

2009 Pavement Management Study

Spencer, Massachusetts

Prepared for

**Town of Spencer
Office of Utilities & Facilities**

**Robert McNeil III P.E.
Superintendent**

Prepared by
ENGINEERS

FST
Since 1914

**Fay, Spofford & Thorndike
Engineers – Planners – Scientists
5 Burlington Woods
Burlington, MA 01803
781-221-1000
fstinc.com**

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1. Introduction

Background:

The Town of Spencer is located in the heart of Worcester County, west of Worcester, Massachusetts and ten minutes northeast of the junction of I-84 and I-90 in Sturbridge. A 110.7-mile roadway network serves a population of approximately



12,500 people. Spencer's roadway network is comprised of approximately 5.3 state highway miles, 8.5 private miles and 96.9 public miles.

The Town of Spencer, in October 2008, retained the firm of Fay, Spofford & Thorndike (FST) to develop and implement a Pavement Management System (PMS) for its public roadway miles. From the first meeting with Superintendent of Utilities and Facilities, Robert McNeil, and Highway Foreman, Eben Butler, it was clear that Spencer was committed to improving their roadway infrastructure to the greatest extent possible.

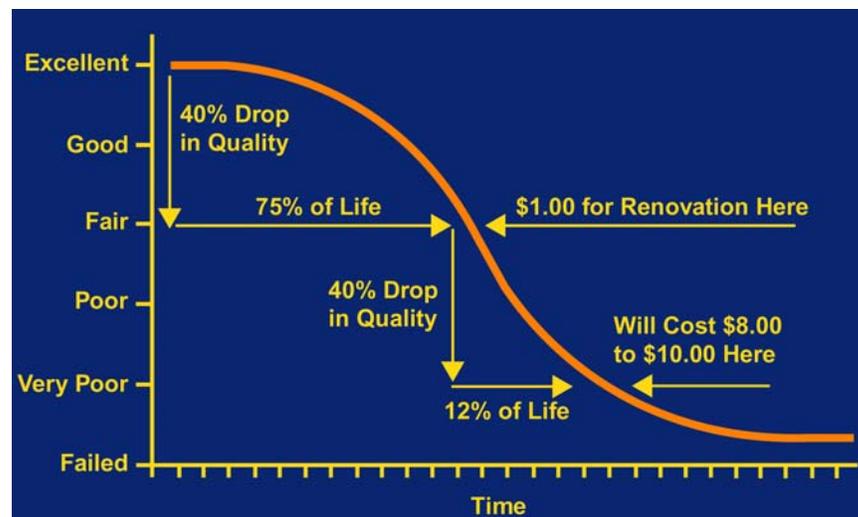
This comprehensive study was undertaken in order to develop an extensive roadway database describing actual pavement conditions and roadway characteristics in Spencer to better understand future roadway needs at various funding levels.

This report is designed to be a network level - planning tool and intended to provide a foundation for managing the Town's roadway resources by combining technology, local knowledge, and professional engineering input. Before describing the roadway management study, scope and findings, an introduction to pavement management concepts and theory is offered.

Pavement Management Concepts:

The development of a pavement management system is a logical approach road officials use to allocate cost effective road budgets. The theory of pavement management is based on accurately predicting accelerated roadway deterioration. Figure 1 dramatically illustrates the key concept of making timely maintenance repairs, thereby averting the need for far more expensive structural repairs. The goal is to save money in both the short and long run by developing a road repair program that minimizes expenditures.

Figure 1
Pavement Deterioration Curve



The curve shows the rate at which the pavement condition deteriorates over time (Figure 1). A roadway worsens slowly at the beginning of its projected life span (the portion of the graph where the curve is nearly horizontal). This level of deterioration per year increases drastically (the portion where the curve becomes nearly vertical) as the pavement reaches near middle age. When the pavement is near the end of its projected life span, the pavement worsens at a slower rate once again (the curve returns to near horizontal). The point where the pavement approaches middle age, before the curve drops off sharply, is considered the *critical zone* in the pavement's life. Before this point, it is relatively inexpensive to keep a roadway in good service, while after this point, it becomes much more expensive to keep the roadway in good service condition.

The pavement management system formalizes the process by using computer software. The procedure is to collect, organize, and maintain a complete roadway database that describes a particular road network system. This data is then analyzed to identify existing deterioration levels, prioritize cost-effective repairs, and create an optimal long-term spending plan. Pavement Management provides the Town with a tool to make the best use of every available dollar.

