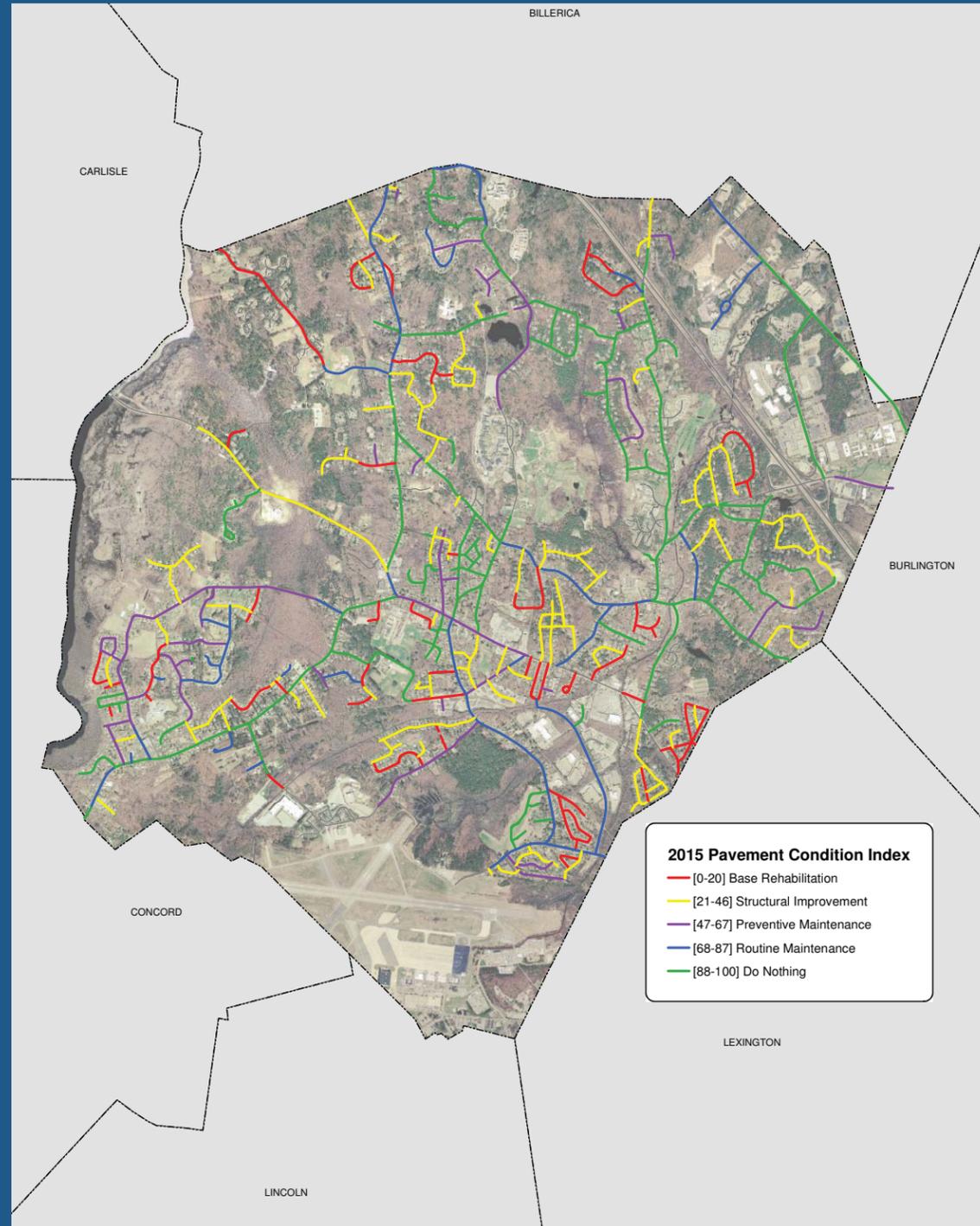
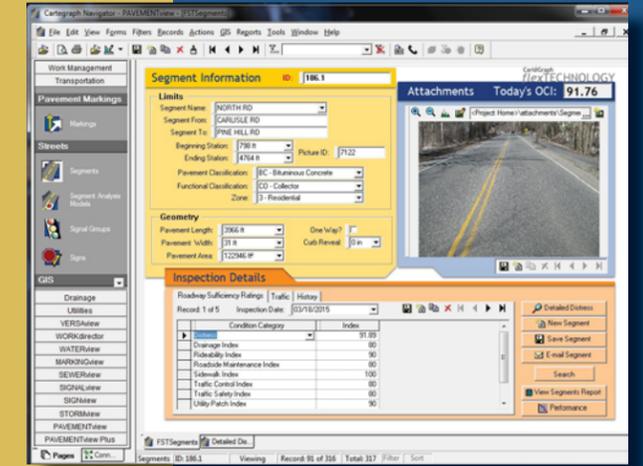
