



# Congestion Management Report

## NH 102, HUDSON, LITCHFIELD & LONDONDERRY



**Segment Length: 9.66 miles**

**Daily Traffic Volumes: 13,500-26,500**

**Analysis Period: October 2016**

**Number of Traffic Signals: 10**

**Number of travel lanes: 2-4**

**Roadway Class: I (Urban - Minor Arterial) and IV (Urban - Principal Arterial—Other)**

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. Since NH 102 runs 24 miles from Hudson to Raymond and crosses two regional planning commissions, the Nashua Regional Planning Commission partnered with Southern New Hampshire Regional Planning Commission (SNHRPC) to divide the corridor into two segments (Hudson to I-93 in Londonderry and I-93 in Londonderry to Raymond) in order to comprehensively study congestion during peak periods. SNHRPC is producing a separate report assessing the congestion from Londonderry to Raymond.

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. This is expected to increase with the coming of Woodmont Commons in Londonderry, which includes 1,300 residential units and over 1.5 million square feet of non-residential development directly accessible to the corridor. Phase 1 of this planned unit development will be completed after 2020 and include 45 buildings, 260 residential units, and nearly 300,000 square feet of non-residential development.

**Report, travel time runs and data analysis conducted by**

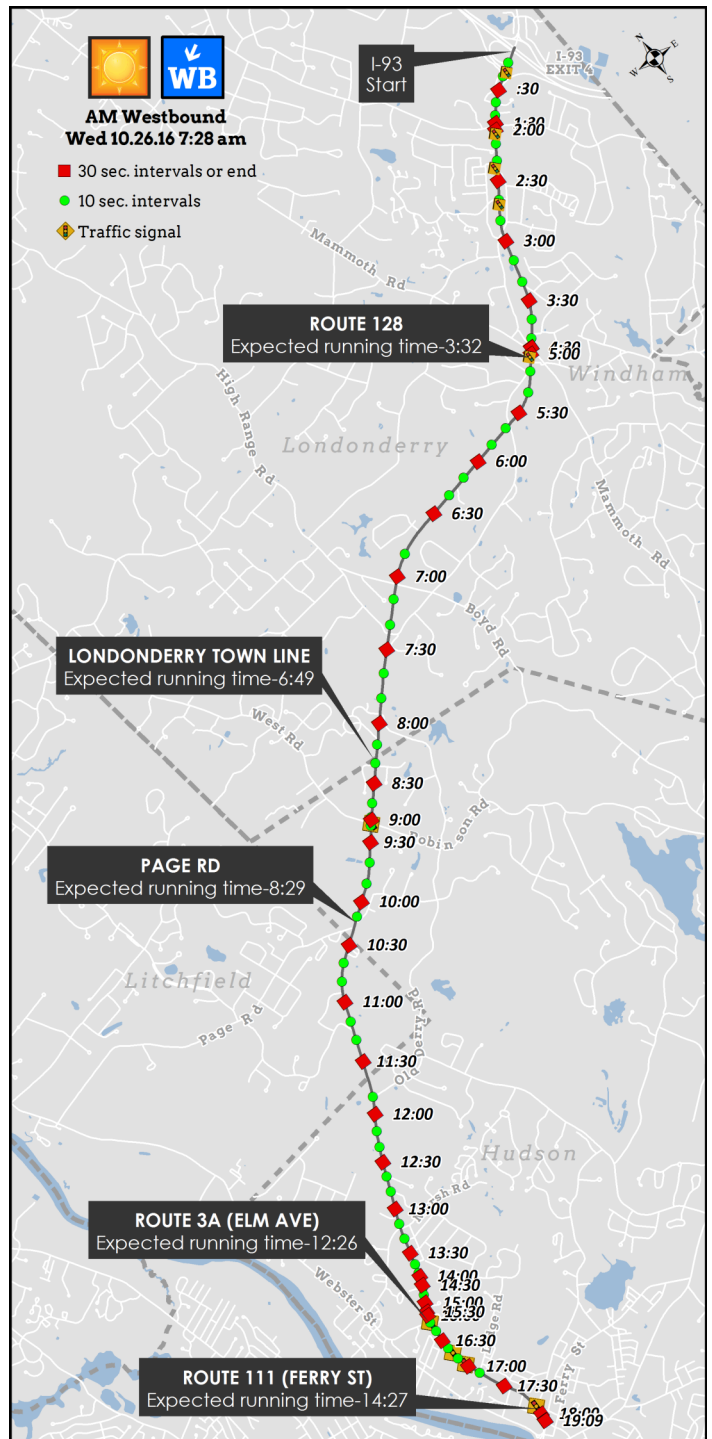
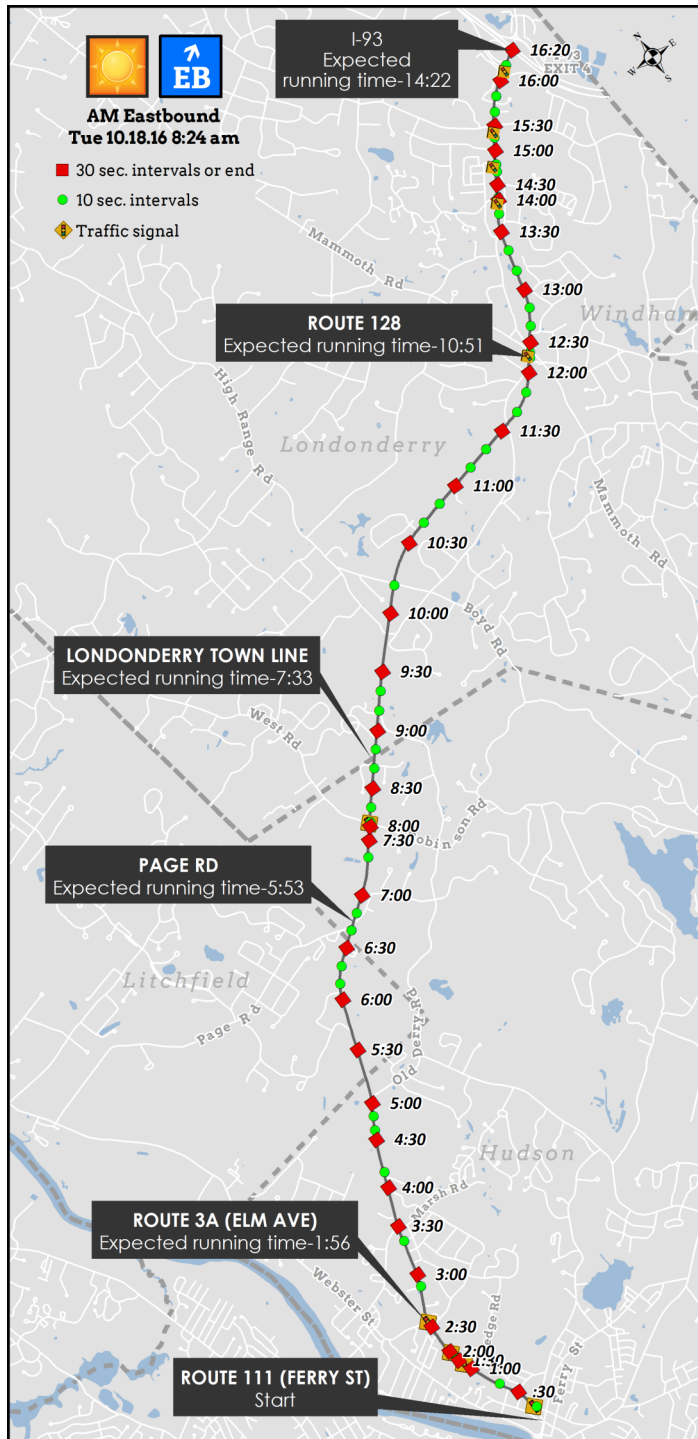