Study Approach:

FST field engineers, using on-board notebook computers, conducted a Town-wide roadway inventory and assessment, which included a detailed evaluation of key distress indicators on the roadway surfaces, to build a comprehensive database. The process entailed breaking out pavement management segments, closely observing and recording individual pavement distresses, and evaluating roadway sufficiency, such as rideability and utility patch conditions.



Roadways were partitioned into “pavement management segments” whenever there was a change in pavement condition, surface type, width, one way status, or other distinguishing characteristics. The pavement management sections were then given a descriptive name

that would best allow someone in the office to identify the field location. Appendix A contains all the pavement management segments identified, and sorted in alphabetical order.

Beginning in November 2008, FST collected four primary types of field data in Spencer:

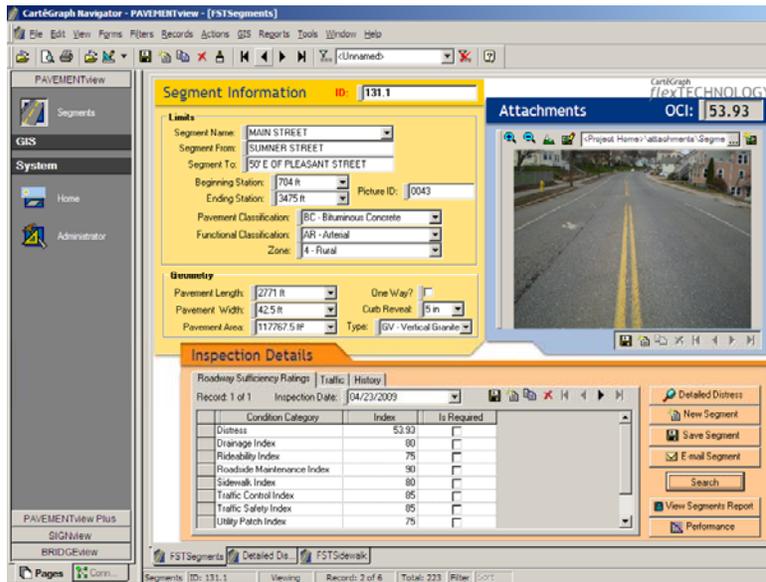
1. General roadway inventory data describing the beginning and end points of pavement segments, width, length, and surface material type.
2. Pavement condition data, providing a snapshot description of pavement surface conditions on the day of the survey—the severity and extent of specific pavement distresses, such as potholes, alligator cracking, transverse and longitudinal cracking, and rutting.
3. Roadway sufficiency scores for overall rideability, drainage, utility patches, traffic control, traffic safety, and roadside maintenance.
4. Sidewalk, pedestrian ramp, and sign inventory and general condition assessment.

Following data collection and field verification, system configuration meetings with the Office of Utilities and Facilities were held to gather information for subsequent computer analysis at various funding levels to be performed.

2. Methodology

Pavement Management Software:

Today's computer management technology allows consolidation of multiple data for easy and efficient building, editing, sorting, and reporting. FST used Carte'graph Systems, Inc. - PAVEMENTview®Plus software for storing and analyzing Spencer's roadway data. The database was custom tailored to reflect Spencer's specific decision-making criteria for selecting roadway repair types for available and proposed budgets. Spencer's Office of Utilities and Facilities and FST jointly developed system configuration parameters used in the analysis projections.



For analyzing Spencer's roadway system, the Pavement Condition Index (PCI) served as the primary condition index to compare the roadway serviceability and performance. PCI is an American Society for Testing & Materials (ASTM) method used to quantify pavement condition that has been verified and adopted by American Public Works Association (APWA). For PCI calculation, the severity and extent of nine (9) major pavement distresses were re-

recorded for each pavement management segment, and then the software used a weighted formula to calculate a PCI number. The nine distresses are: potholes or non-utility patching, alligator cracking, distortion, rutting, block cracking, transverse or longitudinal cracking, bleeding or polished aggregate, surface wear or raveling, and shoving, slippage or corrugations. Three pavement surface types were used to categorize Spencer's road surfaces:

- ❑ "Hot Mix Asphalt" or "bituminous concrete" roadway is typically engineered with a pavement structure designed to withstand predicted traffic load and volume. The roadway usually has a gravel base, an intermediate course, and a top surface wearing course.
- ❑ "Surface Treated" roadways generally started as an oil and sand surface, and then were built up over time with a series of sand and

stone seals. Roads in this category include chip seals, micro-surfacing and Novachip.

