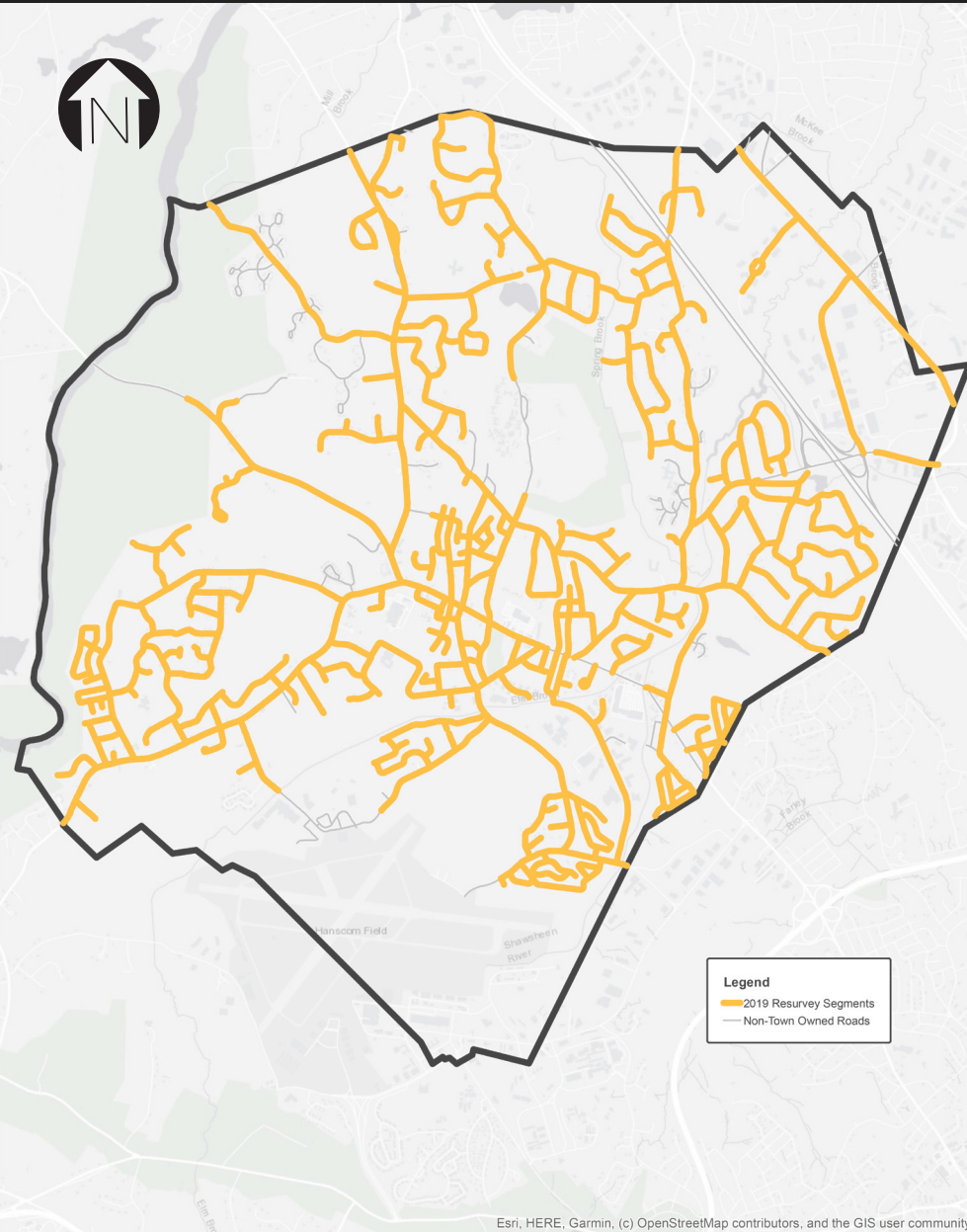
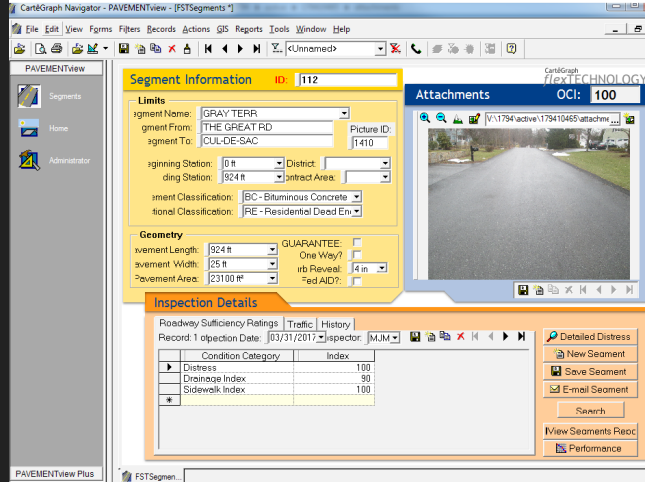




