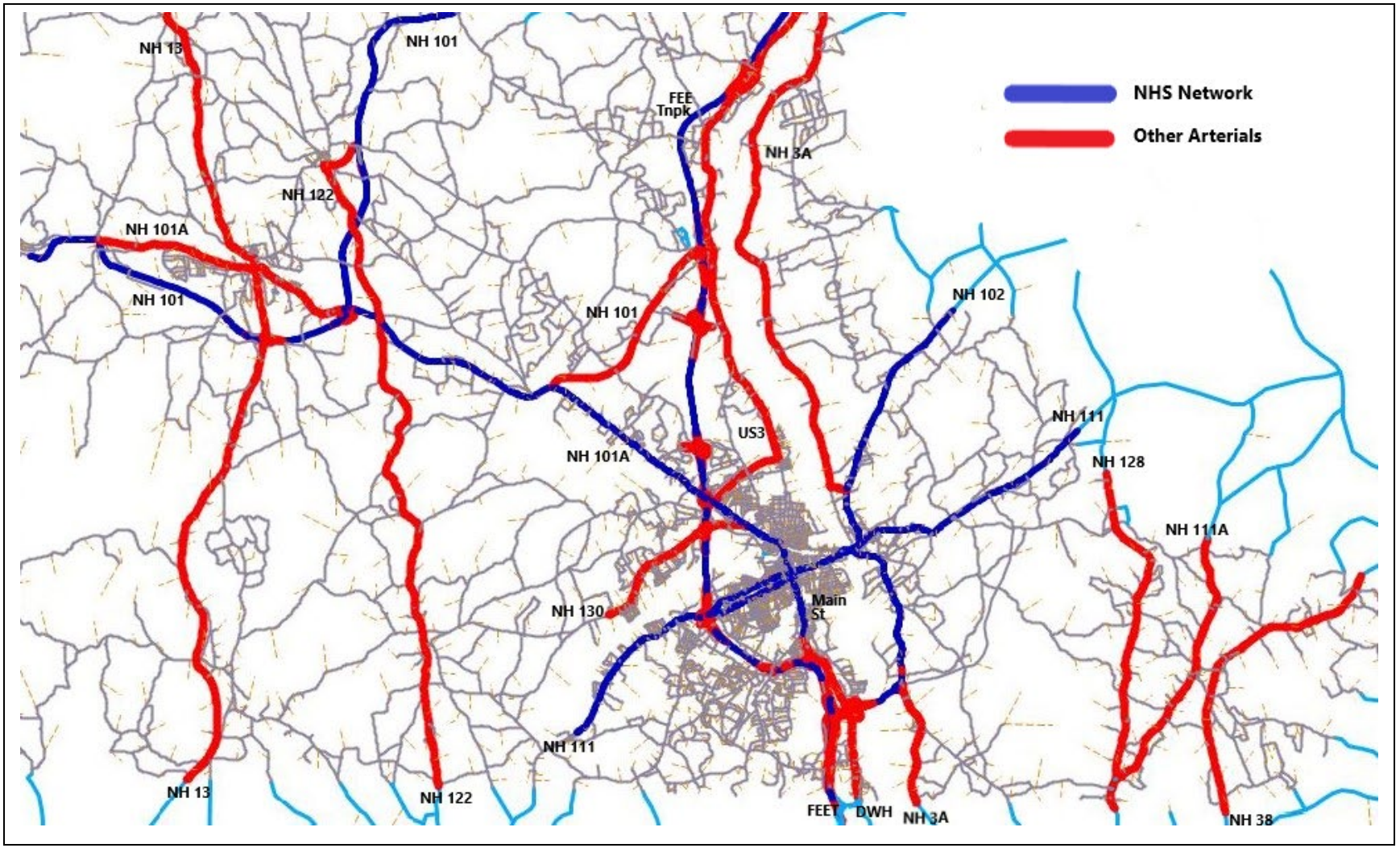
NRPC REGION CONGESTION MANAGEMENT PROCESS HIGHWAY NETWORK



CONGESTION MANAGEMENT PROCESS TOOLBOX

One of the components of the Congestion Management Process for the region is a toolbox of potential congestion reduction and mobility strategies. The idea behind this toolbox is to identify and encourage ways to deal with congestion and mobility problems beyond traditional roadway widening projects. As the CMP is implemented through update of the MTP, the toolbox will be utilized as the starting point for evaluating alternative solutions and will act as a checklist to consider each potential solution and determine whether it has a reasonable potential for providing benefit to the congested area. If a particular strategy could potentially work, it would then be evaluated in detail. Those not likely to be successful would include a brief explanation of why it is not appropriate. The strategies include many options beyond traditional highway widening to include the use of technology, transit, demand management, access management and non-motorized transportation improvements.

Highway Physical Improvements

- Increase number of lanes along arterial segment
- Increase lane width
- Add turn lanes at intersections & other geometric improvements
- Interchange re-configuration
- Safety improvements to reduce incidence of crashes

Transit Strategies

- Increase service frequency of existing fixed routes
- Expansion of service area for fixed routes
- Expansion of existing park-and-ride lots
- New park-and-ride lot construction
- Employer-based micro-transit services
- Passenger rail extension or alternative shuttle service to rail
- Reduce fare costs through employer transit pass programs, etc.
- Transit amenities - shelters, seating, etc.

Bicycle/Pedestian Improvements

- New sidewalks, bicycle lanes, trails
- Bicycle amenities such as bike racks
- Pedestrian-Oriented Development
- Bicycle and Pedestrian Safety Improvements
- Exclusive non-motorized rights-of-way

Transportation System Management & Operations

- Optimization of Individual Traffic Signals
- Traffic Signal Coordination
- Highway Information Systems, such as variable message boards to alert motorists
- Incident management systems

- All-Electronic Tolling

Transportation Demand Management

- Telecommuting
- Flexible work hours to shift to off-peak or compress work week
- Substitute teleconferencing for in-person meetings
- Regional ridesharing program

Access Management

- Left Turn Restrictions
- Consolidation/Relocation of Driveways
- Minimum intersection spacing
- Frontage roads to connect development areas and divert traffic from the arterial roadway

MULTIMODAL PERFORMANCE MEASURES

TRAFFIC COUNT TRENDS

The measurement of roadway congestion begins with looking at the long-term growth trends experienced by each facility. NRPC conducts a regular count program of about 145 locations each year for maintenance of the NHDOT Highway Performance Monitoring System (HPMS) database, which enables these trend data to be developed. The data indicate that, although some roadway segments may operate less than optimally, the trend may be flat or even slightly declining. Addressing congestion in these areas would not be as critical as identifying strategies for corridors which have experienced significant growth over the past decade. Although past traffic count trends do not necessarily indicate the directions that growth will take in the future, comparing the growth rates of a previous generation with trends over the last ten to fifteen years is informative in terms of gauging the magnitude of change in congestion going forward.

The NRPC region during this most recent time period moved past the high growth period of the 1980's and 1990's to a period of relatively flat growth in terms of population and economic activity. The following table presents the growth rates along regional roadways that prevailed during that time period. With some exceptions, growth rates of 2% per year or higher were the norm and rates exceeding 4% were not uncommon. The growth trends for corridors for the 2006 to 2019 time period are presented later with each highway congestion evaluation.

HIGHWAY TRAVEL TIME INDEX

NRPC utilizes the NPMRDS for developing speed data for highway analysis. New Hampshire MPOs have entered into a long-term contract to utilize the Regional Integrated Transportation Information System (RITIS), which provides data for an expanded highway network to include all state-numbered highways and enhanced analytics, which facilitate the use of statistical analysis for the data.

Travel Time Index (TTI) is the ratio of average travel time in peak hours to free-flow travel time. The NRPC region analysis uses 7:00-9:00 AM for the morning peak period and 4:00-6:00 PM for the afternoon peak. The Travel Time Index represents the average additional time required for a trip during peak times in comparison with that trip duration in no-traffic condition. The calculation is as follows:

$$TTI = \frac{Average\ Travel\ Time}{Free\ Flow\ Travel\ Time}$$

For instance, if the average and free-flow travel time are 5 and 4 minutes, respectively, TTI would be 1.25. This value means that your trip will take 25% longer than during a free-flow time of day. TTI can be calculated for different temporal grouping schemes such as X-minute intervals, by time-of-the-day, day-of-the-week, month, and for the entire year. Also, for each of these groups, TTI can be calculated for weekdays and weekends separately. The NRPC CMP focuses specifically on weekday peak period travel.

For the FEE Turnpike, the free flow speed is set at 60 mph, although some sections in Nashua have a 55-mph limit and in other areas there is a 65-mph limit. Review of data shows that free flow speeds are significantly higher than 55 mph through this section. Turnpike speeds of at least 60 mph are considered the free flow condition.

AVERAGE WEEKDAY TRAFFIC COUNT TRENDS, 1983-1998 REGIONAL HIGH GROWTH PERIOD

			1997 AWDT	Trend Period	Annual % Change
FEE Turnpike	Bedford TL	Merrimack	41,200	1984-1997	0.8%
FEE Turnpike	Nashua CL	Merrimack	48,000	1991-1997	2.7%
FEE Turnpike	N. of Exit 4	Nashua	80,800	1987-1996	3.9%
US 3	Bedford TL	Merrimack	14,400	1984-1997	2.7%
US 3	N. of Greeley St	Merrimack	21,800	1990-1997	-2.3%
US 3	N. of H Burque Hwy	Nashua	18,300	1984-1997	-0.3%
NH 101	E of Abbott Hill Rd	Wilton	15,000	1985-1997	1.5%
NH 101	E. of Wilton Rd	Milford	22,700	1983-1997	4.3%
NH 101	E. of NH 13	Milford	25,400	1989-1997	2.3%
NH 101	Bedford TL	Amherst	18,900	1983-1997	3.2%
NH 101A	E. of NH 130	Nashua	33,900	1983-1997	2.3%
NH 101A	Nashua CL	Merrimack	35,200	1983-1996	2.5%
NH 101A	E. of NH 122	Amherst	29,000	1984-1996	3.1%
NH 101A	W. of Oval	Milford	20,200	1984-1998	0.6%
NH 111	Nashua CL	Hollis	13,100	1983-1997	5.0%
NH 111	TF Bridge,Hudson TL	Nashua	47,100	1983-1997	1.0%
NH 111	E. of Library St	Hudson	16,300	1983-1993	1.8%
NH 111	W. of Kimb Hill Rd	Hudson	23,200	1988-1997	0.4%
NH 102	N. of Ledge Rd	Hudson	30,200	1983-1996	1.6%
NH 3A	Manchester CL	Litchfield	8,350	1984-1997	5.3%
NH 3A	S. of Pelham Rd	Hudson	25,900	1983-1997	4.3%
NH 3A	S. of Dracut Rd	Hudson	12,300	1984-1996	3.1%
NH 122	S. of NH 101A	Amherst	6,000	1985-1997	4.0%
NH 122	N. of NH 130	Hollis	9,400	1983-1997	6.6%
NH 130	Nashua CL	Hollis	8,600	1983-1997	4.9%
NH 130	Over FEE Turnpike	Nashua	26,100	1983-1997	1.7%
NH 38	Salem TL	Pelham	11,800	1990-1998	6.1%
NH 38	Mass SL	Pelham	14,000	1983-1997	1.7%
NH 38	S. of Main St	Pelham	8,150	1990-1997	3.1%
NH 128	Mass SL	Pelham	9,850	1983-1997	3.8%
NH 111A	Windham TL	Pelham	4,100	1988-1997	0.8%
NH 13	S. of NH 101A	Milford	12,100	1989-1997	4.1%
NH 13	Mass SL	Brookline	6,950	1984-1997	3.7%
Main St	S. of Canal St	Nashua	36,900	1984-1997	0.5%
Dan Webst Hwy	S. of Sagamore Br	Nashua	36,900	1983-1998	3.0%
Continental Blv	N. of NH 101A	Merrimack	15,100	1984-1998	3.3%
Sagamore Brdg	Hudson TL	Nashua	30,800	1983-1997	4.4%

Five ranges of congestion are defined by TTI range, as shown in the table below. For the turnpike, TTI is associated with the speed ranges shown. For non-expressway roads, free-flow speed is determined by calculating the mean travel time for the uncongested 9:00-10:00 PM night period. In many cases this will be less than posted speed limits since stoppages at traffic lights prevent continuous travel at the allowable speed. For example, motorists on Main Street in Nashua may travel at 25 mph but the data indicate that the free-flow speed at night is 18 mph for both directions of traffic.

Expressway Speed & Travel Time Index Ranges

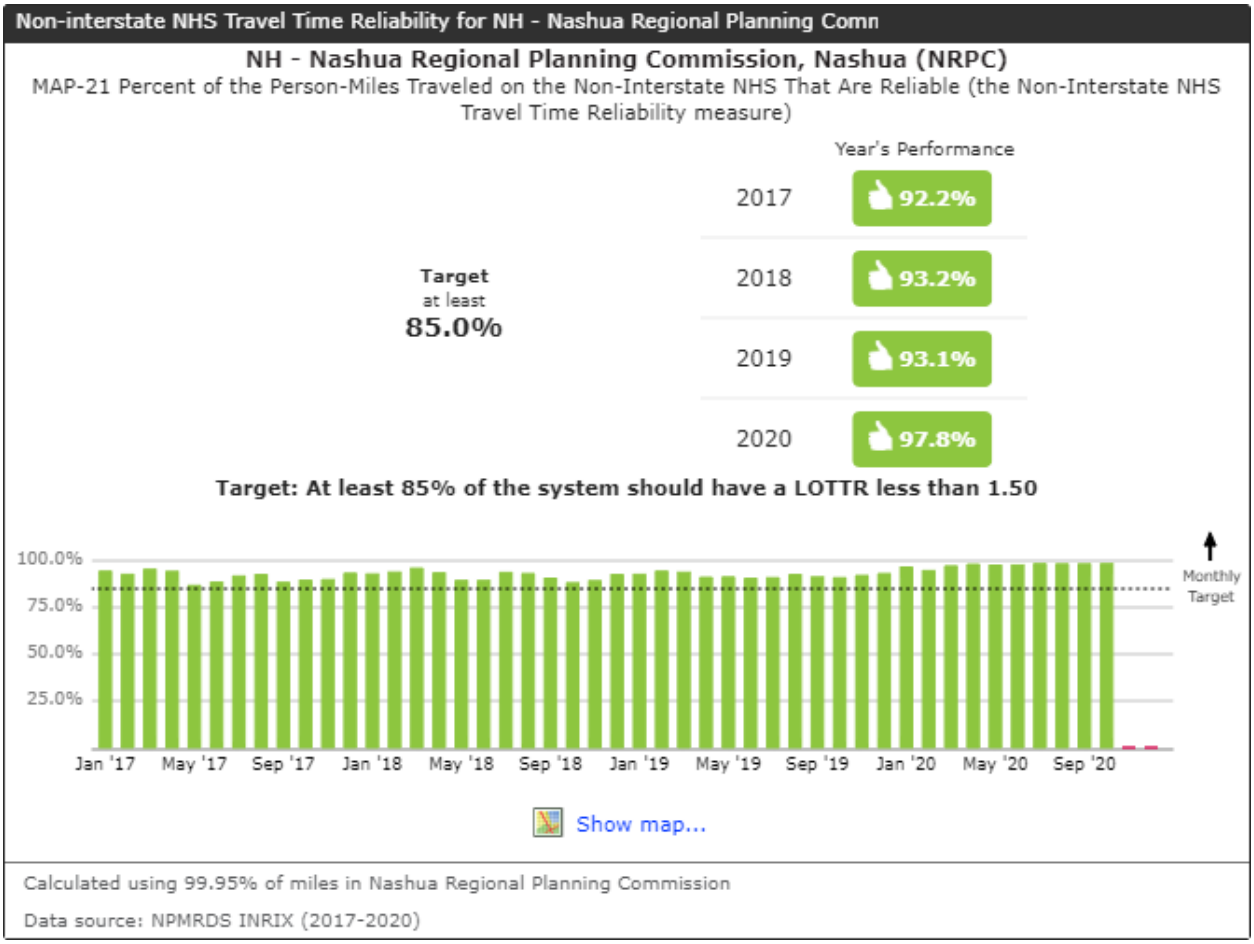
Speed	TTI	Level of Congestion
60+	TTI < 1.00	None
50 - 60	1.00 <= TTI < 1.25	Minor
40 - 50	1.25 <= TTI < 1.50	Moderate
30 - 40	1.50 <= TTI < 2.00	Heavy
< 30	TTI > 2.00	Severe

HIGHWAY TRAVEL TIME RELIABILITY

Whereas TTI measures the average travel time during peak periods to assess average levels of congestion, travel time reliability (TTR) measures the variance in travel times to assess the consistency or dependability in travel times. Reliability is important for both personal and business travelers so they can plan their travel to arrive on time. Specifically, TTR is measured as the 80th percentile travel time divided by the 50th percentile (median) travel time, with ratios larger than 1.5 considered unreliable. A roadway that typically takes 20 minutes to travel during the evening peak period but sometimes takes over 30 minutes qualifies as unreliable if the longer travel time occurs at least 20 percent of the time.

The following figure presents the regionwide percent of person-miles on the regional National Highway System that meet the reliability measure. Between 2017 and 2019 NHS reliability was in the 92.2% to 93.1% range. This is comfortably above the 85% target that has been adopted by the State of New Hampshire for all NHS facilities in the state and by the Nashua MPO for regional NHS facilities. In 2020, significant reductions in travel due to the COVID-19 pandemic resulted in TTR increasing to 97.8%. Until the pandemic is essentially over and new normal levels of travel volumes are established, which may or may not approximate pre-COVID levels, the 2019 TTR is utilized for representing existing conditions on the highway network.

In this CMP, TTR is not calculated at the corridor level, as TTI is recognized as the more relevant indicator of the type of congestion, i.e., recurring, that can be addressed through use of CMP Toolbox strategies.



HIGHWAY OPERATIONAL LEVEL OF SERVICE

Arterial Level of Service

A volume-to-capacity ratio (V/C) represents the amount of traffic relative to the total lane capacity of a roadway for a time period. V/C ranges are closely associated with arterial Level of Service (LOS). Capacity limits for each LOS are calculated by multiplying the number of lanes per direction by the vehicles per lane (VPL) upper bound for that service level.

"Level of Service" is a term which denotes the type of operating conditions which occur along a roadway or at a particular intersection for a given period of time, generally a one-hour peak period. It is a qualitative measure of the effect of a number of operational factors including roadway geometrics, travel delay, freedom to maneuver and safety. Level of service categories for roadway segments and descriptions are explained below.

Level of Service "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

Level of Service "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is still relatively unaffected.

Level of Service "C" is in the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. Occasional backups occur behind turning vehicles.

Level of Service "D" represents high-density, but stable, flow. Speed and freedom to maneuver are restricted, and the driver experiences a below average level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level of Service "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform level. Freedom to maneuver within the traffic stream is extremely difficult and is generally accomplished by forcing other vehicles to give way. Congestion levels and delay are very high. After full roadway capacity has been exceeded (V/C>1), bottlenecks and stop-and-go traffic conditions are present, which constitutes Level of Service “F”.

FREEWAYS & CONTROLLED ACCESS

	Limited Access 60-70 MPH		Controlled Access 50-59 MPH	
LOS	V/C	VPL/Hr	V/C	VPL/Hr
A	0.40	920	0.40	800
B	0.50	1150	0.50	1000
C	0.70	1610	0.70	1400
D	0.85	1950	0.85	1700
E	1.00	2300	1.00	2000
F	>1	>2300	>1	>2000

SINGLE-LANE ARTERIALS UNINTERUPTED FLOW

	Ave Speed = 50		Ave Speed = 40		Ave Speed = 30	
LOS	V/C	VPL/Hr	V/C	VPL/Hr	V/C	VPL/Hr
A	0.30	480	0.30	420	0.30	360
B	0.40	640	0.40	560	0.40	480
C	0.60	960	0.60	840	0.60	720
D	0.80	1280	0.80	1120	0.80	960
E	1.00	1600	1.00	1400	1.00	1200
F	>1	>1600	>1	>1400	>1	>1200

SIGNALIZED ARTERIALS						
	<2 signal int/mi.		2-4 signal int/mi.		>4 signal int/mi.	
LOS	V/C	VPL/Hr	V/C	VPL/Hr	V/C	VPL/Hr
A	--	--	--	--	--	--
B	0.40	420	0.40	360	--	--
C	0.60	630	0.60	540	0.60	450
D	0.80	840	0.80	720	0.80	600
E	1.00	1050	1.00	900	1.00	750
F	>1	>1050	>1	>900	>1	>750

Intersection Level of Service

Capacity analysis and level of service may also be conducted at the intersection level. For **signalized intersections**, level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (generally weekday AM or PM peak hours). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues.

For **unsignalized intersections**, LOS criteria can be further reduced into three intersection types: all-way stop, two-way stop, and roundabout control. All-way stop and roundabout control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way, stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements.

It was the intent of NRPC at the outset of this study to conduct a regular intersection count and capacity analysis program for priority signalized and unsignalized intersections as an input to the CMP process. Due to the traffic reductions resulting from COVID, this effort has been postponed until at least later in 2021. At that time trends in arterial traffic counts will be evaluated and intersection counts will commence, if arterial traffic counts are within 90% of pre-COVID levels.

PRIORITY SIGNALIZED INTERSECTIONS FOR CAPACITY ANALYSIS

Amherst
NH 101/Baboosic Lake Rd
NH 122/NH 101

Brookline
NH13/NH 130

Hollis
NH 130/Broad St
NH 122/Monument Sq

Hudson
Dracut Rd/Sherburne Rd
Bush Hill Rd/Wason Rd
Belknap St/Central St
Burns Hill Rd/Wason Rd

Litchfield
NH 102/Page Rd
NH 3A/Albuquerque Ave
NH 3A/Page Rd

Merrimack
US 3/Wire Rd
US 3/Manchester St
Bedford Rd/Wire Rd
Continental Blvd/Naticook Rd
Baboosic Lake Rd/Turkey Hill Rd

Milford
NH 101A/Old Wilton Rd
NH 101A/Ponemah Hill Rd
NH 101A/NH 13

Nashua
Main Dunstable/Lund Rd/Lake St
Concord St/Manchester St
Pine Hill Rd/Charron Ave
Manchester St/Tinker Rd
Main St/DW Hwy Rotary
East Dunstable Rd/Lamb Rd
Mid Dunstable Rd/Ridge Rd
NH 111/Westgate Crossing
NH 130/Coburn Ave/Titan Way

Pelham
NH 128/NH 111A
NH 128/Sherburne Rd
NH 111A/Nashua Rd/Main St

PRIORITY UNSIGNALIZED INTERSECTIONS FOR CAPACITY ANALYSIS

Amherst
NH 101/Baboosic Lake Rd
NH 122/NH 101

Brookline
NH13/NH 130

Hollis
NH 130/Broad St
NH 122/Monument Sq

Hudson
Dracut Rd/Sherburne Rd
Bush Hill Rd/Wason Rd
Belknap St/Central St
Burns Hill Rd/Wason Rd

Litchfield
NH 102/Page Rd
NH 3A/Albuquerque Ave
NH 3A/Page Rd

Merrimack
US 3/Wire Rd
US 3/Manchester St
Bedford Rd/Wire Rd
Continental Blvd/Naticook Rd
Baboosic Lake Rd/Turkey Hill Rd

Milford
NH 101A/Old Wilton Rd
NH 101A/Ponemah Hill Rd
NH 13/Amherst St

Nashua
Main Dunstable/Lund Rd/Lake St
Concord St/Manchester St
Pine Hill Rd/Charron Ave
Manchester St/Tinker Rd
Main St/DW Hwy Rotary
East Dunstable Rd/Lamb Rd
Mid Dunstable Rd/Ridge Rd
NH 111/Westgate Crossing
NH 130/Coburn Ave/Titan Way

Pelham
NH 128/NH 111A
NH 128/Sherburne Rd
NH 111A/Nashua Rd/Main St

HIGHWAY CRASH STATISTICS

Highway crash statistics provide a key indicator of locations where non-recurring delay may be a problem. NRPC utilizes crash data from the NH Department of Safety to identify the number of crashes occurring along highway segments and the crash rate, measured by the number of crashes per million vehicle miles of travel. Segments which generate relatively high crash rates should be further evaluated to determine whether mitigating measures might reduce crash rates and, consequently, the infrequent but potentially dramatic impacts on roadway congestion. Further investigation of high-crash rate segments will be undertaken by NRPC to better identify the likely causes of non-recurring congestion.

Through extensive studies, highway safety professionals have developed "crash modification factors" (CMF) by comparing the number of crashes before and after implementation of a safety improvement. The FHWA maintains a database of over 3,000 CMFs that can be applied to a wide array of improvements. Some CMFs are based upon more research than others, and a star-rating is provided for each CMF to indicate the level of confidence in the study producing the CMF.

TRANSIT CONGESTION MEASURES

On Time Performance

This transit congestion measure relates average travel time of fixed bus routes to the scheduled times. This measure is based on data collected by the Nashua Transit System for a one-week period, then tabulated and summarized by NRPC. The analysis, which is presented in the next chapter, was a one-time effort but may be repeated on a schedule to be determined mutually by NRPC and NTS.

Seat Capacity Utilization

Transit capacity utilization in a smaller urban area such as Nashua is generally measured by percentage of seating capacity utilized on average along a route for a specified time period. Larger urban areas may include standing capacity as a component of total capacity. The NRPC analysis is conducted for three time periods: AM peak from 6 to 9 AM, Midday from 9 AM to 3 PM, PM Peak from 3 PM to 6 PM and the Night period after 6 PM. The peak hour ranges are established based upon review of NTS boarding counts. Assumptions were made in consultation with NTS regarding the percentage of the route traveled by the reported number of riders, as this is an input to the capacity utilization calculation. It should be noted that the calculations represent averages for a route during a time period; an individual run could be substantially higher than the average due to peaking characteristics.

BICYCLE LEVEL OF TRAFFIC STRESS

Definition

Bicycle Level of Traffic Stress (LTS) is a rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists. Traffic speed, vehicular volume and width/condition of shoulders contribute to the calculation of LTS. Levels of traffic stress range from 1 to 4 as described below:

- LTS 1: Strong separation from all except low speed, low volume traffic. Simple crossings are available and road travel by bicycle is suitable for children.
- LTS 2: Except in low speed / low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. There is physical separation from higher speed and multilane traffic. Crossings are present that are easy for an adult to negotiate. Most adults can tolerate this level of traffic stress.
- LTS 3: This level involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. A level of traffic stress acceptable to those classified as "enthused and confident."
- LTS 4: This level involves interaction with higher speed traffic or close proximity to high speed traffic. This is a level of stress acceptable only to those classified as "strong and fearless."

Criteria for Route Segments

Stand-alone paths are designated LTS 1, as they are physically separated from vehicular traffic. Bike lanes and riding in mixed traffic can present the full range of traffic stress, depending on details of the road configuration.

Segment Type	Level of Traffic Stress
Stand-alone paths	LTS = 1
Segregated paths (sidepaths, cycle tracks)	LTS = 1
Bike lanes	LTS can vary from 1 to 4; see Tables 2 and 3
Mixed traffic	LTS can vary from 1 to 4; see Table 4

HIGHWAY CORRIDOR CONGESTION EVALUATION & STRATEGIES

This section applies the various performance measures to key highway corridors, which are evaluated by segments. Strategies are developed for corridor segments which exhibit deficiencies and performance measures are re-calculated for major investment strategies which are currently programmed in the TIP, included as recommendations in the long-range plan and other projects which may address problem areas.

F.E. EVERETT TURNPIKE, MERRIMACK-NASHUA

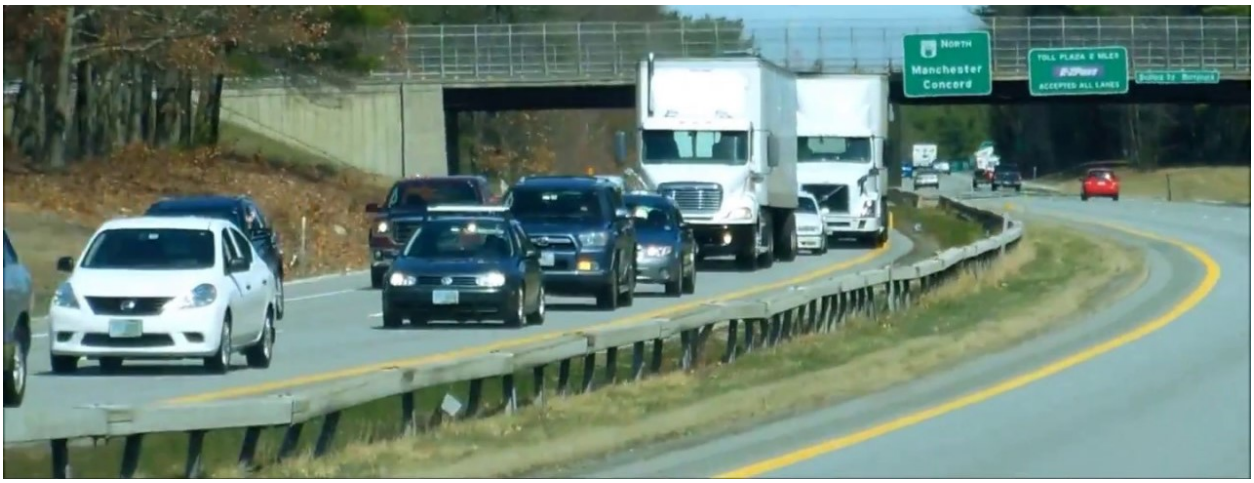
The F.E. Everett Turnpike serves as one of the primary north-south thoroughfares in southern New Hampshire for vehicular traffic by connecting the state's three largest cities: Manchester, Nashua and Concord. The northern segment is located entirely within Merrimack and extends from Interchange 13 (the Bedford Tolls) to Interchange 10 (Industrial Blvd.), paralleling U.S. Route 3 and the Merrimack River. It contains toll plazas at Exit 13, and on the northbound exit and southbound entrance ramps for Exit 10. Since this segment connects Nashua with the Bedford-Manchester region, it is a major commuting route for those working within the southern New Hampshire and metropolitan Boston areas. It is also a vital road for freight transportation and local attractions, including the Merrimack Premium Outlets.

The majority of the middle segment is located within Nashua, with a small portion in Merrimack. It extends from Interchange 10 (Industrial Blvd) to Interchange 7 (NH 101A/Amherst St.), paralleling U.S. Route 3 and the Merrimack River. There is no Interchange 9. It contains toll plazas on the northbound exit and southbound entrance ramps for Interchange 10. Since this segment connects with NH 101A, a major east-west route, it is a major commuting route for those working within southern New Hampshire and metropolitan Boston area. It is also a vital road for freight transportation and local attractions, including the commercial strip along NH 101A and downtown Nashua.

The southern segment is located entirely within Nashua and extends from Interchange 7 (NH 101A/Amherst St) to the Massachusetts state border. This segment of the Everett Turnpike overlaps with U.S. Route 3. Since this segment connects South Nashua with Tyngsborough, Massachusetts, it is a major commuting route for those working within the southern New Hampshire and metropolitan Boston areas. It is also a vital road for freight transportation and local attractions, including the Pheasant Lane Mall, downtown Nashua, and the commercial corridors along NH 101A and the Daniel Webster Highway.

Due to its role as a commuting corridor, the F.E. Everett Turnpike is expected to have some degree of congestion during peak travel times. In addition to the high volume of cars at certain peak travel times, contributors to this congestion are segments where travel lanes vary from two to three lanes in either direction and toll plazas, which require drivers to slow their speed.

The Turnpike is operated by the New Hampshire Department of Transportation's Bureau of Turnpikes. Some of the department's recent improvements on the Turnpike to alleviate congestion have been the completion and opening of the Raymond Wieczorek Airport Access Road in 2011, the removal of Exit 12 off-ramp toll plaza in July 2014 and the end of toll collection at the Exit 11 ramps in January 2020. Removal of the Exit 11 toll plaza is scheduled to occur 2021.



FEE Turnpike South of Bedford Toll Plaza, Merrimack

Traffic Count Trends

F.E.E. Turnpike segments north of Exit 7 in Nashua have shown significant growth in average weekday daily traffic (AWDT) over the past decade, which is contrary to trends that have occurred on most other regional roadways. Average annual growth has been around 3.3% through the Merrimack section reducing to minimal growth at the regional boundary at the Bedford Toll, likely due to traffic exiting to the Manchester Airport Access Road. The high growth in this area is similar to that which occurred during the boom period of the 1980's-90's. South of Exit 7, growth has been around the 1% per year range, which is still higher than seen along many regional arterials.

FEE TURNPIKE WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Bedford Toll	Bedford-Merr TL	2009	50,700	2019	53,100	0.5%
Interchange 12 to 13	Merrimack	2012	56,700	2019	71,200	3.3%
Interchange 11 to 12	Merrimack	2009	58,700	2019	82,300	3.4%
Interchange 10 to 11	Merrimack	2009	60,900	2019	80,500	2.8%
Interchange 8 to 10	Merr-Nashua	2009	57,900	2019	77,200	2.9%
Interchange 7 to 8	Nashua	2009	76,800	2019	101,800	2.9%
Interchange 6 to 7	Nashua	2009	110,700	2019	121,300	0.9%
Interchange 5 to 6	Nashua	2009	120,800	2019	134,300	1.1%
Interchange 4 to 5	Nashua	2009	108,400	2019	121,800	1.2%
Interchange 2 to 3	Nashua	2009	105,200	2019	117,200	1.1%
Massachusetts State Line	Nashua	2009	94,400	2019	101,100	0.7%

Travel Time Index

The F.E. Everett Turnpike encounters significant congestion and bottlenecks through the section in Merrimack where three lanes taper to two. Taper lanes also create dangerous passing areas which can induce crashes and thereby contribute to non-recurring delay. Bottlenecks are most severe in the northbound direction during the PM peak, with average speed falling below 22 mph and TTI reaching 2.80. Widening to provide a continuous three-lane section throughout the Turnpike is in the Ten Year Plan, with completion scheduled for prior to 2030.