- “Gravel” roads having dirt or gravel unbound road surfaces.

The Pavement Condition Index (PCI) Defined:

Recording of actual field distresses calculate the PCI. A PCI was generated for each inventoried, surfaced, public roadway in Spencer using distress data. PCI is measured on a one hundred to zero scale, with one hundred representing a pavement in excellent condition and zero describing a pavement in extremely poor condition. Each type of observed pavement distress is assigned a deduct value based on the distress type, severity and extent.

More severe distress types, such as potholes, have higher “deduct points” than a lesser distress such as longitudinal cracking. A weighted sum of the deduct points is then subtracted from the perfect “one hundred” road in order to generate a PCI for each roadway. In general, base related (the pavement foundation) distresses are weighted more heavily than surface related distresses.

The Five Treatment Repair Bands:

FST’s pavement management software decision matrix uses five broad category ranges to group the calculated PCI numbers into five major repair bands. An individual road segment will fall into a particular band based on user defined criteria such as pavement type, functional classification, curb reveal, and sidewalk condition. Then each segment is assigned a repair alternative candidate with the prescribed treatment band. Table 1 presents the category ranges represented by the PCI bands.

Table 1
(PCI) Treatment Band Ranges¹

| | |
|---|--|
| 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) | Failure Condition - in need of full depth reconstruction/reclamation. |

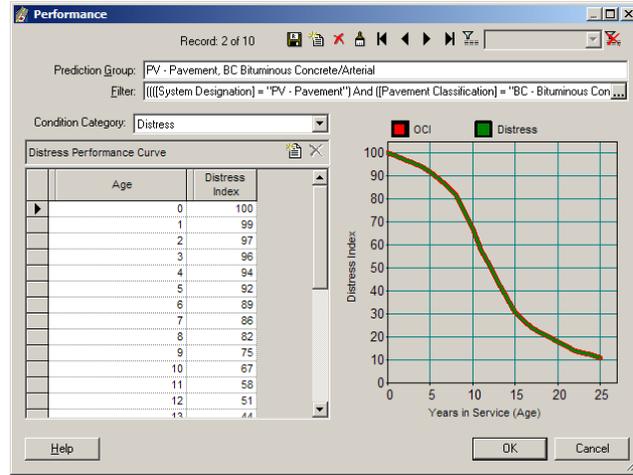
¹ The PCI ranges given in this table are general averages. The actual treatment band threshold numbers depend on pavement surface type and functional classification.

1. When roads are in near perfect condition, the **Do Nothing** category (Band #1) prescribes no maintenance.
2. **Routine Maintenance** (Band #2) is regularly used on roads in reasonably good condition to prevent deterioration from the normal effects of traffic and pavement age. This treatment category would include either crack sealing or local repair (pothole, depression, poorly constructed utility patch, etc.), or minor localized leveling.
3. **Preventive Maintenance** (Band #3) is a slightly greater response to more pronounced signs of age and wear than that of Band #2. Not only would crack sealing, full-depth patching, and minor leveling be included, but also surface treatments such as chip seals, micro-surfacing, and thin overlays may apply on selected facilities and pavement types. A road in need of Preventive Maintenance is in the critical zone of the pavement deterioration curve (Figure 1). It is in this range of a pavement's life cycle that the most cost-effective repairs can be made. Further deterioration warrants a significantly more costly response.
4. When the pavement deteriorates beyond the need for surface maintenance applications, but the road base appears to be sound, **Structural Improvement** (Band #4) repairs are in order. They could include structural overlays, shim and overlay, cold planeing and overlay, and hot in-place recycling.
5. The **Base Rehabilitation** category (Band #5) represents roads that exhibit weakened pavement foundation base layers. Complete reconstruction and full depth reclamation fall into this category. Quite often, project level pavement evaluation through field sampling and laboratory testing is used to evaluate the existing materials for possible recycling or reuse.