Nashua Regional  
Planning Commission  
2018



# AM Peak Period Actual & Expected Travel Times

Corridor Extents: NH 111 (Ferry St) to I-93



### Expected Travel Time during the Morning Commute

14 minutes and 22 seconds, traveling in easterly direction based upon posted speeds and free flowing traffic  
 14 minutes and 27 seconds, traveling in westerly direction based upon posted speeds and free flowing traffic

### Actual Travel Time during the Morning Commute:\*

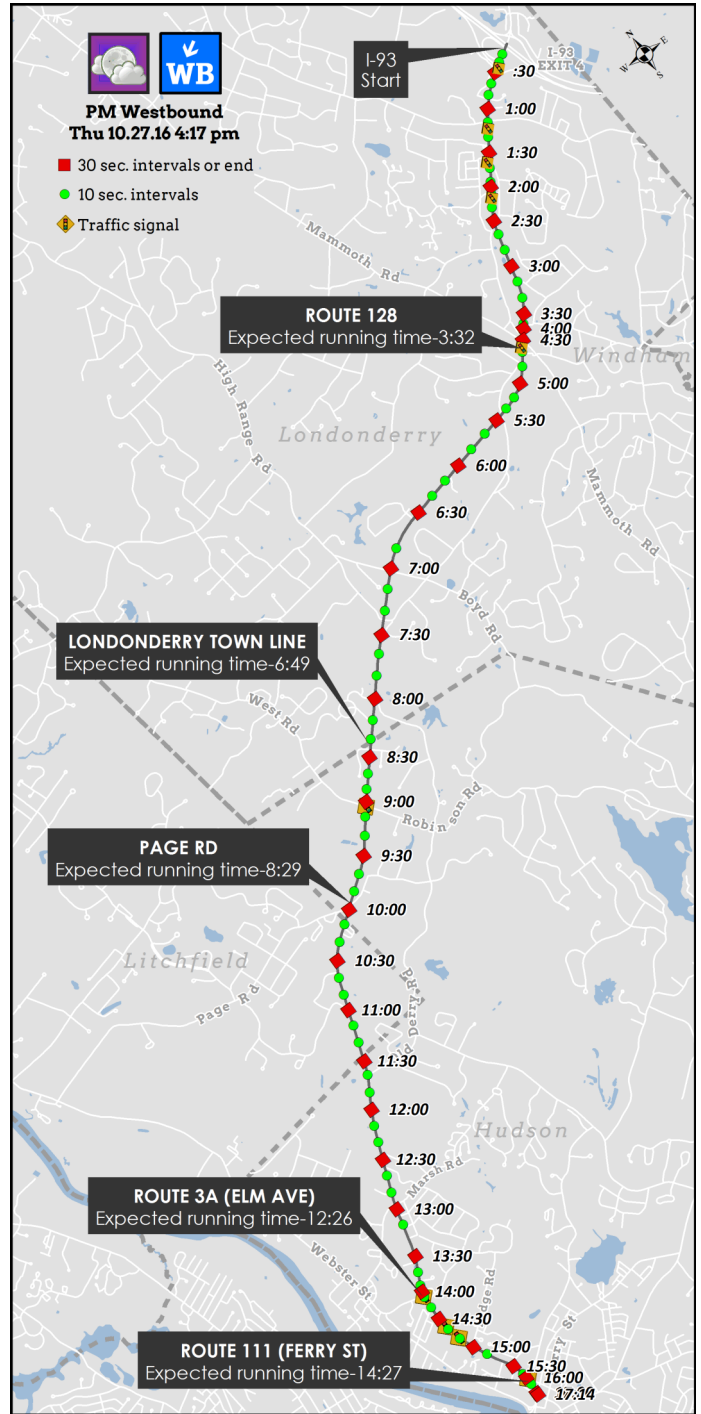
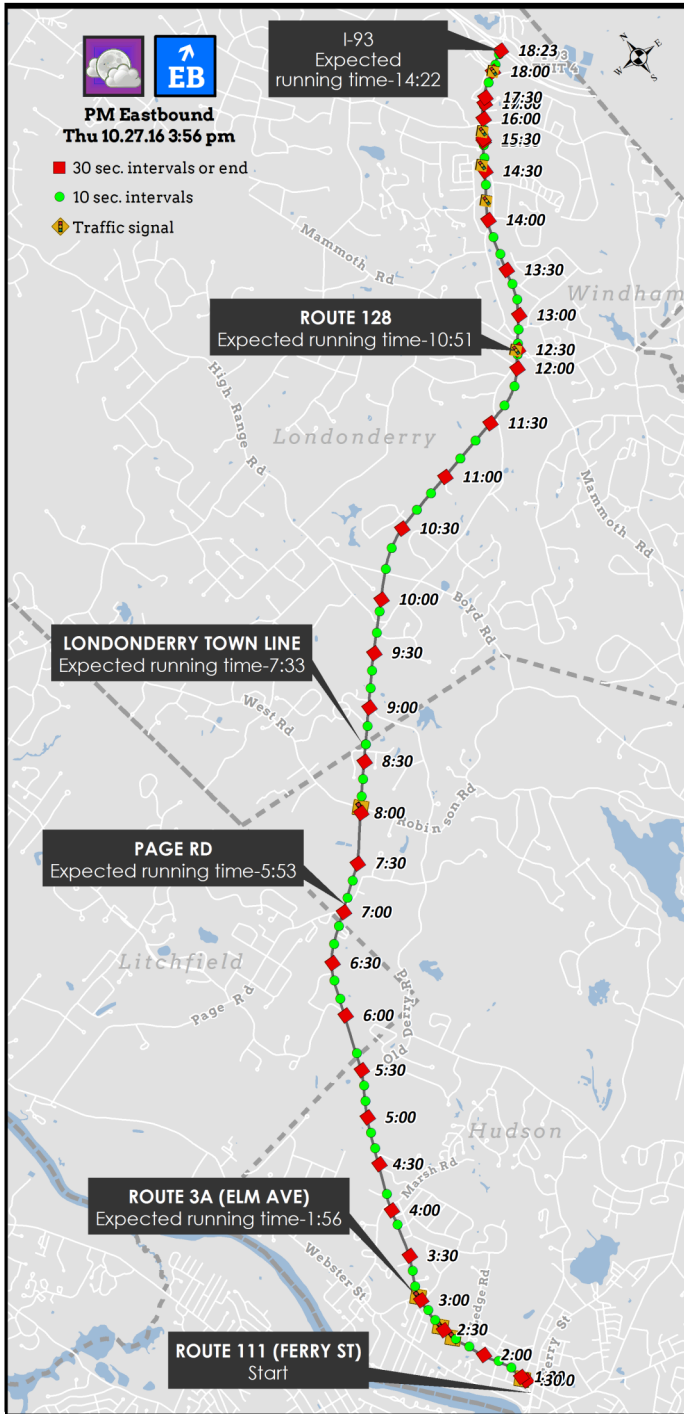
	Eastbound	Westbound
	16 minutes and 20 seconds	19 minutes and 09 seconds
	1 minute and 58 seconds (14%) longer than expected	4 minutes and 42 seconds (33%) longer than expected

\*The actual travel time is based upon a single travel run that was similar in duration and congestion to the average observed travel time.



# PM Peak Period Actual & Expected Travel Times

Corridor Extents: NH 111 (Ferry St) to I-93



### Expected Travel Time during the Evening Commute

14 minutes and 22 seconds, traveling in easterly direction based upon posted speeds and free flowing traffic  
 14 minutes and 27 seconds, traveling in westerly direction based upon posted speeds and free flowing traffic