FEE TURNPIKE PEAK PERIOD SPEED AND TRAVEL TIME INDEX

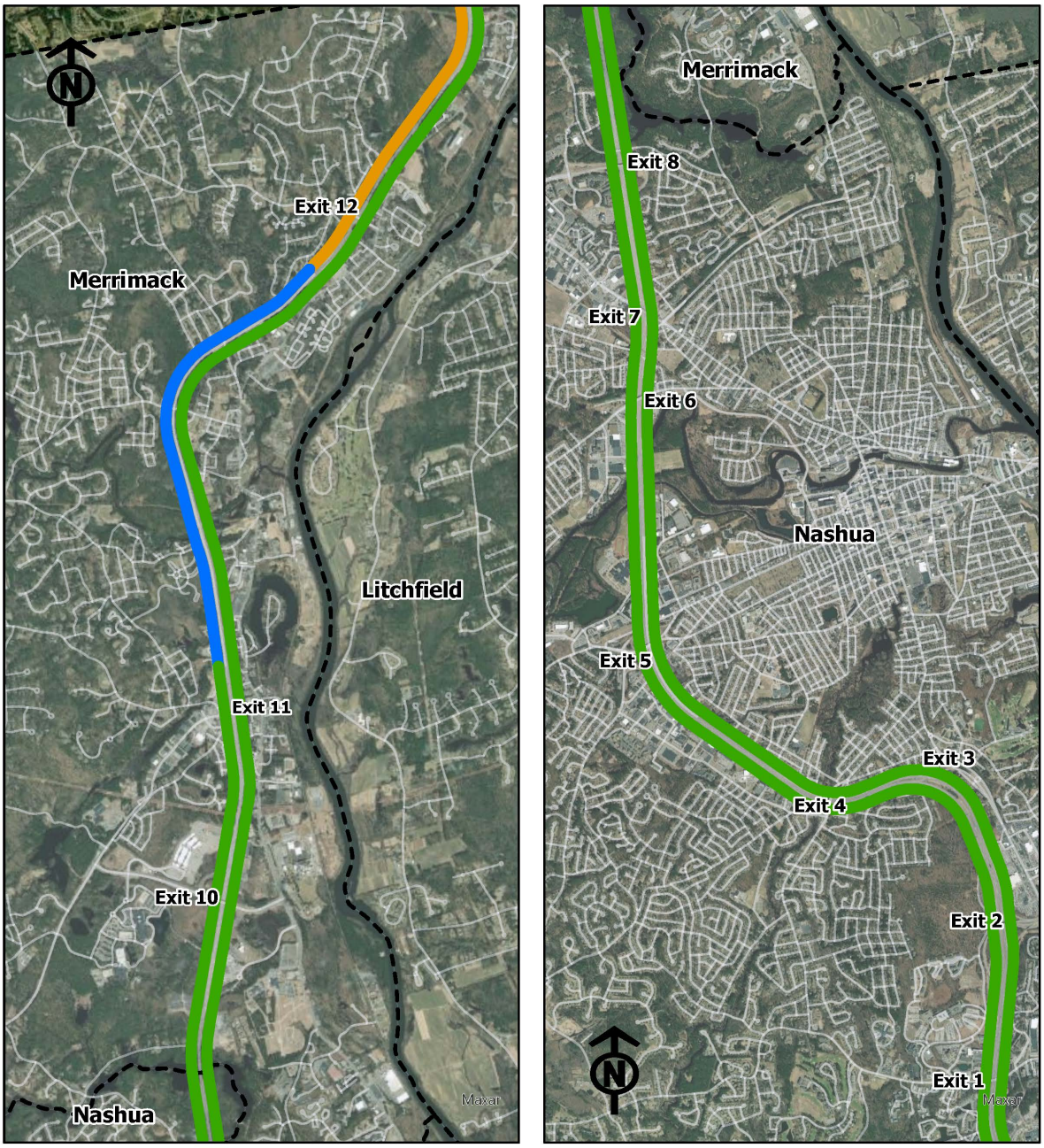
	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Exit 12 to Exit 13	**62.8**	**0.96**	**62.8**	**0.96**	**30.3**	**1.98**	**59.4**	**1.01**
Exit 11 to Exit 12	**63.0**	**0.95**	**38.3**	**1.57**	**49.5**	**1.22**	**62.5**	**0.96**
Exit 10 to Exit 11	**63.0**	**0.96**	**21.6**	**2.80**	**64.5**	**0.93**	**64.4**	**0.93**
Exit 7 to Exit 10	**63.2**	**0.95**	**50.9**	**1.18**	**65.5**	**0.92**	**65.4**	**0.92**
Mass Line to Exit 7	**65.7**	**0.91**	**63.4**	**0.95**	**63.3**	**0.95**	**66.6**	**0.90**

Highway Capacity Utilization

The segments with congested peak period travel times closely correlate with the NPMRDS data. LOS E prevails in the northbound direction throughout the Merrimack section and the segments between Exits 10 and 12 are approaching forced flow (LOS F) conditions, where the V/C ratio exceeds 1.0.

FEE TURNPIKE CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Bedford Toll	Merrimack	53,050	2,653	0.58	C	2,971	0.65	C
Interchange 12 to 13	Merrimack	71,150	3,558	0.77	D	3,984	0.87	E
Interchange 11 to 12	Merrimack	82,350	3,912	0.85	D	4,529	0.98	E
Interchange 10 to 11	Merrimack	80,500	3,824	0.83	D	4,428	0.96	E
Interchange 8 to 10	Merr/Nash	77,200	3,667	0.80	D	3,860	0.84	E
Interchange 7 to 8	Nashua	101,750	4,833	0.70	C	5,088	0.74	D
Interchange 6 to 7	Nashua	121,350	5,582	0.54	C	5,764	0.72	D
Interchange 5 to 6	Nashua	134,350	6,180	0.60	C	6,382	0.62	C
Interchange 4 to 5	Nashua	121,820	5,665	0.62	C	5,786	0.63	C
Interchange 2 to 3	Nashua	117,200	5,626	0.82	D	5,567	0.61	C
Massachusetts SL	Nashua	101,100	5,055	0.73	D	5,055	0.73	D

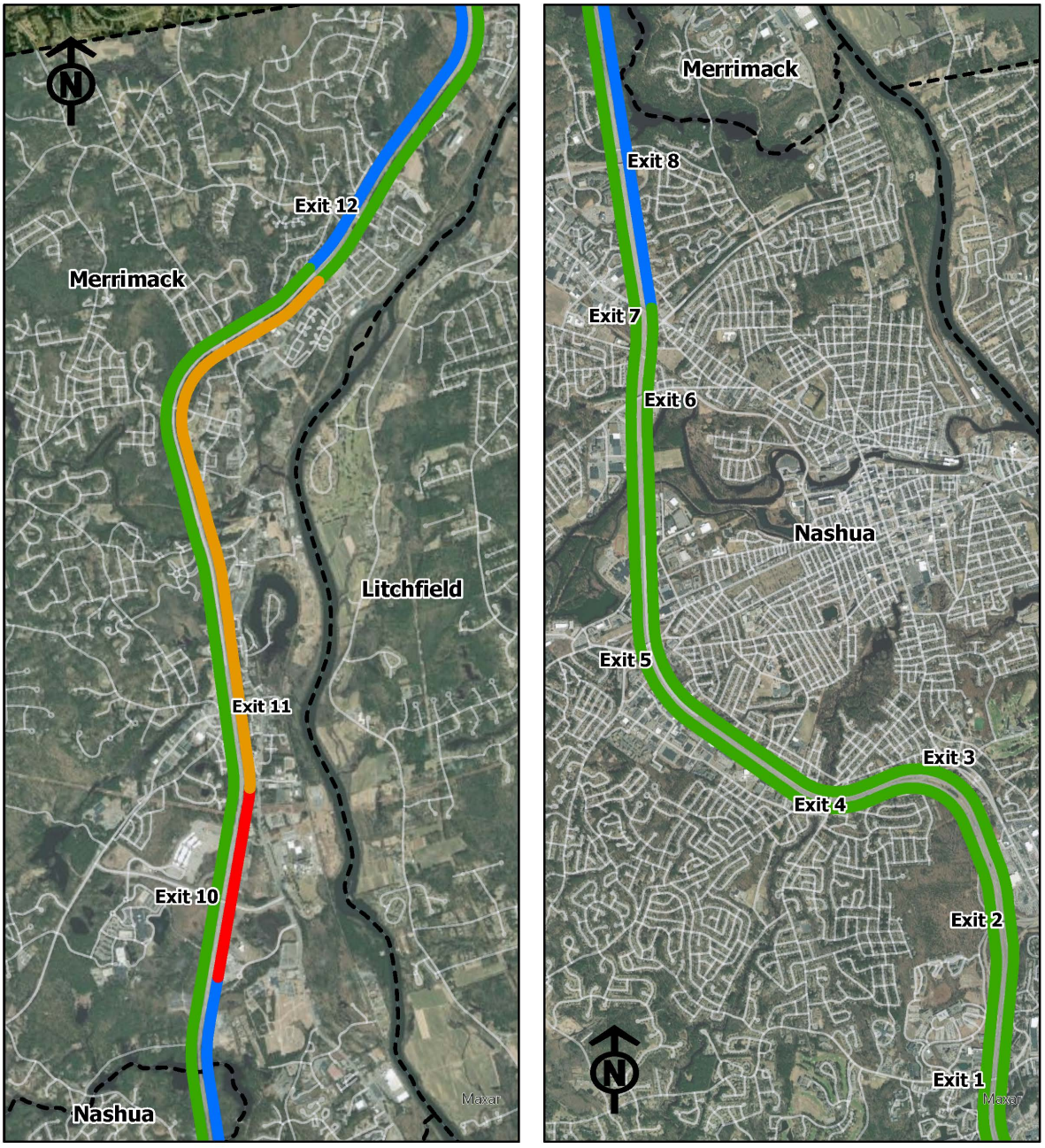


F.E. Everett Turnpike
Travel Time Index
Weekday AM Peak Period
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

1 Miles

NRPC



F.E. Everett Turnpike
Travel Time Index
Weekday PM Peak Period
(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

1 Miles

NRPC

Highway Crash Statistics

Crash rates on the Turnpike range between 0.37-1.07 per million vehicle miles of travel. The limited access nature of the highway is the primary factor in the low level of incidents; however, crashes which do occur are most often at high speed and prone to causing personal injury. The northbound segment between Exits 10 and 11 tends to bottleneck during the PM peak due to tapering from three to two lanes and this is a contributing factor to rear end crashes.

FEE TURNPIKE AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave Yrly Crashes	Crashes/ MVM
Bedford TL - Exit 12	Merrimack					
Northbound		1.82	34,600	22.98	10.50	0.46
Southbound		1.82	31,900	21.19	19.00	0.90
Exit 12 - Exit 11	Merrimack					
Northbound		3.85	39,400	55.37	30.25	0.55
Southbound		3.85	37,600	52.84	29.75	0.56
Exit 11 - Exit 10	Merrimack					
Northbound		1.27	38,300	17.75	19.00	1.07
Southbound		1.27	37,000	17.15	6.75	0.39
Exit 10 - Nashua CL	Merrimack					
Northbound		1.13	36,500	15.05	14.00	0.93
Southbound		1.13	35,700	14.72	7.25	0.49
Merr TL - Exit 8	Nashua					
Northbound		1.05	36,500	13.99	9.25	0.66
Southbound		1.05	35,700	13.68	5.00	0.37
Exit 8 - Exit 7	Nashua					
Northbound		0.91	49,600	16.47	7.75	0.47
Southbound		0.91	45,500	15.11	3.00	0.20
Exit 7 - Exit 6	Nashua					
Northbound		0.54	56,700	11.18	12.00	1.07
Southbound		0.54	56,700	11.18	4.50	0.40
Exit 6 - Exit 5	Nashua					
Northbound		1.54	63,700	35.81	23.00	0.64
Southbound		1.54	61,900	34.79	20.75	0.60
Exit 5 - Exit 4	Nashua					
Northbound		1.51	56,900	31.36	17.00	0.54
Southbound		1.51	56,900	31.36	15.75	0.50
Exit 4 - Exit 2	Nashua					
Northbound		1.72	55,900	35.09	20.50	0.58
Southbound		1.72	53,700	33.71	16.75	0.50
Exit 2 - Mass SL	Nashua					
Northbound		1.48	47,300	25.55	16.00	0.63
Southbound		1.48	47,300	25.55	10.75	0.42

Congestion Management Strategies

- Expand the use of Intelligent Transportation Systems (ITS) devices such as message boards, which advise travelers of expected travel times to major destinations, incidents and other information which can influence route choice.
- Increased roadway monitoring, such as closed-circuit video and sensors to alert the NHDOT Traffic Management Center (TMC) of conditions impacting roadway travel.
- Widening of the FEE Turnpike to three lanes per direction between Exit 7 in Nashua and I-293 in Bedford (TYP/TIP, construction 2022-2028).
- Implement Open Road or All Electronic Tolling at the Bedford Toll Plaza to enable continuous flow of traffic (TYP/TIP, construction 2023-2024).
- Re-configuration of the FEE Turnpike Exit 5E southbound off-ramp to facilitate travel flow from the turnpike to NH 111. (TYP, construction in 2030).
- Evaluate the need for expansion of the Exit 8 Southwood Drive park-and-ride and for additional park-and-ride construction in south Nashua.
- Evaluate the need for full interchange construction at Exit 12, Merrimack (NRPC study to commence October 2021).
- Continue support for Nashua to Boston intercity bus service to reduce long-distance trips by private auto.
- Passenger rail service extension to Nashua and Manchester, which would reduce traffic volume on the Turnpike.

Analysis of CMP Major Investments Impacts

- FEE Turnpike Widening, Exit 8 Nashua to I-293 Bedford – Southbound turnpike segments during the AM peak between Exits 8 and 13 are forecasted to improve from LOS D at present to C in the 2045 forecast year with the additional lane constructed. For northbound PM peak traffic, the existing LOS E will improve to C.

2045 FEE TURNPIKE VOLUME/CAPACITY AND LOS – TURNPIKE WIDENING

Location	Municipality	2045 AWDT	2045 AM PK	AM V/C	AM LOS	2045 PM Pk	PM V/C	PM LOS
Bedford Toll	Merrimack	54,980	2,831	0.41	B	2,694	0.39	B
Interchange 12 to 13	Merrimack	74,100	3,705	0.54	C	3,631	0.53	C
Interchange 11 to 12	Merrimack	90,050	4,503	0.65	C	4,412	0.64	C
Interchange 10 to 11	Merrimack	87,200	4,360	0.63	C	4,273	0.62	C
Interchange 8 to 10	Merr/Nash	84,490	4,225	0.61	C	4,098	0.59	C

- Construction of FEE Turnpike Exit 12 Ramps to/from North – NRPC is currently undertaking a study to evaluate the impact of construction of the north ramps at Exit 12 of the FEE Turnpike. The analysis will be completed in Spring, 2022 and the findings will be incorporated into the CMP.

- Passenger Rail Extension Reduction of Turnpike Traffic – In 2018 NRPC prepared an analysis of the impact on FEE Turnpike traffic from implementing the recommended service plan in the Capitol Corridor Study, which would provide regular service throughout the day to Nashua, Bedford/Manchester Airport and Manchester. Vehicle reductions would be dependent upon which station the new rail user accesses. From Manchester and Bedford, vehicle trips are reduced along the entire stretch of the highway. Those driving to downtown Nashua would impact the turnpike primarily south of Exit 7. Most rail riders at south Nashua would use Exit 1 for access and hence would reduce volume only south of this location, although there could be up to 20% in the south Nashua area who access via DW highway for rail and currently travel the turnpike for their trip.

  Along the maximum vehicle reduction segment on US 3, south of the state line, a 6.6% reduction in vehicles southbound in the AM peak is calculated and a 5.5% reduction for PM peak northbound vehicles. The table below summarizes the peak hour traffic reductions.

FEE TURNPIKE TRAFFIC REDUCTION FROM PASSENGER RAIL EXTENSION

AM Peak Hour Southbound										
Exit:	13 to 12	12 to 11	11 to10	10 to 8	8 to 7	7 to 6	6 to 5	5 to 4	4 to 2	Mass SL
Rail Station										
Manchester	60	60	60	60	60	60	60	60	60	60
Bedford/MHT	76	76	76	76	76	76	76	76	76	76
Nashua	0	0	0	0	50	80	90	107	107	107
South Nashua	0	0	0	0	0	0	0	0	30	150
Veh. Reduced	136	136	136	136	186	216	226	243	273	393
2040 Veh w/o rail	3,132	4,637	4,570	5,107	6,115	7,459	9,092	7,123	6,854	5,914
2040 Veh w/rail	2,996	4,501	4,434	4,971	5,929	7,243	8,866	6,880	6,581	5,521
Pct. Reduction	4.3%	2.9%	3.0%	2.7%	3.0%	2.9%	2.5%	3.4%	4.0%	6.6%

PM Peak Hour Northbound										
Exit:	12 to 13	11 to 12	10 to11	8 to 10	7 to 8	6 to 7	5 to 6	4 to 5	2 to 4	Mass SL
Rail Station										
Manchester	51	51	51	51	51	51	51	51	51	51
Bedford/MHT	67	67	67	67	67	67	67	67	67	67
Nashua	0	0	0	0	45	70	80	93	93	93
South Nashua	0	0	0	0	0	0	0	0	30	132
Veh. Reduced	118	118	118	118	163	188	198	211	241	343
2040 Veh w/o rail	3,299	4,885	4,814	5,381	6,443	7,859	9,579	7,505	7,222	6,230
2040 Veh w/rail	3,181	4,767	4,696	5,263	6,280	7,671	9,381	7,294	6,981	5,887
Pct. Reduction	3.6%	2.4%	2.5%	2.2%	2.5%	2.4%	2.1%	2.8%	3.3%	5.5%

NH 101, WILTON-MILFORD-AMHERST

NH 101 serves as the major east-west thoroughfare in the Nashua Region. The portion of the NH 101 corridor in Amherst serves several local and regional transportation functions. Within Amherst, the route parallels the F.E. Everett Turnpike and the Merrimack River, thereby connecting Milford with Bedford. It is a major commuting corridor within the Nashua Region.

NH 101 is a bypass from Old Wilton Road in Milford to Baboosic Lake Road in Amherst, providing a limited access, two-lane bi-directional undivided highway with 12-foot travel lanes and 10-foot wide paved shoulders. The remaining segments of the corridor are also two-lane bidirectional and undivided, but are characterized with business frontage, numerous curb cuts and intersecting side streets. The posted speed limit is 50 mph for most of the corridor in Amherst.

Along the section of Route 101 north and east of the Route 122/Baboosic Lake Road interchange, which provides access to Amherst's town center, land is predominantly agricultural, very low density residential, or vacant. The visual character of this area of the corridor in Amherst is rural and open. There are small areas of commercial land use and the town solid waste transfer facility along this portion of highway. Principal commercial land uses are the Salzburg Square and the Meeting Place complexes, along with smaller stand-alone businesses like the Black Forest.

Along the route, there are no sidewalks and only minimal infrastructure for cyclists. Although no volume estimates are available, cyclists can be seen using the highway shoulders throughout the corridor, particularly on weekends. Riders can be seen on the highway shoulder in both designated and designated portions of the highway.

NH 101 Intersection with NH 101A, Western Milford

Traffic Count Trends

Traffic growth along NH 101 has flatlined over the past dozen years, with the exception of the northeast segment running from Baboosic Lake Road to the Bedford line, where a 1.3% rate per year has been sustained. Growth rates during the 1980's-90's had been predominately in the 3-4% annual range, resulting in future traffic forecasts that called for widening to two lanes per direction. Widening for the sake of increasing capacity is no longer an MTP priority, although a passing lane section has been proposed by NHDOT to improve safety (eliminating the need to pass in the lane of oncoming vehicles).

NH 101 WEEKDAY TRAFFIC COUNT TRENDS

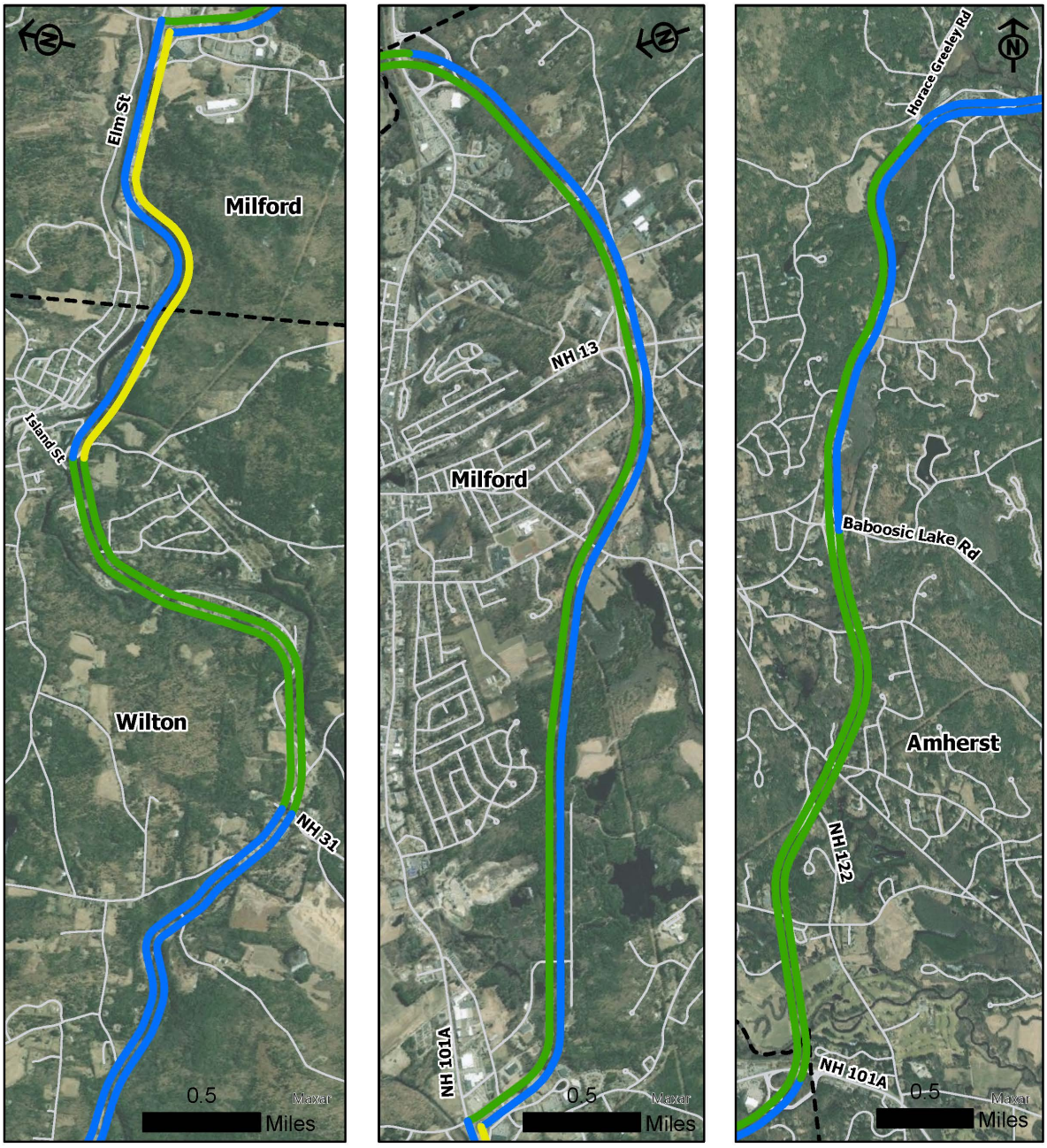
Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
West of Old Wilton Rd.	Milford	2006	9,100	2018	7,700	-1.4%
West of West St.	Milford	2007	14,150	2019	13,050	-0.7%
East of NH 13	Milford	2007	15,300	2019	13,150	-1.3%
West of NH 101 Interchange	Milford	2006	21,450	2018	18,900	-1.0%
East of NH 101 Interchange	Amherst	2006	35,900	2019	34,500	-0.3%
East of NH 122	Amherst	2007	28,150	2019	29,800	0.5%
Hollis Town Line	Merrrimack	2007	37,350	2019	38,500	0.3%
Nashua City Line	Merrrimack	2007	42,800	2019	39,600	-0.6%
West of Capitol St.	Nashua	2006	47,500	2018	38,400	-1.8%
East of Thornton Rd.	Nashua	2006	51,600	2017	44,800	-1.3%
East of H Burque Hwy	Nashua	2006	26,550	2018	24,450	-0.7%
East of Baldwin St.	Nashua	2006	27,350	2018	20,400	-2.4%
West of Main St.	Nashua	2007	25,750	2019	18,550	-2.7%
Canal St. at Nashua River	Nashua	2006	23,400	2018	18,450	-2.0%

Travel Time Index

NH 101 operates at or around free-flow traffic speeds throughout Wilton. Upon the approach to the NH 101A intersection, eastbound traffic experiences the low end of moderate congestion during the AM peak. Otherwise, congestion in both directions is minor to non-existent.

NH 101 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Eastbound				Westbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Temple Rd-Greenville Rd, Wil	49.0	1.02	49.1	1.02	47.9	1.04	49.0	1.02
Greenville Rd-Island St	45.8	0.98	45.9	0.98	45.3	0.99	45.4	0.99
Island St to NH 101A Elm, Mlf	28.0	1.25	31.5	1.11	33.3	1.05	31.7	1.11
NH 101A to NH 13	51.0	1.02	51.3	1.01	52.3	0.99	43.9	1.19
NH 13 to NH 101A, Amhr TL	52.3	1.05	53.3	1.03	53.7	1.02	51.1	1.08
NH 101A to NH 122	56.5	0.97	56.5	0.97	56.2	0.98	55.5	0.99
NH 122 to Baboosic Lake Rd	55.9	0.98	55.5	0.99	56.2	0.98	56.1	0.98
Baboos Lake Rd - H Greeley Rd	49.7	1.01	49.1	1.02	50.5	0.99	49.4	1.01
H Greeley Rd to Bedford TL	48.4	1.03	47.8	1.05	48.0	1.04	47.4	1.06



NH 101

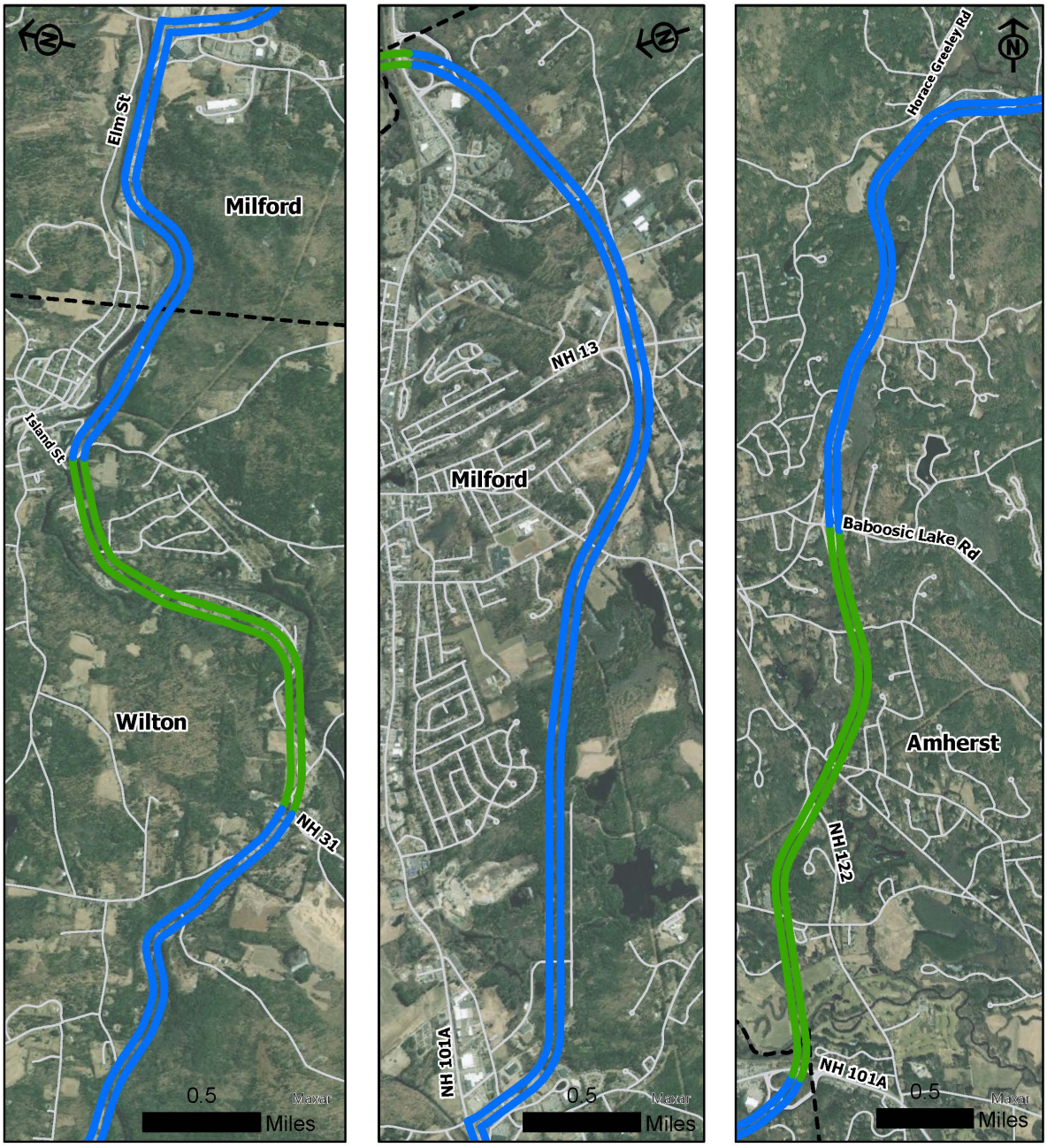
Travel Time Index

Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

NRPC



NH 101

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

NRPC

Highway Capacity Utilization

NH 101 operates at LOS C through the at-grade section from Wilton into Milford, where signal control at the Wilton Road and NH 101A intersections result in LOS D for both peak periods. Throughout the Milford Bypass section into Amherst to the Baboosic Lake Road intersection, drivers experience average congestion at LOS C. North of Baboosic Lake Road, LOS D conditions prevail. Although the TTI indicates speeds do not significantly fall below free flow through this section, higher traffic volumes result in some loss of driver comfort.

NH 101 CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Over Souhegan River	Wilton	16,500	825	0.59	C	825	0.59	C
Wilton Town Line	Milford	17,300	865	0.54	C	865	0.54	C
E of Wilton Rd	Milford	24,000	1,200	0.76	D	1,200	0.76	D
S of NH 101A Elm St	Milford	20,025	1,001	0.59	C	1,001	0.59	C
W of NH 13	Milford	20,150	1,008	0.59	C	1,008	0.59	C
E of NH 13	Milford	28,000	1,400	0.70	C	1,400	0.70	C
N of NH 101A	Milford	17,400	870	0.51	C	870	0.51	C
Over Boston Post Rd	Amherst	16,850	843	0.50	C	843	0.50	C
N of Baboosic Lake Rd	Amherst	22,140	1,107	0.69	D	1,107	0.69	D
Bedford Town Line	Amherst	21,650	1,083	0.68	D	1,083	0.68	D

Highway Crash Statistics

The lowest crash incidence on NH 101 occurs along the Milford Bypass section; however, this segment also is responsible for the most severe crashes, as cars attempting to pass or accidentally drifting over the centerline can result in extreme high-speed crashes. The NH 101 safety improvement program will address this hazard.

NH 101 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Temple TL to Milford TL	Wilton	3.85	15,200	21.36	22.25	1.04
Temple TL to Amherst TL	Milford	6.69	24,700	60.31	45.50	0.75
Milford TL to Bedford TL	Amherst	6.83	15,100	37.64	56.75	1.51

Bicycle Level of Traffic Stress

Most of NH 101 is not bicycle-friendly, except for the segment between Wilton Road and the NH 101A intersection in Milford, which has a 2.0 rating. The most hazardous section, Ring Road to NH 31 in

Wilton, is ranked 3.77. The remainder of NH 101 is at the 3.0 LTS level, a suitable rating only for experienced and confident bicyclists.

NH 101 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Temple TL - Ring Rd, Wilton	16,500	0.835	3.00
Ring Rd - NH 31	16,500	2.354	3.77
NH 31 - Abbott Hill Rd	16,500	1.994	3.00
Abbott Hill Rd - Wilton Rd, Milford	17,300	1.266	3.00
Wilton Rd - N River Rd/NH 101A	24,900	0.792	2.00
Milford Byp, NH 101A West - Amherst TL	28,950	5.316	3.00
Milford TL - Bedford TL	22,450	6.852	2.98

Congestion Management Strategies

- Expand the use of Intelligent Transportation Systems (ITS) devices such as message boards, which advise travelers of expected travel times to major destinations, incidents and other information which can influence route choice.
- Increased roadway monitoring, such as closed-circuit video and sensors to alert the NHDOT Traffic Management Center (TMC) of conditions impacting roadway travel.
- Evaluate the demand and feasibility of transit services to Manchester center and the Manchester-Boston Regional Airport.
- Investigate potentially feasible segments for construction of a non-motorized modal path along NH 101.
- Implement the proposed phases of the NH 101 safety improvement project in the TYP, consisting of the following (TYP construction years to be determined):
    - Improvements at the NH 101/101A and NH 101/Phelan Rd intersections
    - Construct passing lanes for 4400 feet along the Bypass section in Milford
    - Improvements to the NH 101/NH 13 interchange
    - Improvements to NH 101/Horace Greeley Road intersection

Analysis of CMP Major Investments Impacts

- NH 101 Intersection Improvements – NHDOT has proposed to upgrade the NH 101 intersections with NH 101A and Old Wilton Road/Phelan Road in Milford. Their analysis indicates that LOS at the NH 101A intersection for westbound PM peak traffic will improve from F to B and eastbound AM peak traffic at the Old Wilton Rd/Phelan Rd. intersection will go from D to B.
- NH 101 Widening from Perry Road to Osgood Road Overpasses – NHDOT proposes adding passing lanes in both directions to improve safety along a high-speed segment where passing is allowed at present but requires doing so in the oncoming traffic lane. NHDOT estimates a 35% reduction in crashes, based on FHWA Crash Modification Factor for this improvement type.

NH 101A, MILFORD-AMHERST-MERRIMACK-NASHUA

NH 101A is a principal east-west arterial connecting Nashua and the FE Everett Turnpike with points west and north. It serves as the primary commuter route for residents living in Amherst, Milford, Wilton, Mont Vernon and Lyndeborough. The corridor segment running from the NH 101 interchange at the Milford-Amherst town line to the FEE Exit 7 interchange has succumbed to extreme development pressure and as such, experiences high volumes of traffic due to multiple retail and commercial destinations located along the corridor. The western section of the corridor runs through downtown Milford and includes the Milford Oval which introduces conflicting traffic flow.

East of the Turnpike interchange, the highway serves as the primary entry point to the Nashua Downtown Central Business District from the east and the west, Amherst St, Canal St and Bridge St (which collectively comprise the portion of NH 101A in Nashua east of the F.E. Everett Turnpike) serve several vital transportation functions. This corridor functions as a major east-west thoroughfare as it is one of the only two Nashua River crossings in the downtown area, thereby providing a connection between the F.E. Everett Turnpike and the Town of Hudson.

NH 101A Amherst Street includes commercial, industrial, recreational and civic uses. It is also located at the center of several densely populated adjoining neighborhoods. In addition to the relatively high levels of pedestrian traffic, the corridor also serves public transit riders. Recently, the City of Nashua has completed significant improvement projects along the corridor and nearby to improve navigability and comfort levels for pedestrians and motorists.

NH 101A is programmed to be improved between Celina Avenue and Somerset Parkway in Nashua by widening the corridor to a consistent 3 lane cross section and completing a series of intersection improvements. Additional safety improvements to intersections and road segments in Merrimack will also be undertaken.

NH 101A at Continental Boulevard Intersection, Merrimack

Traffic Count Trends

NH 101A has experienced negative growth over all but one segment since 2006, with the most significant declines present along the section leading into downtown Nashua continuing along Canal Street. Through the Milford section, NH 101A has seen declines averaging around 1% per year. Between the NH 101 interchange and the Merrimack/Nashua city line, traffic overall has been flat, with the secular decline again beginning to appear as the corridor heads into Nashua. West of Capitol Street, AWDT has declined from 47,800 to 39,600 over a twelve-year period. The numerical difference continues within the segment heading into downtown, but percentage differences are more pronounced. Approaching the Library Hill intersection at Main Street, NH 101A has declined at a rate of 2.7% per year, from 25,750 to 18,550.