Priority Ranking and Future Projection:

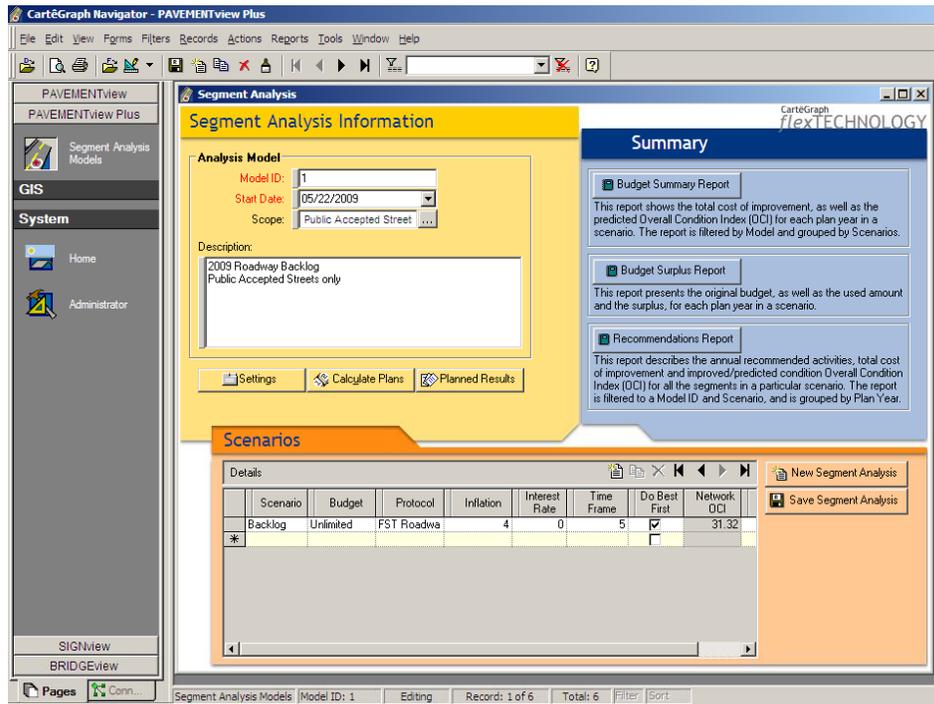
After all pavement segment repairs are assigned, the software prioritizes needed system repairs based on the highest projected Network Priority Ranking (NPR). The NPR value uses variables representing functional classification, pavement type, PCI, and traffic volume. Although road repairs could be prioritized on "worst first" basis, FST and Spencer Office of Utilities and Facilities chose to maximize its available road funds by generating an NPR that favors cost-effective repairs that improve and/or maintain salvageable pavement segments. This would delay repair actions on those segments that require reconstruction or major rehabilitation; i.e., their condition cannot deteriorate much further. After the relatively good roads are "preserved", future repairs are then directed toward the poorer, heavily traveled roads.

In order to properly plan future repairs, the software utilizes several different deterioration curves.



These pavement performance curves depict four (4) major categories relative to functional classification (arterial roads in one curve, collector in one curve, local through roads in one curve and local dead-end roads in another curve); and three (3) fundamental pavement systems (a

curve for Hot Mix Asphalt pavements, a curve for surface treatment surfaces, and a different curve for gravel surfaces). When a road segment is evaluated as to whether it should be included in future repair programs, it deteriorates according to the applicable curve for the model duration, thereby accounting for the differential effects of traffic volume and pavement type.



Each plan year, the software prepares a future roadway condition projection, exhausts the assigned budget, and then produces an annual list of road segments to include in the repair program. The system also takes inflation into account for the time value of money. In these cases, a 4% inflation rate was used. Having explained the methodology built into the pavement management software, the next section describes the existing conditions in Spencer.

3. Existing Conditions

Roadway Mileage and Current PCI:

Spencer has 157 streets that make up 96.9 public miles. This public roadway system is predominately hot mix asphalt (bituminous concrete) roadway surfaces. The mileage is comprised of 1.2 miles of arterials, 32.6 miles of collectors, 56.0 miles of locals, and 7.1 miles of dead ends.

FST identified 213 pavement management segments, and determined that the Town's average road network PCI in the Spring of 2009 was 54, placing Spencer's typical road conditions in the middle of the Preventive Maintenance treatment band (PCI range from 67 to 47). This PCI average value generally represents a roadway in "fair" condition.

An average road condition in the Preventive Maintenance treatment band by definition means that considerable resources will be needed to sustain network wide road conditions. It is likely that while any proposed pavement management spending plan will strive to maximize the benefit of each dollar spent, without a pre-emptive strike the system will undoubtedly continue to lose roads from the routine and preventive maintenance category into the structural improvement and base rehabilitation bands. This very costly loss will present a challenge to Spencer officials if the Town wants to retain its roads in fair condition.