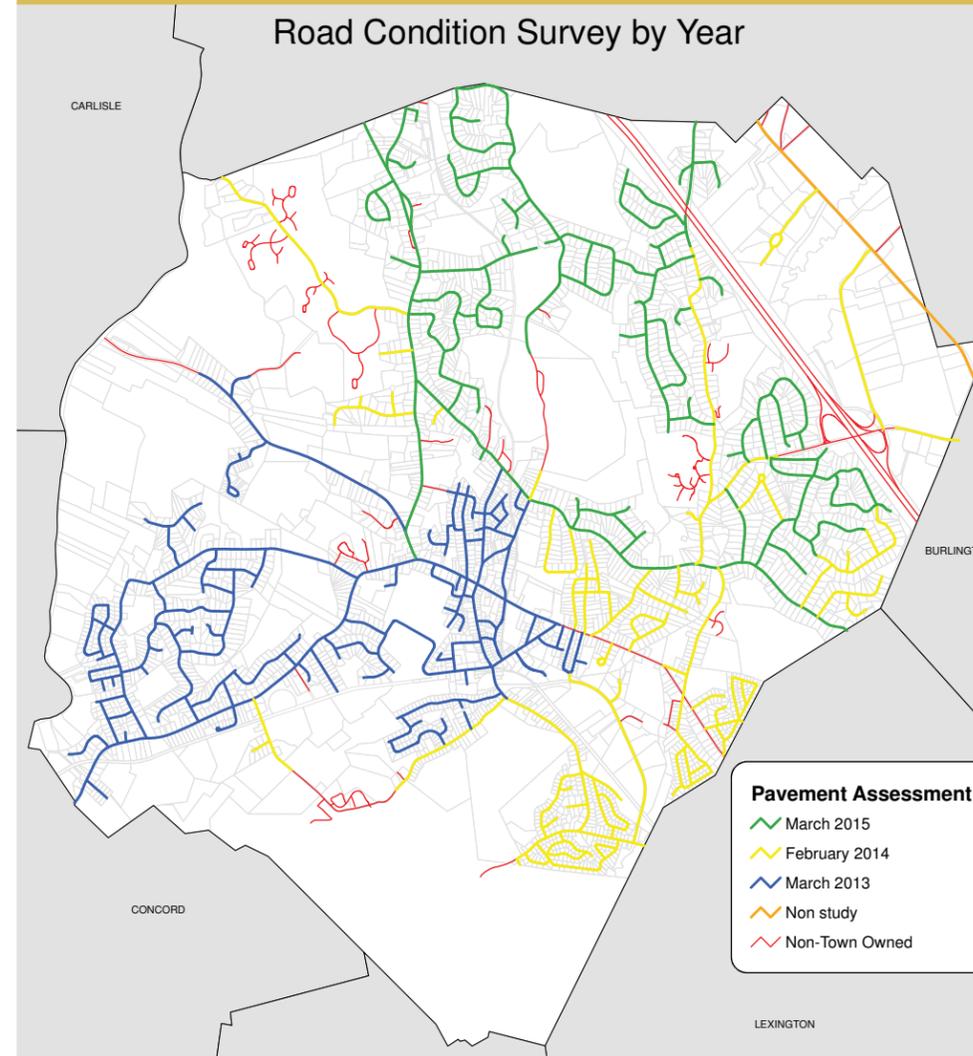


