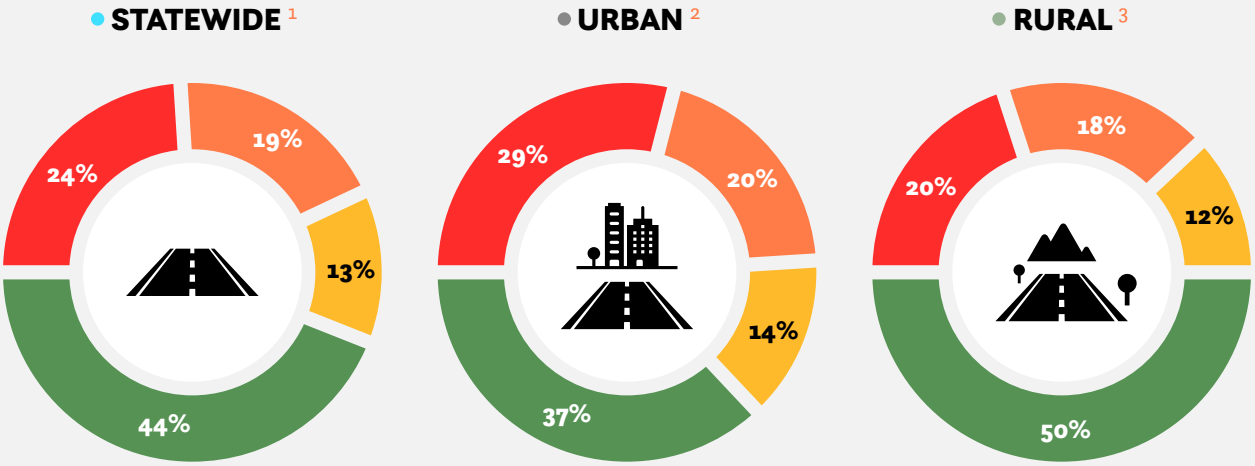
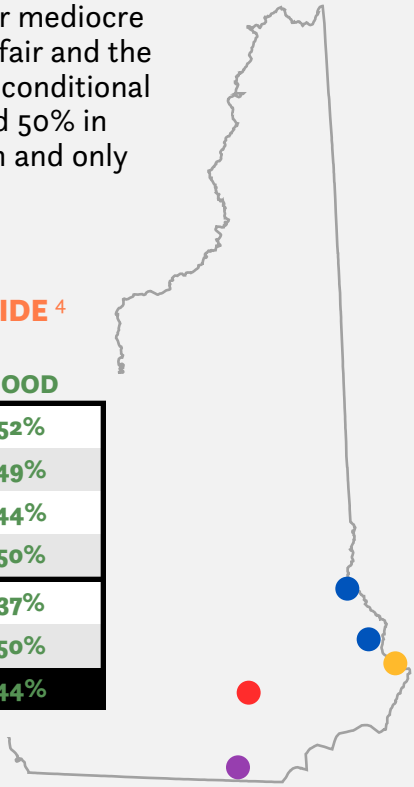
ROAD CONDITIONS & COSTS TO DRIVERS

The life cycle of New Hampshire's roads is greatly affected by the state and local governments' ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

CONDITIONS OF NEW HAMPSHIRE ROADS



Statewide, 43% of New Hampshire's major roads are in poor or mediocre condition. 24% are poor and 19% are mediocre, while 13% are fair and the remaining 44% are good. New Hampshire's rural roads have a conditional edge over it's urban roads, with only 20% in poor condition and 50% in good condition, while 29% of urban roads are in poor condition and only 37% are in good condition.