### Actual Travel Time during the Evening Commute:\*

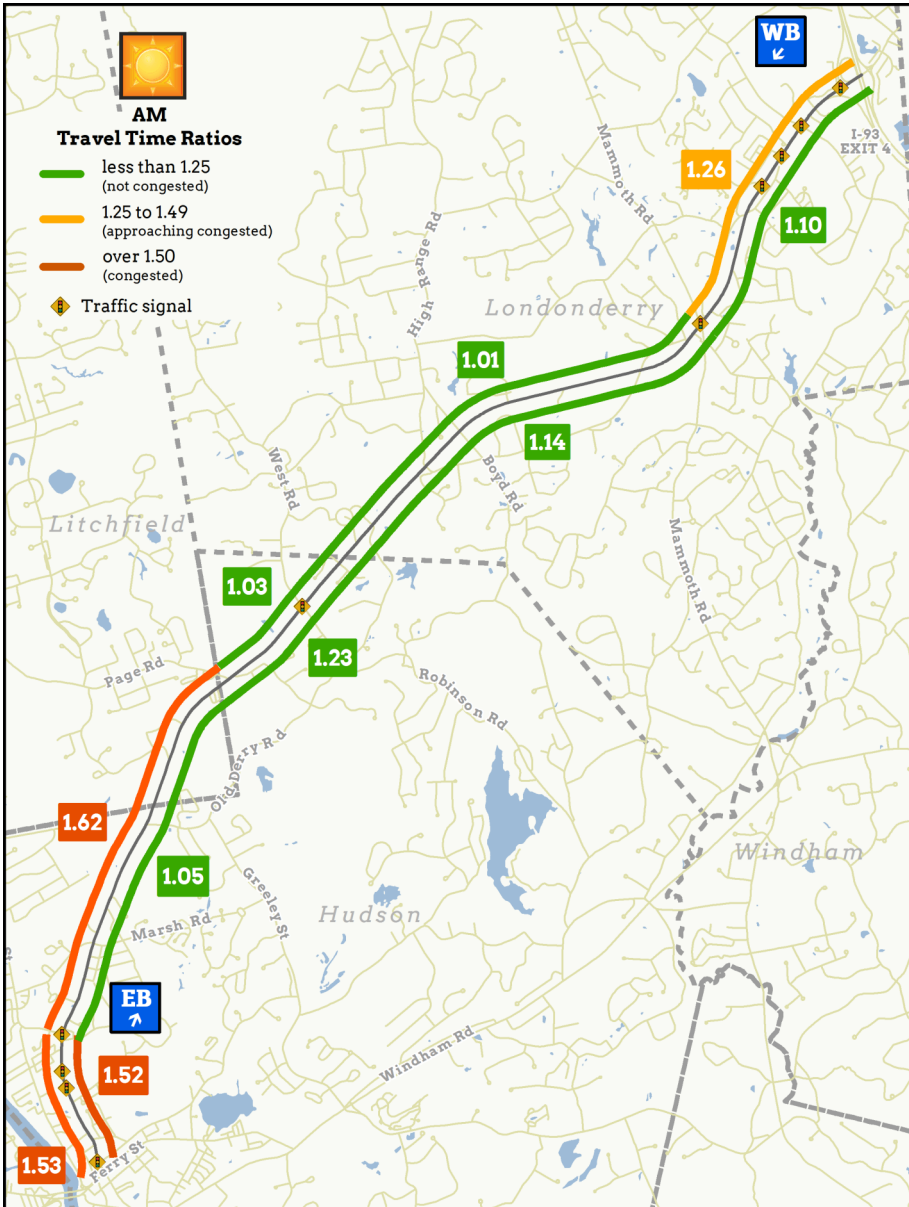
<b>Eastbound</b>	<b>Westbound</b>
18 minutes and 23 seconds	17 minutes and 14 seconds
4 minutes and 01 second (28%) longer than expected	2 minutes and 47 seconds (19%) longer than expected

\*The actual travel time is based upon a single travel run that was similar in duration and congestion to the average observed travel time.



# AM Travel Time Ratios (7:00am–9:00am)

Corridor Extents: NH 111 (Ferry St) to I-93



## Travel Time Ratio

A travel time ratio (TTR) compares the actual (measured) & expected (non-congested) travel times along a corridor. It is assumed that in non-congested conditions, motorists can travel at the posted speed limit. The actual time is the average of several travel time runs. The ratio between the actual time and the expected time would equal 1 for a non-congested segment.

### Eastbound

Congestion occurs during the morning peak period between Ferry St and Elm Ave (NH3A), as indicated by a ratio above the 1.5 threshold. Congestion does not occur in the remainder of the corridor.

On average, travel in the eastbound direction during the morning commute takes approximately 2 minutes and 26 seconds (17%) longer as compared to free-flow conditions.

### Westbound

Congestion does occur in the westbound direction between Page Rd and Ferry St, as indicated by ratios that are above the threshold of 1.5. Traffic approaches congestion in the segment from I-93 to NH 128, as indicated by a ratio between 1.25 and 1.5.