FY 2015

# Pavement Management Summary



## Road Condition Survey by Year



Prepared For:



**Town of Bedford  
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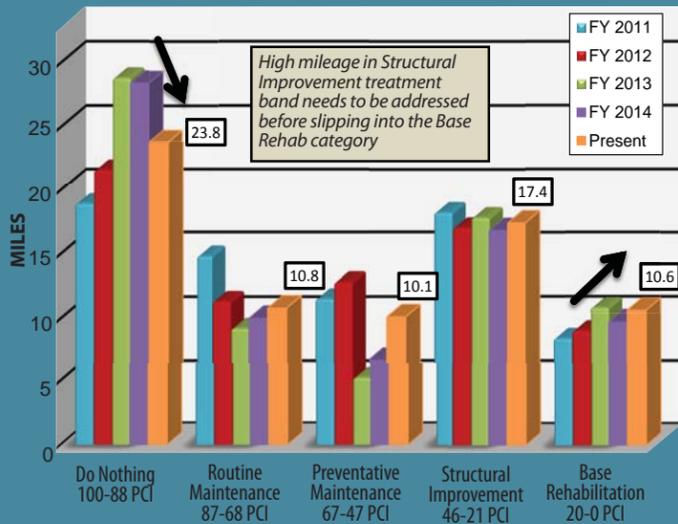
FAY, SPOFFORD & THORNDIKE

## EXISTING CONDITIONS

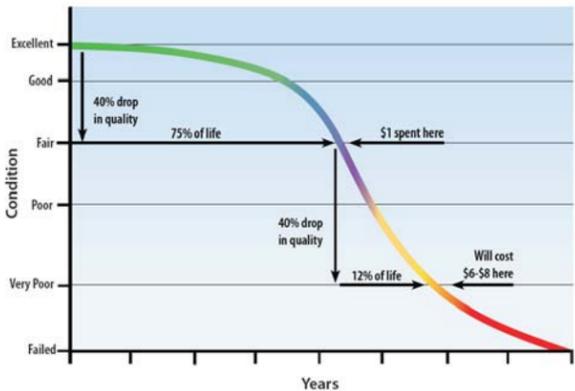
Bedford's roadway network is comprised of 7.7 state highway miles, 7.5 private road miles, and 72.7 public miles. Fay, Spofford & Thorndike (FST) has worked with the Town implementing and updating its Pavement Management System since 2006. In March of 2015, FST completed a 33% re-survey of the Town's public roadway network, determined today's average road network Pavement Condition Index (PCI), roadway repair backlog, and investigated three future funding scenarios.

FST identified 294 pavement segments and determined the Town's average road network PCI in April 2015 was a 62.7. This average PCI places Bedford's typical road conditions in the top of the Preventive Maintenance treatment band (PCI range from 47 to 67), as seen to the right and represents a roadway in "fair" condition.

### PCI Distribution in Miles by Treatment Band for Previous 4 Years Monitored



## Pavement Deterioration Curve



### (PCI) Treatment Band Ranges<sup>1</sup>

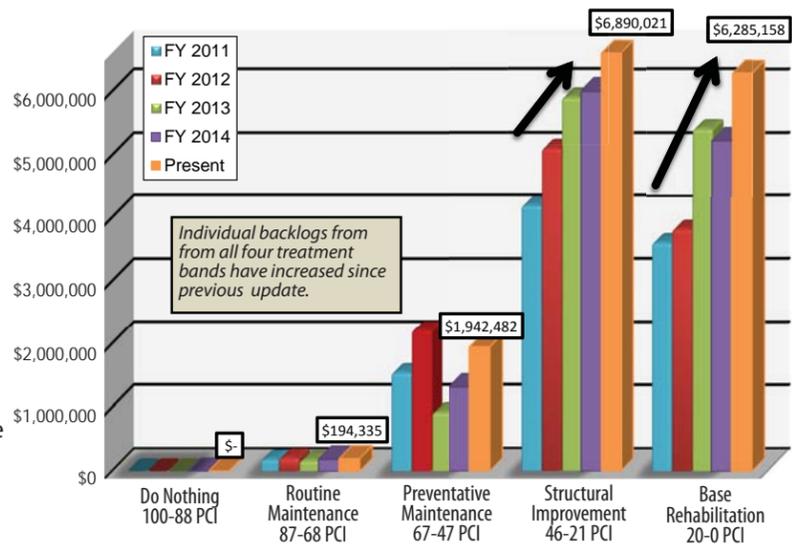
DO NOTHING PCI Band #1 (100 - 88 PCI)	Excellent Condition - in need of no immediate maintenance.
ROUTINE MAINTENANCE PCI Band #2 (87 - 68 PCI)	Good Condition - may be in need of crack sealing or minor localized repair.
PREVENTIVE MAINTENANCE PCI Band #3 (67 - 47 PCI)	Fair Condition - pavement surface in need of surface sealing or thin overlay.
STRUCTURAL IMPROVEMENT PCI Band #4 (46 - 21 PCI)	Poor Condition - pavement structure in need of additional thickness to resist traffic loading.
BASE REHABILITATION PCI Band #5 (20 - 0 PCI)	Failed Condition - in need of full depth reconstruction/reclamation.