FY 2019

Asset Management Summary



Prepared for:
Town of Bedford
Public Works
Department
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Prepared by:
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68.9
AVERAGE
PAVEMENT
CONDITION
INDEX (PCI)



 Existing Conditions

Bedford's roadway network is comprised of 7.7 state highway miles, 7.5 private road miles, and 72.7 public miles.

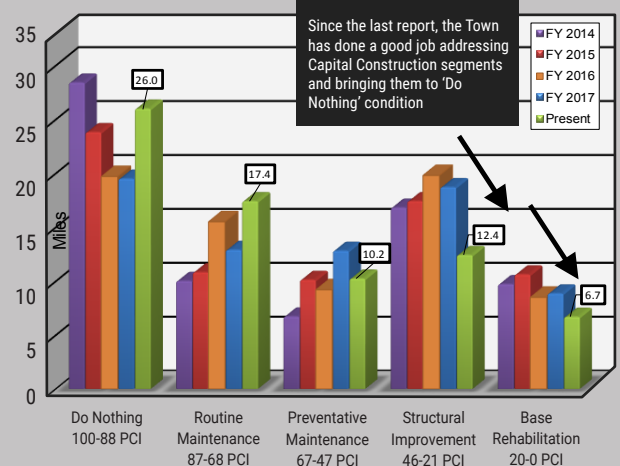
Stantec Consulting Services has worked with the Town implementing and updating its Pavement Management System since 2006. In July of 2019, Stantec completed a full re-survey of the Town's public roadway network, determined today's average road network Pavement Condition Index (PCI), roadway repair backlog, and investigated three future funding scenarios.

Stantec identified 291 pavement segments and determined the Town's average road network PCI in July of 2019 is a 68.9. This average PCI places Bedford's typical road conditions at the bottom of the Routine Maintenance treatment band (PCI range from 68 to 88), as seen to the right and represents a roadway in "good" condition.

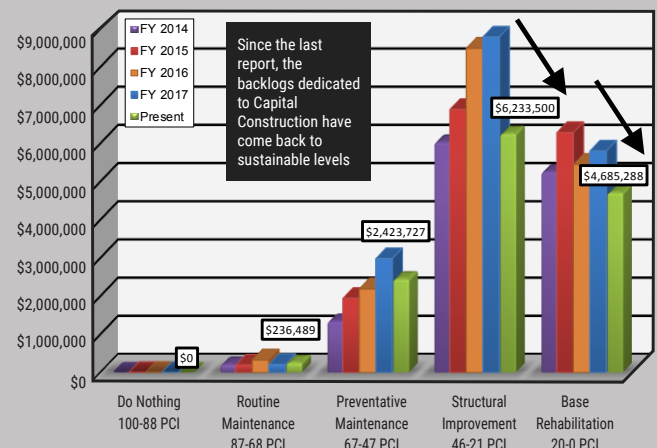
 Current Backlog of Outstanding Repairs (\$13,579,004)

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 years' 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 July 2019 is \$13,579,004. The figure above summarizes the backlog repair miles by PCI treatment bands for the last five years. As can be seen on the figure to the right, the number of miles dedicated to 'Do Nothing' streets have significantly increased since the last report while the number of miles dedicated to the capital construction repairs has decreased significantly. The Town's investment in capital construction over the past few years has led to improved network conditions as well as a sustainable future backlog.