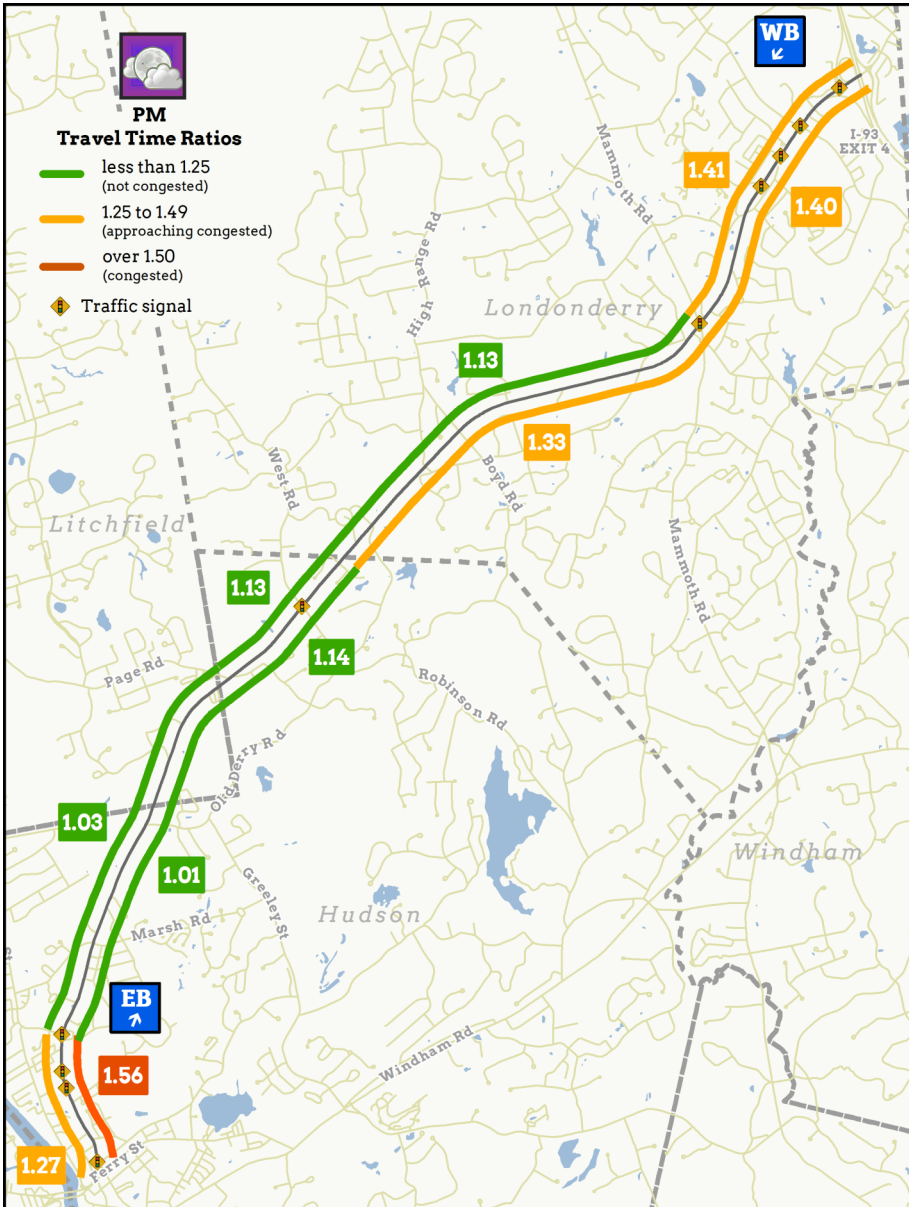
On average, travel in the westbound direction during the morning commute takes approximately 4 minutes and 31 seconds (31%) longer as compared to free-flow conditions.

EASTBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Ferry St to Elm Ave (3A)	0.97	02:57	01:56	01:01	1.52
Elm Ave (3A) to Page Rd	2.63	04:10	03:57	00:13	1.05
Page Rd to Londonderry Town Line	1.11	02:03	01:40	00:23	1.23
Londonderry Town Line to NH 128	2.91	03:46	03:18	00:28	1.14
NH 128 to I-93	2.00	03:53	03:32	00:21	1.10
<b>TOTAL EASTBOUND</b>	<b>9.62</b>	<b>16:49</b>	<b>14:22</b>	<b>02:26</b>	
WESTBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
I-93 to NH 128	2.00	04:27	03:32	00:55	1.26
NH 128 to Londonderry Town Line	2.91	03:20	03:18	00:02	1.01
Londonderry Town Line to Page Rd	1.11	01:43	01:40	00:03	1.03
Page Rd to Elm Ave (3A)	2.63	06:22	03:57	02:26	1.62
Elm Ave (3A) to Ferry St	1.01	03:06	02:01	01:04	1.53
<b>TOTAL WESTBOUND</b>	<b>9.66</b>	<b>18:58</b>	<b>14:27</b>	<b>04:31</b>	



# PM Travel Time Ratios (4:00pm–6:00pm)

Corridor Extents: NH 111 (Ferry St) to I-93



## Travel Time Ratio

A travel time ratio (TTR) compares the actual (measured) & expected (non-congested) travel times along a corridor. It is assumed that in non-congested conditions, motorists can travel at the posted speed limit. The actual time is the average of several travel time runs. The ratio between the actual time and the expected time would equal 1 for a non-congested segment.

## Eastbound

Congestion does occur in the eastbound direction between Ferry St to Elm Ave (NH 3A) during the evening peak period, as indicated by a ratio above the threshold of 1.5. Traffic approaches congestion from the Londonderry Town Line to the intersection of I-93.

On average, travel in the eastbound direction during the evening commute takes approximately 3:51 seconds (27%) longer as compared to free-flow conditions.

## Westbound

Traffic approaches congestion during the evening peak period in the westbound direction between the intersection of I-93 and NH 128, and the corridor between Elm Ave (NH 3A) to Ferry St, as indicated by ratios between 1.25 and 1.5.

On average, travel in the westbound direction during the evening commute takes approximately 2:46 seconds (24%) longer as compared to free-flow conditions.

EASTBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
Ferry St to Elm Ave (NH 3A)	0.97	03:02	01:56	01:06	1.56
Elm Ave (NH 3A) to Page Rd	2.63	03:58	03:57	00:01	1.01
Page Rd to Londonderry Town Line	1.11	01:54	01:40	00:14	1.14
Londonderry Town Line to NH 128	2.91	04:23	03:18	01:05	1.33
NH 128 to I-93	2.00	04:56	03:32	01:25	1.40
<b>TOTAL EASTBOUND</b>	<b>9.62</b>	<b>18:13</b>	<b>14:22</b>	<b>03:51</b>	
WESTBOUND	Length (miles)	Average Observed Travel Time (mm:ss)	Expected Travel Time (mm:ss)	Additional Travel Time (mm:ss)	Travel Time Ratio >1.5 = congestion
I-93 to NH 128	2.00	04:59	03:32	01:27	1.41
NH 128 to Londonderry Town Line	2.91	03:44	03:18	00:26	1.13
Londonderry Town Line to Page Rd	1.11	01:53	01:40	00:13	1.13
Page Rd to Elm Ave (NH 3A)	2.63	04:03	03:57	00:06	1.03
Elm Ave (NH 3A) to Ferry St	1.01	02:34	02:01	00:33	1.27
<b>TOTAL WESTBOUND</b>	<b>9.66</b>	<b>17:13</b>	<b>14:27</b>	<b>02:46</b>	



# Probe Travel Time Data

Corridor Extents: NH 128 (Mammoth Rd) to I-93

The NPMRDS provides roadway performance data for the National Highway System (NHS). The NPMRDS data are derived from instantaneous vehicle probe speed data supplied by a variety of GPS devices carried by both trucks and cars. The data are supplied on a GIS roadway network, which divides the NHS into directional road segments based on the Traffic Message Channel (TMC) standard.

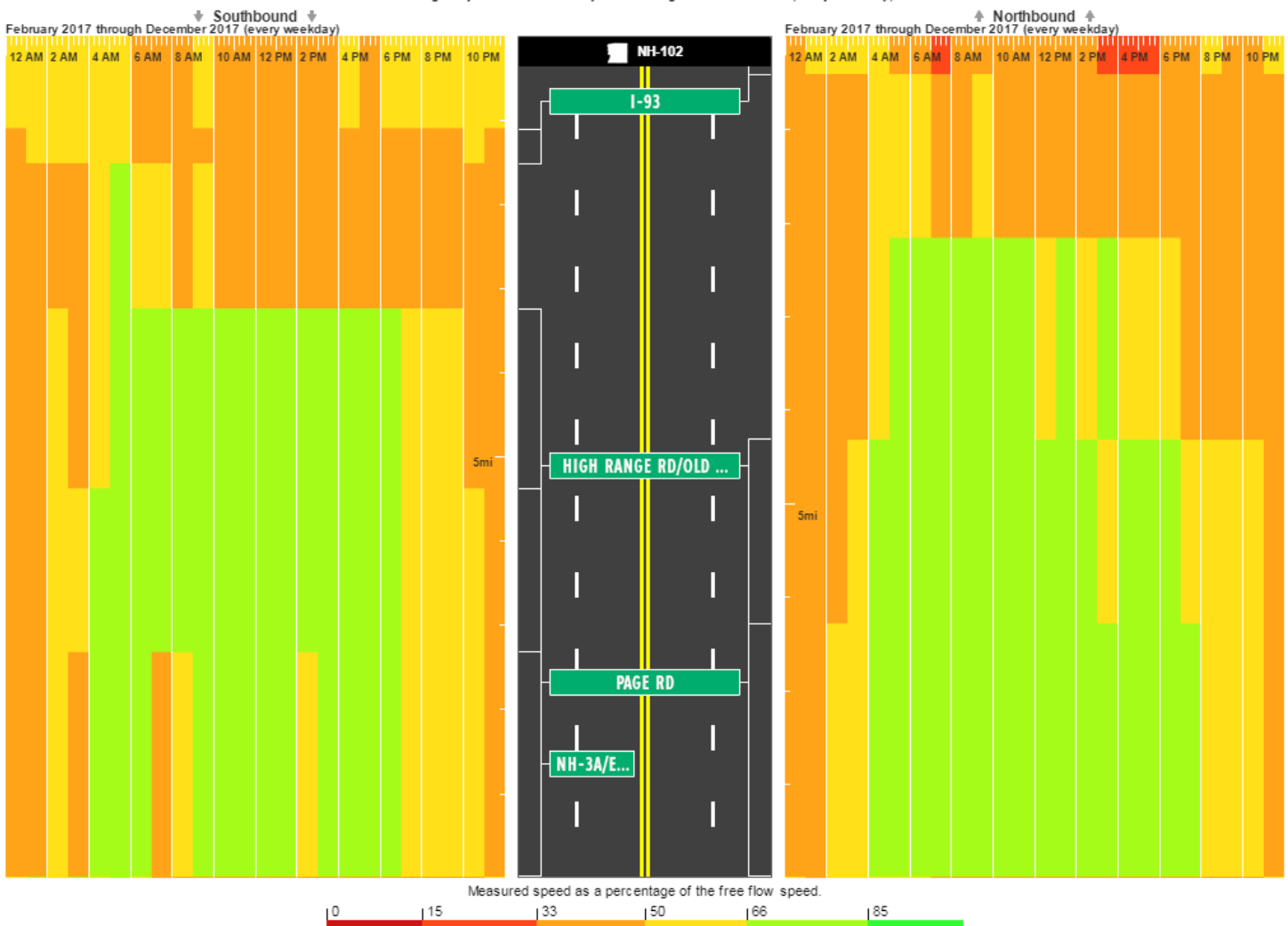
Travel times from the National Performance Measurement Research Data Set (NPMRDS) are available for the extent of NH 102 between I-93 and NH -128. Weekday travel time data collected in 2017 along four TMCs located as shown in the figure below is summarized by measured speed as a percentage of free flow speed.