NH 101A WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % Δ
West of Old Wilton Rd.	Milford	2006	9,100	2018	7,700	-1.4%
West of West St.	Milford	2007	14,150	2019	13,050	-0.7%
East of NH 13	Milford	2007	15,300	2019	13,150	-1.3%
West of NH 101 Interchange	Milford	2006	21,450	2018	18,900	-1.0%
East of NH 101 Interchange	Amherst	2006	35,900	2019	34,500	-0.3%
East of NH 122	Amherst	2007	28,150	2019	29,800	0.5%
Hollis Town Line	Merrimack	2007	37,350	2019	38,500	0.3%
Nashua City Line	Merrimack	2007	42,800	2019	39,600	-0.6%
West of Capitol St.	Nashua	2006	47,500	2018	38,400	-1.8%
East of Thornton Rd.	Nashua	2006	51,600	2017	44,800	-1.3%
East of H Burque Hwy	Nashua	2006	26,550	2018	24,450	-0.7%
East of Baldwin St.	Nashua	2006	27,350	2018	20,400	-2.4%
West of Main St.	Nashua	2007	25,750	2019	18,550	-2.7%
Canal St. at Nashua River	Nashua	2006	23,400	2018	18,450	-2.0%

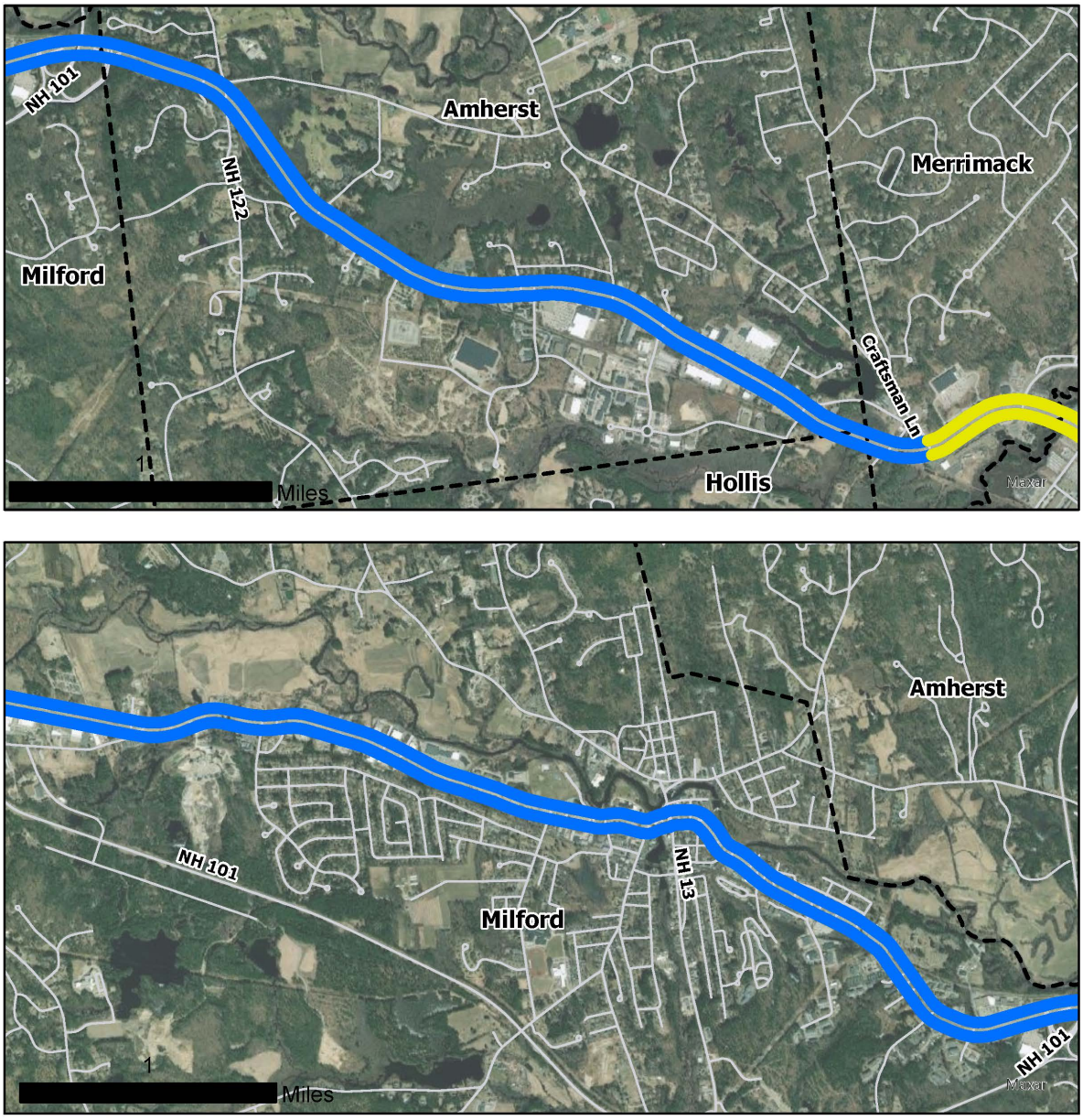
Travel Time Index

Minor levels of congestion occur along NH 101A through the Milford section, reflected by 16-24% increases in travel time over the free-flow speeds. With significant increases in traffic to the east in Merrimack and Nashua, moderate levels of congestion become more prevalent, and the Nashua segment west of Somerset Parkway falls to the heavily congested range, with a TTI of 1.65. Along Canal and Bridge Streets, which comprise the easternmost segment of NH 101A, heavy congestion is the norm, with TTI reaching 1.88 for eastbound PM peak motorists.

NH 101A PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Eastbound				Westbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
N River Rd to Milford Oval *	**32.5**	**1.08**	**29.7**	**1.18**	**33.4**	**1.05**	**28.3**	**1.24**
NH 13 to NH 101 int, Amhr TL *	**26.9**	**1.04**	**26.9**	**1.16**	**30.6**	**1.02**	**25.6**	**1.22**
NH 101 to Craftsman Ln, Merr	**33.6**	**1.13**	**31.3**	**1.21**	**34.6**	**1.10**	**29.7**	**1.28**
Craftsman Ln-Som. Pkwy, Nash	**26.1**	**1.36**	**24.7**	**1.44**	**28.3**	**1.26**	**21.6**	**1.65**
Som. Pkwy to H Burque Hwy	**24.1**	**1.20**	**22.3**	**1.30**	**23.5**	**1.15**	**20.2**	**1.34**
H Burque Hwy to Main St	**19.7**	**1.30**	**17.4**	**1.47**	**26.6**	**1.16**	**25.5**	**1.22**
Canal/Bridge Sts to TF Bridge	**17.7**	**1.39**	**13.2**	**1.88**	**16.6**	**1.56**	**14.8**	**1.73**

* NPMRDS data not available. Uses 2017 travel run data



NH 101A

(Milford, Amherst, Merrimack)

Travel Time Index

Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC

NH 101A (Nashua)

Travel Time Index

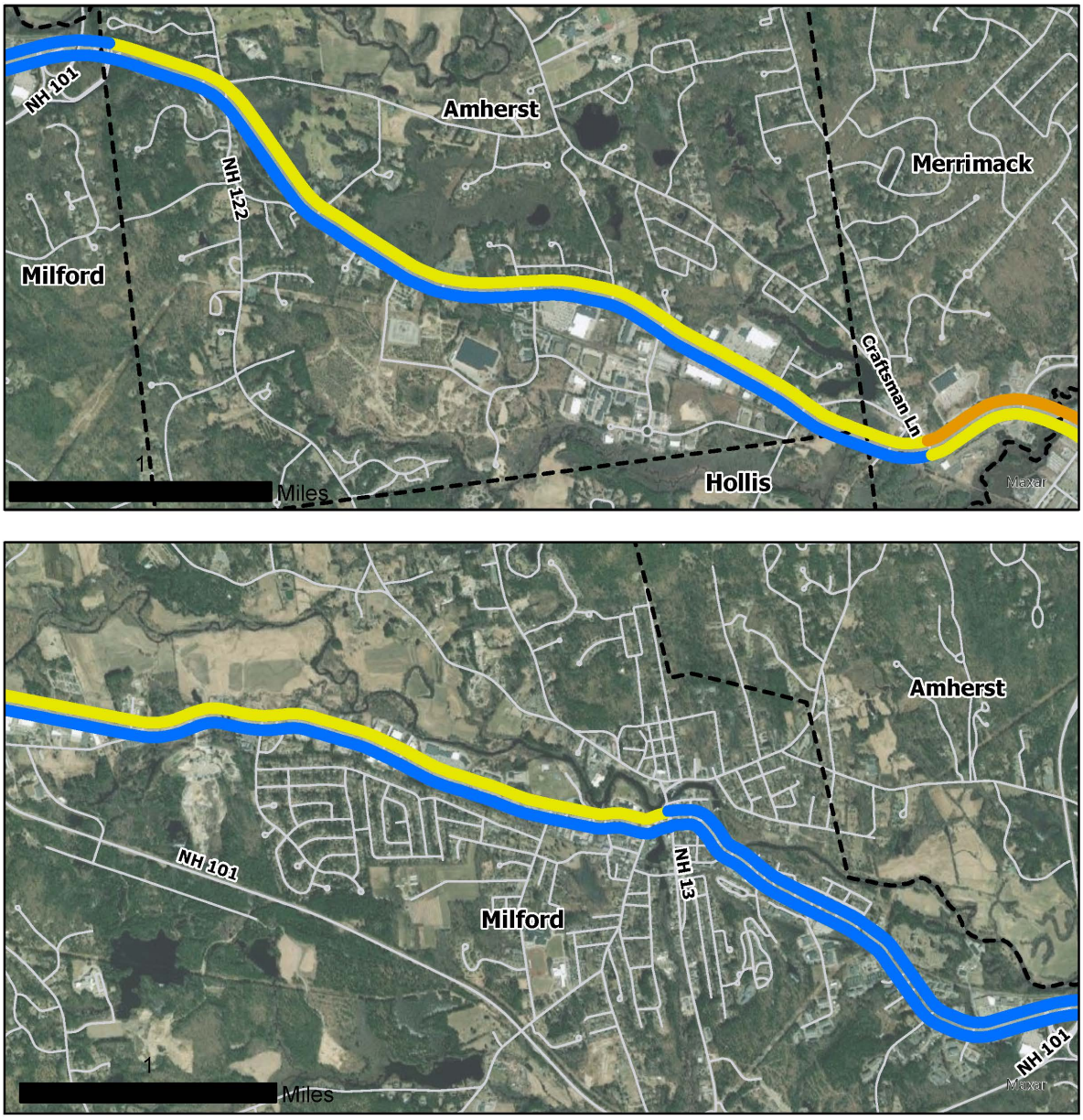
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC



NH 101A

(Milford, Amherst, Merrimack)

Travel Time Index

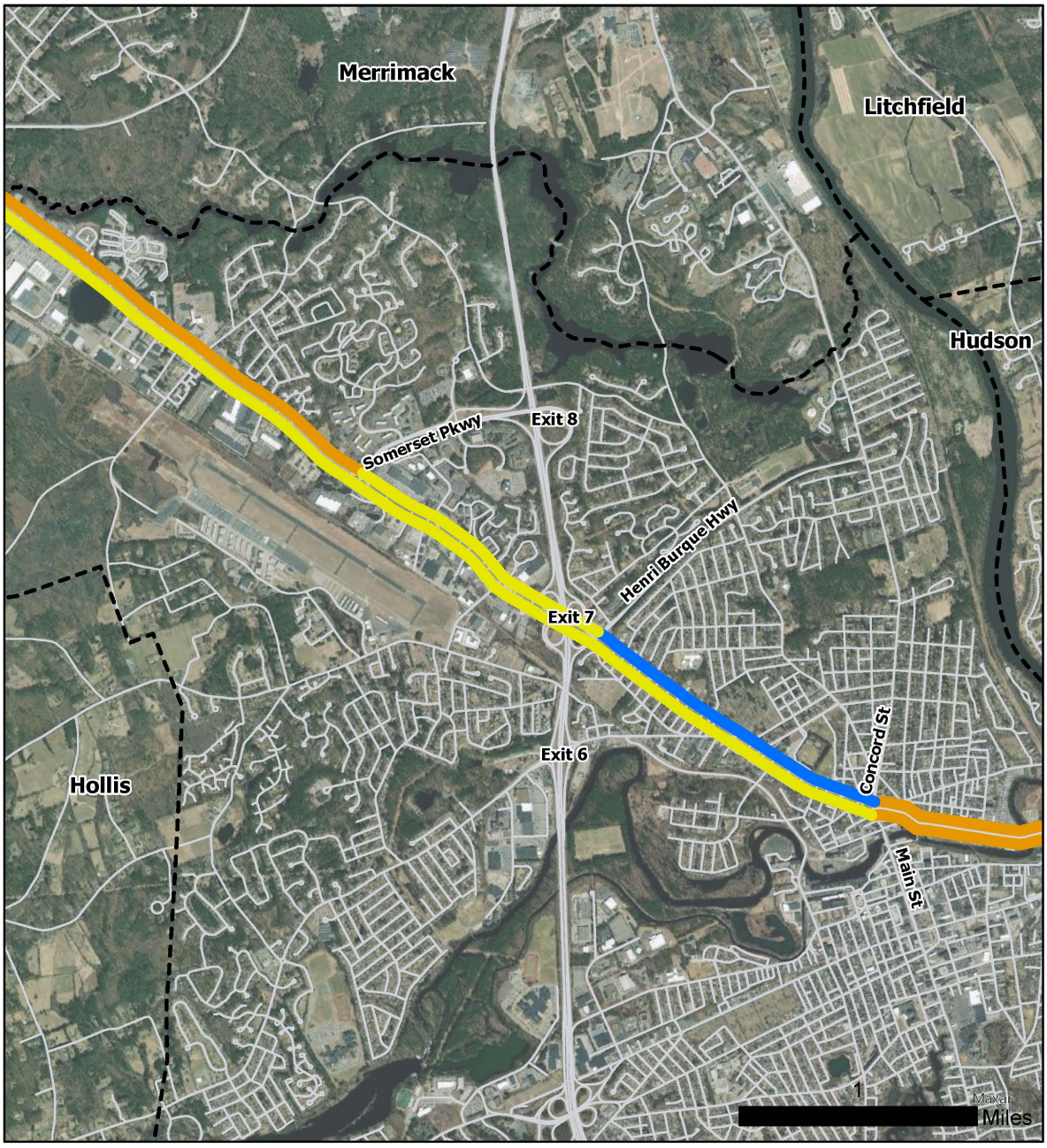
Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC



NH 101A (Nashua)

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC

Highway Capacity Utilization

NH 101A through most of Milford operates in the LOS D range, characteristic of drivers experiencing some degree of congestion but still able to maintain acceptable speeds. To the east of NH 101A there is a decline to LOS E during both peak periods, then improves to a borderline D/E condition east of NH 122. Through the Merrimack and Nashua sections west of the Turnpike, the variation between D and E is largely due to changes in the number of lanes present. The widening program will even out this congestion variation. Along Canal and Bridge Streets, LOS is well into the E range, which is in line with the travel times observed along this section.

NH 101A CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
W of Old Wilton Rd	Milford	7,700	273	0.26	B	339	0.32	B
W of West St	Milford	13,050	653	0.62	D	653	0.62	D
E of Cottage St	Milford	14,900	745	0.71	D	745	0.71	D
E of NH 13	Milford	13,150	658	0.63	D	658	0.63	D
W of NH 101 interchange	Milford	18,900	945	0.53	C	945	0.53	C
E of NH 101 Interchange	Amherst	34,500	1,673	0.93	E	1,639	0.91	E
E of NH 122	Amherst	29,800	1,416	0.79	D	1,445	0.80	D
Hollis Town Line	Merrimack	38,500	1,675	0.83	E	1,829	0.90	E
Nashua City Line	Merrimack	39,600	1,683	0.62	D	1,861	0.69	D
W of Capitol St	Nashua	38,400	1,459	0.81	E	1,536	0.85	E
E of Thornton Rd	Nashua	44,790	1,568	0.87	E	1,948	0.72	D
E of H Burque Hwy	Nashua	24,450	905	0.80	D	917	0.82	E
E of Baldwin St	Nashua	20,400	755	0.42	C	765	0.43	C
W of Main St	Nashua	18,550	686	0.76	D	696	0.39	B
Canal St @ Nashua R.	Nashua	18,450	821	0.91	E	756	0.84	E

Highway Crash Statistics

Crash rates are highest in the Milford segment east of the Oval to the Amherst line, and in Nashua from Somerset Parkway to Main Street. The NH 101A segments to be widened in Merrimack and Nashua have lower than average crash rates for the corridor.

NH 101A AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
NH 101 - West St	Milford	2.38	11,400	9.90	30.50	3.08
West St - Tonella Rd	Milford	0.90	12,700	4.17	20.50	4.91
Tonella Rd - Amherst TL	Milford	1.61	17,100	10.05	41.00	4.08
Milford TL - Veterans Rd	Amherst	1.09	26,500	10.54	16.50	1.57
Veterans Rd - Northern Blvd	Amherst	0.91	29,100	9.67	12.00	1.24
Northern Blvd - Merrimack TL	Amherst	1.34	33,400	16.34	66.00	4.04
Amherst TL to Nashua CL	Merrimack	0.80	35,100	10.25	20.75	2.02
Merrimack TL -Somerset Pkwy	Nashua	2.13	43,100	33.51	92.00	2.75
Somerset Pkwy - Tpk Exit 7	Nashua	1.08	38,000	14.98	77.75	5.19
Tpk Exit 7 - Main St	Nashua	1.53	22,000	12.29	62.25	5.07

Bicycle Level of Traffic Stress

The bicycle LTS calculation begins at the junction of NH 101A with North River Road/NH 101 in Milford, where a bicyclist-unfriendly score of 3.43 average is calculated to Westchester Drive, with narrow shoulders being a prime contributor. Between Medlyn Street, Milford and Boston Post Road, LTS is in the 2 to 2.4 range, a much better environment for non-motorized travel. There are some significant fluctuations in conditions between decent and substandard from that point to Deerwood Drive in Nashua. To the east, NH 101A in Nashua is consistently around 3.0 until the final 0.6-mile segment on Bridge Street leading to the Taylors Falls Bridge, where LTS declines to 3.5, indicating a significantly hazardous condition for bicyclists.

NH 101A BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
N River Rd/NH 101 - Westchester Dr, Mil	13,070	1.188	3.43
Westchester Dr - NH 13	14,900	1.673	2.53
NH 13 - Medlyn St	13,150	1.203	3.01
Medlyn St - NH 101 On-Ramp	18,900	0.581	2.00
NH 101 W Ramps - NH 101 E Ramps	18,900	0.316	2.44
NH 101 East Ramps - NH 122, Amherst	18,900	0.482	2.22
NH 122 - Boston Post Rd, Merrimack	35,200	2.995	2.00
Boston Post Rd - Cellu Dr, Nashua	39,600	1.340	2.94
Cellu Dr - Deerwood Dr	44,730	0.657	2.00
Deerwood Dr. - Somerset Pkwy.	44,730	0.801	3.86
Somerset Pkwy - Tnpk/H Burque Hwy	22,550	1.255	3.11
H Burque Hwy - NH 130 Broad St	24,370	0.719	3.00
NH 130 - Main St.	18,550	0.661	3.00
Lowell Street, Main St. - Canal St.	3,870	0.205	3.00
Canal Street, Lowell St. - Amory St.	18,550	0.697	2.97
Bridge Street, Canal St - Tay Falls Bridge	18,550	0.577	3.50

Congestion Management Strategies

- Implement coordinated signal management system along NH 101A. Such a system was installed using Congestion Mitigation and Air Quality (CMAQ) program funds in the late 1990's but has not been maintained due to additional installation of signals.
- Widen to maintain three-lane cross section in each direction from Somerset Parkway to Celina Ave in Nashua (TYP, construction in 2023-2024).
- Implement safety improvements at NH 101A/Continental Blvd and Craftsman Lane/Boston Post Road in Merrimack (TYP, construction in 2021-2022).
- Construct a new interchange along the Broad Street Parkway to connect Franklin Street, which will reduce traffic along NH 101A, Amherst Street from NH 130 to Main Street (TYP, construction in 2028).
- Improvements to the NH 101A & NH 13 Milford Oval area to improve vehicle circulation and non-motorized mobility.
- Intersection improvements and circulation modification at the junction of NH 101A/Main Street.
- Continue NTS service to Walmart, Amherst beyond the CMAQ funding period to expire in 2022.
- Seek funding to implement transit service on NH 101A to Milford Center, following up on the 2019 Nashua Transit Expansion Study.
- Construct a 16-mile paved non-motorized path along the NH 101A rail corridor from Nashua to Wilton to facilitate safe travel along the route (added to MTP in 2021).

Analysis of CMP Major Investments Impacts

- NH 101A Widening – Widening from two to three lanes per direction from Somerset Parkway to Celina Ave. in Nashua is projected to improve NH 101A operational conditions from LOS E to C in both peak periods. The westbound direction east of Thornton Road is already three lanes and therefore will remain at LOS D.

2045 NH 101A VOLUME/CAPACITY AND LOS – WIDEN FROM SOMERSET PARKWAY TO CELINA AVE

Location	Municipality	2045 AWDT	2045 AM PK	AM V/C	AM LOS	2045 PM Pk	PM V/C	PM LOS
W of Capitol St	Nashua	39,890	1,516	0.56	C	1,596	0.59	C
E of Thornton Rd	Nashua	46,590	1,631	0.60	C	2,027	0.75	D

- Broad Street Parkway/Franklin Street Interchange – Construction of the new interchange is projected to reduce NH 101A Amherst Street traffic by 1,200 per day between the Henri Burque Highway (US 3) and Main Street. This represents about a 5% reduction. To the east of US 3 the v/c ratio would improve from .85 to .79 and LOS would improve from E to the low end of LOS D.
- Transit Service Extension – Extension of transit service from Walmart at present to the entire length of NH 101A in Milford is projected to generate 27,500 passenger trips per year. This works out to about 100 trips per weekday. Along Milford's most heavily travelled segment, this would represent a minor reduction of 0.5% of vehicle trips. Arterial operational conditions would not be noticeably improved by this level of traffic reduction.
- Coordinated Signal System – Review of projects implemented elsewhere in the U.S. indicates that up to a 25% reduction in travel time is a reasonable expectation for this improvement. This could improve peak hour average speed from 20 to 25 mph along the most congested segment of NH 101A west of the Turnpike interchange.

US 3, DANIEL WEBSTER HIGHWAY, NASHUA-MERRIMACK

Serving as a major north-south corridor for Merrimack, this segment of the Daniel Webster Highway overlaps with U.S. Route 3. The route runs from the southeastern to the northeastern portion of the town, paralleling the F.E. Everett Turnpike and the Merrimack River.

In Merrimack, the Daniel Webster Highway includes industrial, commercial, and residential uses. As this road passes through the neighborhoods of Reeds Ferry and Merrimack Village, there is some level of pedestrian and cycling activity along the route. However, the sidewalk network throughout the corridor in Merrimack is sporadic.

From Greeley Street (which connects to Exit 11 on the Turnpike) to Bedford Road (which connects to Exit 12 on the Turnpike), the Daniel Webster Highway is designated as a Class IV Road, as this portion of Merrimack is considered an urban compact area. Due to this designation, this section of the Highway is maintained by the Town of Merrimack. The remainder of the Daniel Webster Highway within Merrimack is designated as a Class I road, which is maintained by the State of New Hampshire.

Since this segment parallels the F.E. Everett Turnpike, it is an alternative commuting route for those working within southern New Hampshire and the metropolitan Boston area. It is also a vital road for freight transportation and local attractions, including the Merrimack Premium Outlets and Anheuser-Busch Brewery. Due to its role as a commuting corridor and its mixture of uses, the Daniel Webster Highway is expected to have some degree of congestion during peak travel times.

Future projects on the F.E. Everett Turnpike may help to alleviate traffic congestion on the Daniel Webster in Merrimack, since the Highway tends to collect spillover traffic during peak travel hours.

US 3 Daniel Webster Highway, Merrimack

Traffic Count Trends

At its northernmost segment, US 3 has increased at a rate of 1.3% per year between 2007 and 2019 from 14,650 to 17,150 weekday vehicles. The increase in traffic along this segment compared to generally decreasing traffic to the south can be attributed to the construction of the Manchester Airport Access Road connecting the F.E.E. Turnpike to US 3 at the Bedford/Merrimack line.

Travel Time Index

Two segments show TTI levels which indicate heavy congestion in peak periods – from Greeley Street to Baboosic Lake Road northbound during the AM period and Bedford Rd to the Bedford Line southbound during the PM peak. The fact that the latter segment is the one experiencing growth in volumes has raised awareness among Merrimack residents and officials for again considering the need to complete the Exit 12 Turnpike interchange to accommodate vehicles to and from the north.

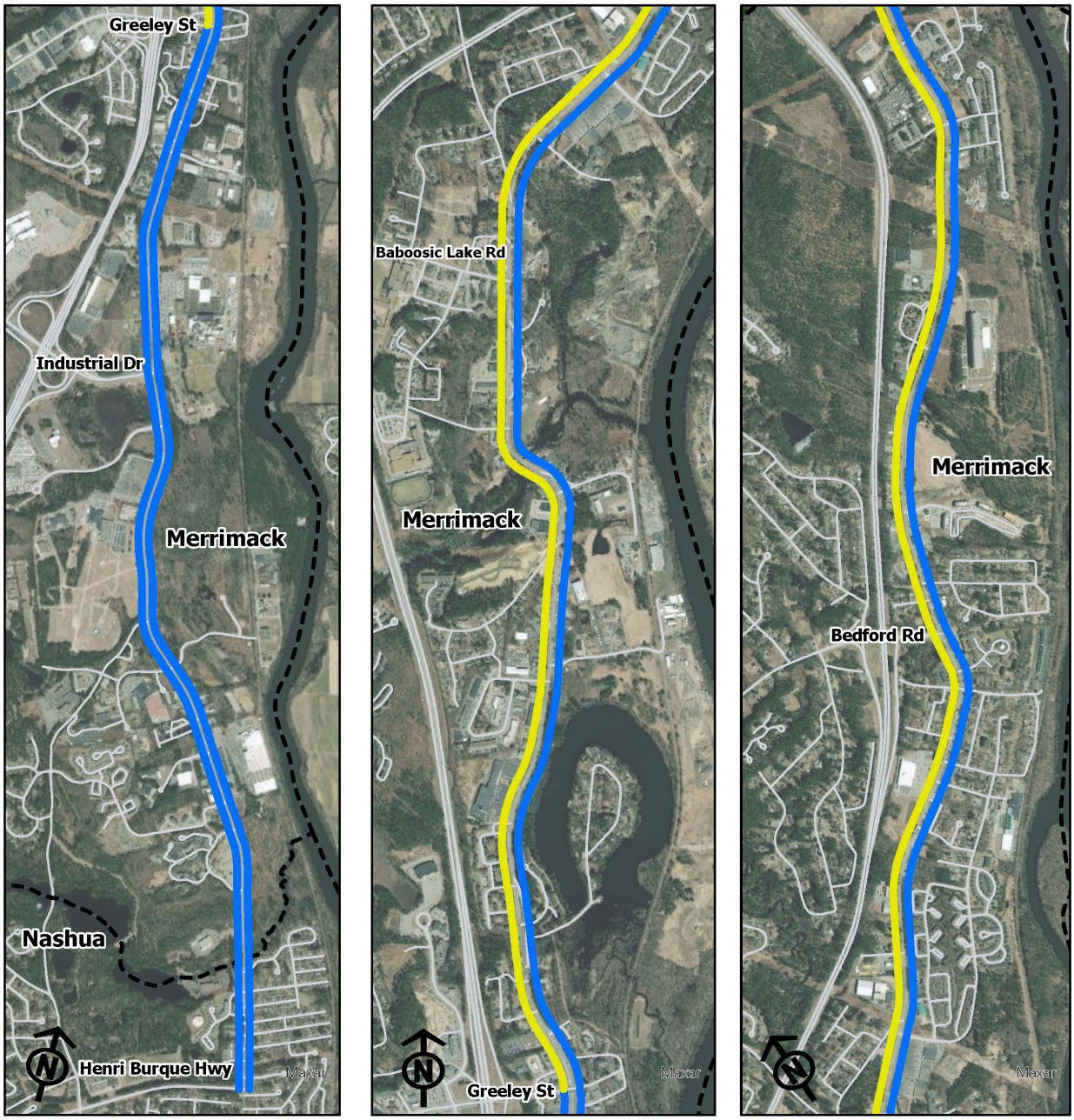
The other southbound segments to Greeley Street operate in the moderate congestion level, where speeds may be up to 40% higher during free flow times of day than peak periods.

US 3 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
North of Bedford Rd.	Merrimack	2007	14,650	2019	17,150	1.3%
South of Bedford Rd.	Merrimack	2008	15,800	2017	14,850	-0.7%
Over Souhegan River	Merrimack	2007	17,800	2019	16,250	-0.8%
South of Columbia Cir.	Merrimack	2008	20,900	2017	15,450	-3.3%
North of Industrial Dr.	Merrimack	2007	15,900	2019	13,900	-1.1%
North of Manchester St.	Merrimack	2007	19,050	2019	17,600	-0.7%
Nashua City Line	Merrimack	2007	15,600	2019	13,500	-1.2%
H Burque Hwy W of DW Hwy	Nashua	2007	15,650	2019	12,950	-1.6%

US 3 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Bedford Rd to Bedford Line	**33.0**	**1.21**	**32.8**	**1.22**	**30.2**	**1.33**	**26.4**	**1.52**
Baboosic Lake Rd to Bedford Rd	**28.8**	**1.22**	**25.7**	**1.36**	**26.5**	**1.32**	**25.0**	**1.40**
Greeley St to Baboosic Lake Rd	**31.1**	**1.16**	**22.6**	**1.60**	**28.9**	**1.28**	**27.5**	**1.34**
Industrial Dr to Greeley St	**37.6**	**1.04**	**34.9**	**1.12**	**34.4**	**1.08**	**32.0**	**1.16**
HB Hwy int. to Industrial Dr	**36.3**	**1.02**	**34.5**	**1.07**	**36.4**	**1.05**	**37.1**	**1.03**



US Route 3

Travel Time Index

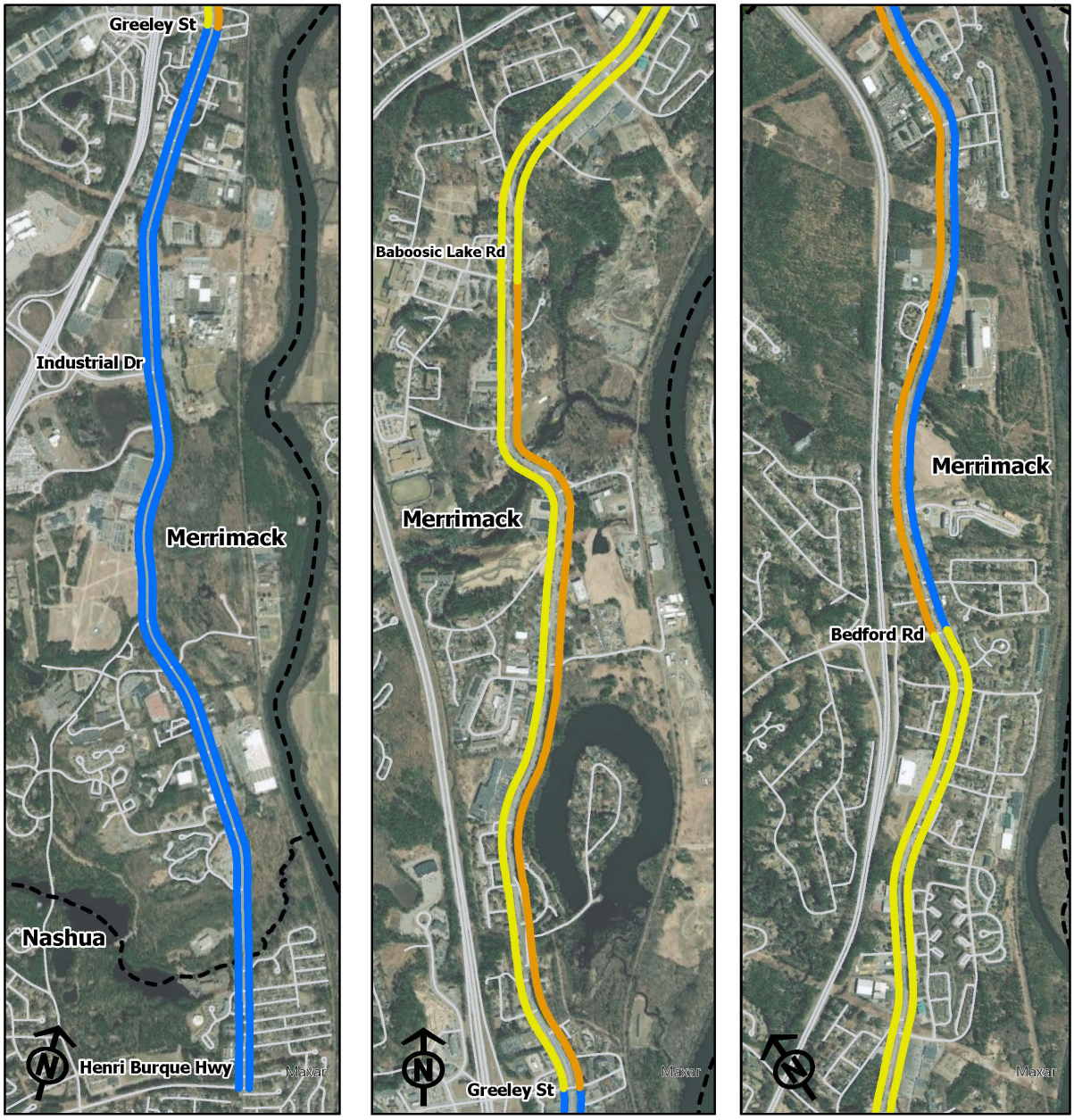
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC



US Route 3

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

Highway Capacity Utilization

The highway capacity analysis reveals significant issues along several segments. The segment north of Bedford Road operates at LOS E during the PM peak, and a capacity analysis for the Bedford Road intersection specifically would reveal LOS F conditions, as southbound queues are lengthy and require more than one signal cycle to clear. This intersection will be evaluated in the Exit 12 Study.

Through the single-lane section of US 3 between Columbia Circle and the Souhegan River crossing, the roadway operates at LOS E during the AM peak and LOS F during the PM. Much better operational conditions are present to the south, where two lanes of travel are provided in each direction.

US 3 HIGHWAY CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
N. of Bedford R	Merrimack	17,150	772	0.86	D	746	0.83	E
S. of Bedford Rd	Merrimack	14,850	668	0.74	D	646	0.72	D
Over Souhegan River	Merrimack	16,250	813	0.90	E	991	1.10	F
S. of Columbia Cir	Merrimack	15,450	773	0.86	E	927	1.03	F
N. of Industrial Dr.	Merrimack	13,900	591	0.28	B	973	0.46	C
N. of Manchester St.	Merrimack	17,500	919	0.44	C	1,103	0.53	C
Nashua City Line	Merrimack	13,500	540	0.51	C	709	0.68	D
Henri Burque Hwy	Nashua	12,950	518	0.49	C	680	0.65	D

Highway Crash Statistics

US 3 through its entire length in Merrimack and Nashua has lower than average crash rates. Only the Concord Street segment exceeds three crashes per one million vehicle miles of travel.

US 3 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Manchester TL - Bedford Rd	Merrimack	1.99	15,600	11.33	14.50	1.28
Bedford Rd - Baboosic Lake Rd	Merrimack	1.67	14,600	8.90	10.25	1.15
Baboosic Lake Rd - Greeley St	Merrimack	1.96	14,600	10.44	19.25	1.84
Greeley St - Industrial Dr	Merrimack	1.28	10,600	4.95	6.25	1.26
Industrial Dr - Nashua CL	Merrimack	2.39	13,300	11.60	9.75	0.84
Concord St	Nashua	0.46	10,800	1.81	5.75	3.17
Henri Burque Hwy	Nashua	1.40	10,700	5.47	7.25	1.33

Bicycle Level of Traffic Stress

Bicycle LTS remains comfortably below the 3.0 level throughout the corridor, indicating a reasonable degree of comfort at least for those who are experienced bicyclists. Although shoulder widths are highly variable even over short distances, the single-lane traffic at relatively low speeds and many stoppages at signals largely contribute to this outcome. Nevertheless, the lack of consistent adequate lanes for bicycle users highlights the need for improvements to facilitate this mode of travel.