<sup>1</sup> The PCI ranges given in this table are general averages. The actual treatment band threshold numbers depend on pavement surface type and functional classification.



### Current Backlog of Outstanding Repairs (\$15,311,996)

The backlog is defined as the cost of repairing all the roads within one year and bringing the average PCI to a near perfect 100. Backlog is a "snapshot" or relative measure of outstanding repair work. The backlog not only represents how far behind the Bedford roadway network is in terms of its present physical condition, but also its cost value serves as a benchmark to measure the impact of various funding scenarios. The current backlog offers a basis for comparison to future and/or past year's backlog(s). Backlog dollars represent the pavement structure only; it does not include related repair cost for drainage, sidewalk, curbing, signals, or signs. Bedford's backlog as of April 2015 is \$15,311,996. The figure above summarizes the backlog repair miles by PCI treatment bands for the last five years. Unfortunately, about five miles throughout the Town have fallen out of the Do Nothing treatment band, and all four of the other treatment bands have increased in mileage.



## BUDGET ANALYSIS

The analysis software of the PMS is where financial determinations and projections are made. Consideration is given to the required budget, by repair type, based on the supplied information from meetings with the Town and FST, for overall desired roadway network conditions. Various scenarios were analyzed to measure the effects of alternative funding levels and to determine the funding needed to avoid deteriorating pavement conditions. Today's backlog cost and future funding scenarios are based on estimated bid prices for roadway construction.

Using the Town's pavement management software, FST modeled three, five-year future funding scenarios. Each scenario utilizes certain allotments to address various repair types throughout the Town dependent on current conditions. For a point of comparison, there is a cracksealing program built into year three of the projection, similar to the projections from the previous update. This explains the PCI increase seen below in FY 2018. Each scenario, as depicted in the line charts below, results in a projected average network PCI and backlog. Also, all scenarios incorporate a 3.5% annual inflation rate. Therefore, due to the impact of

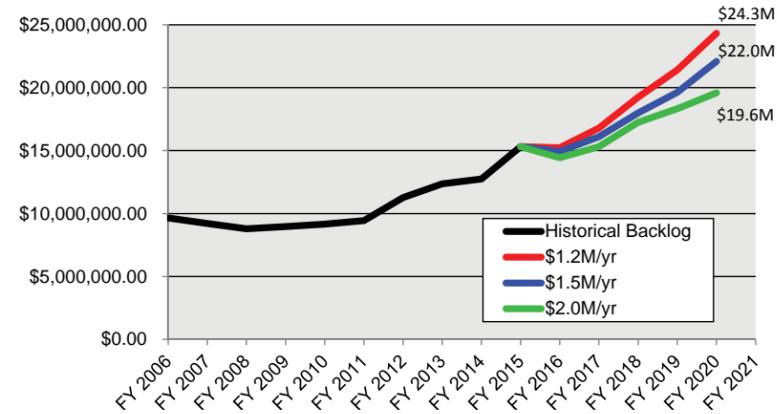
inflation, a net budget may in fact remain level where the annual road appropriation appears to increase.

The first scenario incorporates a roadway repair budget of \$1.2M per year. It shows the backlog growing to \$24,324,761 while the network average PCI decreases slightly to 62 by FY 2020. This projection is displayed below by the red line.