Current PCI Distribution in Miles By Treatment Band



Current Backlog Distribution In Dollars by Treatment Band





Using pavement management software, Stantec modeled three, five-year future funding scenarios.

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 Stantec, 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 pavement management software, Stantec modeled three, five-year future funding scenarios. Each scenario utilizes certain allotments to address various repair types throughout the Town dependent on current conditions. Each scenario, as depicted in the line charts to the right and below, results in a projected average network PCI and backlog. Also,

all scenarios incorporate a 2.5% 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.

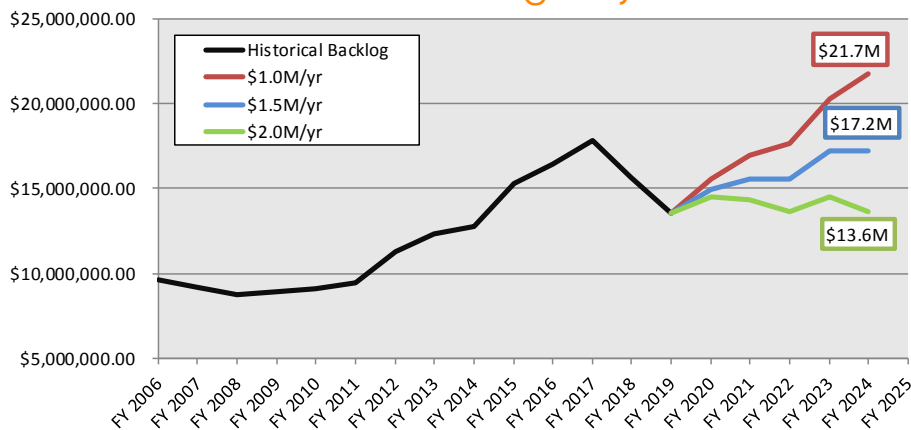
The first scenario, shown with the red line, analyzes the impact on the roadway network with a budget of \$1.0M per year. Under this scenario the backlog grows to \$21,745,082 while the network average PCI decreases slightly to 65 by FY 2024. The insufficiency in funds within this budget leads to roadways deteriorating to more expensive treatment repairs which leads to the inflated backlog, and worsening network conditions.

The blue line in the figure displays the projected conditions for a roadway

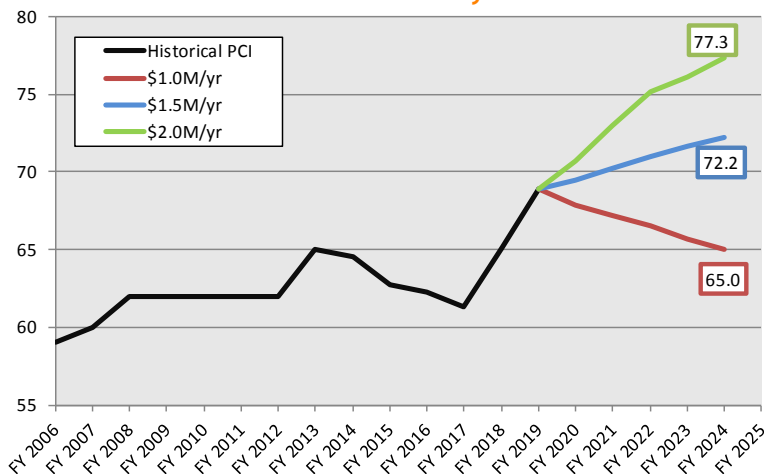
repair budget of \$1.5M per year. Here the backlog increases to \$17,243,353 while the network average PCI increases to 72 in FY 2024. While this scenario improves the network conditions, the backlog still increases as all treatment bands are not funded sufficiently enough to prevent backlog growth.