US 3 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Bedford Rd - Merr/Bedford TL	17,150	2.000	2.02
Baboosic Lk Rd - Bedford Rd	14,850	1.670	2.22
Greeley St - Baboosic Lk Rd	16,250	1.970	2.68
Industrial Dr - Greeley St	15,450	1.280	2.39
Nashua CL - Industrial Dr	17,600	2.180	2.41
H Burque Hwy int. - Merrimack TL	13,500	0.475	1.99
H Burque Hwy, Concord St - FEE Tnpk int	12,950	0.857	2.17

Congestion Management Strategies

- Evaluate the need for full interchange construction at Exit 12 that would relieve traffic congestion between Bedford Road and the Bedford town line (NRPC study to commence October 2021).
- Identify intersections that meet the criteria for installation of flashing yellow left turn arrows, to allow clearing of left-turn storage lanes and reduce cycle length.
- Implement safety and capacity improvements to the US 3/Wire Road intersection (TYP, construction 2027).
- Seek funding to implement transit along US 3 in Merrimack following up on the 2019 Nashua Transit Expansion Study.
- Implement recommendations of the US 3, Merrimack, Bicycle & Pedestrian Study, which identified locations where increased paved shoulder width was needed to reasonably accommodate bicycle travel.

Analysis of CMP Major Investments Impacts

- Turnpike Exit 12 North Ramps – A study conducted by NRPC in 2004 reported a 23% reduction in US 3 traffic north of Bedford Road, the most congested corridor segment. Applying this reduction to peak period conditions results in a lowering of LOS from 1.00 to .75 and LOS improving from E/F to D. NRPC is in the process of updating this study with newly acquired traffic data and revised land use forecasts which will be input to the traffic model to develop revised future traffic volumes.

- Transit Service Extension to Merrimack/Bedford Border - – Extension of transit service from Nashua along US 3 to the Merrimack/Bedford line is projected to generate 17,800 passenger trips per year. This is approximately 70 trips per weekday. This represents about a .35% reduction in vehicle trips and no noticeable improvement in arterial operational conditions.

NH 3A & SAGAMORE BRIDGE ROAD, HUDSON-LITCHFIELD

NH 3A serves as the major north-south thoroughfare in the Nashua Region east of the Merrimack River. The portion of the NH 3A corridor in Hudson comprises Lowell Rd and River Rd, which serves several local and region transportation functions. Its location on the state border encourages shoppers to enjoy New Hampshire's sales tax-free environment.

The route parallels U.S. 3 at this juncture and the Merrimack River, connecting Litchfield with Tyngsborough, Mass. It is an alternative commuting route for those working within southern New Hampshire and the metropolitan Boston area. It serves as a route for freight transportation and local attractions, including Walmart, various shopping plazas, Hudson Center. Due to its role as a commercial corridor, Lowell Rd is expected to have some degree of congestion during peak travel times. In addition to the high volume of cars at certain peak travel times, contributors to this congestion are segments where travel lanes vary from two to four lanes in either direction and short distances between traffic lights. Along certain segments, there is also a high density of curb cuts, which contribute to congestion.

The Town operates a signal management system for its town-controlled signals on NH 3A and NH 111, which allows 24/ access for monitoring, making adjustments to signal cycles and data collection. Green time arrivals are improved by up to 17% through adjustments, significantly reducing congestion delay.

NH 3A Southbound, Hudson, Junction of Central Street & Lowell Road

Additionally, the southern portion of Lowell Road is a key access point to the Sagamore Bridge, which links Hudson with Nashua via one of the Merrimack River crossings in the Region. The Taylor Falls Bridge to the north is the other Merrimack River crossing in the Nashua Region. This bridge crossing also intersects with NH 3A.

Along the route, there is minimal infrastructure for pedestrians and cyclists. Some segments of sidewalks exist near the commercial uses, such as Walmart and nearby grocery stores.

Traffic Count Trends

Traffic in the northern segment of NH 3A in Litchfield has grown moderately between 2007-2019 at a rate of 1.2% per year. This mirrors growth along US 3 in northern Merrimack and suggests the link with the Airport Access Road to the Turnpike is the key contributing factor. To the south of Hillcrest Road in Litchfield, traffic has been in decline. As NH 3A passes through the Hudson center area where it converges with NH 111, there has been a significant drop in traffic in the 2.0% per year range. Further to the south as NH 3A becomes Lowell Road, the change in traffic to the intersection with Sagamore Bridge Road has been relatively flat, although Sagamore Bridge Road itself has increased at a 1.1% per year growth rate over the past decade. Further to the south before the Dracut Road intersection traffic trends again have experienced a significant downturn, declining 1.9% per year.

Sagamore Bridge Over Merrimack River, Nashua-Hudson

NH 3A & SAGAMORE BRIDGE RD WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Manchester City Line	Litchfield	2007	10,320	2019	11,950	1.2%
North of Hillcrest Rd.	Litchfield	2007	5,150	2019	5,260	0.2%
North of Page Rd.	Litchfield	2007	7,210	2019	6,000	-1.5%
Hudson Town Line	Litchfield	2007	6,970	2019	5,780	-1.5%
South of Derry Ln	Hudson	2008	8,560	2017	9,320	0.9%
North of Ledge Rd.	Hudson	2008	28,700	2017	26,700	-0.8%
North of NH 111 Ferry St.	Hudson	2006	20,200	2018	15,800	-2.0%
East of Library St	Hudson	2008	19,640	2017	16,050	-2.2%
South of Central St	Hudson	2008	23,420	2017	22,950	-0.2%
South of Pelham Rd	Hudson	2008	25,210	2017	25,600	0.2%
South of Wason Rd	Hudson	2008	38,380	2017	39,680	0.4%
Sagamore Bridge Rd	*Hudson*	*2009*	*45,050*	*2018*	*49,600*	*1.1%*
South of Rena Ave	Hudson	2008	31,420	2017	26,350	-1.9%
Massachusetts State Line	Hudson	2008	7,830	2017	7,710	-0.2%

Travel Time Index

NH 3A operates congestion free through Litchfield, even in the northern segment near the Manchester line, where traffic is at its highest in the town and showing at least moderate growth due to the connection with the Airport Access Road. Significant congestion as measured by TTI is evidenced in the Hudson center, where NH 3A and NH 111 converge. The most substantial delays occur from this convergence area to the Sagamore Bridge, with heavy congestion southbound in the AM and northbound in the PM. Moderate delays continue to be most present south of Sagamore Bridge during the PM peak period. On the Sagamore Bridge the free flow speed of 48 mph eastbound during the PM peak falls to 27.6, producing a 1.74 TTI. The bridge is uncongested for both directions.

NH 3A PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Corning Rd-Hillcrest Rd, Litch.	40.2	0.99	40.6	0.99	40.3	0.99	41.1	0.97
Hillcrest Rd to Page Rd	38.3	1.05	41.6	0.96	40.0	0.99	42.1	0.95
Page Rd-Elm Ave, Litch-Hud	38.9	1.03	40.0	0.99	34.2	1.17	38.6	1.04
Elm Ave to NH 111, Hudson	27.4	1.09	24.4	1.23	22.4	1.34	24.4	1.23
NH 111 to Sagamore Bridge	24.2	1.24	17.0	1.78	20.1	1.50	22.7	1.32
Sagamore Bridge to Mass SL	24.0	1.17	22.4	1.25	27.0	1.04	24.4	1.15

SAGAMORE BRIDGE ROAD SPEED AND TRAVEL TIME INDEX

	Eastbound				Westbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
Roadway Segment	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
FEET Ramps to DW Hwy, Nashua	**53.9**	**0.89**	**53.5**	**0.90**	**56.6**	**0.88**	**55.0**	**0.91**
DW Hwy to NH 3A, Hudson	**48.4**	**0.99**	**27.6**	**1.74**	**48.0**	**0.95**	**57.4**	**0.96**

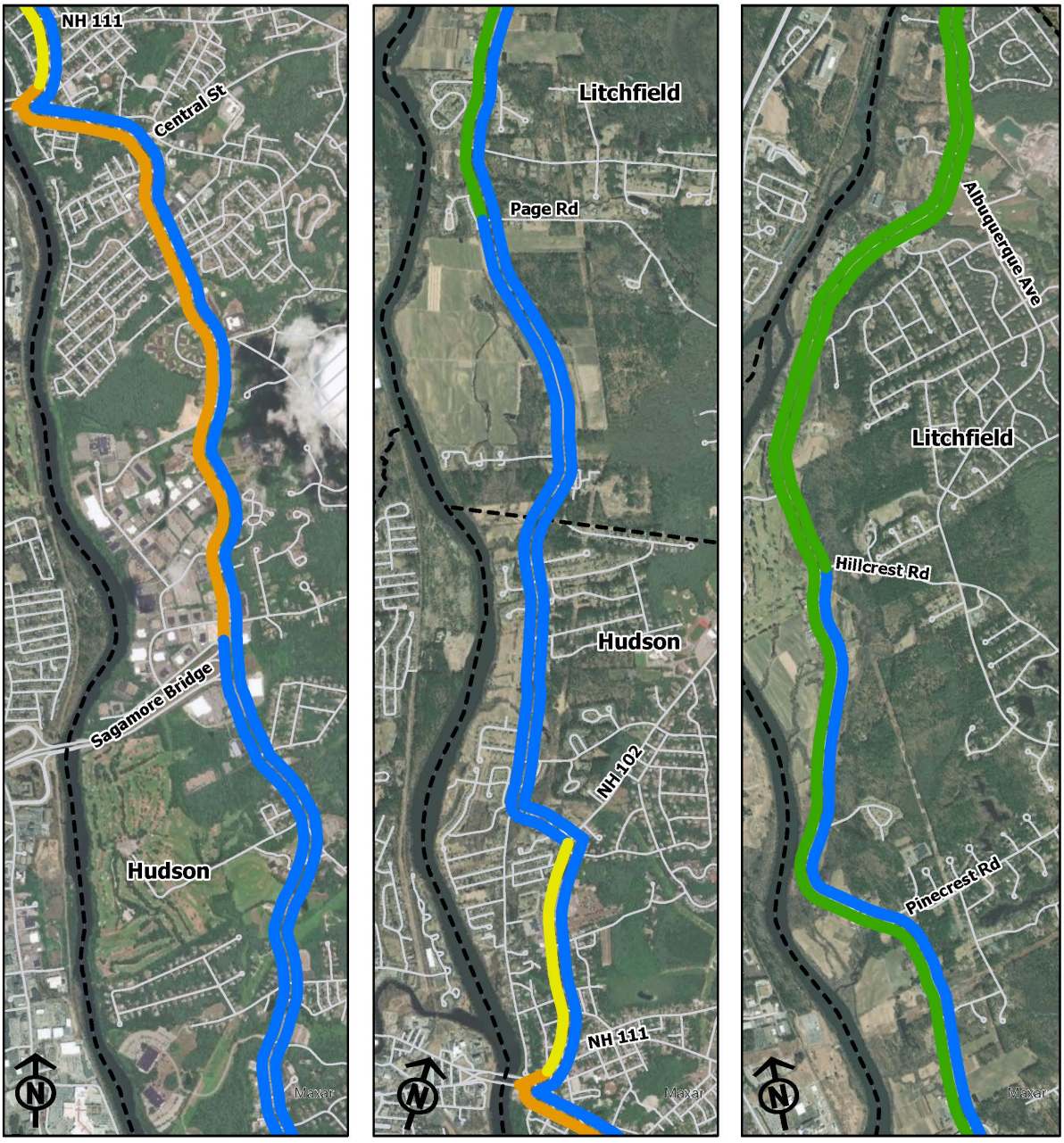
Highway Capacity Utilization

The metrics from v/c analysis mirror the data from NPMRDS data. Drivers are able to operate comfortably at LOS B or C until reaching the Hudson center. At this point operational conditions deteriorate to D and then E continuing to the south on Lowell Road. South of Wason Road LOS F is present for both peak periods, indicating severe bottlenecks and forced flow conditions. South of the Sagamore Bridge, traffic operates at LOS C during the AM, LOS D through the PM peak. These levels constitute normal congestion for a built-up corridor as NH 3A.

Sagamore Bridge Road experiences substantial delay at LOS in the PM peak period, which corresponds to the westbound traffic flow delays indicated by probe data.

NH 3A & SAGAMORE BRIDGE RD CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Manchester Line	Litchfield	11,940	454	0.32	B	573	0.41	C
S. of Derry Ln	Hudson	9,320	354	0.34	B	447	0.43	C
N of Ledge Rd	Hudson	26,700	961	0.53	C	1,001	0.56	C
N of NH 111 Ferry St	Hudson	15,800	569	0.63	D	593	0.66	D
E of Library St	Hudson	16,050	610	0.54	C	770	0.68	D
S of Central St	Hudson	22,950	872	0.78	D	1,102	0.98	E
S of Pelham Rd	Hudson	25,600	973	0.86	E	1,229	0.91	E
S of Wason Rd	Hudson	39,680	1,508	1.01	F	1,905	1.02	F
Sagamore Bridge Rd	*Hudson*	*49,600*	2,207	0.53	*C*	2,381	0.88	*E*
S of Rena Ave	Hudson	26,350	883	0.49	C	1,186	0.66	D
Massachusetts Line	Hudson	7,710	262	0.29	A	366	0.41	C



NH 3A

Travel Time Index

Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

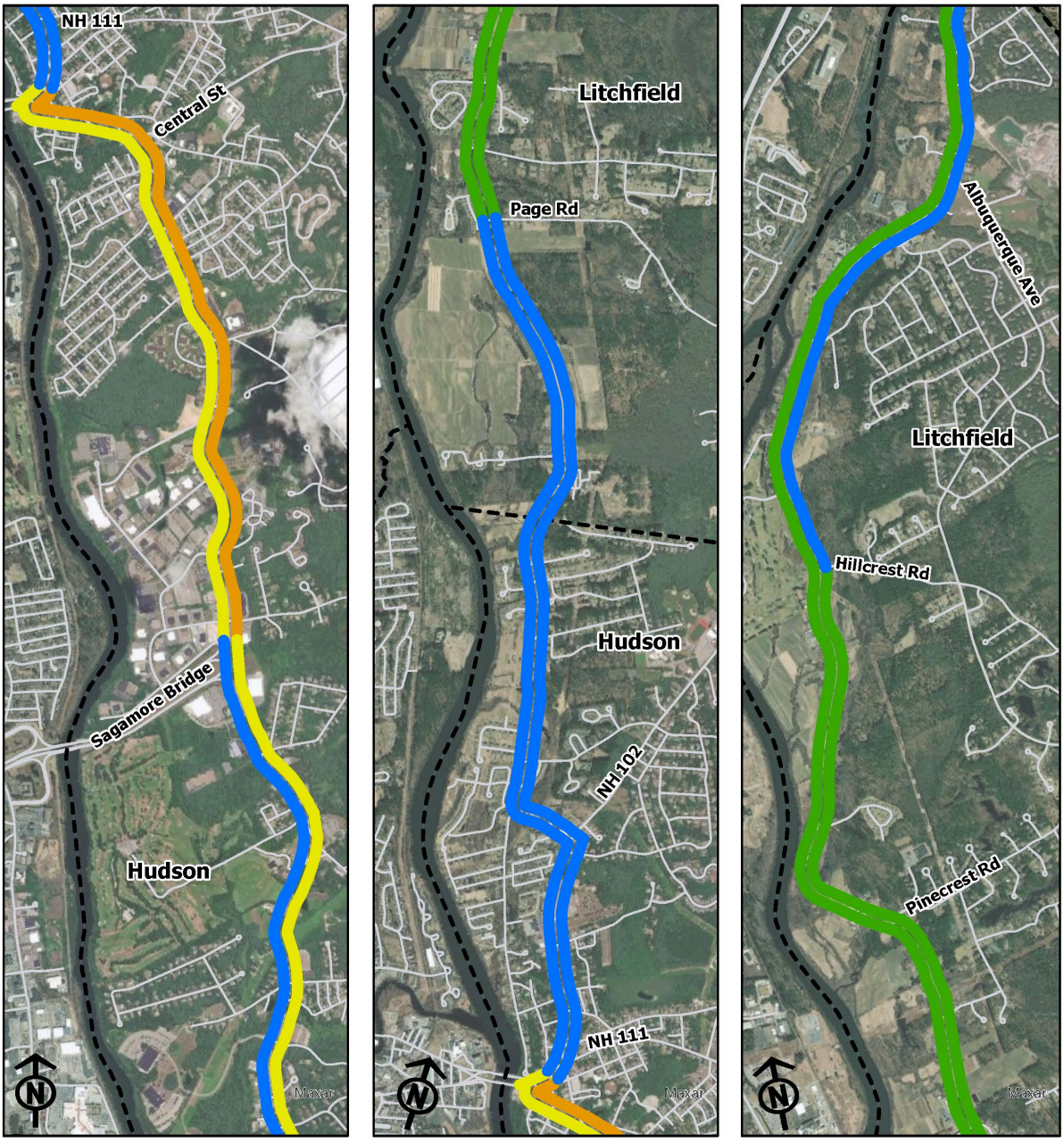
Sagamore Bridge
Travel Time Index
Weekday AM Peak Period
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.25 Miles

NRPC



NH 3A

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

Sagamore Bridge
Travel Time Index
Weekday PM Peak Period
(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.25 Miles

NRPC

Highway Crash Statistics

The NH 3A segment through Litchfield and Hudson to the Derry Road intersection is characterized by low crash generation, reaching only 1.45 crashes/MVM in the final Webster Street segment in Hudson. Along the much more highly travelled segment of Derry Road, the rate of incidents more than triples

NH 3A/SAGAMORE BRIDGE RD AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Manchester CL - Hillcrest Rd	Litchfield	3.39	10,800	13.36	11.75	0.88
Hillcrest Rd - Talent Rd	Litchfield	3.23	5,400	6.37	7.50	1.18
Talent Rd - Hudson TL	Litchfield	1.71	5,400	3.37	4.25	1.26
Litchfield TL - Elm/Derry Rd	Hudson	1.57	6,300	3.61	5.25	1.45
Elm Ave - Ferry St	Hudson	1.01	25,000	9.22	44.50	4.83
Central St- County Rd	Hudson	0.51	20,400	3.80	16.25	4.28
County Rd-Executive Dr	Hudson	1.06	23,000	8.90	31.50	3.54
Executive Dr-Sagamore Br	Hudson	0.82	30,000	8.98	44.00	4.90
Sagamore-Bridge Rd	Hudson	1.07	45,000	17.57	11.75	0.67
Sagamore-Dracut Rd	Hudson	0.74	23,500	6.35	40.25	6.34
Dracut Rd - Mass SL	Hudson	1.45	8,000	4.23	6.25	1.48

Bicycle Level of Traffic Stress

From the Manchester line to the Hudson line, NH 3A is treacherous for bicyclists, owing to high speeds and minimal striped shoulders. The LTS score improves to mid-range through the Hudson town center continuing along Lowell Road, although there is a case to be made that non-motorized travel through the triangle area is for the super-confident bicyclist only. There is a somewhat favorable section between Executive Drive and Friel Golf Road, but NH 3A continuing to the state line LTS scores round 4.0. Sagamore Bridge road does not receive a positive ranking at 3.4. Although it has shoulders sufficient for bicyclist, high speeds approaching freeway levels create substantial stress for bicyclists.

NH 3A & SAGAMORE BRIDGE RD BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Manch CL - Litch/Hud south TL	11,950	8.360	4.00
Litch TL - NH 3A/102 Derry St	6,000	1.560	3.00
NH 3A/102 Derry St - Chase/Central Sts	36,700	1.197	2.81
Chase/Central - Executive Dr.	22,950	1.558	3.00
Executive Dr. - Sagamore Bridge Rd.	25,600	0.828	2.15
Sagamore Bridge Rd (NH 3Ato DW Hwy)	*49,600*	*0.961*	*3.41*
Sagamore Bridge Rd - Friel Golf Rd	24,300	0.963	2.30
Friel Golf Rd - Mass SL	7,800	1.207	3.99

Congestion Management Strategies

- Continued use of the traffic signal management system to optimize traffic flows and collect data useful for identifying potential roadway improvements to reduce congestion.
- Implementation of flashing yellow signals and other signal coordination technology along state-controlled sections of NH 3A (Pending TYP regional project, locations to be studied).
- Construct a third southbound right turn lane on NH 3A from Wason Road to Sagamore Bridge Road (TYP funded through CMAQ, construction in 2021).
- Construct sidewalk on NH 3A from Birch Street to Pelham Road and from Nottingham Square to Executive Drive (MTP recommended project).
- Seek funding to implement transit along NH 3A, Lowell Road following up on the 2019 Nashua Transit Expansion Study.

Analysis of CMP Major Investment Impacts

- The CMAQ project which adds a southbound lane on NH 3A south of Wason Road will improve v/c from 1.01 and LOS F at present during peak hour to 0.67 v/c and LOS D. Traffic will move at an acceptable level of service following construction.
- Coordinated Signal System – Applying an estimated 15% to 20% reduction in travel time along NH 3A Lowell Road could improve peak hour average speed from 20 mph to the 23-24 mph range along the most congested segments.
- Transit Service Extension Along NH 3A Lowell Road - – Extension of transit service from Nashua along NH 3A between the Hudson Mall and the Massachusetts line is projected to generate 16,700 passenger trips per year. This is approximately 65 trips per weekday. This represents about a .15% reduction in vehicle trips along the most congested segment of Lowell Road and there would be no perceptible change in arterial operational conditions.

NH 102, HUDSON-LITCHFIELD

NH 102 provides a critical east-west connection between the Nashua region to the west and the Seacoast region to the east, as well as to points north and south via I-93 Exit 4. Within the Nashua Region, NH 102 serves an alternative east-west corridor to NH 111. NH 102 runs 24 miles from Hudson to Raymond and crosses two regional planning commissions. The northern segment in Londonderry is addressed in the Southern NH Planning Commission CMP.

NH Route 102 from Hudson to Londonderry comprises Derry St in Hudson and Litchfield, and Nashua Rd in Londonderry. There are two segments in Hudson, which are bisected by Litchfield. While there are some municipal uses, such as Alvirne High School, most of the development in Hudson is single family residential with some commercial developments, such as the Hudson Mall. Uses in Litchfield include a mobile home park, and some commercial and industrial businesses. In Londonderry, NH 102 is the location of much of the Town's commercial and retail development.

Due to its mix of uses and role as a commuting corridor, NH 102 is expected to have some degree of congestion during peak travel times.

NH 102 Derry Road, Hudson

Traffic Count Trends

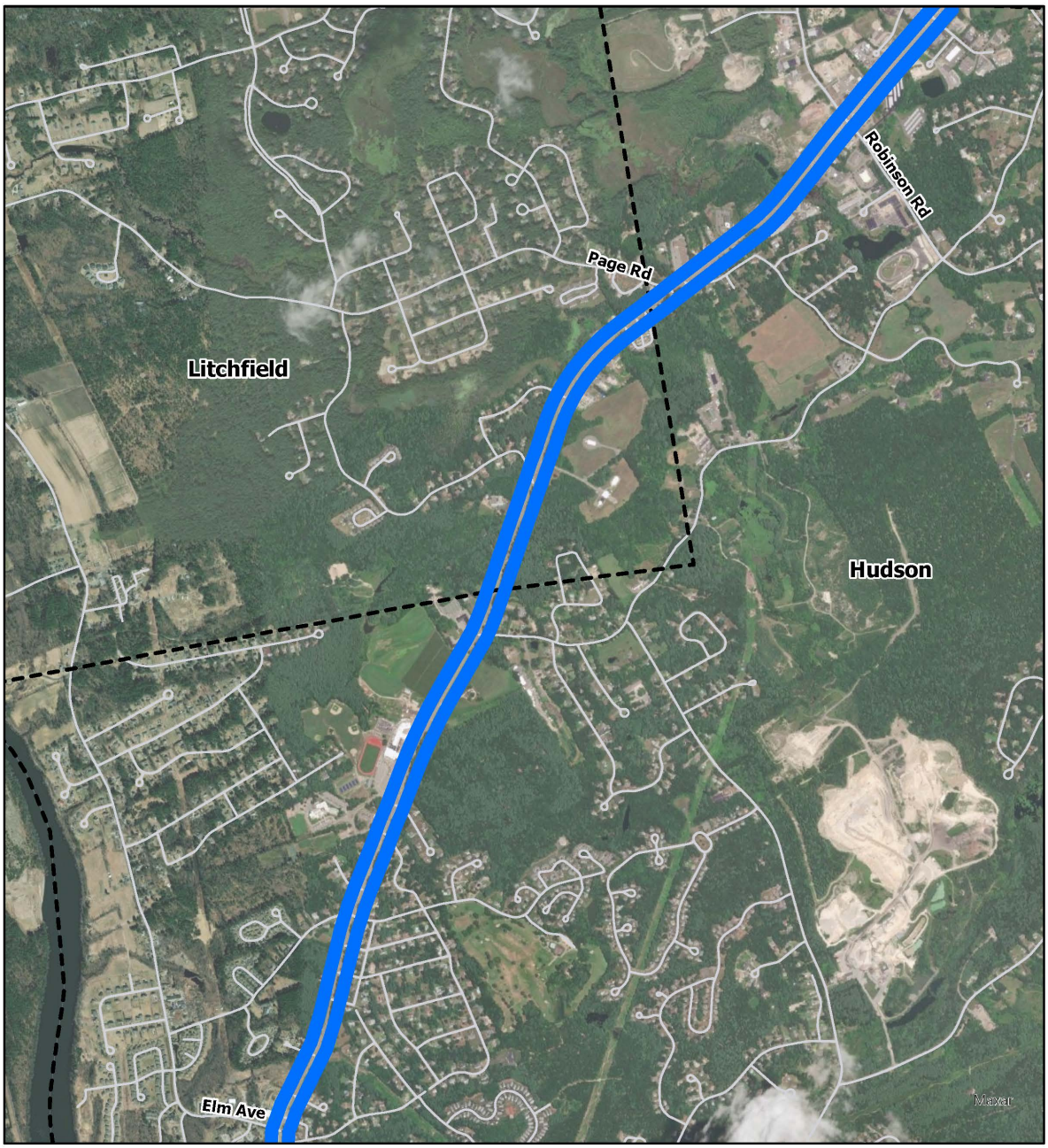
Traffic has seen some growth on NH 102 in the most northern segment approaching the Londonderry line but to the south the numbers have ranged from slight to significant decline. In the vicinity of Easy Street, just north of where NH 102 runs concurrently with NH 3A to the Hudson town center, a significant drop from 21,850 to 16,800 occurred over a 12-year period.

NH 102 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Londonderry Town Line	Hudson	2006	15,900	2018	17,750	0.9%
Litchfield Town Line	Hudson	2007	18,700	2019	17,050	-0.8%
North of Easy St.	Hudson	2007	21,850	2019	16,800	-2.2%

Travel Time Index

Peak period speeds along the NH 102 segment between the NH 3A junction and the Londonderry town line have been just under free-flow speeds. The only area of note is the northbound PM TTI north of Page Road in Hudson, just across from the Litchfield line. The NH 102/Page Road intersection has been evaluated by NRPC at the request of Litchfield, due to delay in accessing NH 102 from Page Road. NRPC did not find that a signal warrant exists at the location and did not find sufficient traffic to support provision of separate left and right turns on Page Road at the intersection.



NH 102

Travel Time Index

Weekday AM Peak Period

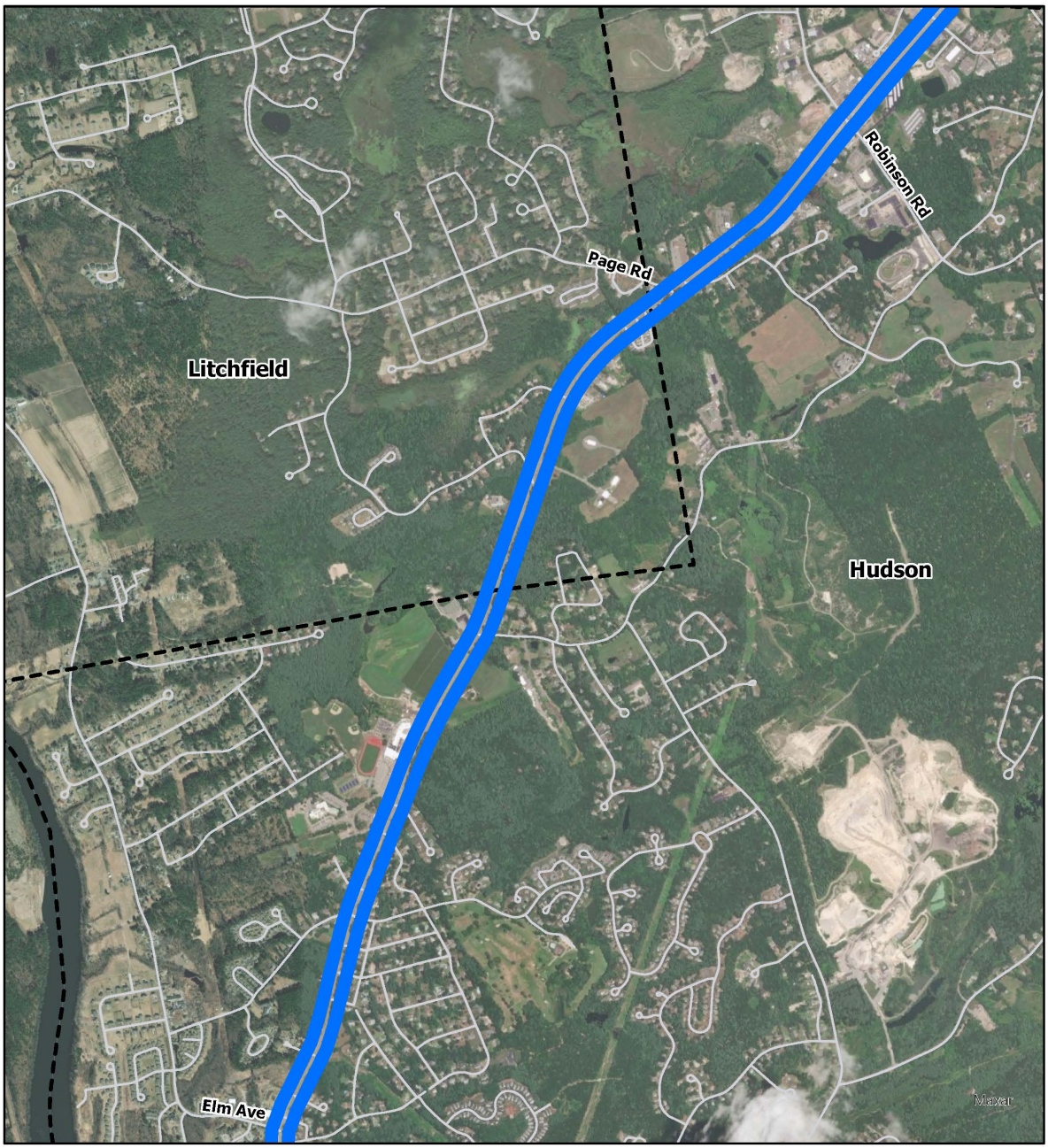
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.25 Miles

NRPC



NH 102

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.25 Miles

NRPC

NH 102 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Londonderry TL to Page Rd, Litch	**42.3**	**1.04**	**41.1**	**1.07**	**43.3**	**1.04**	**43.7**	**1.03**
Page Rd to Elm Ave, Hudson	**38.1**	**1.05**	**39.8**	**1.01**	**33.7**	**1.19**	**38.6**	**1.04**

Highway Capacity Utilization

NH 102 operates comfortably within the LOS B to C range, indicative of little impact from traffic on the ability to maintain free flow speeds along the route.

NH 102, HUDSON-LITCHFIELD CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Londonderry Town Line	Hudson	17,750	639	0.40	B	666	0.42	C
Litchfield Town Line	Hudson	17,050	614	0.38	B	639	0.40	B
N of Easy St	Hudson	16,800	605	0.58	C	630	0.60	C

Highway Crash Statistics

From the Londonderry town line to Alvirne High School in Hudson, NH 3A crash rates are significantly lower than average. From that point to the NH 3A (Elm Ave) intersection the crash rates significantly increase but remain below the regional average.

NH 102 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Londonderry TL - Litchfield TL	Hudson	2.66	14,900	14.47	18.00	1.24
Hudson TL - Alvirne HS	Litchfield	0.91	14,900	4.95	6.25	1.26
Alvirne HS -Derry Ln	Hudson	0.43	15,200	2.39	9.00	3.77
Derry Ln - Elm Ave	Hudson	0.64	15,400	3.60	9.50	2.64

Bicycle Level of Traffic Stress

Bicycle LTS is rated 3.0 for the entire length of NH 102 from Londonderry to the NH 3A intersection, indicating that the entire length is suitable for experienced bicyclists, but not for less experienced ones.

NH 102 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Londonderry TL - Litchfield TL, Hudson	17,750	1.192	3.00
Hudson TL, Litchfield - Derry Ln, Hudson	17,050	1.912	3.00
Derry Ln - NH 3A Elm Ave	16,800	1.272	3.00

Congestion Management Strategies

- Continue to monitor the NH 102/Page Road intersection to evaluate the need for signalization or other improvements to reduce minor street delay.
- Continue the bicycle lane on NH 102 from Towhee Drive to Meghan Drive (recommended MTP project).

NH 111, HOLLIS-NASHUA-HUDSON

NH 111 provides a primary east-west route through the NRPC region that connects the southwestern section of the region to downtown Nashua and continues east through Hudson to the New Hampshire seacoast. Its western terminus is at the Massachusetts state line at the border with Hollis. It continues in a northeasterly direction as Runnells Bridge Road, crossing the Nashua River about one-half mile from the border and passing the Overlook Country Club. The route crosses into Nashua, where it continues as West Hollis Street. In Nashua, the route parallels the Nashua River's south bank, moving through the suburban southwestern quadrant of the city. At the F.E.E. Turnpike a complex interchange involves the Turnpike, NH 111, the eastern terminus of NH 111A (Main Dunstable Road), and several local streets. Leaving the interchange, NH 111 splits into two one-way streets, with West Hollis Street westbound and Kinsley Street eastbound. St. Joseph Hospital is a key destination along this segment. After crossing Main Street and passing Nashua City Hall and Southern New Hampshire Medical Center, the two one-way streets merge again onto East Hollis Street. Going through an industrial part of East Nashua, still following the south bank of the Nashua River, NH 111 crosses the twin-span Taylor Falls/Veterans Memorial bridges over the Merrimack River into Hudson.

Traversing Hudson Village along with NH 102 and intersecting NH 3A, the route goes east following Ferry Street and Burnham Road, before turning northeast along Central Street, one of the main commercial areas of the town of Hudson. In the village of Hudson Center, NH 111 passes Benson Park and continues beyond the NRPC region into Windham, where it eventually links with Interstate 93.

NH 111 Medical Center Drive, Linking Kinsley Street to East Hollis Street, Nashua

Traffic Count Trends

At its western end, NH 111 traffic has been on the rise, as evidence by a 1.6% annual growth rate at the Hollis/Nashua line. Continuing east, the volumes have shown declines ranging from minor west of the Turnpike interchange at Exit 5 to more significant decreases along the one-way West Hollis St. and Kinsley St. sections. As the route traverses past the Nashua central business district (CBD), the decline rate is in the half-percent range. Along the western segment in Hudson, in the vicinity of Kimball Hill Road, there has been a significant rise in traffic over the past decade, which falls back to a flat growth rate at the Windham town line.