PAVEMENT CONDITIONS ON MAJOR URBAN ROADS IN NEW HAMPSHIRE'S LARGEST URBAN AREAS & STATEWIDE 4

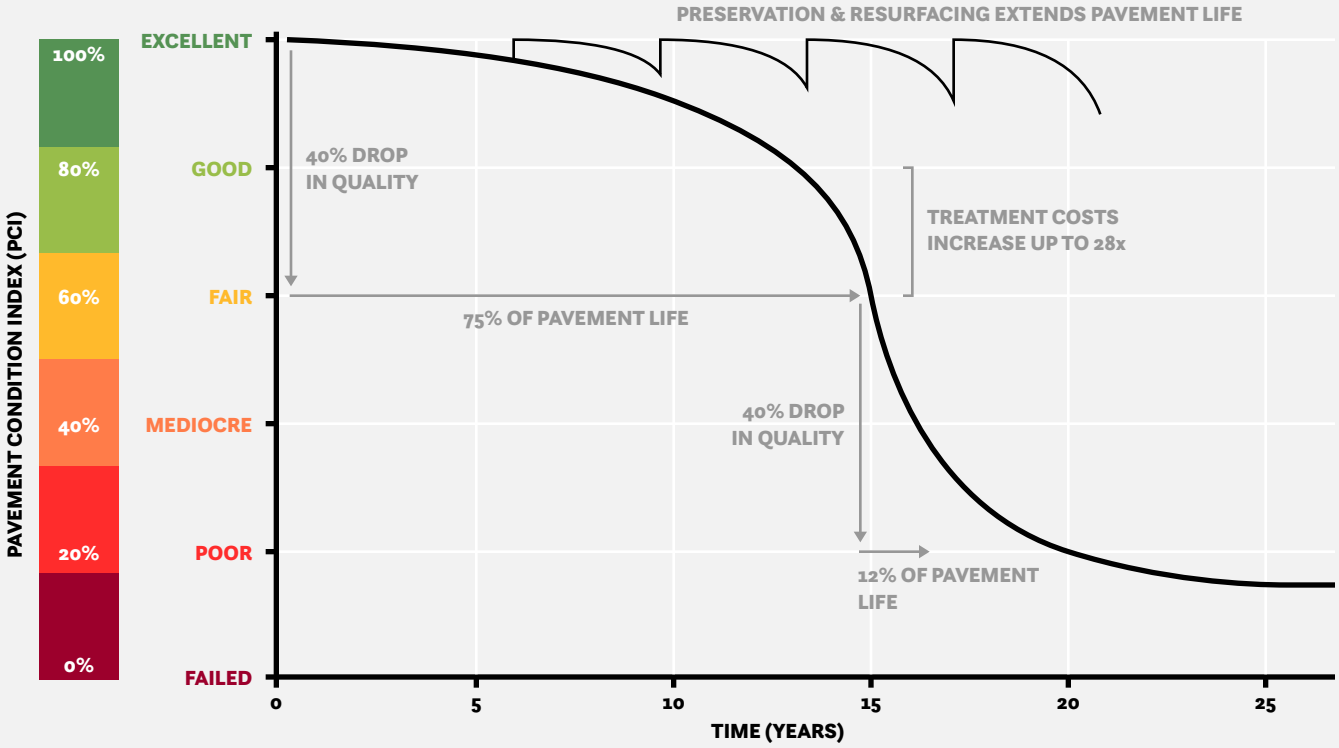
	POOR	MEDIOCRE	FAIR	GOOD
DOVER-ROCHESTER	12%	21%	14%	52%
MANCHESTER	23%	14%	14%	49%
NASHUA	21%	22%	13%	44%
PORTSMOUTH	23%	18%	10%	50%
STATEWIDE URBAN	29%	20%	14%	37%
STATEWIDE RURAL	20%	18%	12%	50%
NH STATEWIDE	24%	19%	13%	44%

Source: TRIP analysis of Federal Highway Administration data.

Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[5] As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

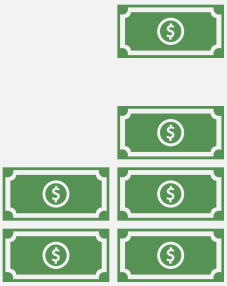
Traffic, moisture & climate cause pavement failure. Intersections are more prone to deterioration.

PAVEMENT CONDITION CYCLE WITH TREATMENT & COSTS



Source: North Carolina Department of Transportation (2016), linked below
2016 Maintenance Operations and Performance Analysis Report

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A **report on maintaining pavements** found that every $1 of deferred maintenance on roads and bridges costs an additional $4 to $5 in needed future repairs.[6]



$1 in deferred maintainance...

...costs an additional $4 to $5 in needed future repairs

THE COST TO MOTORISTS OF ROADS IN INADEQUATE CONDITION

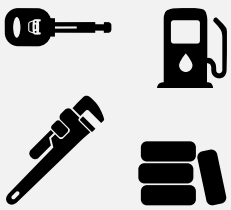
TRIP has calculated the additional cost to motorists of driving on roads in poor, mediocre or fair condition. When roads are in poor, mediocre or fair condition—which may include potholes, rutting or rough surfaces—the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by New Hampshire motorists as a result of deteriorated road conditions is $572 million annually, an average of $518 per driver statewide.[7]

The chart below details additional VOC per motorist in the state's largest urban areas.

	VOC/motorist
DOVER-ROCHESTER	$353
MANCHESTER	$458
NASHUA	$477
PORTSMOUTH	$469
NH STATEWIDE	$518

Source: TRIP estimates

Poor, mediocre or fair road conditions—like **potholes**, **rough surfaces** and **rutting**—result in increased VOC from **accelerated vehicle depreciation**, **increased tire wear** and **fuel consumption**, and **vehicle repair costs**.



Road deterioration increases **ownership**, **repair**, **fuel**, and **tire costs**.

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs.[8] The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs. The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on **AAA's driving cost estimates** and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[9] Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

WORKS CITED

1 Federal Highway Administration, Highway Statistics 2018 (2019).

2 Ibid.

3 Ibid.

4 Ibid.

5 Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

6 **Pavement Maintenance**, by David P. Orr, PE Senior Engineer, Cornell Local Roads Program, March 2006.

7 TRIP calculation.

8 Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.

9 Your Driving Costs. American Automobile Association. 2019.