The percent of traffic traveling below the speed limit versus at or above the posted speed limit during the peak and off peak hours for each segment is graphed in figures below. The segments are arranged by the time of day shown

horizontally and the location along NH 3A shown vertically. Southbound traffic is on the left, while northbound traffic is shown on the right. Segments are colored based on a scale from red to orange to green, which corresponds to transition from higher levels of congestion to lower levels of congestion.

The data indicate that, in general, Northbound PM peak traffic near I-93 is most congested, with greater than 66% of travel speeds below the speed limit for both passenger and freight vehicles.

**Congestion on NH-102 between I-93 and NH-128/Mammoth Rd using NPMRDS (Trucks and passenger vehicles) data**  
 Averaged by 1 hour for February 2017 through December 2017 (every weekday)





# Probe Travel Time Data

Corridor Extents: NH 128 (Mammoth Rd)

The 2017 weekday travel time data was also summarized by average travel speed by hour of day for all vehicle types (passenger and freight combined), as shown in the figure below.

Northbound traffic slows considerably during the PM peak hours between I-93 and High Range Rd/Old Nashua Rd, where the number of curb cuts increases and there is more commercial development.

A similar slow down occurs in the same area in the southbound

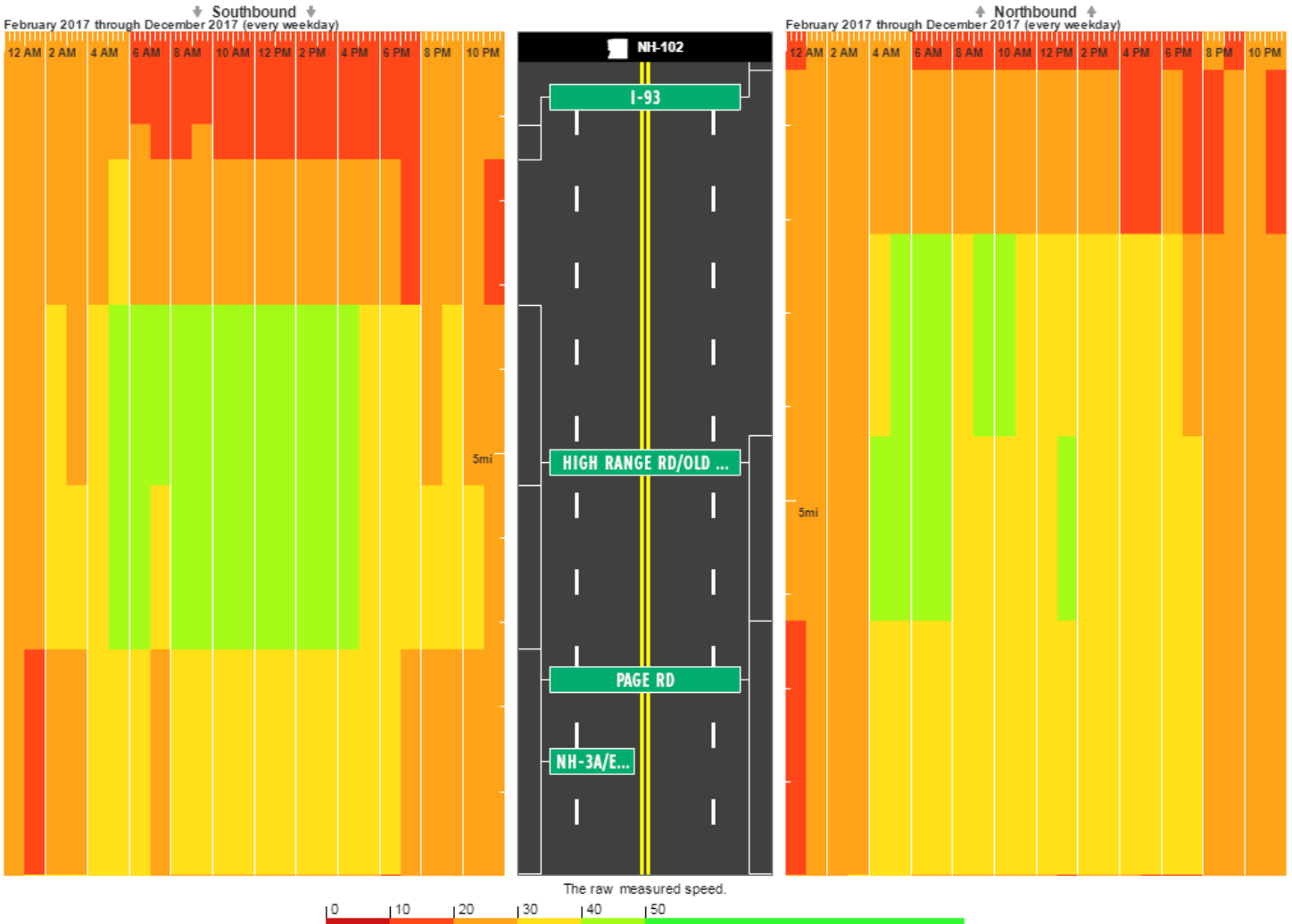
direction during the AM and PM peak, though traffic slows to around 20 mph. The bottleneck in the north – and southbound directions occurs where there is also a drop from four lanes to two.

There are also lower speeds on the segment of NH 102 near Hudson Town Center. This is due to a change of the posted speed limit from 50 mph to 30 mph when NH 102 changes from being more rural in character to more urbanized.