Recognizing that the budget needs to be increased to maintain the current backlog, an aggressive funding approach of \$2.0M per year was run and is depicted by the green line. For this scenario, the average PCI of the network increases to 77, while the backlog remains at current levels. This budget adequately funds all treatment bands which results in "good" to "excellent" network conditions as well as a sustainable future backlog.

Future Backlog Projection



Future PCI Projection





Concluding Remarks

Since the last report, the average conditions have increased from 61.3 to 68.9 while the backlog has decreased by approximately \$4.2M.

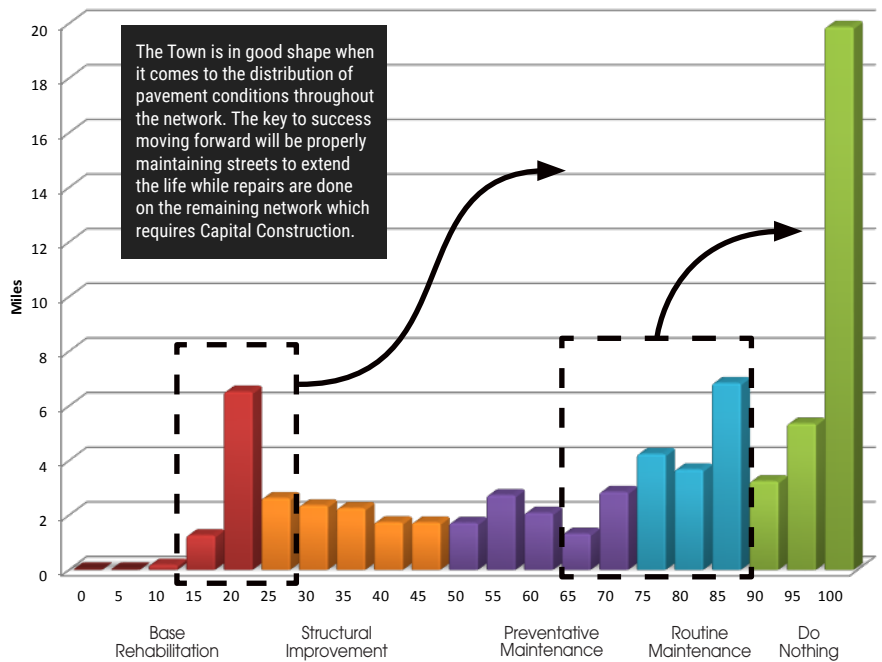
Stantec has been assisting the Town of Bedford with its Pavement Management System since 2006. Since the last report, the average conditions have increased from 61.3 to 68.9 while the backlog has decreased by approximately \$4.2 million dollars. Since the last report, which was done in 2017, the number of miles dedicated to 'Do Nothing' has increased while the miles dedicated to capital construction have decreased. The investment the Town has made in paving the last few years has improved conditions and brought the repair backlog to sustainable levels.

As can be seen in the histogram of the Town's network conditions, the strategy moving forward should be to focus on routine and preventative maintenance on their "good" condition roadways while addressing the remaining capital construction segments within the network. By extending the life of the "good" roadways now, the Town will buy time to address more capital construction segments while maintaining "good" network conditions.

In doing the network wide assessment, Stantec did notice many instances of raveling/weathering/pitting. The Town should be testing to make sure there is adequate liquid asphalt in the mix and tack being applied. Stantec also suggests the Town start implementing a fog sealing and microsurfacing program to seal the surface of these roadways and prevent further oxidation and raveling.

Stantec recommends that the Town maintain a minimum budget to \$1.5 million dollars annually to sufficiently fund each treatment band and establish a balanced annual program which will improve conditions and maintain a sustainable future backlog.

Current PCI Histogram



2019 Pavement Condition Index