NH 111 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Hollis Town Line	Nashua	2007	9,700	2019	11,700	1.6%
East of Parkhurst Dr	Nashua	2006	21,750	2018	19,450	-0.9%
Over FEE Turnpike	Nashua	2008	45,350	2017	43,950	-0.3%
West of Ritter Rd (EB)	Nashua	2009	13,800	2017	11,550	-2.2%
West of Simon St. (WB)	Nashua	2007	23,650	2017	20,950	-1.2%
East of 12th St. (WB)	Nashua	2008	14,700	2017	12,400	-1.9%
West of Allds St.	Nashua	2008	16,350	2017	14,400	-1.4%
Taylor Falls Bridge	Nashu-Hudson	2006	39,100	2019	37,150	-0.4%
East of Library St.	Hudson	2007	14,300	2019	13,300	-0.6%
North of Central St.	Hudson	2007	13,250	2019	12,650	-0.4%
West of Kimball Hill Rd.	Hudson	2008	18,850	2017	22,900	2.2%
East of Kimball Hill Rd.	Hudson	2008	15,570	2017	18,950	2.2%
Windham Town Line	Hudson	2006	15,950	2018	16,600	0.3%

Travel Time Index

Minor congestion characterizes NH 111 prior to the complicated Exit 5 interchange area, where the congestion level bumps up to the moderate range. Conditions worsen along the East Main Street route over the Taylor Falls Bridge into the center of Hudson, with heavy congestion levels in the westbound direction during the PM peak and reaching a severe condition for eastbound traffic. Continuing to Kimball Hill road, peak period travel is still congested, with free-flow speed being 30-40% higher than the congested periods. East of Kimball Hill Road to the Windham line, only minor congestion exists.

NH 111 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

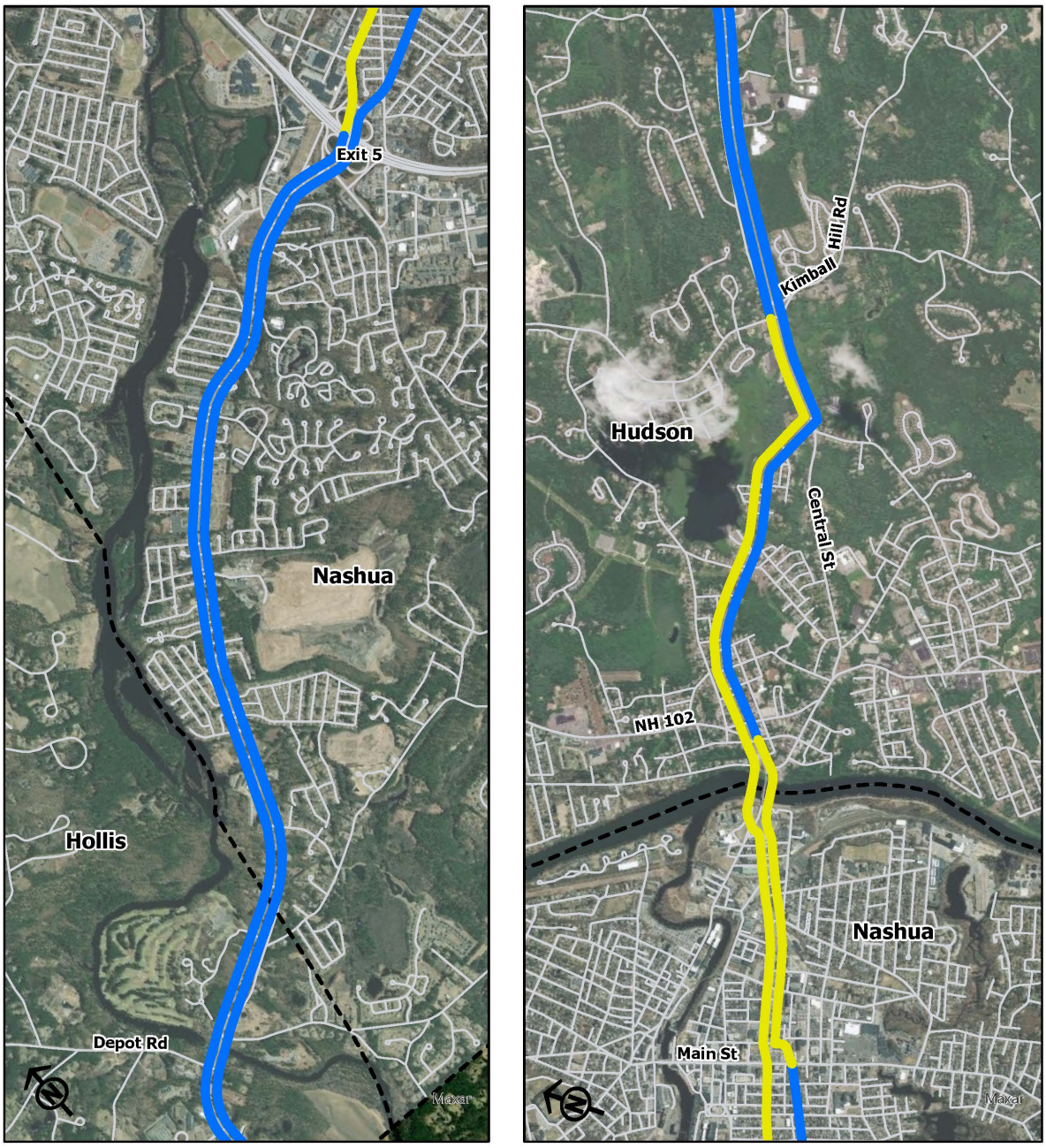
	Eastbound				Westbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Mass Line to S Depot Rd, Hollis	**33.4**	**1.17**	**33.1**	**1.18**	**36.9**	**1.06**	**35.1**	**1.11**
S Depot Rd to FEET Exit 5, Nash	**31.3**	**1.18**	**31.8**	**1.17**	**33.6**	**1.13**	**32.2**	**1.18**
FEET Exit 5 to Main St.	**24.5**	**1.23**	**23.1**	**1.30**	**23.9**	**1.26**	**23.6**	**1.27**
Main St to Chase St, Hudson	**18.5**	**1.46**	**13.6**	**2.01**	**18.6**	**1.46**	**14.8**	**1.83**
NH 102/Chase St - Kimb Hill Rd	**23.9**	**1.22**	**19.8**	**1.47**	**21.4**	**1.38**	**22.3**	**1.32**
Kimball Hill Rd to Windham TL	**42.3**	**1.07**	**40.6**	**1.11**	**38.9**	**1.16**	**39.0**	**1.16**

Highway Capacity Utilization

Capacity analysis corresponds to the speed data that were tabulated. Moderate but acceptable levels of congestion build up in Nashua approaching the Turnpike interchange, ease up along the separated one-way paths but deteriorate to forced flows as indicated by LOS F between Main Street and the Taylor Falls Bridge. LOS E conditions indicative of heavy congestion continue to the west to Kimball Hill Road, from which point traffic is again operating comfortably at LOS C.

NH 111, NASHUA-HUDSON CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Hollis Town Line	Nashua	11,700	527	0.38	B	585	0.42	C
E. of Parkhurst Dr	Nashua	19,450	827	0.79	D	827	0.79	D
Over FEE Turnpike	Nashua	43,950	2,180	0.69	D	2,125	0.67	D
W of Simon St (WB)	Nashua	20,950	1,299	0.62	D	1,571	0.75	D
E of 12th St (WB)	Nashua	12,400	769	0.43	C	942	0.52	C
W of Ritter St (EB)	Nashua	11,550	716	0.40	B	878	0.49	C
W of Allds St	Nashua	14,400	1,080	1.15	F	1,051	1.12	F
Taylor Falls Bridge	Nas/Hud	37,150	1,690	0.94	E	1,393	0.77	D
E of Library St	Hudson	13,300	565	0.38	B	585	0.39	B
N of Central St	Hudson	12,650	506	0.56	C	607	0.67	D
W of Kimball Hill Rd	Hudson	22,900	1,031	0.98	E	1,031	0.98	E
E of Kimball Hill Rd	Hudson	18,950	853	0.81	E	853	0.81	E
Windham Town Line	Hudson	16,600	780	0.49	C	872	0.54	C

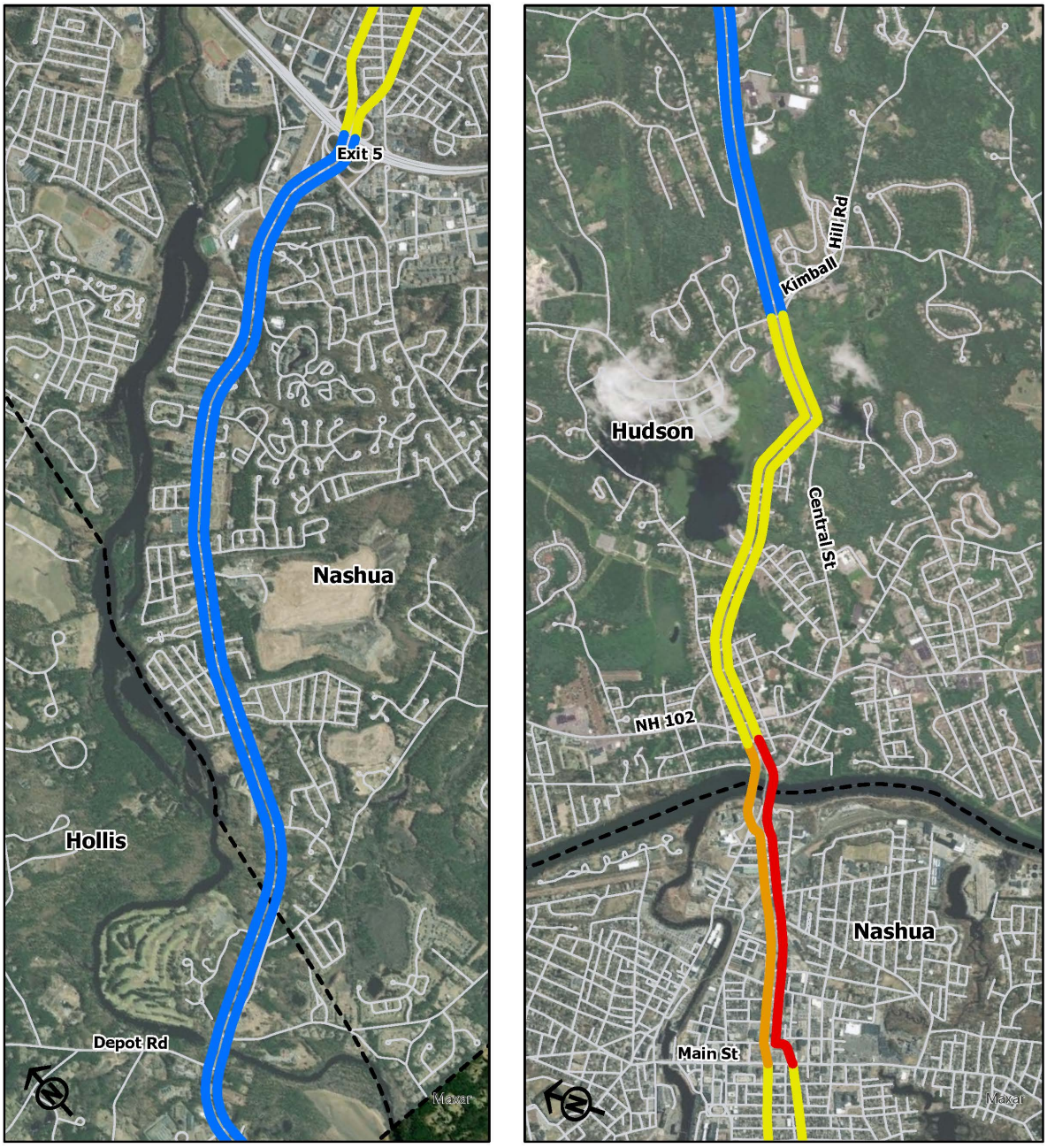


NH 111
Travel Time Index
Weekday AM Peak Period
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC



NH 111

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

Highway Crash Statistics

Beginning from the western end in Hollis, NH 111 crash rates are very low throughout the town and in Nashua to the junction with the FEE Turnpike at Exit 5. From that point the crash rate approximately quadruples and remains at a high rate of hazard along Kinsley Sreet. Eastbound/West Hollis Street westbound and through the Nashua downtown across the Taylor Falls Bridge into Hudson. The crash rate remains higher than average through the Hudson Center and declines substantially east of Kimball Hill Road.

NH 111 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Mass SL - S Depot Rd	Hollis	0.82	13,400	4.01	3.25	0.81
S Depot Rd - Nashua TL	Hollis	0.57	10,200	2.12	2.25	1.06
Hollis TL - Exit 5	Nashua	3.32	16,000	19.39	41.00	2.11
W Hollis St WB	Nashua	1.68	11,600	7.11	57.75	8.12
Kinsley St EB	Nashua	1.77	11,000	7.11	57.50	8.09
Main St - Taylor Falls Bridge	Nashua	1.04	12,700	4.82	46.50	9.65
Ferry St , TFB - Central St	Hudson	1.28	11,900	5.56	33.75	6.07
Burnham Rd-Kimball Hill Rd	Hudson	0.43	21,900	3.44	16.25	4.73
Kimball Hill Rd-Windham TL	Hudson	2.71	17,000	16.82	9.50	0.56

Bicycle Level of Traffic Stress

The most favorable stretch of NH 111 for bicyclists occurs between Countryside Drive and Riverside Drive in Nashua, where it remains within the 2.0 to 2.5 range. The section within the Exit 5 area presents serious challenges and, other than a .4-mile segment on Kinsley Street between New Dunstable Road and St. Joseph's Hospital Drive, the route is suitable for only very experienced and confident bicyclists until moving past the Hudson Center to the Burnham Road section. Along NH 111 Central Street to the Windham line, LTS is at a favorable 2.0 to Hamblett Drive, 3.0 for the remainder.

NH 111 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Mass/Hollis SL - Countryside Dr, Nashua	11,700	1.582	3.00
Countryside Dr - River Pines Blvd	16,450	0.719	2.19
River Pines Blvd - Settlement Way	16,450	0.877	2.51
Settlement Way - Riverside Dr.	18,000	0.927	2.04
Riverside Dr - Tnpk NB on-ramp from W.	19,450	0.484	3.00
Turnpike Ramp - New Dunstable Rd	20,950	0.219	4.00
Kinsley St EB, New Dunst Rd - St. Joes Dr	11,550	0.396	2.00
Kinsley St EB, St. Joseph Dr. - Main St.	11,550	1.004	4.00
W Hollis St WB, Main St - Pine St	12,450	0.397	3.68
W Hollis St WB, Pine St - 12th St	12,450	0.652	3.93
W Hollis St WB 12th St - FEET NB Ramp	20,950	0.421	3.39
E Hollis St, Main St - Taylor Falls Bridge	14,400	0.907	3.00
Taylor Falls Bridge - Chase St, Hudson	37,150	0.324	4.00
Ferry St, Chase St. - State St.	13,300	1.076	3.00
Burnham Rd, State St - Central St	12,650	0.343	2.52
Central St, Burnham Rd - Hamblett Ave	22,900	0.486	2.00
Central St, Hamblett Ave - Windham TL	16,600	2.661	3.00

Congestion Management Strategies

- Improvements along East Hollis Street from Main Street east to C Street (TYP, construction in 2025).
- Implement intersection improvements at East Hollis Street and Bridge Street from C Street to the Taylor Falls Bridge (TYP, construction in 2021).
- Re-configuration of the FEE Turnpike Exit 5E southbound off-ramp to facilitate travel flow from the turnpike to NH 111. (TYP, construction in 2030).
- Implementation of flashing yellow signals and other signal coordination technology along state-controlled sections of NH 111 (Pending TYP regional project, locations to be studied).
- Implement pedestrian and bicycle accessibility improvement project (TYP, construction in 2031).
- Seek funding to implement transit to Hudson, which would reduce vehicular traffic on the NH 111 Nashua-Hudson bridges. (service evaluated in the 2019 Nashua Transit Expansion Study).

Analysis of CMP Major Investment Impacts

- East Hollis Street/Bridge Street Intersection Improvements – An analysis of improvement in operational conditions will be done once final design of improvements is in place.
- Exit 5 Reconfiguration – Review of CMFs indicates crash reduction in the 30-40% range.

NH 130, NASHUA

As the primary connector between Hollis Center and the Nashua Downtown Central Business District, NH 130 serves several important transportation functions. The corridor that is analyzed in this report stretches from the intersection of NH 122 in Hollis east to the intersection of Amherst St (NH 101A) in Nashua. For most of its length, this segment of NH 130 is Broad Street, with Ash Street comprising a small portion, which connects Broad Street with Proctor Hill Rd in Hollis.

The character of NH 130 changes from rural in Hollis to more urban as it approaches downtown Nashua. While there are some commercial uses along Ash Street in Hollis, most of NH 130 in Hollis are agricultural or residential. In Nashua, there are several dense residential neighborhoods, municipal facilities such as Nashua High School North and Broad Street Elementary, and large commercial uses. In addition to the relatively high levels of pedestrian traffic, the corridor also serves public transit riders within Nashua.

Some level of motor vehicle congestion should be expected given the mixed-use nature of this corridor. Furthermore, Exit 6 of the F.E. Everett Turnpike joins with NH 130, which increases the corridor's role as a commuting corridor, especially for residents of Hollis. As an east-west corridor west of the Merrimack River, NH 130 also servers an alternative to NH 101A.

NH 130 Broad Street Westbound Approaching Broad Street Parkway Intersection

Traffic Count Trends

NH 130 has experienced declines along most of its path in Nashua, except for the westernmost segment at the Hollis town line, where growth has averaged 0.6%. Elsewhere, the traffic trend has been downward, with a significant drop in AWDT over the Turnpike from 32,750 in 2007 to 27,040 in 2019.

NH 130 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Nashua City Line	Hollis	2006	8,300	2018	8,900	0.6%
West of Dublin Ave.	Nashua	2006	21,000	2018	18,750	-0.9%
West of FEE Turnpike	Nashua	2006	30,600	2018	28,200	-0.7%
Over FEE Turnpike	Nashua	2007	32,750	2019	27,040	-1.6%
East of Pinehill Ave.	Nashua	2008	13,900	2017	12,700	-1.0%

Travel Time Index

Travel from the center of Hudson to Titan Way in Nashua is virtually uncongested. From that point to the Exit 6 Turnpike interchange, some congestion is present in the eastbound direction, more significant levels for westbound traffic. For the segment from the Turnpike exit to NH 101A Amherst Street, the PM peak is characterized by significant delay, evidence by TTI of 1.4 in both directions.

NH 130 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Eastbound				Westbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
NH 122 Hollis - Titan Way, Nash	**33.9**	**1.03**	**34.5**	**1.02**	**34.7**	**1.01**	**34.8**	**1.01**
Titan Way to FEE Tnpk Exit 6	**21.8**	**1.19**	**22.6**	**1.15**	**23.9**	**1.25**	**21.7**	**1.40**
FEE Tnpk Exit 6 to Amherst St	**18.5**	**1.19**	**15.8**	**1.40**	**18.7**	**1.23**	**16.5**	**1.40**

Highway Capacity Utilization

The volume/capacity statistics indicate LOS D prevailing in the PM peak period for all but the westernmost NH 130 segment in Nashua. This can be considered normal, acceptable levels of delay for an urban area such as Nashua.

NH 130, NASHUA CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Nashua City Line	Hollis	8,900	423	0.24	A	454	0.32	B
W of Dublin Ave	Nashua	18,750	891	0.68	D	956	0.73	D
W of FEE Turnpike	Nashua	28,200	1,199	0.53	C	1,438	0.64	D
Over FEE Turnpike	Nashua	27,040	1,149	0.51	C	1,379	0.61	D
E of Pinehill Ave	Nashua	12,700	540	0.60	C	648	0.72	D

Highway Crash Statistics

Crash rates remain low on NH 130 from the Brookline/Hollis town line to the FEE Turnpike Exit 6 intersection in Nashua. The crash rate more than triples from this point to the termination of NH 130 at NH 101A, as there are numerous conflict points with commercial driveways.

NH 130 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

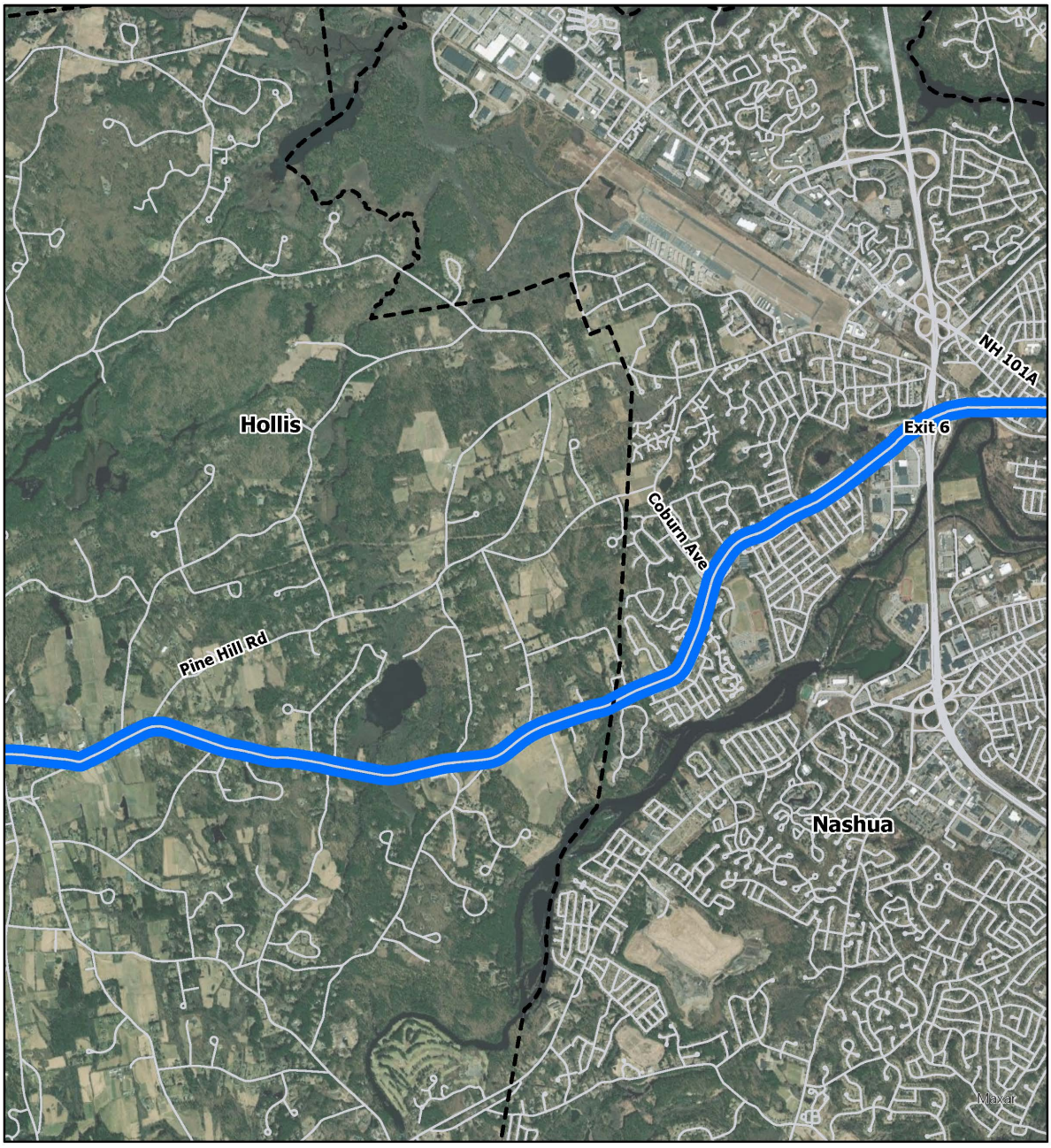
Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Brookline TL - NH 122	Hollis	2.57	5,900	5.53	9.50	1.72
NH 122 - Nashua TL	Hollis	3.43	8,700	10.89	17.75	1.63
Hollis TL - Titan Way	Nashua	0.90	8,200	2.69	6.50	2.41
Titan Way - Tnpk Exit 6	Nashua	1.51	17,300	9.53	24.25	2.54
Tnpk Exit 6 - NH 101A	Nashua	0.75	12,100	3.31	27.25	8.23

Bicycle Level of Traffic Stress

All NH 130 roadway segments at LTS 3 or under, which is a relatively favorable condition for an urban arterial. The higher speeds for the uncontrolled flow of traffic between Hollis center and the Nashua line results in a ranking right at the 3.0 level. As speeds drop in the Nashua urban section due to lower speed limits and traffic signals, LTS improves to the 2.3 to 2.65 range. Over the final segments from the approach to the Turnpike ramps to NH 101, LTS again climbs to around 3.0.

NH 130, HOLLIS-NASHUA BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
NH 122 Hollis - Nashua City Line	8,900	3.455	2.99
Hollis TL - Piermont St	10,000	0.509	2.00
Piermont St - Coburn Ave	15,000	0.463	2.64
Coburn Ave - Beaver St	18,750	0.509	2.34
Beaver St - Horse Pond Ave	18,750	0.444	2.47
Horse Pond Ave - FEE Tnpk NB Ramps	28,200	0.513	3.00
FEE Tpk NB Ramps - NH 101A Amherst St	12,700	0.699	2.83



NH 130

Travel Time Index

Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC

NH 130

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC

Congestion Management Strategies

- Construct a new interchange along the Broad Street Parkway to connect Franklin Street, which will reduce traffic to the approach with NH 101A, Amherst Street (TYP, construction in 2028).
- Evaluate traffic signals for installation of flashing yellow phases or other signal modification strategies.
- Reconstruct NH 130 from Coburn Avenue to Coliseum Avenue to provide shoulders for safe bicycle travel and safety improvements (recommended MTP project).

Analysis of CMP Major Investment Impacts

- The construction of a Franklin Street interchange with the Broad Street Parkway is estimated to reduce NH 130 traffic east of the Broad Street Parkway by 1,200 per day. This project will reduce the v/c ratio on NH 130 east of the Broad Street Parkway from .75 and LOS E to .68 LOS D.

NH 38, PELHAM

NH 38 begins at the Massachusetts/Pelham line continuing north as a single lane in each direction as Bridge Street passing numerous businesses, but otherwise traveling to the east of the center of town. At Main Street, it begins to bend to the northeast, passing through a residential neighborhood. It crosses into Salem and provides access to I-93 via a short trip along South Policy Street. Signals along NH 38 are located at the intersections with Willow St./Highland Avenue, Old Bridge St./Atwood Road and Main Street.

NH 38, Pelham

Traffic Count Trends

NH 38 in Pelham has experienced traffic growth along all segments, due to its function of carrying longer distance trips from I-93 and Salem into Massachusetts. The growth rate has generally ranged from 0.5% to 1.2% per year, except north of Atwood Road, which has had a 2.4% growth rate. That location has a lower base count than the other segments, which partially accounts for the higher rate of increase.

NH 38 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Salem Town Line	Pelham	2008	12,450	2017	13,550	0.9%
South of Hobbs Rd	Pelham	2008	12,900	2017	14,350	1.2%
North of Atwood Rd	Pelham	2008	8,800	2017	10,900	2.4%
South of Atwood Rd	Pelham	2008	14,100	2017	14,950	0.7%
Massachusetts State Line	Pelham	2006	13,150	2018	13,950	0.5%

Travel Time Index

The southernmost segment from Old Bridge Street to the Massachusetts line shows some degree of mild congestion but the other segments operate just under the free-flow speeds. For the most part, these segments are congestion-free.

NH 38 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

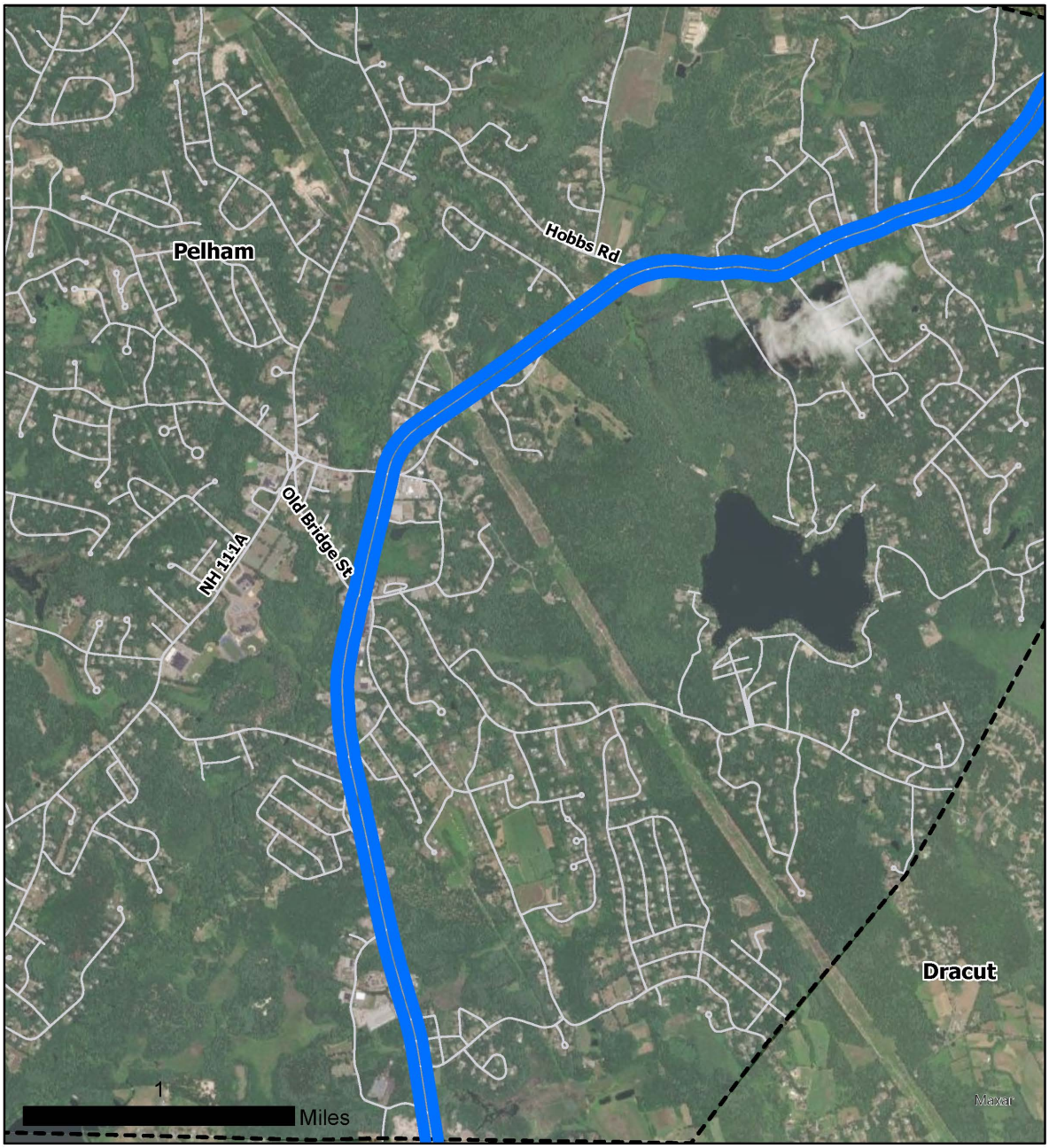
	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
NH 38 Segment	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Salem Town Line to Hobbs Rd.	**41.2**	**1.05**	**40.9**	**1.05**	**41.2**	**1.03**	**40.0**	**1.06**
Hobbs Rd -to Old Brdg/Atwood	**42.4**	**1.04**	**41.8**	**1.05**	**40.7**	**1.07**	**40.1**	**1.09**
Old Bridge/Atwood - Mass SL	**33.3**	**1.10**	**31.9**	**1.15**	**36.7**	**1.06**	**33.2**	**1.18**

Highway Capacity Utilization

NH 38 operates at LOS C along its entire length during the PM peak and LOS B or C for the AM period. This represents quite favorable operational conditions and there is capacity available for future traffic growth before experiencing a decline in service levels.

NH 38, PELHAM CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Salem Town Line	Pelham	13,550	461	0.33	B	610	0.44	C
S of Hobbs Rd	Pelham	14,350	488	0.35	B	646	0.46	C
N of Atwood Rd	Pelham	10,900	371	0.41	C	491	0.55	C
S of Atwood Rd	Pelham	14,950	508	0.45	C	673	0.60	C
Massachusetts SL	Pelham	13,950	474	0.34	B	628	0.45	C



NH 38

Travel Time Index

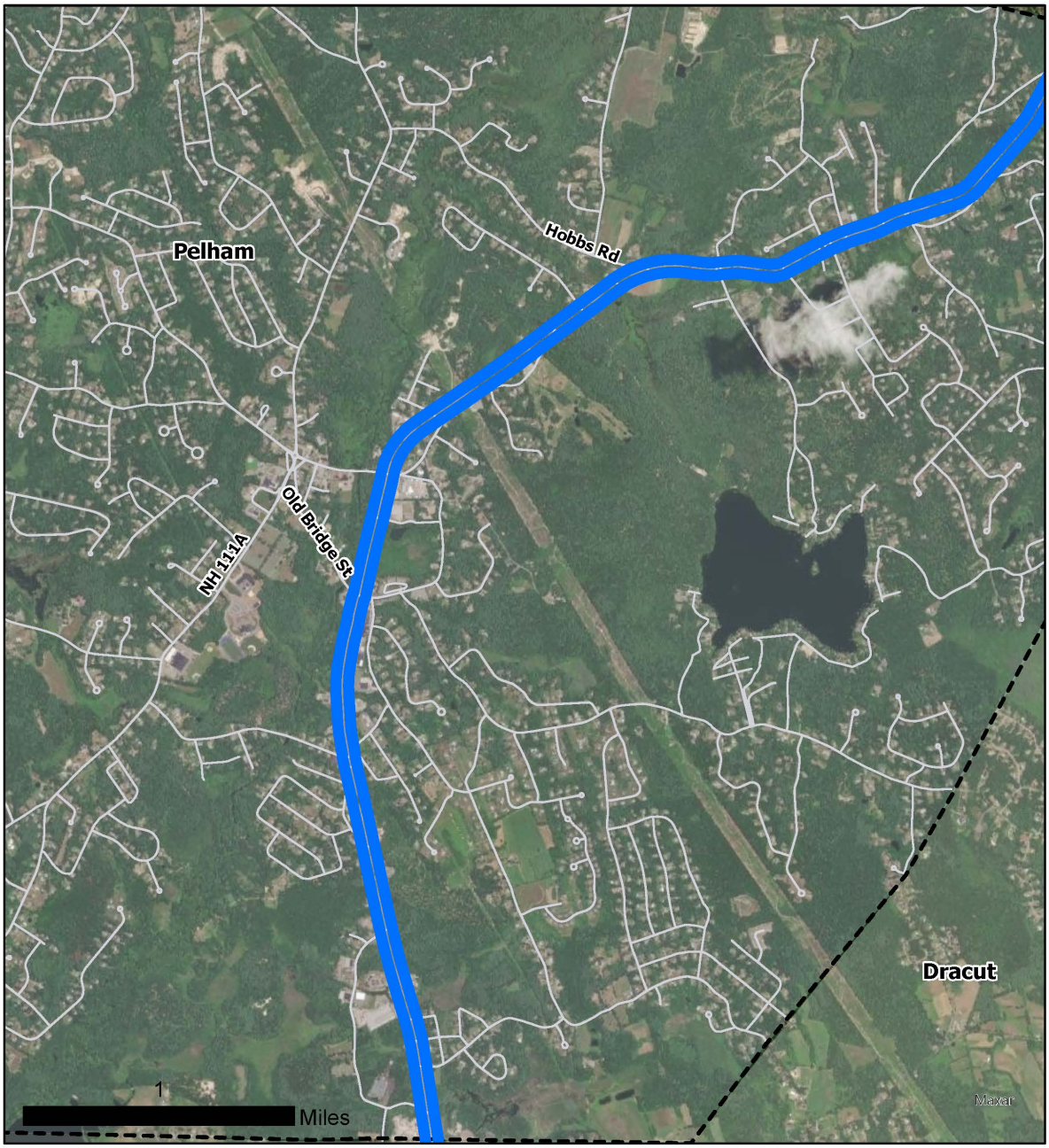
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC



NH 38

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

NRPC

Highway Crash Statistics

The crash rate along NH 38 is consistently between 2 to 3 crashes per MVM, indicating a relatively safely performing route.