Speed on NH-102 between I-93 and NH-128/Mammoth Rd using NPMRDS (Trucks and passenger vehicles) data

Averaged by 1 hour for February 2017 through December 2017 (every weekday)





# Projects

There are several infrastructure projects along NH 102 that could impact the corridor. Future projects prioritize managing the impacts of the I-93 widening by increasing access, reducing congestion, and improving safety. These projects include the reconstruction of NH Route 102 approaches to the I-93 Exit 4 interchange and construction Exit 4A. On the western end of this segment of NH 102, long range projects include constructing additional bike and pedestrian amenities along Derry Road in Hudson and completing the Northern Crossing (both of these projects currently remain unfunded). The Nashua Regional Planning Commission plans to complete an additional congestion analysis of NH 102 after the impacts of the I-93 improvements are fully in effect.

Existing projects on NH 102, Hudson, Litchfield & Londonderry					
Project	Funding Years	Estimate <sup>^</sup>	Scope	Benefits (CMP Strategy <sup>*</sup> )	Status
NH 102/Derry Road Improvements - Phase II & Phase III	2021	\$896,137	Phase II: Continue Pedestrian/Bike Lane on Derry Rd/NH 102, from Towhee Dr to the Hudson Mall	Increase mobility and access; Increase nonmotorized mode shares; Separate slowmoving bicycles from motorized vehicles; Reduce incidents (3a)	MPO Long Range Project (Not in TYP)
Northern Crossing	2033 - 2040	\$267,283,896	Construct a northern crossing of the Merrimack River to provide a four lane roadway connecting NH 102 in Hudson, NH 3A in Litchfield and US 3 in Nashua; exact location of crossing to be determined	Improved accessibility & mobility, including freight mobility; reduced congestion and auto emissions (6e)	MPO Long Range Project (Not in TYP)
Exit 4 Interchange, Northbound and Southbound Mainline & NH 102 Approach Work	2017–2020	\$70,405,164	NB & SB Mainline & NH 102 approach work	Increase mobility; Reduce congestion by improving bottlenecks; Increase traffic flow and improve safety (1b)	Existing 2017 - 2026 TYP Project
Nearby projects with potential impacts to NH 102, Hudson, Litchfield & Londonderry					
Project	Funding Years	Estimate <sup>^</sup>	Scope	Benefits (CMP Strategy <sup>*</sup> )	Status
I-93 Exit 4A	2017 - 2022	\$56,855,000	Final Design, Right of Way & Construction of new interchange and connecting roadway	Increase mobility; Reduce congestion by improving bottlenecks; Increase traffic flow and improve safety (1b)	Existing 2017 - 2026 TYP Project
Northbound and Southbound Mainline between Exits 4 and 5 (Londonderry)	2017 - 2019	\$33,070,164	NB & SB Mainline & NH 102 approach work	Reduced congestion, improved safety and air quality (1e)	Existing 2017 - 2026 TYP Project
I-93 Expansion	2019 -2020	\$10,860,000	Exit 1 to Exit 5 - Construct 4th lane northbound and southbound	Reduced congestion, improved safety and air quality (1e)	Existing 2017 - 2026 TYP Project
NH 3A/Lowell Road Improvements	2021	\$479,584	Continue Sidewalk on NH 3A/Lowell Rd from Birch St to Executive Dr	Increase mobility and access; Increase nonmotorized mode shares; Separate slowmoving bicycles from motorized vehicles; Reduce incidents (3a)	MPO Long Range Project (Not in TYP)
NH 3A/Lowell Road Intersection Improvements	2021	\$712,525	Add a right turn lane on NH 3A/Lowell Rd southbound from Flagstone Drive to the westbound ramp on Sagamore Bridge Rd	Increase mobility; Reduce congestion by improving bottlenecks; Increase traffic flow and improve safety (1b)	MPO Long Range Project (Not in TYP)
East Hollis Street Improvements - 1	2017 - 2018	\$4,170,111	Intersection improvements at the intersection of East Hollis Street and Bridge Street from C Street to the Hudson Town Line	Improve safety for all users, including bicyclists and pedestrians; improve traffic flow and mobility (3d)	Existing 2017 - 2020 TIP project
East Hollis Street Improvements - 2	2022 - 2025	\$5,111,042	Improvements to East Hollis Street and its intersections	Improved safety for all users, including bicyclists and pedestrians; improved traffic flow and mobility (3d)	Existing 2017 - 2026 TYP Project
Park 'n Ride	1999 - 2017	\$3,596,087	Construct Crown Street Park 'n Ride and accessory facilities	Support carpool, vanpool, intercity bus and alternate modes of transportation (2c)	Existing 2017 - 2020 TIP project
Capitol Corridor	2020+	\$125,000,000 - \$250,000,000	Establish passenger rail in New Hampshire. Lower estimate reflects Nashua option; higher estimate reflects Manchester option.	Reduced trip times, alternative mode option, improved access, economic development, reduced auto emissions (2d)	MPO Long Range Project (Illustrative)

<sup>^</sup>Estimate costs include indirects and inflation

<sup>\*</sup>Strategy definitions are detailed in the NRPC MPO Congestion Management Process Toolbox: [http://www.nashuarpc.org/files/4613/8981/7207/NRPC\\_CongMgmtProc\\_2010.pdf](http://www.nashuarpc.org/files/4613/8981/7207/NRPC_CongMgmtProc_2010.pdf)