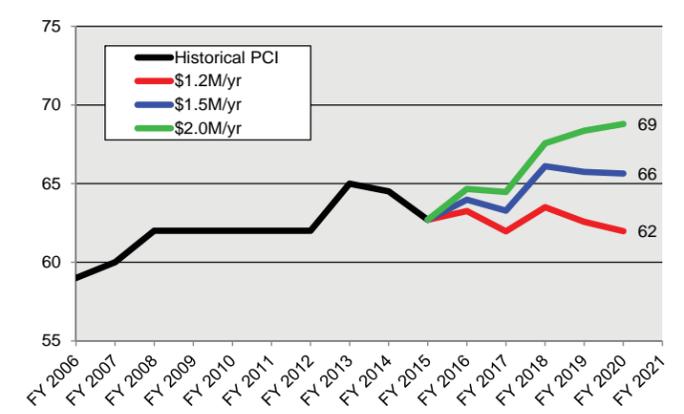
The blue line in the figure displays the projected conditions for the Town's 2015 expected roadway repair budget of \$1.5M per year. Here the backlog increases to \$22,076,048 while the network average PCI increases to 66 in FY 2020. Obviously, this scenario is not sufficient to maintain the current backlog.

FST also investigated the aggressive funding approach of \$2.0M per year and is depicted by the green line. The backlog rises to \$19,581,865 and the network average PCI increases to 69 in FY 2020. FST recommends the Town strive to implement this scenario to improve the average network PCI and attempt to limit the ever increasing backlog.

### Town of Bedford's Future Backlog Projection

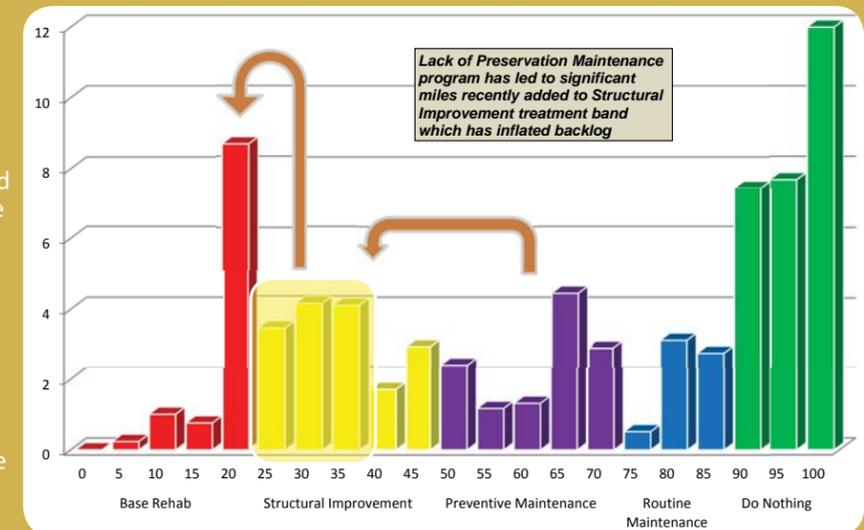


### Town of Bedford's Future PCI Projection



## CONCLUDING REMARKS

Since 2006, Bedford has worked together with FST to allocate funds based on the pavement management theory to maximize taxpayer dollars. Over the last couple of years, the black line in the PCI figure above shows a discouraging trend of the Town's decreasing network PCI. The histogram to the right shows a detailed breakdown of the Town's roadway mileage by PCI. While there is a large percentage of roadway miles in the Do Nothing category, the amount of mileage in the more expensive treatment bands has increased significantly and has resulted in a growing backlog. Without the proper funding, this trend is expected to continue and could result in an insurmountable backlog. Also, the shaded area highlights roadway miles in the bottom of the Structural Improvement treatment band. If these miles are not addressed soon, they will fall in to the Base Rehabilitation treatment band and could be as much as 60% more expensive to repair. For these reasons, it is recommended to address the mileage in the capital construction categories. However, once the distribution of mileage has become more balanced, the Town should consider the benefits of a preservation maintenance treatment program on select roadways as a more affordable approach to increase the roadway network PCI.



The funding analyses herein illustrate current funding levels will not sustain expected pavement deterioration over the long term causing an ever increasing backlog. Even this year's budget of \$1.5M is not currently sufficient to maintain the Town's backlog. It is recommended that the town should strive to fund an annual budget of \$2.0M to continue its commitment to their pavement management plan and to maintain a healthy distribution of treatment band miles.