NH 38 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Salem TL - Hobbs Rd	Pelham	1.99	12,200	8.86	18.50	2.09
Willow St - Hobbs Rd	Pelham	2.31	13,400	11.30	33.00	2.92
Mass SL - Willow St	Pelham	1.46	11,900	6.34	18.50	2.92

Bicycle Level of Traffic Stress

Between the Salem line and Rita Ave, bicycle LTS is rated quite unfavorable at a solid 4.0 for a three-mile stretch. Paved, striped shoulders are minimal along this segment and widen to a convenient width for bicyclists south of this location.

NH 38, PELHAM BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Salem TL - Rita Ave	13,550	2.952	4.00
Rita Ave - Willow Ave/Highland St	14,350	1.350	2.66
Willow Ave/Highland St - Mass SL	13,950	1.452	2.12

Congestion Management Strategies

- Consider implementation of flashing yellow signals at the three signalized intersections along NH 38. They have been identified as potential locations for a statewide CMAQ project to modify signals to reduce waiting for major arterial left-turning traffic.
- Widen paved shoulders along the northern segment to improve LTS to at least a 3.0 rating.

NH 128, PELHAM

NH 128 runs north-south through the entire length of Pelham in the western end of town, beginning at the Massachusetts state line and continuing to Windham, where it intersects with NH 128. There are no traffic signals along the corridor within Pelham. Minimal paved shoulder widths do not provide a friendly environment for bicyclists. The key intersections are in close proximity in the southern end of Pelham, at Sherburne Road and about 1,000 feet to the north at NH 111A Marsh Road. These two intersections have been identified as problematic and selected for improvement under the federal Congestion

Mitigation and Air Quality (CMAQ) program. The improvements are in the TYP and construction of roundabouts or alternative configuration is scheduled for 2022.

Traffic Count Trends

Count trends indicate a slight increase in NH 128 traffic over the years north of Sherburne Road and a moderate decline for the southernmost segment to the Massachusetts line. Overall, the roadway can be characterized as a flat-growth corridor.

NH 128, PELHAM WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Windham TL	Pelham	2006	5,530	2018	5,620	0.1%
North of Sherburne Rd	Pelham	2006	13,850	2018	14,860	0.6%
Massachusetts SL	Pelham	2006	11,470	2018	10,400	-0.8%

NH 128 Mammoth Road at NH 111A March Road Intersection

Travel Time Index

NH 128 operates virtually free of congestion, with only minute differences between free-flow and peak period observed speeds.

NH 128 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
NH 128 Segment	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Keyes Hill Rd - Tenney Rd	**37.2**	**1.04**	**38.5**	**1.01**	**37.2**	**1.05**	**38.5**	**1.01**
Tenney Rd - Sherburne Rd	**38.3**	**1.02**	**38.5**	**1.01**	**36.6**	**1.06**	**38.5**	**1.01**

Highway Capacity Utilization

NH 128 operates at no worse than LOS C and has sufficient capacity to accommodate traffic growth and remain in that condition. Elsewhere the highway is at LOS A or B, characteristic of free-flow traffic conditions in a rural area.

NH 128, PELHAM CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Windham Town Line	Pelham	5,620	239	0.17	A	281	0.20	A
N of Sherburne Rd	Pelham	14,860	632	0.45	C	706	0.50	C
Massachusetts SL	Pelham	10,400	364	0.26	A	494	0.35	B

Highway Crash Statistics

The northern segment of NH 128 from the Windham line to Nashua Road has the highest crash rate but is still somewhat under the regional average for arterials. NH 128 ranks as a safer route in the region.

NH 128 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Windham TL - Nashua Rd	Pelham	2.82	4,900	5.04	17.00	3.37
Nashua Rd - NH 111A	Pelham	2.98	4,800	5.22	11.50	2.20
NH 111A - Mass SL	Pelham	0.54	13,200	2.60	5.75	2.21

NH 128

Travel Time Index

Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC

NH 128

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC

Bicycle Level of Traffic Stress

NH 128 is rated LTS 4.0 for the majority of its length, 3.0 elsewhere. It is characterized by narrow shoulders and this combines with 40 mph speeds to make for unfavorable bicycling conditions.

NH 128 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Windham TL - Tallant Rd	5,620	0.941	4.00
Tallant Rd - Nashua Rd	5,620	1.851	3.00
Nashua Rd - Greeley Rd	5,620	2.414	4.00
Greeley Rd - Massachusetts SL	14,860	1.153	4.00

Congestion Management Strategies

- Construct roundabouts or alternative intersection improvements at NH 128/Sherburne Road and NH 128/NH 111 Marsh Road to improve operational conditions for the minor street traffic-controlled approaches
- Widen shoulders where possible to improve LTS above the 4.0 level.

Analysis of CMP Major Investment Impacts

- Based on nineteen studies conducted nationwide on the safety impact of roundabouts, it is estimated that crashes will be reduced by 40% with the construction of roundabouts at the two NH 128 intersections.

NH 111A, PELHAM

NH 111A begins at a problematic intersection with NH 128, identified for improvements as previously noted. It runs northerly through town, passing through the town center via rotaries at Old Bridge Street/Village Green and at Nashua Road/Main Street. It crosses over into Windham where it soon takes a northeast direction and eventually intersects with NH 111 in close proximity to I-93 Exit 3. As the picture below shows, there is very little paved shoulder provided to accommodate bicycle travel.

NH 111A Marsh Road Exhibiting Minimal Paved Shoulders

Traffic Count Trends

The two count locations on NH 111A in Pelham indicate a moderate secular growth trend to the north near the Windham line and a slightly declining rate to the north of Brookview Rd. The latter location is still north of the town center and, unfortunately, there is no recent count for the segment which continues from the town center to the junction with NH 128, which queues during peak periods.

NH 111A, PELHAM WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
Windham TL	Pelham	2006	5,950	2018	6,510	0.8%
North of Brookview Rd.	Pelham	2006	7,520	2018	7,000	-0.6%

Travel Time Index

Travel time data are available for the entire route south of Tallant Road. North of Old Bridge Street NH 111A is uncongested; however, the southernmost segment shows significant congestion, due to conflicting traffic at the junction with NH 128.

NH 111A PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
NH 111A Segment	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Tallant Rd - Hobbs Rd	**39.4**	**1.02**	**39.9**	**1.00**	**38.6**	**1.04**	**39.4**	**1.02**
Hobbs Rd - Old Bridge St	**36.7**	**1.05**	**37.8**	**1.02**	**35.6**	**1.12**	**36.9**	**1.08**
Old Bridge St - NH 128	**23.8**	**1.34**	**26.2**	**1.22**	**21.0**	**1.43**	**25.0**	**1.20**

Highway Capacity Utilization

As traffic data are available only for locations north of Brookview Road, LOS A is all that can be reported for NH 111A. An analysis of operational conditions would likely indicate LOS D for the southernmost segment; however, counts need to be taken at this location to verify this.

NH 111A, PELHAM CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
Windham TL	Pelham	5,950	253	0.18	A	283	0.20	A
N of Brookview Rd	Pelham	7,520	263	0.19	A	357	0.26	A

Highway Crash Statistics

NH 111A exhibits a low crash rate through all segments, around the 2 crash per MVM level.

NH 111A AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Windham TL - Hobbs Rd	Pelham	1.09	5,700	2.27	3.75	1.65
Hobbs Rd - Burns Rd	Pelham	2.19	6,300	5.04	10.50	2.09
Burns Rd - NH 128	Pelham	1.62	9,000	5.32	10.75	2.02

Bicycle Level of Traffic Stress

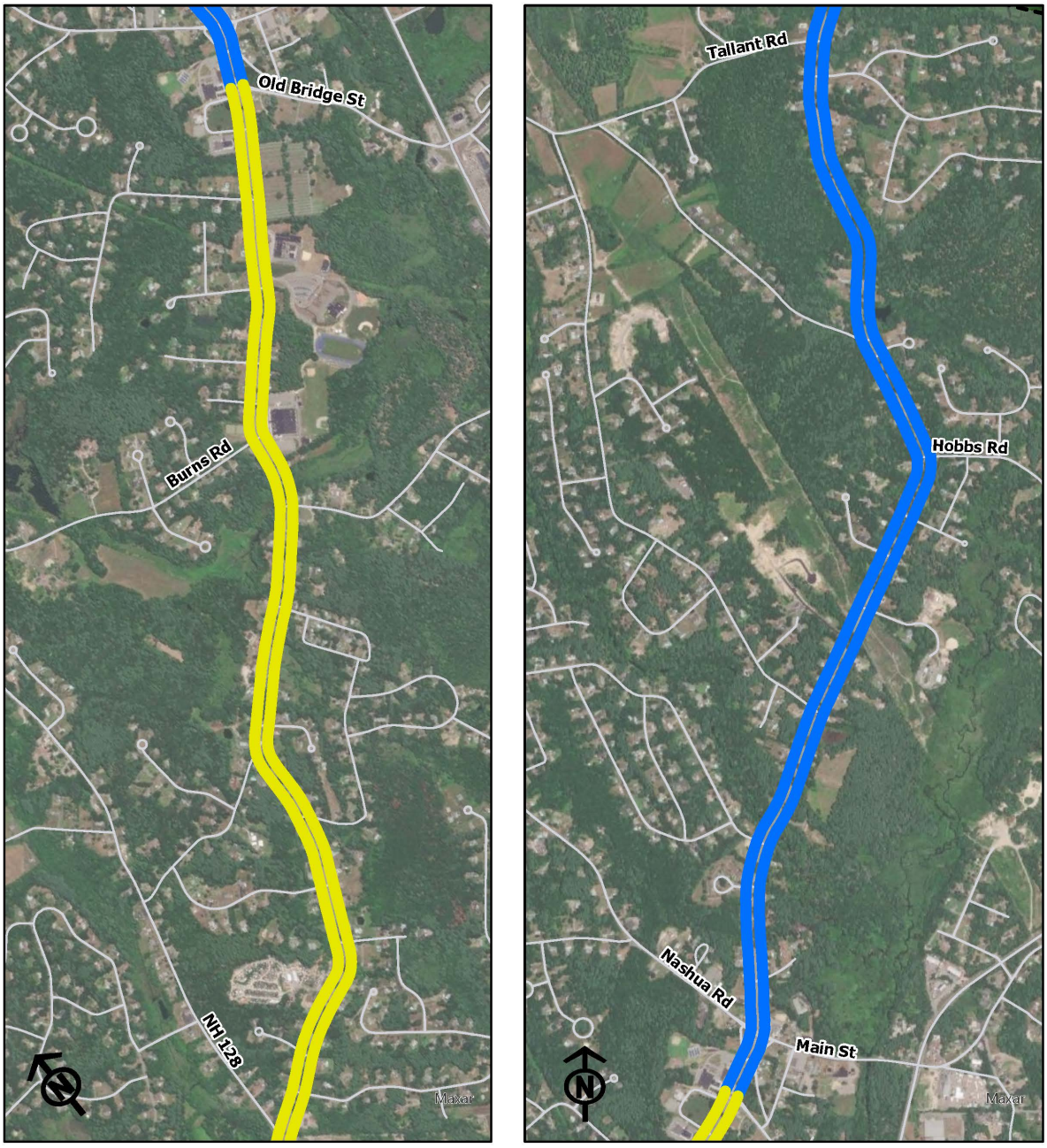
Bicycle LTS remains at near the 3.0 level throughout the entire length of NH 111A. Experienced bicyclists do not encounter undue stress along the route. However, narrow shoulders make it problematic for the less confident segment of the bicycling population.

NH 111A BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Windham TL - Nashua Rd	5,959	2.484	2.89
Nashua Rd - NH 128	7,920	2.434	3.00

Congestion Management Strategies

- Construct roundabouts or alternative improvements at the intersection with NH 128/to reduce stopped delay for traffic on NH 111A.



NH 111A

Travel Time Index

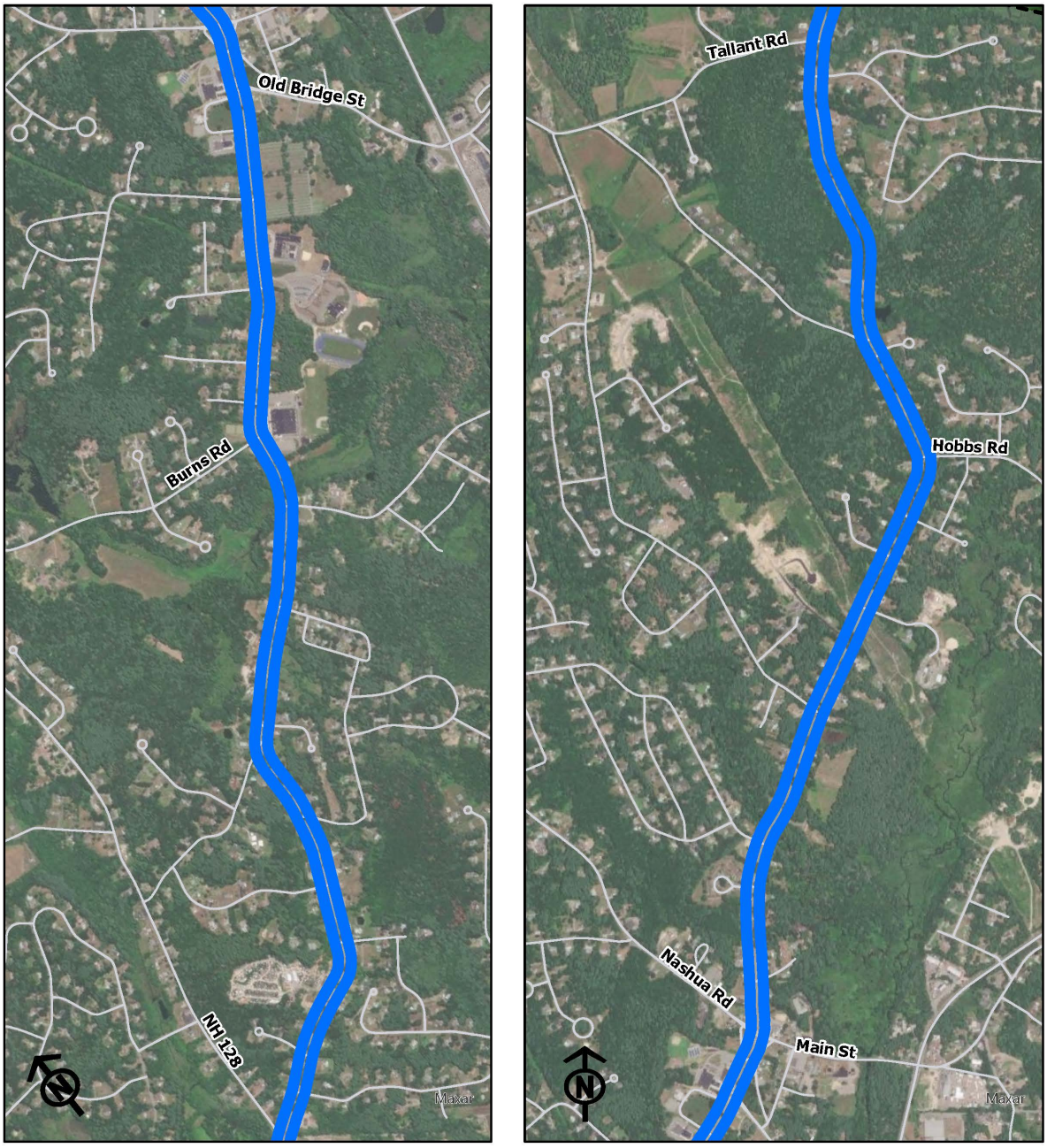
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC



NH 111A

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

NH 13, MONT VERNON-MILFORD-BROOKLINE

NH 13 is a minor north-south thoroughfare in the Nashua Region west of the F.E. Everett Turnpike. The southern terminus of NH 13 is at the Massachusetts state line in Brookline, where the road continues as Massachusetts State Route 13 until it terminates in Leominster. The northern terminus of NH 13 is at an interchange with New Hampshire Route 9 and U.S. Route 202 in Concord.

NH 13 is a minor arterial in Brookline and Milford, providing access to NH 101 and NH 101A. In Brookline, NH 13 is the primary corridor for access to all town services and neighborhoods. In Milford, NH 13 helps to comprise the core of downtown Milford and its essential services.

The character of NH 13 has very distinct segments along its corridor, especially when comparing the segments in Brookline with Milford. The section in Brookline is much more rural, with mostly homes, forestland and some commercial enterprises along the road. However, the portion in Milford has more commercial activity, especially within the Milford Oval district. While there are no sidewalks along the corridor in Brookline, there is a robust pedestrian network in Milford close to the Oval, making it one of the most walkable areas in the Region outside of Nashua. NH DOT data suggests that NH 13 is a moderately popular route for cyclists in the Nashua Region. Riders can be seen on the highway shoulder in both designated and undesignated portions of the highway. The route is quite rural throughout Mont Vernon.

NH 13 South Street Approaching the Milford Oval

Traffic Count Trends

Through Mont Vernon and Milford south to the town oval, NH 13 traffic volume has experienced a negative trend. Continuing through the town center to south of the NH 101 interchange, a positive rate of change is present, followed by a moderate rate of decline in Brookline and finally slight growth in volume at the Massachusetts line.

NH 13 WEEKDAY TRAFFIC COUNT TRENDS

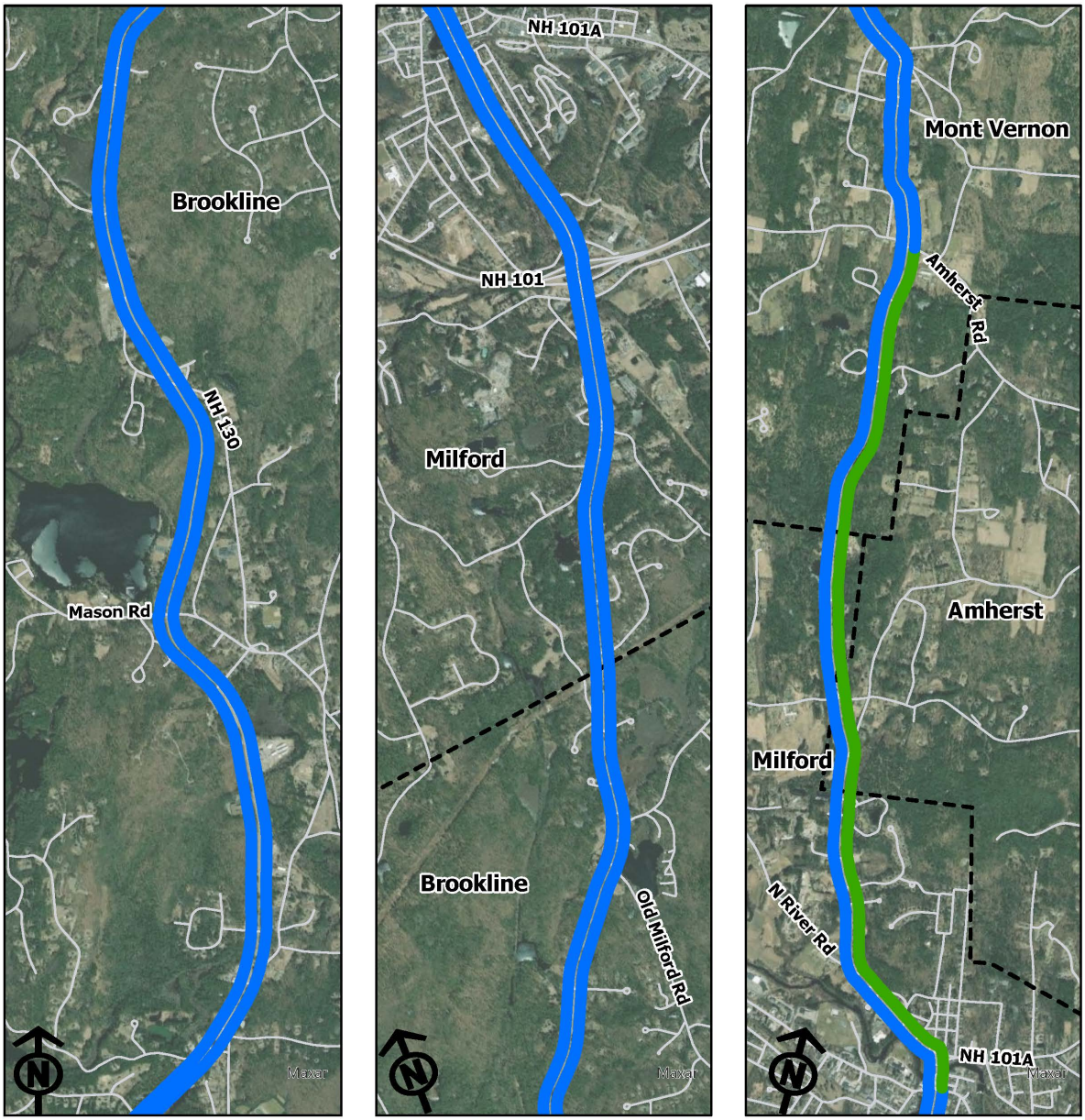
Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % Δ
S. of Francestown Turnpike	Mont Vernon	2006	5,510	2018	4,920	-0.9%
S. of North River Rd.	Milford	2006	10,030	2018	8,670	-1.2%
Over Souhegan River	Milford	2007	16,280	2019	17,660	0.7%
S. of NH 101	Milford	2007	11,470	2019	13,300	1.2%
Over Nissitissit River	Brookline	2008	6,350	2017	5,550	-1.5%
Massachusetts SL	Brookline	2006	6,830	2018	7,320	0.6%

Travel Time Index

All NH 13 roadway segments are at or close to free-flow speed levels. Only minor decreases in speeds occur during the PM peak period between the oval area and the NH 101 interchange.

NH 13 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
NH 13 Segment	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Frances. Tpk-Amherst Rd, MV	**33.8**	**1.01**	**35.2**	**0.97**	**34.8**	**1.02**	**35.3**	**1.01**
Amherst Rd to NH 101A, Mlf	**34.0**	**0.94**	**32.2**	**0.99**	**28.5**	**1.02**	**26.3**	**1.10**
NH 101A to NH 101 Intchange	**29.8**	**1.07**	**28.8**	**1.11**	**33.4**	**1.05**	**33.0**	**1.06**
NH 101 to NH 130, Brookline	**41.7**	**1.06**	**40.8**	**1.08**	**40.7**	**1.06**	**39.7**	**1.09**
NH 130 - Meetinghouse Hill Rd	**43.7**	**1.03**	**42.8**	**1.05**	**44.9**	**1.00**	**45.2**	**0.99**
Meetinghouse Hill Rd -Mass SL	**46.0**	**1.03**	**45.8**	**1.04**	**46.4**	**1.02**	**45.1**	**1.05**



NH 13

Travel Time Index

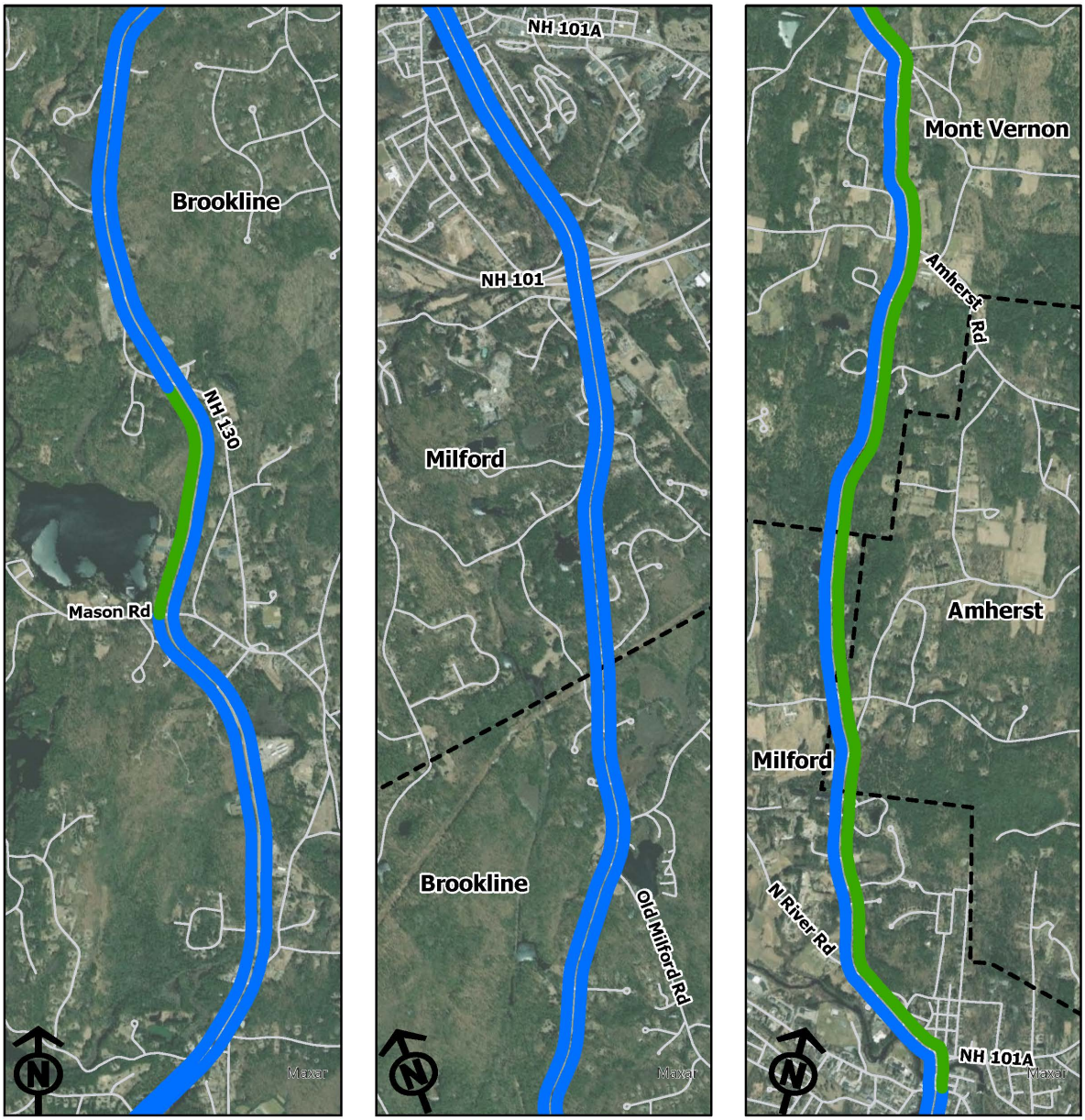
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC



NH 13

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

0.5 Miles

NRPC

Highway Capacity Utilization

One segment of NH 13 in Milford, in the vicinity of the town oval, operates at the high end of LOS D, not that far from the LOS C range. All other segments operate at LOS A or B.

NH 13, MONT VERNON-MILFORD CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
S. of Francestown Tnpk	Mont Vernon	4,920	209	0.15	A	209	0.15	A
S. of North River Rd.	Milford	8,670	368	0.31	B	368	0.31	B
Over Souhegan River	Milford	17,660	751	0.63	D	751	0.63	D
S. of NH 101	Milford	13,300	565	0.40	B	565	0.40	B
Over Nissitissit River	Brookline	5,550	236	0.22	A	236	0.22	A
Massachusetts SL	Brookline	7,320	311	0.22	A	311	0.22	A

Highway Crash Statistics

NH 13 has one higher than average crash segment, which is between Grove Street and Lincoln Street in Milford. This segment passes through the Milford Oval area, which intersects with NH 101A and is characterized by high density commercial/industrial establishments. To the north and south of this segment, the NH 13 crash rate indicates a safely operating facility.

NH 13 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
New Boston TL - N Main St	Mont Vernon	2.40	3,800	3.33	4.00	1.20
N Main St - Milford TL	Mont Vernon	2.39	4,400	3.84	5.25	1.37
Mont Vernon TL - Grove St	Milford	1.84	8,800	5.91	5.00	0.85
Grove St - Lincoln St	Milford	0.38	14,800	2.05	10.75	5.24
Lincoln St - NH 101	Milford	1.25	5,100	2.33	4.00	1.72
NH 101 - Brookline TL	Milford	1.73	11,700	7.39	6.00	0.81
Milford TL -Old Milford Rd	Brookline	0.85	9,800	3.04	3.50	1.15
Old Milford Rd - NH 130	Brookline	2.55	6,000	5.58	11.75	2.10
NH 130 - Mass SL	Brookline	3.37	6,000	7.38	12.25	1.66

Bicycle Level of Traffic Stress

For LTS reporting, NH 13 is divided into a number of sections, as conditions are variable. The northern end in Mont Vernon receives an unfavorable 4.0 rating, which improves to under 3.0 near the Milford-

Mont Vernon line. LTS returns to 4.0 from this point to North River Road and maintains a 3.0 rating though the Milford Oval. For the next 1.7 miles, just past Emerson Road, LTS is at its most favorable rating, averaging 2.3, then returns to around 3.0 through Brookline to the Massachusetts line.

NH 13 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
New Boston TL - Beech Hill Rd, Mt Vern	4,920	2.268	4.00
Beech Hill Rd - Hillcrest Ave	4,920	0.617	2.90
Hillcrest Ave - .65 mi. S of Secomb Rd	4,920	1.873	2.66
.65 mi S of Secomb Rd - N River Rd, Mil	3,270	1.863	4.00
N River Rd - NH 101A	8,670	0.610	3.01
NH 101A - NH 101 WB Ramps	6,000	1.210	2.32
NH 101 WB Ramp - .3 mi S of Emerson Rd	13,300	0.477	2.24
S of Emerson Rd - Brookline TL	8,900	1.900	3.07
Milford TL - Quimby Rd, Brookline	5,550	3.352	3.04
Quimby Rd - Mass State Line	7,320	3.431	3.03

Congestion Management Strategies

- Construct a southbound left turn lane on NH 13 to Old Milford Rd (TYP, construction in 2026-2027).
- Improvements at the NH 13 intersection with Main Street to address safety issues (TYP, construction in 2029).
- Improvements to the NH 101A & NH 13 Milford Oval area to improve vehicle circulation and non-motorized mobility.

Analysis of CMP Major Investment Impacts

- Construction of a left turn lane on NH 13 to Old Milford Road in Brookline is estimated to reduce crashes at this location by 30%, based on national studies. This reduction factor may also apply to the NH 13/Main Street intersection.

NH 122, AMHERST-HOLLIS

NH 122 is a minor north-south thoroughfare in the Nashua Region west of the F.E. Everett Turnpike. This route runs through Hollis (where it is known as Silver Lake Rd) and terminates in Amherst (where it is comprised of Hollis Rd, Ponemah Rd, Boston Post Rd, and Amherst St).

The southern terminus of NH 122 is at the Massachusetts state line in Hollis, where the road continues into Massachusetts as an unnumbered local road in the town of Pepperell. The northern terminus of NH 122 is at an interchange with New Hampshire Route 101 in Amherst.

NH 122 is a major collector from NH 101 to the NH 130 and a minor collector from NH 130 to the Massachusetts border. It is characterized by its rural character in both Hollis and Amherst. Uses found along this route include low density residential, municipal, farmland and limited commercial. It also is the location of several regional draws, including the Amherst Country Club, Silver Lake State Park, and the Hollis Flea Market, which can increase traffic during the warmer seasons.

Along the route, there are some sidewalks and only minimal infrastructure for cyclists. NH DOT data suggests that NH 122 is one of the most popular routes for cyclists in the Nashua Region. Riders can be seen on the highway shoulder in both designated and undesignated portions of the highway.

Traffic Count Trends

Traffic counts have been generally trending down on NH 122 in Amherst and Hollis approximately 1% per year, except near the Massachusetts line, where a slight uptick has occurred in what historically has been a low-volume roadway segment.

NH 122 WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
South of NH 101	Amherst	2006	7,800	2018	6,760	-1.2%
North of NH 101A	Amherst	2006	8,130	2018	7,560	-0.6%
Amherst TL	Hollis	2006	4,820	2018	4,290	-1.0%
North of NH 130	Hollis	2006	9,440	2018	8,340	-1.0%
Massachusetts SL	Hollis	2006	2,250	2018	2,410	0.6%

NH 122 Southbound at NH 130 Intersection, Hollis

Travel Time Index

All roadway segments operate within or quite near to free-flow speeds. There are no peak hour congestion issues. It has been observed that spot congestion at the NH 122/NH 130 intersection in Hollis does occur during the afternoon school peak but this a brief and localized congestion issue.

NH 122 PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
NH 101 to NH 101A, Amherst	**38.1**	**1.02**	**39.2**	**0.99**	**39.5**	**0.99**	**39.5**	**0.99**
NH 101A - S Merrimack Rd, Holl	**36.6**	**1.04**	**37.1**	**1.02**	**38.7**	**0.98**	**39.3**	**0.97**
S. Merrimack Rd to NH 130	**33.6**	**0.97**	**34.7**	**0.94**	**31.3**	**1.04**	**32.7**	**0.99**
NH 130 to Massachusetts Line *	**36.8**	**1.09**	**37.1**	**1.08**	**39.8**	**1.01**	**39.6**	**1.01**

* NPMRDS data not available. Uses 2017 travel run data

Highway Capacity Utilization

All NH 122 highway segments operate at LOS A or B, indicative of a corridor with excess capacity and free of congestion.

NH 122, AMHERST-HOLLIS CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
South of NH 101	Amherst	6,760	304	0.22	A	304	0.22	A
North of NH 101A	Amherst	7,560	340	0.32	B	340	0.32	B
Amherst TL	Hollis	4,290	193	0.14	A	193	0.14	A
North of NH 130	Hollis	8,340	375	0.36	B	375	0.36	B
MassachusettsSL	Hollis	2,410	108	0.08	A	108	0.08	A

Highway Crash Statistics

NH 122 has a significantly higher than average crash rate between NH 101A and the Hollis line at 7.46 crashes/MVM compared with levels between 1.9 and 2.2 to the north. This segment should be evaluated through a safety inspection to determine probable cause(s) of the high crash rate.

NH 122 AVERAGE YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Amherst St - Boston Post Rd	Amherst	0.98	5,050	1.81	4.00	2.21
Bost Post Rd - Merrimack Rd	Amherst	0.97	4,700	1.66	2.25	1.35
Merrimack Rd - NH 101A	Amherst	1.03	6,900	2.59	5.00	1.93
NH 101A - Hollis TL	Amherst	0.40	3,900	0.57	4.25	7.46
Amherst TL - S Merrimack Rd	Hollis	2.51	4,400	4.03	4.75	1.18
S Merrimack Rd - NH 130	Hollis	1.81	7,600	5.02	4.50	0.90
NH 130 - Mass SL	Hollis	2.76	2,200	2.22	7.00	3.16

Bicycle Level of Traffic Stress

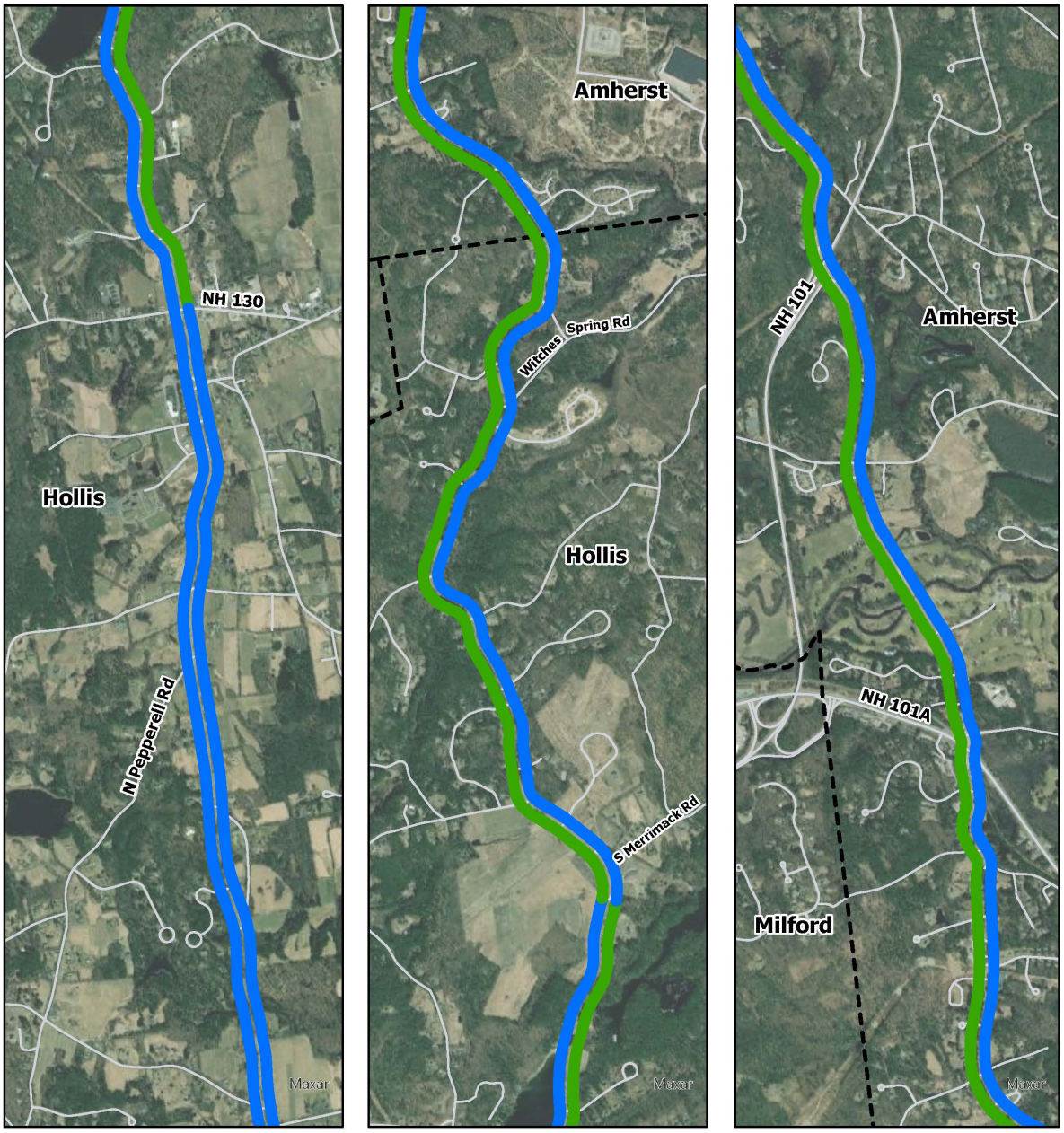
Variable LTS ratings are present from the northern end of NH 122 in Amherst to Hayden Road in Hollis, ranging between 2.0 and 4.0. LTS then hovers around the mid-grade 3.0 level until the final 1.8 miles north of the Massachusetts line, where bicyclists must contend with a lowly 4.0 rating.

NH 122 BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
NH 101 Int -Bost Post Rd @ Amhr Center	6,760	0.769	2.00
Bost Post Rd - Amherst Country Club Rd	7,560	1.592	3.94
Amherst Country Club - Old Nashua Rd	7,560	0.807	2.83
Old Nashua Rd - Hayden Rd, Hollis	4,820	2.604	4.00
Laurel Hill Rd - South of Colburn Ln	4,820	2.017	3.16
S. of Colburn Ln - NH 130	7,270	3.101	3.00
NH 130 - Ridge Rd	4,290	0.933	3.00
Ridge Rd - Mass State Line	2,550	1.832	4.00

Congestion Management Strategies

- Consider implementation of traffic alternatives in Hollis Monument Square, which connects to NH 122. NRPC has completed a site evaluation which suggests changes in traffic control or construction of a roundabout.
- Continue to evaluate the need for changes in lane geometry and access to schools due to school afternoon peak traffic impacts.
- Widening of paved shoulders to improve segments rated LTS 4.0.



NH 122

Travel Time Index

Weekday AM Peak Period

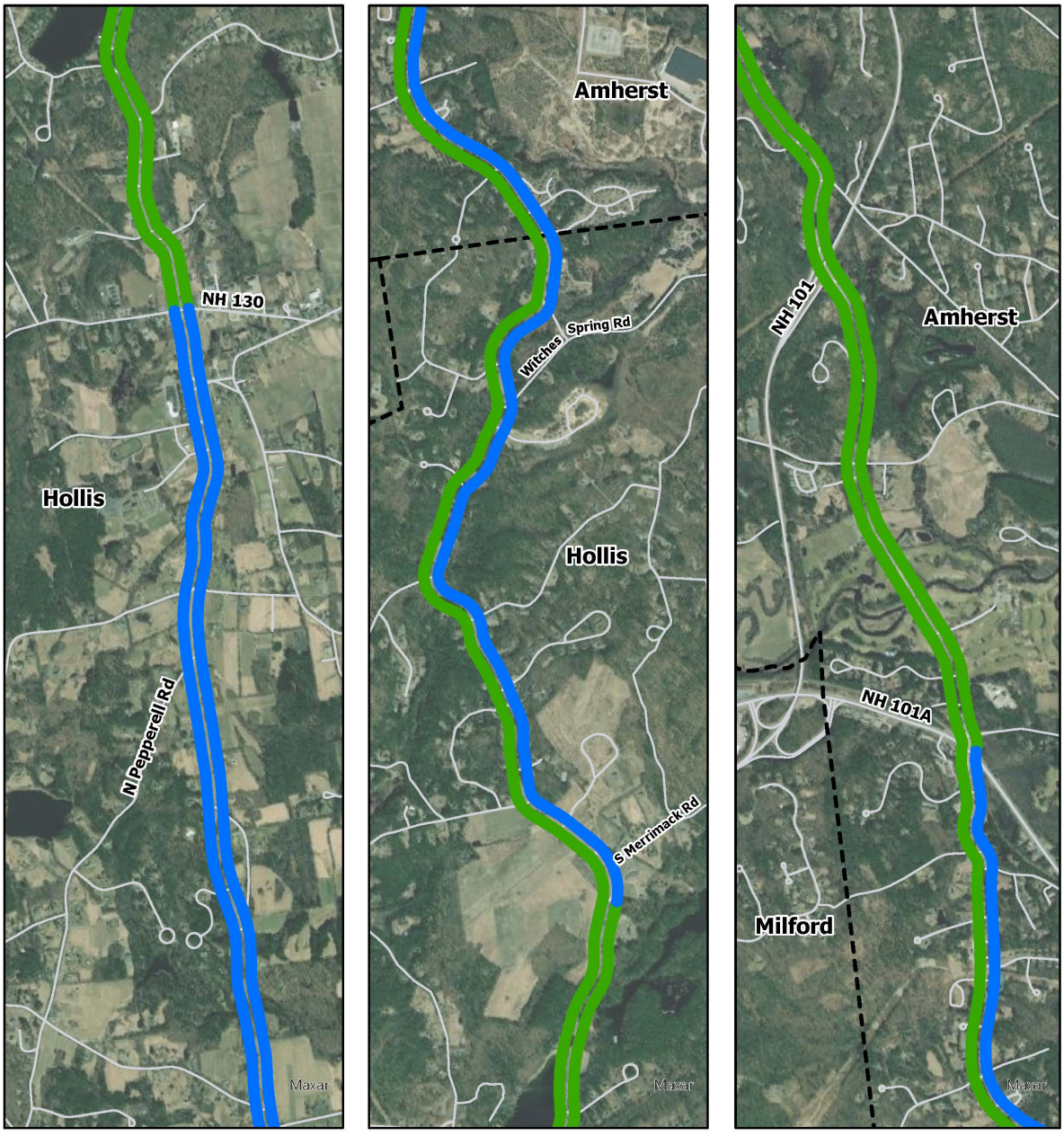
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC



NH 122

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

0.5 Miles

NRPC

MAIN STREET, NASHUA

Marking the center of Nashua's Downtown Central Business District, Main Street serves several vital transportation functions. As one of only two Nashua River crossings in the downtown area, the corridor services a large share of north-south vehicular traffic. Main Street also includes commercial uses and service centers that generate high levels of pedestrian activity and is located at the center of several densely populated adjoining neighborhoods. In addition to pedestrian traffic, the corridor also serves many public transit riders and includes several crosswalks. Parking is constrained in the area, like many downtown areas, and motorists encounter various conflicts, including fellow motorists parallel parking, crossing pedestrian traffic, cyclists and the loading and unloading of freight.

Additionally, the northernmost edge of the Main Street corridor is a key access point to the Canal Street and Bridge Street corridor, which links Nashua with Hudson via the Taylor Falls Bridge.

In recent years, the City of Nashua has completed a significant rehabilitation of pedestrian facilities along Main Street designed to improve navigability and comfort levels for pedestrians.

Some level of motor vehicle congestion should be expected given the mixed-use nature of Main Street.

Traffic Count Trends

Main Street at the turn of the millennium was a prime focus for congestion concerns, as AWDT was recorded at 37,000 in 1997. The Broad Street Parkway was the key action plan to relieving Main Street traffic. Certainly the opening of the parkway in late 2015 had a major impact on diverting traffic away from Library Hill, but economic factors have also played a role. Main Street AWDT now stands at 22,100 south of Amherst Street, representing a 3.1% annual decrease between 2008-2017. South of Kinsley Street the rate of decline is not as steep but still substantial at 1.9% annually.

Main Street, Nashua at Railroad Square

MAIN STREET, NASHUA WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
South of Amherst St (NH 101A)	Nashua	2008	29,400	2017	22,100	-3.1%
Over Nashua River	Nashua	2006	33,600	2017	24,150	-3.0%
North of Hollis St.	Nashua	2006	22,550	2018	14,950	-3.4%
South of Kinsley St.	Nashua	2007	21,250	2019	16,850	-1.9%
South of Lake St.	Nashua	2006	20,650	2018	16,400	-1.9%
North of East Dunstable Rd.	Nashua	2007	24,600	2019	23,150	-0.5%

Travel Time Index

Peak period congestion on Main Street during the years of highest traffic volumes was severe, with LOS F the prevailing condition. At present, south of Amherst Street the probe speed data indicate TTI around 1.5 for both peak hours. There is moderate congestion, but it is an acceptable level for an urban downtown arterial.

MAIN AND CONCORD STREETS, NASHUA PEAK PERIOD SPEED AND TRAVEL TIME INDEX

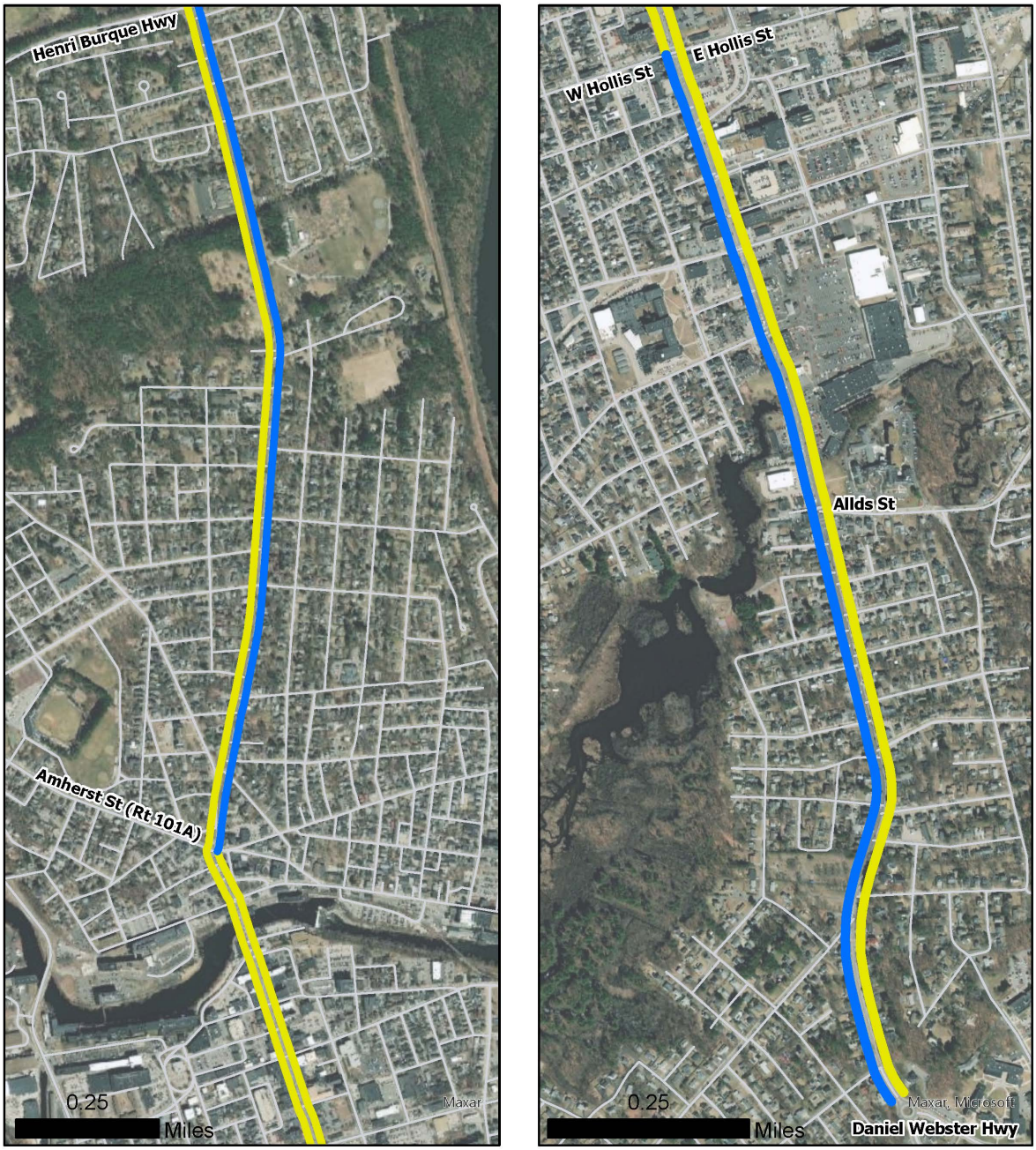
	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
H Burque Hwy to Amherst St	**30.6**	**1.15**	**28.4**	**1.23**	**27.4**	**1.28**	**26.6**	**1.31**
Amherst St to E/W Hollis St	**14.2**	**1.28**	**12.3**	**1.47**	**12.9**	**1.40**	**12.5**	**1.45**
E/W Hollis St to DW Hwy	**20.8**	**1.30**	**18.9**	**1.43**	**26.4**	**1.21**	**25.9**	**1.23**

Highway Capacity Utilization

In the vicinity of Library Hill and Railroad Square, Main Street's LOS is calculated at D. Further to the south LOS improves to C. Peak period operational conditions are much improved over that seen in the previous generation.

MAIN STREET, NASHUA CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
S of NH 101A Amherst St	Nashua	22,100	939	0.63	D	917	0.61	D
Over Nashua River	Nashua	24,150	1,026	0.68	D	1,002	0.67	D
N of Hollis St	Nashua	14,950	635	0.42	C	620	0.41	C
S of Kinsley St	Nashua	16,850	716	0.48	C	699	0.47	C
S of Lake St	Nashua	16,400	697	0.46	C	680	0.45	C
N of E Dunstable Rd	Nashua	23,150	984	0.47	C	961	0.46	C



Main St/Concord St

Travel Time Index

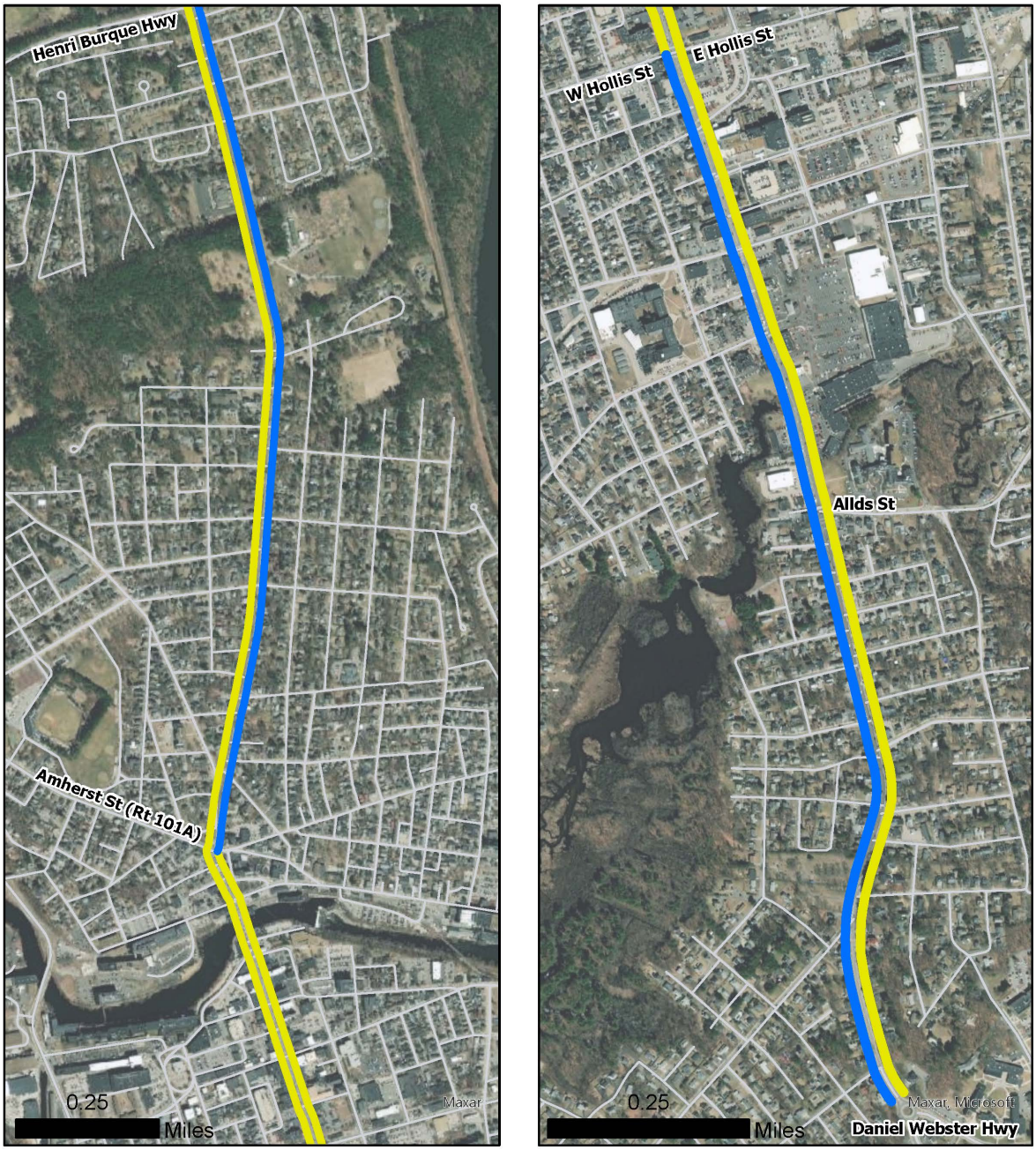
Weekday AM Peak Period

(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC



Main St/Concord St

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC

Highway Crash Statistics

Main Street experiences extremely high crash rates through the downtown core between NH 101A (Amherst Street) and Allds Street. The crash incidents were substantially reduced in 2020, when through traffic lanes were reduced from two to one per direction and on-street parking was eliminated. This was to accommodate outdoor dining. The lower 2020 crash rates are not included in the table below, as there is some question regarding the validity of data and in any event, the reduced lane condition may prove to be a temporary measure.

MAIN STREET, NASHUA YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
NH 101A - Hollis St	Nashua	0.55	19,500	3.91	61.67	15.75
Hollis St - Allds St	Nashua	0.60	14,100	3.09	56.33	18.24
Allds St - DW Highway	Nashua	0.77	23,100	6.49	17.67	2.72

Bicycle Level of Traffic Stress

North of Amherst Street, the LTS conditions on Concord Street are variable, beginning at 2.8 at the junction with Henri Burque Highway to Swart Street, then improving to 1.64 to Courtland Street. A wide paved shoulder is provided to facilitate bicycle travel. From Amherst Street (NH 101A) south, Main Street is solidly at 3.0 LTS.

CONCORD & MAIN STREETS, NASHUA BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
H Burque Hwy - Swart St.	12,050	0.623	2.80
Swart St - Courtland St	12,050	0.411	1.64
Courtland St - Amherst St	12,050	0.472	2.41
Amherst St - Canal St	22,100	0.095	3.00
Canal St - Temple St	24,150	0.189	3.00
Temple St - Kinsley St	14,950	0.336	3.00
Kinsley St - Allds St	16,850	0.522	3.00
Allds St = E. Dunstable Rd	23,150	0.537	3.00
E Dunst Rd - DWH Rotary	10,900	0.395	2.93

Congestion Management Strategies

- Intersection improvements and circulation modification at the junction of NH 101A/Main Street and Main Street/Canal Street.
- Construct a new interchange along the Broad Street Parkway to connect Franklin Street, which will further reduce Main Street traffic, moving it to the more uncongested Parkway (TYP, construction in 2028).
- Reconstruct the Main Street railroad crossing, to reduce the potential for derailments which would completely bottleneck Main Street traffic.

Analysis of CMP Major Investment Impacts

- Nashua Downtown Circulation Improvements – The CMAQ analysis for the project estimated about a 1% reduction in vehicle hours of travel resulting from the proposed circulation changes.
- Broad Street Parkway Interchange with Franklin Street – A 5% reduction from existing conditions in traffic on Main Street in the congested segment over the Nashua River is estimated. This would somewhat improve v/c from .67 to .64, while LOS would remain at D.

DANIEL WEBSTER HIGHWAY, NASHUA

Running from Tyngsborough, Massachusetts up to the junction of Main Street at a rotary located just north of the F.E.E. Turnpike Interchange 3, D.W. Highway in Nashua is the main thoroughfare for the South Nashua Commercial District in the southeastern portion of the city.

Access between the D.W. Highway and the Everett Turnpike is as follows:

- Partial access at Turnpike Exit 3; there is no Turnpike exit on the northbound side.
- Full access between the two roads at Turnpike Exit 2.
- Full access via Spit Brook Road at Turnpike Exit 1.
- Partial access at Route 3 Massachusetts Exit 36 (Middlesex Road); there is no southbound exit.

Between the rotary and the Exit 2 Turnpike interchange, DWH is two lanes of through traffic southbound and ranges from two to three lanes northbound. This segment is populated primarily with auto dealerships. Continuing south to the Spit Brook Road intersection, lanes continue to vary between two and three per direction. Further to the south of this intersection, lane geometry is a more consistent three-lane cross section in each direction, with turn lanes at the key intersections.

Daniel Webster Highway, South Nashua

Traffic Count Trends

The rate of decline seen on the southern half of Main Street continues south to Daniel Webster Highway. The highest count location, south of Spit Brook Road, fell to 27,400 in 2018 from 30,700 in 2012. Earlier data for that location does not exist but at the Massachusetts state line, AWDT declined from 24,200 in 1997 to 21,800 in 2006 prior to its 1% per year decrease to the present 19,380.

DANIEL WEBSTER HIGHWAY, NASHUA WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
South of Main St.	Nashua	2006	13,500	2018	12,600	-0.6%
South of FEE Turnpike Exit 3	Nashua	2006	20,200	2017	17,300	-1.4%
South of Sagamore Bridge	Nashua	2006	26,300	2018	21,700	-1.6%
South of Spit Brook Rd.	Nashua	2012	30,690	2018	27,400	-1.9%
Massachusetts State Line	Nashua	2006	21,800	2018	19,380	-1.0%

Travel Time Index

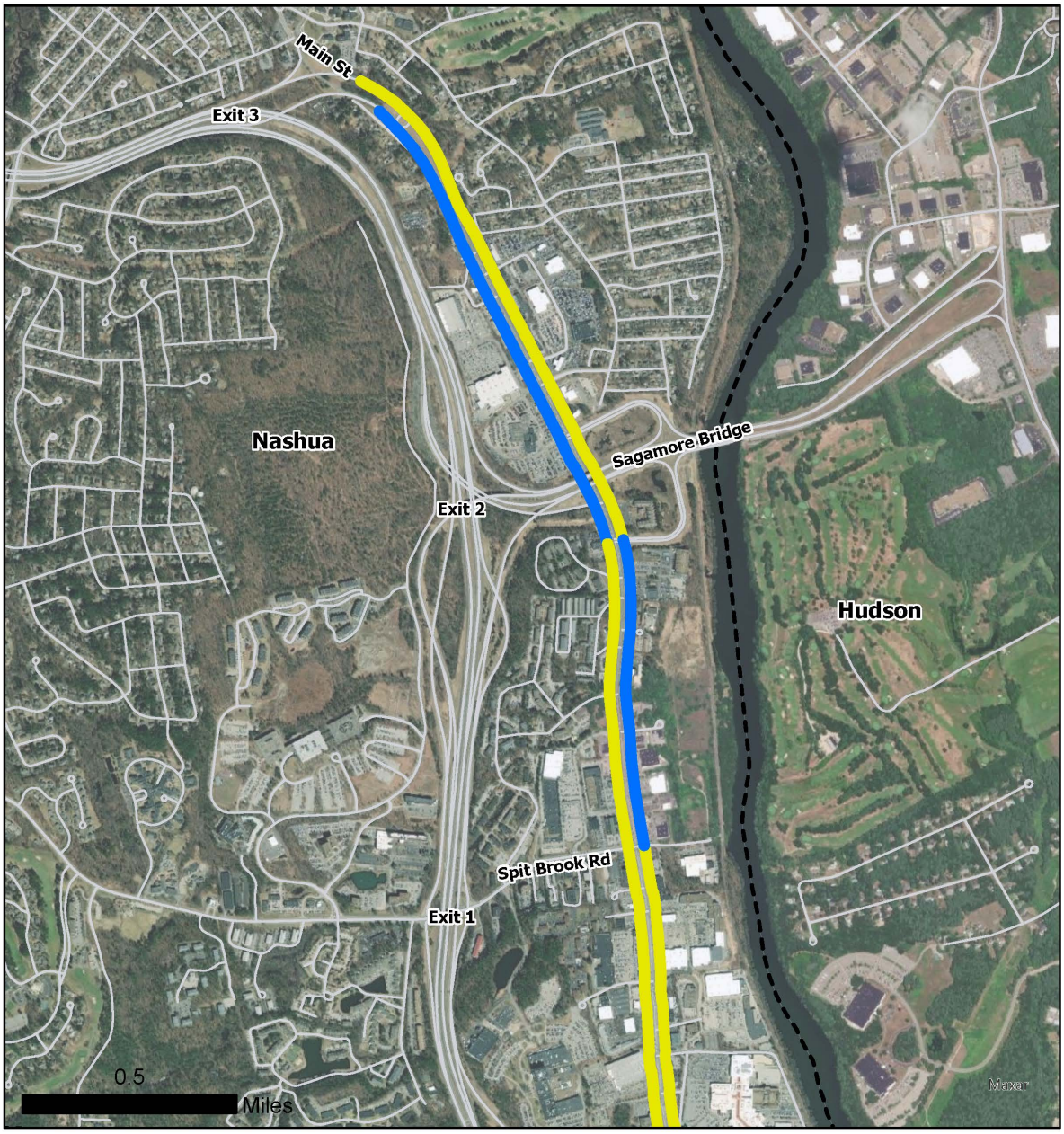
Despite declining levels of traffic there exist substantial levels of congestion, particularly during the PM peak period. During the night periods from which free-flow speeds are calculated, turns to and from driveways is a fraction of that during the congested periods. This is a primary contributor to slowing of traffic during peak times of day. Congestion is rated “heavy” for PM peak southbound drivers from the Sagamore Bridge Road to the Massachusetts line.

DANIEL WEBSTER HIGHWAY, NASHUA PEAK PERIOD SPEED AND TRAVEL TIME INDEX

	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
FEET Exit 3 to Sagamore Bridge	**27.0**	**1.34**	**28.2**	**1.28**	**29.5**	**1.15**	**27.5**	**1.24**
Sagamore Br to Spit Brook Rd	**25.1**	**1.20**	**21.5**	**1.40**	**24.9**	**1.29**	**21.0**	**1.53**
Spit Brook Rd to Mass SL	**18.4**	**1.31**	**17.0**	**1.42**	**21.6**	**1.30**	**17.8**	**1.58**

Highway Capacity Utilization

Generally, Daniel Webster Highway operates at LOS C, based the roadway capacity. There is some divergence from the travel time data, which is heavily influenced by activity to and from driveways during peak periods.

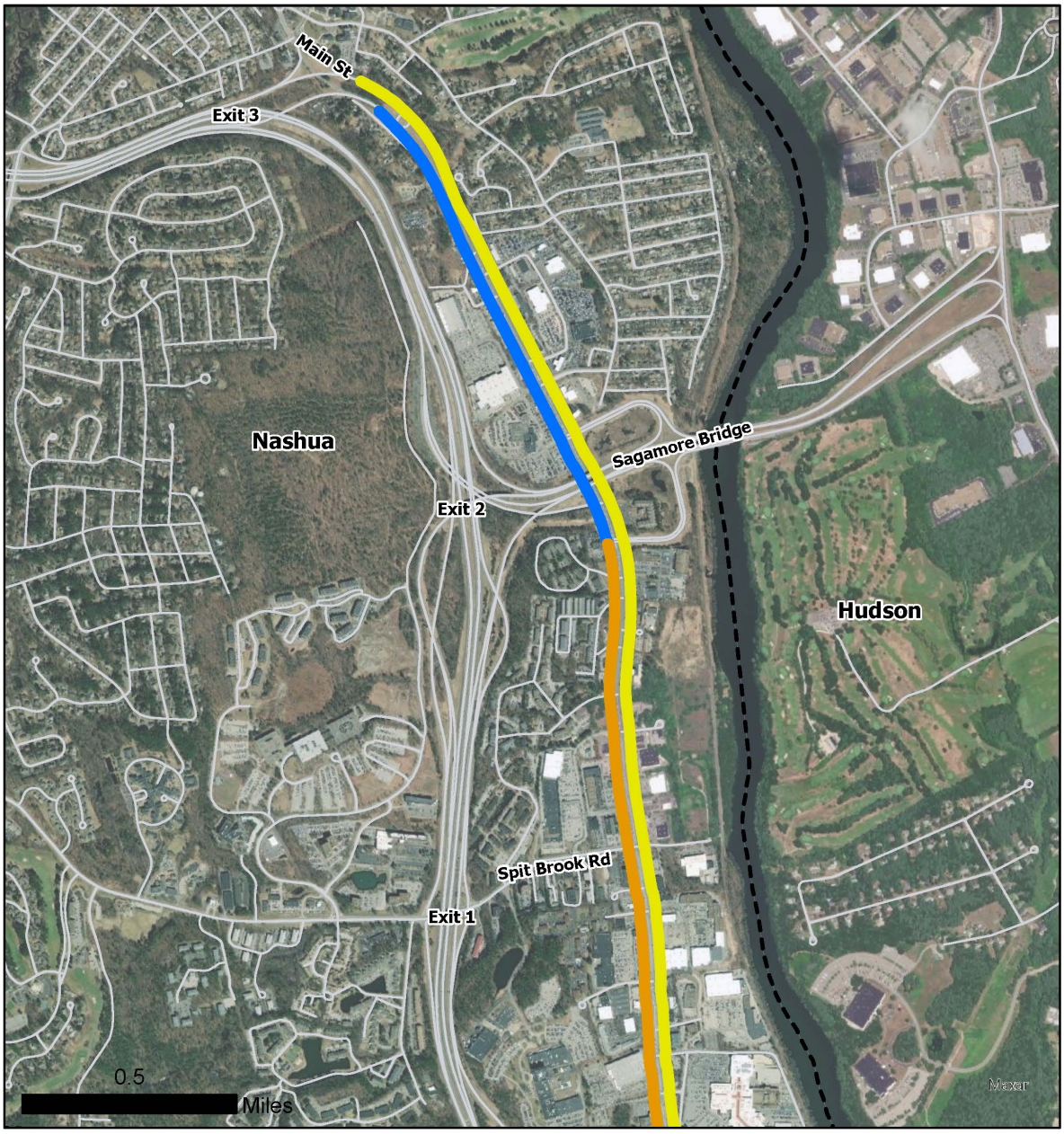


Daniel Webster Hwy
Travel Time Index
Weekday AM Peak Period
(7-9 AM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC



Daniel Webster Hwy

Travel Time Index

Weekday PM Peak Period

(4-6 PM)

- No Congestion (Less than 1)
- Minor Congestion (1-1.24)
- Moderate Congestion (1.25-1.49)
- Heavy Congestion (1.50-1.99)
- Severe Congestion (Greater than 2)

N

NRPC

DANIEL WEBSTER HWY, NASHUA CAPACITY UTILIZATION AND LEVEL OF SERVICE, 2020

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
S of Main St	Nashua	12,600	378	0.42	C	592	0.66	D
S of FEE Tnpk Exit 3	Nashua	17,300	519	0.35	B	813	0.54	C
S of Sagamore Bridge	Nashua	21,700	510	0.34	C	998	0.53	C
S of Spit Brook Rd	Nashua	27,400	548	0.24	C	1,219	0.54	C
Massachusetts SL	Nashua	19,380	339	0.15	C	891	0.40	C

Highway Crash Statistics

The segment of Daniel Webster Highway south of Spitbrook Road to the Massachusetts line has the highest crash rate, 24.32, of all arterials in the region. The segment to the north from Sagamore Bridge Road to Spitbrook Road has about twice the average crash rate at 8.56/MVM. These rates highlight the results of high-density strip commercial development with minimal driveway access controls.

DANIEL WEBSTER HIGHWAY, NASHUA YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Main St - Sagamore Bridge Rd	Nashua	1.25	15,500	7.07	21.75	3.08
Sagamore Br Rd - Spitbrook Rd	Nashua	0.86	18,700	5.87	50.25	8.56
Spitbrook Rd - Mass SL	Nashua	0.71	16,900	4.38	106.50	24.32

Bicycle Level of Traffic Stress

There are segments of Daniel Webster Highway that are LTS rated favorable for bicyclists, the first being from the Pike Street Rotary to the Sagamore Bridge north ramp. The following section to Autumn Leaf Drive is somewhat lower rated but improves again to Royal Crest Drive. From there to the Massachusetts line, LTS averages 3.5, not convenient or perceived as safe for most bicyclists.

DANIEL WEBSTER HIGHWAY, NASHUA BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Main St Rotary - Pike St Rotary	12,600	0.400	2.97
Rotary - Sagamore Br N Ramp	17,300	0.836	2.15
Sag Br N Ramp - Autumn Leaf	21,700	0.352	2.92
Autumn Leaf - Royal Crest Dr	21,700	0.272	2.00
Royal Crest Dr - Spit Brook Rd	21,700	0.358	3.48
Spit Brook Rd - Mass SL	19,400	0.708	3.56

Congestion Management Strategies

- Implement a coordinated signal management system along Daniel Webster Highway. Preliminary work would be a traffic analysis to evaluate the current level of optimization of signals along the corridor.
- Implement non-motorized travel safety improvements along DW Highway (TYP, construction in 2027).

GREELEY STREET & CONTINENTAL BOULEVARD

Greeley Street in Merrimack provides a short arterial link from US 3 Daniel Webster to the F.E.E. Turnpike at Exit 11. Continuing southwesterly as Continental Boulevard, it intersects with Industrial Drive, then terminates at an intersection with NH 101A. South of its intersection with Camp Sargent Road in the north, Continental Boulevard was constructed as a bypass for that road, intended to accommodate heavy commuter traffic to businesses on Industrial Drive. Two lanes of travel per direction are provided from its southern intersection with Camp Sargent Road. Wide paved shoulders are prevalent along most of the roadway but narrow north of Cambridge Drive.

Traffic Count Trends

Uncharacteristic of most Nashua area roadways, Continental Boulevard has experienced significant traffic volume increases, with a 2.8% per year rate observed west of Amherst Road. The Greeley Street section appears to have experienced little growth; however, the short distance between US 3 and the Turnpike ramps makes it difficult to obtain accurate counts in this location, as stationary vehicles may block adjacent lane traffic from being properly counted.

Traffic Incident on Greeley Street, a Key Link between US 3 and the F.E. Everett Turnpike

GREELEY ST/CONTINENTAL BLVD, MERRIMACK WEEKDAY TRAFFIC COUNT TRENDS

Location	Municipality	Prior Count	Prior AWDT	Current Count	Current AWDT	Annual % △
West of US 3	Merrimack	2008	23,370	2017	23,650	0.1%
West of Amherst Rd	Merrimack	2007	10,040	2019	13,940	2.8%
North of Contra Way	Merrimack	2008	14,900	2017	18,140	2.2%
East of Naticook Rd	Merrimack	2007	14,460	2019	17,990	1.8%
North of NH 101A	Merrimack	2007	18,370	2019	21,690	1.4%

Travel Time Index

Due to the series of traffic signals and elaborate interchange configuration with the turnpike, Greeley Street is very congested during peak periods, particularly during the PM hours when average speeds drop to the 16-17 mph range for each direction. Vehicles attempting to access the Turnpike during this period are observed to queue back to US 3, adding to that bottleneck. To the west where the roadway

continues as Continental Drive congestion levels drop considerably and are virtually non-existent to the west of Industrial Drive.

GREELEY ST/CONTINENTAL BLVD PEAK PERIOD SPEED AND TRAVEL TIME INDEX

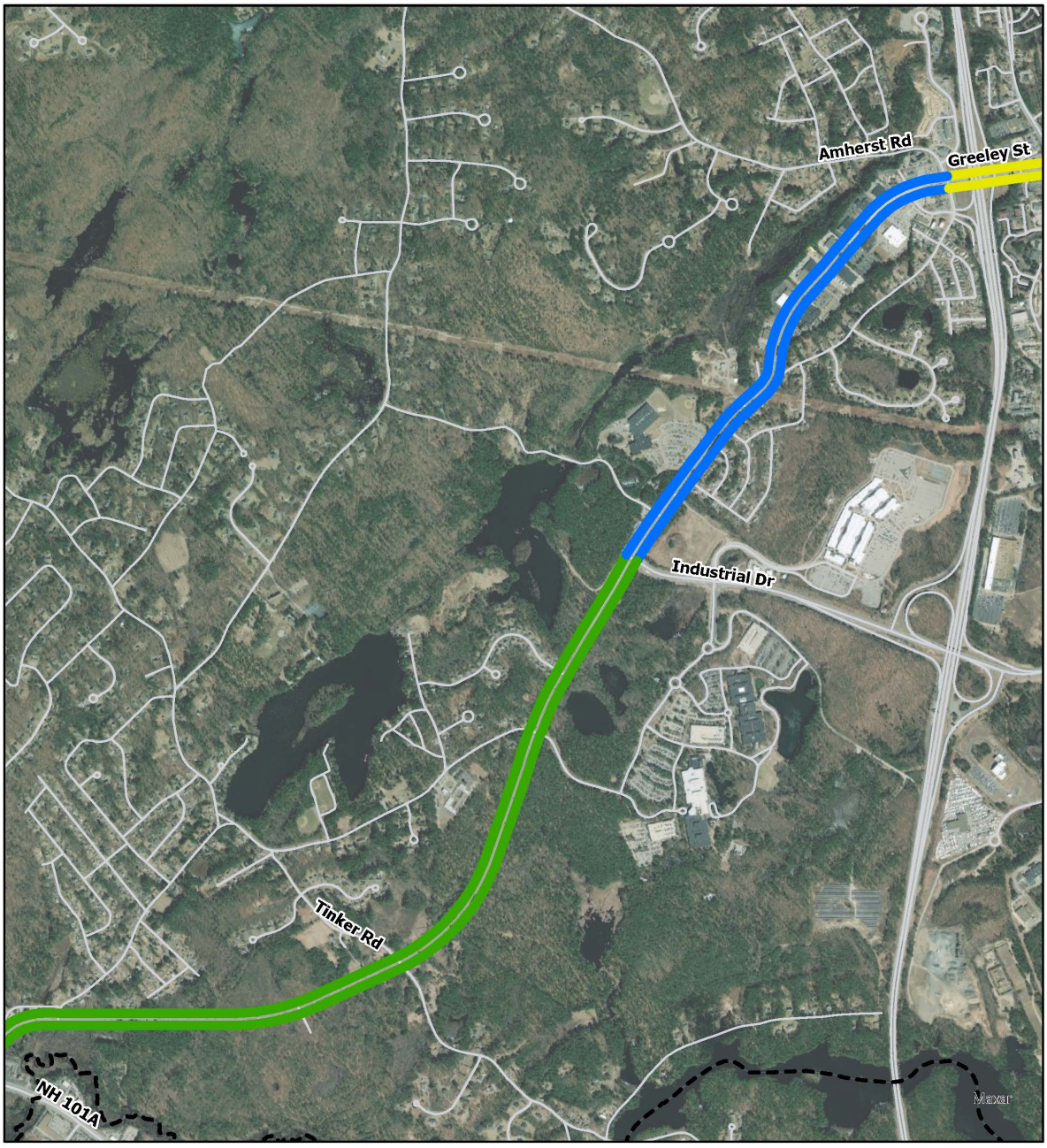
	Northbound				Southbound			
	AM Peak (7-9)		PM Peak (4-6)		AM Peak (7-9)		PM Peak (4-6)	
	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind	Speed	TT Ind
Greeley St. to Amherst Rd.	**20.6**	**1.36**	**17.1**	**1.64**	**19.8**	**1.41**	**16.4**	**1.71**
Amherst Rd. to Industrial Dr.	**28.6**	**1.22**	**28.9**	**1.21**	**34.1**	**1.03**	**32.7**	**1.07**
Industrial Dr. to NH 101A	**39.1**	**0.90**	**37.3**	**0.94**	**37.9**	**0.92**	**34.3**	**1.02**

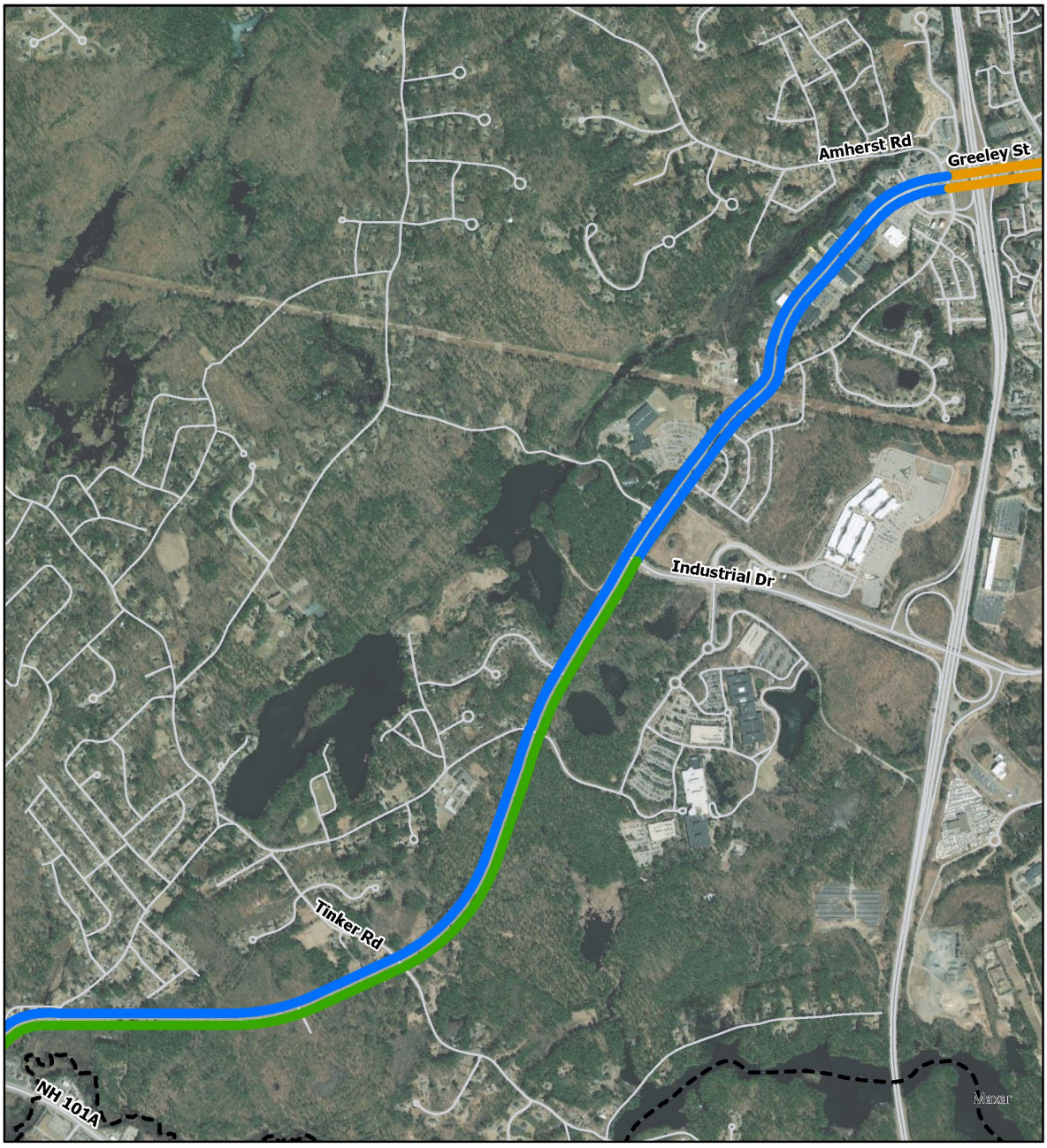
Highway Capacity Utilization

Level of service E prevails along Greeley Street, which mirrors the high TTI noted along this corridor segment. Elsewhere, the corridor operates at an acceptable level of service. While there is a decline to LOS D for the approach to NH 101A, this is more a function of the reduced capacity imposed by the signals and heavy traffic on the latter during the PM peak.

GREELEY ST/CONTINENTAL BLVD, MERRIMACK CAPACITY UTILIZATION AND LEVEL OF SERVICE

Location	Municipality	2019 AWDT	2019 AM Pk	AM V/C	AM LOS	2019 PM Pk	PM V/C	PM LOS
US 3 to FEET Int. 11	Merrimack	23,650	851	0.57	C	1,265	0.84	E
West of Amherst Rd	Merrimack	13,940	502	0.33	C	746	0.50	C
North of Contra Way	Merrimack	18,140	653	0.31	B	970	0.46	C
East of Naticook Rd	Merrimack	17,990	648	0.46	C	962	0.69	D
North of NH 101A	Merrimack	21,690	781	0.59	C	1,160	0.74	D


Amherst Rd
Greeley St
Industrial Dr
Tinker Rd
NH 101A
Continental Blvd
Travel Time Index
Weekday AM Peak Period
(7-9 AM)
No Congestion (Less than 1)
Minor Congestion (1-1.24)
Moderate Congestion (1.25-1.49)
Heavy Congestion (1.50-1.99)
Severe Congestion (Greater than 2)
N
0.5
Miles
NRPC


Amherst Rd
Greeley St
Industrial Dr
Tinker Rd
NH 101A
Continental Blvd
Travel Time Index
Weekday PM Peak Period
(4-6 PM)
No Congestion (Less than 1)
Minor Congestion (1-1.24)
Moderate Congestion (1.25-1.49)
Heavy Congestion (1.50-1.99)
Severe Congestion (Greater than 2)
N
0.5
Miles
NRPC

Highway Crash Statistics

Greeley St between US 3 and the FEE Turnpike ramps has a relatively high crash rate of 4.47 per MVM, which is 53% higher than the regional arterial average. Bottlnecked conditions during peak periods and queuing of traffic back into US 3 are lirkley the primary contributors to this high rate.

GREELEY ST/CONTINENTAL BLVD, MERRIMACK YEARLY CRASH RATES (per million vehicle miles)

Highway Segment		Length	AWDT	MVM/ Year	Ave. Yrly. Crashes	Crashes/ MVM
Greeley St	Merrimack	0.40	15,700	2.29	10.25	4.47
Continental Blvd	Merrimack	3.86	16,800	23.67	38.75	1.64

Bicycle Level of Stress

The majority of the Greeley Street-Continental Boulevard corridor is rated 3.0, with two separated segments rated 2.0. The more favorably rated segments appear to be a function of wider striped shoulders to accommodate bicyclists.

GREELEY ST/CONTINENTAL BLVD BICYCLE LEVEL OF TRAFFIC STRESS

Roadway Segment	AWDT	Miles	LTS
Greeley St, US 3 - Amherst Rd	16,900	0.277	3.00
Continental Blv, Amherst Rd - Tallant Rd	13,950	0.837	3.00
Tallant Rd - Camp Sargent Rd	18,150	1.021	2.00
Camp Sargent Rd - Naticook Rd	18,000	1.650	3.00
Naticook Rd - NH 101A	21,700	0.287	2.00

Congestion Management Strategies

- Evaluate the three sets of traffic signals in close proximity along Greeley Street and Continental Blvd. and follow up with optimization strategies.
- Widen striped shoulders where possible to improve LTS for safe bicycle travel.
- Seek funding to implement transit along US 3 in Merrimack following up on the 2019 Nashua Transit Expansion Study.

TRANSIT CONGESTION MEASURES AND MITIGATION STRATEGIES

This section looks at tools of measuring levels of congestion present within the transit system that might impact passengers' level of comfort and travel times. The expansion of transit services to relieve highway congestion has been addressed in the previous section.

TRANSIT SYSTEM RELIABILITY AND CAPACITY

Ridership & Capacity Utilization

An analysis of pre-COVID NTS ridership patterns indicates that ridership is heaviest surrounding major commercial destinations, particularly along Route 101A, the Daniel Webster Highway and the retail centers located along Broad Street at Exit 6. Routes 2, 2A, 6, and 6A, which serve the Route 101A and Daniel Webster Highway corridors account for approximately 52 percent of all NTS ridership.

Weekday (M-F) daytime service (approximately 6:15am-6:15pm) accounts for 83% of total system ridership. Saturday service (approximately 9:00am-9:45pm) accounts for 10% of total system ridership. Weekday (M-F) evening (approximately 6:45pm-10:45pm) accounts for 7% of total system ridership.

The following table provides an indicator of seating capacity utilization by NTS for the morning peak, midday, afternoon peak and night periods. The period capacity is calculated by multiplying the number of runs for the period by the number of seats for that route. It is recognized that there may be peak runs within a time period for which the occupancy rate will be higher or lower than the period average. The other variable contributing to capacity utilization is the percent of route travelled by an average passenger. NTS estimated that 60% of a route would be a reasonable estimate.

As the tables indicate, no routes are reaching near full capacity conditions for any time period. Again, it may be that a particular run during peak commute hours may be significantly higher and this has been reported by NRPC staff who have conducted on-board passenger surveys. The highest approximate capacity utilization that has been reported informally for a single run is around 75%.

AVERAGE CAPACITY UTILIZATION BY NTS BUS ROUTE BY TIME PERIOD

Rte #	Route Name	6-9 AM	Cap Util	9 AM-3 PM	Cap Util	3-6 PM	Cap Util	6 PM to 10	Cap Util
1	French Hill/Greeley Park	22	16%	41	15%	18	13%	--	--
2	Amherst St/Westside Plaza	50	29%	103	29%	43	25%	--	--
2A	Amherst St/Westside Plaza	60	34%	106	30%	25	15%	--	--
4	Harris Rd/Main Dunstable	17	12%	35	12%	16	12%	--	--
5	Lake St/Northeastern Blvd	36	21%	60	17%	20	11%	--	--
6	South End/Pheasant Lane	46	27%	114	41%	61	44%	--	--
6A	South End/Pheasant Lane	61	35%	106	30%	30	17%	--	--
7	Crown Hill/Spring St	18	13%	61	22%	24	17%	--	--
8	W Hollis /Nashua Mall	27	19%	63	22%	28	20%	--	--
9	Broad St/Nashua High North	29	21%	57	20%	16	11%	--	--
10	Walmart (Westside to end)	4	3%	13	5%	5	4%	4	4%
	North End Night	--	--	--	--	--	--	41	37%
	Central Night	--	--	--	--	--	--	15	13%
	South End Night	--	--	--	--	--	--	58	41%
Total - All Routes		370	23%	758	24%	287	18%	118	21%

Nashua Transit System On-Time Performance

NTS on-time performance evaluation is based on data provided by NTS staff for a single week in October 2019. Departure times were noted for key stops along routes for all runs throughout each day of the week and noted next to the bus schedule departure time. NRPC staff calculated delay that was incurred, or set delay to zero for leaving on time or in advance of the scheduled departure time (the latter was recorded on several occasions). Averages were compiled for weekday time periods (AM peak, midday, PM peak), for night service routes and for Saturdays.

The following routes experienced average delays in excess of five minutes for the time periods specified:

- Route 2, PM Peak – 7.22 minutes max delay
- Route 2A, PM Peak – 8.30
- Route 4, PM Peak – 5.44
- Route 6, PM Peak – 6.90
- Route 6A, PM Peak – 6.83
- Route 8, PM Peak – 6.64
- Night Central, Saturday – 6.61
- Night North, Saturday – 5.65
- Night South, Saturday – 5.44
- Route 10A, Saturday – 6.53

The complete data set for on-time performance for each route for weekdays by time period and Saturdays is provided in the following tables.

Average Delay (Minutes) at NTS Primary Bus Stops

Route 1 **French Hill/Greeley Park**	Transit Center	Temple St/ Senior Ctr	Chandler & Lock Sts	Concord St @ Greeley Park	Manchester & Charlotte Sts
Weekly Average	**1.69**	**2.38**	**2.30**	**1.84**	**2.25**
Weeday Average	**1.64**	**2.37**	**2.28**	**1.82**	**2.23**
AM Peak (6-9 AM)	1.47	1.80	2.07	1.72	2.04
Midday (9-3:30 PM)	1.63	2.43	2.17	1.72	2.09
PM Peak (3:30-6:30 PM)	1.86	2.85	2.76	2.19	2.77
Saturday Average	**2.02**	**2.45**	**2.48**	**1.97**	**2.45**

Route 2 **Amherst St/Westside Plaza**	Transit Center	Manchester & Charlotte Sts	Somerset Plaza	Westside Plaza	Amherst St at Honda
Weekly Average	**1.49**	**5.55**	**3.30**	**5.04**	**4.33**
Weeday Average	**1.56**	**5.82**	**3.52**	**5.16**	**4.52**
AM Peak (6-9 AM)	1.06	6.33	3.74	4.01	1.90
Midday (9-3:30 PM)	1.70	5.64	2.94	4.51	3.83
PM Peak (3:30-6:30 PM)	1.77	5.69	4.44	7.50	8.30
Saturday Average	**1.00**	**3.64**	**1.66**	**4.14**	**2.97**

Route 2A **Amherst St/Westside Plaza**	Transit Center	Manchester & Charlotte Sts	Somerset Plaza	Westside Plaza	Amherst St at Honda
Weeday Average	**1.65**	**5.90**	**3.48**	**4.50**	**3.96**
AM Peak (6-9 AM)	1.56	5.58	2.89	3.20	2.21
Midday (9-3:30 PM)	1.59	5.79	3.38	4.41	3.77
PM Peak (3:30-6:30 PM)	2.00	6.74	4.68	6.77	7.22

Route 4 **Harris Rd/Main Dunstable**	Transit Center	Harris Rd @ Greenbriar	Conant/ Dow Jones	M Dunstable/ Northeast Blvd	Kinsley @ St. Joseph
Weekly Average	**2.01**	**2.92**	**3.08**	**3.01**	**3.41**
Weeday Average	**2.02**	**2.99**	**3.15**	**3.06**	**3.45**
AM Peak (6-9 AM)	1.68	2.05	2.27	2.25	2.52
Midday (9-3:30 PM)	1.80	2.52	2.62	2.51	2.92
PM Peak (3:30-6:30 PM)	2.82	4.88	5.10	4.97	5.44
Saturday Average	**1.93**	**2.41**	**2.54**	**2.65**	**3.11**

Route 5 **Lake St/Northeastern Blvd**	Transit Center	Pine St. & Arel Manor	Fairgrounds School	Harris Rd @ Greenbriar	Kinsley @ St. Joseph
Weekly Average	**1.71**	**3.54**	**4.19**	**3.86**	**3.57**
Weeday Average	**1.81**	**3.69**	**4.37**	**4.07**	**3.87**
AM Peak (6-9 AM)	1.53	3.47	3.92	3.76	3.75
Midday (9-3:30 PM)	1.99	3.92	4.70	4.38	4.20
PM Peak (3:30-6:30 PM)	1.67	3.36	4.04	3.68	3.22
Saturday Average	**0.98**	**2.44**	**2.93**	**2.36**	**1.37**

Average Delay (Minutes) at NTS Primary Bus Stops

Route 6	Transit	E Dunstable	Spit Brook Rd	Royal Ridge	Pheasant	Rivier
So End/Pheasant Ln Mall	Center	& Harris Rds	Shelter	Center	Lane Mall	University
Weekly Average	**2.44**	**4.86**	**3.03**	**3.80**	**2.19**	**4.31**
Weeday Average	**2.64**	**4.99**	**3.19**	**3.88**	**2.14**	**4.23**
AM Peak (6-9 AM)	1.85	4.32	2.55	2.67	1.18	2.26
Midday (9-3:30 PM)	1.72	4.04	2.17	2.84	1.33	3.91
PM Peak (3:30-6:30 PM)	5.39	7.69	5.99	7.32	4.84	6.90
Saturday Average	**1.06**	**3.89**	**1.91**	**3.23**	**2.55**	**4.86**

Route 6A	Transit	Rivier	Royal Ridge	Pheasant	200 Innovative	E Dunstable/
So End/Pheasant Ln Mall	Center	University	Center	Lane Mall	Way	Timberline
Weeday Average	**1.85**	**4.44**	**3.81**	**2.57**	**2.48**	**4.72**
AM Peak (6-9 AM)	0.87	3.14	2.23	1.33	0.57	3.22
Midday (9-3:30 PM)	1.67	4.56	3.77	2.63	2.67	4.76
PM Peak (3:30-6:30 PM)	3.95	5.97	6.30	4.24	4.72	6.83

Route 7	Transit	Temple St @	Arlington/	Marketplace	Spring St
Crown Hill/Spring St	Center	Senior Center	Underhill	at Shaws	at Post Office
Weekly Average	**1.59**	**2.55**	**2.91**	**3.07**	**3.24**
Weeday Average	**1.74**	**2.71**	**3.03**	**3.23**	**3.43**
AM Peak (6-9 AM)	1.00	1.60	2.14	2.24	1.59
Midday (9-3:30 PM)	1.74	2.90	3.16	3.81	4.15
PM Peak (3:30-6:30 PM)	2.50	3.42	3.66	3.08	3.83
Saturday Average	**0.48**	**1.34**	**2.02**	**1.81**	**1.79**

Route 8	Transit	Gatewood		11 Riverside	W Hollis St	Ledge St -
W Hollis St/Nashua Mall	Center	Manor	Hannafords	Shelter	at J-Dons	Houde
Weekly Average	**2.51**	**4.21**	**2.60**	**3.11**	**3.50**	**2.84**
Weeday Average	**2.75**	**4.52**	**2.83**	**3.35**	**3.87**	**3.19**
AM Peak (6-9 AM)	1.78	3.75	1.46	2.17	2.52	2.77
Midday (9-3:30 PM)	2.45	3.94	2.33	2.65	3.16	2.32
PM Peak (3:30-6:30 PM)	4.31	6.47	5.18	5.92	6.64	5.34
Saturday Average	**0.68**	**1.86**	**0.88**	**1.36**	**0.77**	**0.27**

Route 9	Transit	Pine Hill	Hollis	Nashua High		Broad St Pky
Broad St/Nashua High Nortl	Center	Gardens	Crossing	School North	Hannafords	at Millyard
Weekly Average	**1.99**	**2.55**	**2.52**	**1.28**	**2.40**	**1.91**
Weeday Average	**1.95**	**2.42**	**2.34**	**1.17**	**2.16**	**1.52**
AM Peak (6-9 AM)	1.26	1.32	1.69	0.66	2.23	0.68
Midday (9-3:30 PM)	2.02	2.40	2.31	1.13	1.95	1.64
PM Peak (3:30-6:30 PM)	2.75	4.12	3.39	2.05	2.79	2.33
Saturday Average	**2.32**	**3.59**	**3.92**	**2.10**	**4.24**	**4.86**

Average Delay (Minutes) at NTS Primary Bus Stops

Night Central	Transit Center	Arlington - Underhill	Gardens	Hollis Crossing	Hannafords	Kinsley @ St. Joseph
Weekly Night	1.67	1.50	3.71	3.72	3.89	4.59
Weeday Night	1.66	1.40	3.09	3.26	3.57	4.16
Saturday Night	1.73	1.95	6.62	5.91	5.41	6.61

Night North	Transit Center	Temple St/ Senior Ctr	Chandler & Lock Sts	Somerset Plaza	Westside Plaza	Amherst St Honda
Weekly Night	1.61	3.50	3.11	1.62	1.59	3.87
Weeday Night	1.24	3.09	2.63	1.28	1.30	3.38
Saturday Night	2.94	4.97	4.85	2.83	2.65	5.65

Night South	Transit Center	Spit Brook Rd Shelter	Royal Ridge Center	Pheasant Lane Mall	Rivier University
Weekly Night	1.02	2.58	3.28	2.54	3.57
Weeday Night	0.85	2.39	3.05	2.04	3.04
Saturday Night	1.63	3.30	4.11	4.35	5.49

Route 10 Walmart -Westside Plaza	Westside Plaza	TGI Fridays (Amherst)	Walmart (Amherst)	Petco (Amherst)
Weeday Average	**1.16**	**2.95**	**1.37**	**1.02**
AM Peak (6-9 AM)	1.65	3.53	0.55	0.52
Midday (9-3:30 PM)	0.77	2.45	1.04	0.80
PM Peak (3:30-6:30 PM)	1.62	3.54	2.17	1.53

Route 10A Walmart - Downtown	Transit Center	Somerset Plaza	TGI Fridays (Amherst)	Walmart (Amherst)	Petco (Amherst)	Westside Plaza
Saturday Average	1.79	5.11	6.42	6.53	6.10	5.72

Park-and-Ride Capacity Utilization

The park-and-ride lot on Southwood Drive off the Turnpike Exit 8 in Nashua services Boston Express riders to Boston. The most recent parking survey was conducted in March 2020, just a few weeks prior to the COVID shutdown of Boston Express service. There were 344 vehicles parked in the 377-space lot, for a capacity utilization of 91%. Should we return to this rate following full recovery from the traffic reduction impacts of COVID, additional expansion of this lot or construction of one in south Nashua may be needed to accommodate any expansion of existing services or implementation of new ones.

Congestion Management Strategies

- Continue to monitor capacity utilization rates and conduct on an individual run basis, to identify specific run peaking rates of use of seating capacity.

- Establish system performance measures for on-time performance and periodically monitor, with emphasis on delays that exceed schedule times by 5 minutes or more. Modify route schedules as necessary to maintain good on-time performance.
- Consider construction of a park-and-lot in south Nashua, which would provide a convenient parking location for many potential users of transit expansion services mentioned in this document.

COVID-19 TRAFFIC CONGESTION IMPACTS

The sudden and dramatic reduction in economic activity that occurred in March 2020 due to the COVID-19 virus had a commensurate impact on transportation activity. On the negative side, many businesses were forced to close for a time and some were unable to recover, some shutting their doors forever. The pandemic also had a negative impact on transit systems nationwide, most critically those in large metropolitan areas, where commuters are very dependent on transit services. In Nashua, NTS service was temporarily suspended and restored over time to full service, although at reduced vehicle capacity.

A silver lining of the pandemic was that many employees were given their first opportunity to telecommute, opening the door to this very underutilized tool to deal with roadway congestion.

HIGHWAY TRAFFIC

There are three permanent traffic count locations in the NRPC region which provide a good barometer for measuring the magnitude of the COVID pandemic on vehicular activity and the degree to which traffic has recovered during various phases, including the second wave that began in fall of 2020 and the current period, where an increasing portion of the population is being vaccinated for the virus.

During the first full month of COVID lockdown in April 2020, traffic on the FEE Turnpike at the Bedford toll declined nearly 54% from year-to-year. By September, traffic had recovered to within 19% of the 2019 volume, but the second pandemic wave caused traffic decline to fall back to the 25% range. With the vaccination program well under way in May 2021, traffic levels have progressively recovered to 12% below the 2019 weekday average.

F.E. Everett Turnpike AWDT at Bedford Toll

			% Change		% Change
	2019	2020	2019-20	2021	2019-21
Jan	48,703	50,759	4.2%	36,955	-24.1%
Feb	49,853	50,019	0.3%	36,655	-26.5%
Mar	51,219	37,868	-26.1%	40,048	-21.8%
Apr	51,134	23,661	-53.7%	41,591	-18.7%
May	53,981	31,533	-41.6%	44,945	-16.7%
Jun	55,980	39,631	-29.2%	48,269	-13.8%
Jul	56,643	43,826	-22.6%	50,888	-10.2%
Aug	58,446	45,750	-21.7%	50,771	-13.1%
Sep	55,016	44,671	-18.8%	48,625	-11.6%
Oct	54,775	43,354	-20.9%	48,940	-10.7%
Nov	52,255	39,107	-25.2%	45,985	-12.0%
Dec	47,526	37,219	-21.7%		

The Turnpike between Exits 5 and 6 in Nashua has historically been the highest traffic volume location along the expressway. From an immediate 50% loss at the outset of the pandemic, traffic had recovered to within 16% before the second wave caused a relapse to a 23% decline. A sharp traffic recovery began in March 2021 has continued, with the July volume recorded at about 9.5% below the 2019 AWDT. There has been a disruption in traffic data at this location since that time.

F.E. Everett Turnpike AWDT, Exit 5 to 6, Nashua

	Average Weekday				% Change
	2019	2020	Change	2021	2019-21
Jan	126,824	130,815	3.1%	100,293	-20.9%
Feb	126,299	127,763	1.2%	97,234	-23.0%
Mar	132,005	101,215	-23.3%	109,215	-17.3%
Apr	134,608	66,748	-50.4%	113,906	-15.4%
May	140,195	87,390	-37.7%	122,081	-12.9%
Jun	141,441	106,425	-24.8%	125,395	-11.3%
Jul	138,897	112,131	-19.3%	125,657	-9.5%
Aug	140,866	114,970	-18.4%	NA	
Sep	138,966	115,548	-16.9%	NA	
Oct	138,736	116,072	-16.3%	NA	
Nov	136,376	108,140	-20.7%	NA	
Dec	124,081	104,296	-15.9%		

US 3 north of Bedford Road in Merrimack experienced less of a decline than the Turnpike locations and as of October 2021, is within 6% of the 2019 volume.

	Average Weekday				% Change
	2019	2020	Change	2021	2019-21
Jan	16,273	16,247	-0.2%	13,606	-16.4%
Feb	15,972	15,743	-1.4%	13,232	-17.2%
Mar	16,687	13,257	-20.6%	14,835	-11.1%
Apr	17,054	9,882	-42.1%	15,512	-9.0%
May	17,472	12,678	-27.4%	16,648	-4.7%
Jun	17,949	14,398	-19.8%	16,947	-5.6%
Jul	17,104	14,801	-13.5%	16,313	-4.6%
Aug	17,550	14,980	-14.6%	16,205	-7.7%
Sep	17,494	15,421	-11.8%	16,443	-6.0%
Oct	17,103	14,770	-13.6%	16,282	-4.8%
Nov	16,728	14,368	-14.1%	15,774	-5.7%
Dec	15,470	13,853	-10.5%		

TRANSIT RIDERSHIP

Nashua Transit System

The COVID emergency resulted in a suspension of NTS fixed route service on March 25, 2020. On-demand service was continued for essential workers only. Resumption of service was undertaken through the following phases:

Phase 1 began on June 8 with 4 daytime buses only: North, South, East, and West operating Monday through Saturday.

Phase 2 began July 20, adding buses for the daytime service and restoring the night service.

Phase 3/Pilot – began August 24 and restored all service on day/Night/Saturday routes but did change some routing and time changes from Pre-COVID.

During the pandemic NTS reevaluated the performance of bus routes and redesigned the lowest performing routes to provide improved service with reduced travel times and greater efficiency, resulting in a new set of routes and schedules. The existing service schedule began on January 31, 2021.

Prior to the COVID pandemic, NTS weekday fixed-route ridership was reported at 1,507. When limited service resumed in June 2020 average weekday trips were 366, down 75% from normal levels. As of April, weekday ridership has recovered to 902, which is still 40% off the pre-COVID trip figure. It is to be noted that NTS continues to operate at reduced seating capacity, due to the need to distance passengers. This may present capacity issues should ridership continue to increase while distancing restrictions are in effect.

NASHUA TRANSIT SYSTEM RIDERSHIP DURING COVID ERA

	Average Weekday	Average Saturday
June 2020	366	207
July	496	166
Aug	623	442
Sep	734	497
Oct	745	497
Nov	789	542
Dec	752	452
Jan 2021	757	448
Feb	731	475
Mar	815	551
Apr	902	600

MOVING FORWARD WITH THE CONGESTION MANAGEMENT PROCESS

The completion of this Congestion Management Process document in June 2021 precedes the scheduled completion data of the Metropolitan Transportation Plan (MTP) by a year and a half. The MTP development incorporates recommendations from the CMP and other documents (e.g. Regional Bicycle/ Pedestrian Plan, transit feasibility studies, etc.). The NRPC intends to update the CMP regularly in the year preceding MTP updates. This will enable the mitigation strategies resulting from the process to be continually considered for, and adopted into, the long-range recommendations of the MTP.

The major advance in data sources for the 2021 CMP over the previous document produced in 2010 is the availability of the NPMRDS for the calculation of congested period average speeds and travel time indices. While the raw data set is available free of charge for the National Highway System (NHS) network, the NH MPOs have partnered to purchase the expanded data set covering non-NHS roads, as well as enhanced analytics tools that enable quicker processing of data. NRPC is committed to continuing to participate in the purchase of the dataset. NRPC will also continually update other performance measures including v/c ratios, level of service, bicycle LTS, crash rates and transit congestion measures.

NRPC has developed a multi-pronged approach to evaluating congestion. For highways, in addition to congested speeds and travel time indices, traffic volume trends, volume-to-roadway capacity statistics and bicycle level of traffic stress have been utilized. NRPC will consider other congestion performance measures that could be utilized, as well. Highway crash data may be inserted into the process in the next CMP update. The crash database has become more reliable in the past few years, although there still exist issues in completeness of data (particularly specific location) at the time accidents are recorded by the investigating authority. Intersection counts and capacity analysis will be conducted for the next CMP update, once a new normal level of traffic has been established.

Finally, it is recognized that the issues of congestion are interregional and, although the NRPC analysis ends at the regional borders, we do review the CMP reports of our bordering MPOs – the Southern NH Planning Commission, the Rockingham Planning Commission and the Northern Middlesex Council of Governments (NMCOG), to evaluate the congestion issues facing these regions to which a substantial portion of Nashua area origin trips are headed to and through. Coordinated and cooperative efforts will continue to be undertaken with our NH MPO, state and federal partners through the Partnering for Performance New Hampshire (PFPNH) workgroup and through annual cross-border coordination meetings with NMCOG. NRPC will also coordinate with the Boston MPO and other Massachusetts MPOs with borders within the Boston Urbanized area, which include the Northern Middlesex Council of Govenments and Montachusett Regional Planning Commission.