The following photographs illustrate examples of Spencer roadways that fall into each of the five treatment repair bands, and a representative average Town roadway condition. The photographs also show, for each treatment band, the location and the PCI value.

Do Nothing

PCI = 96

Wire Village Road from Pleasant Street to Gold Nugget Farm Road



Routine Maintenance

PCI = 73

Paxton Road from 300' S. of Wilson Road to 750' N. of Wilson Road



Preventive Maintenance

PCI = 49

R. Jones Road from Ash Street to Kingsbury Road



Structural Improvement

PCI = 25

Water Street from Valley Street to Main Street



Base Rehabilitation

PCI = 11

Ashview Drive from Ash Street to Cul-de-sac



Town Average Pavement Condition Index PCI = 54

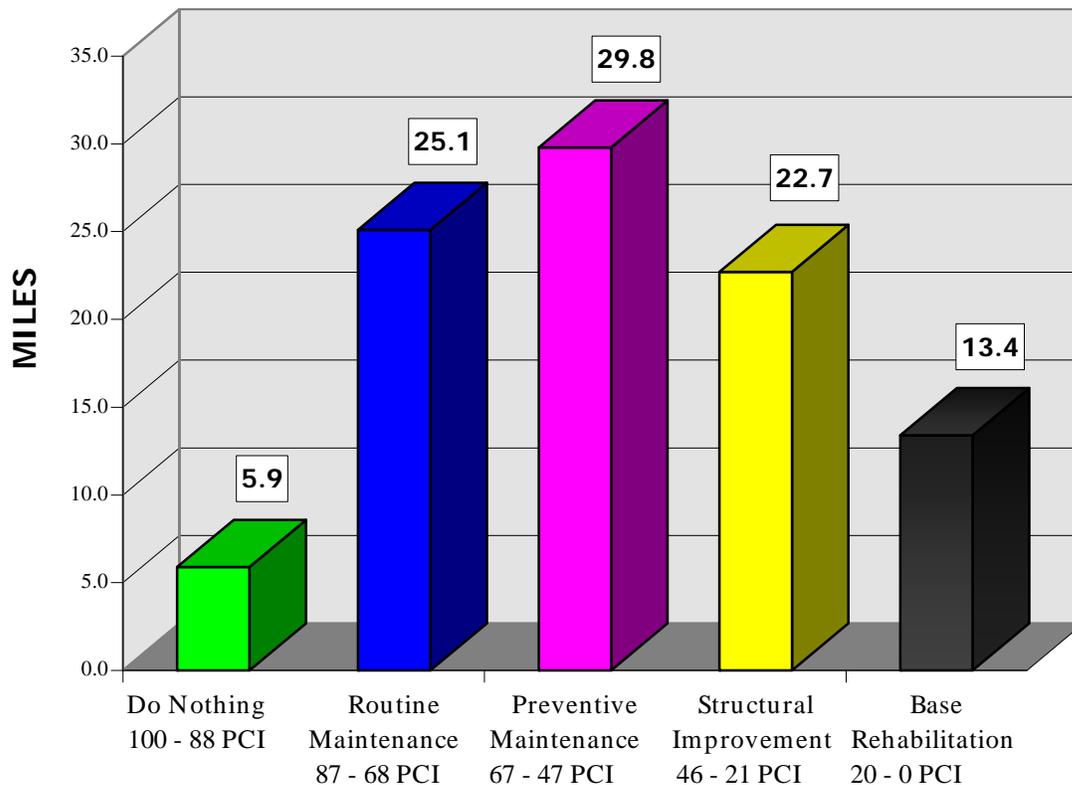
Main Street from Sumner Street to 50' E. of Pleasant Street



Distribution of Pavement Conditions:

A categorization of the surveyed pavement segments show that 6% (5.9 miles) of the roadways fall into the "Do Nothing" band; 26% (25.1 miles) of the roads are in the "Routine Maintenance" band; 31% (29.8 miles) of the roads are in the "Preventive Maintenance" band; 23% (22.7 miles) of the roads are in need of "Structural Improvement"; and 14% (13.4 miles) of the pavement segments are in need of "Base Rehabilitation" (Figure 2). One quarter of the roadway network lies in the "Structural Improvement" band or "fair" condition, while the lowest mileage category for Spencer's roads is the "Do Nothing" band. Appendix A contains the PCI values for each individual pavement segment.

Figure 2
PCI Distribution in Miles by Treatment Band



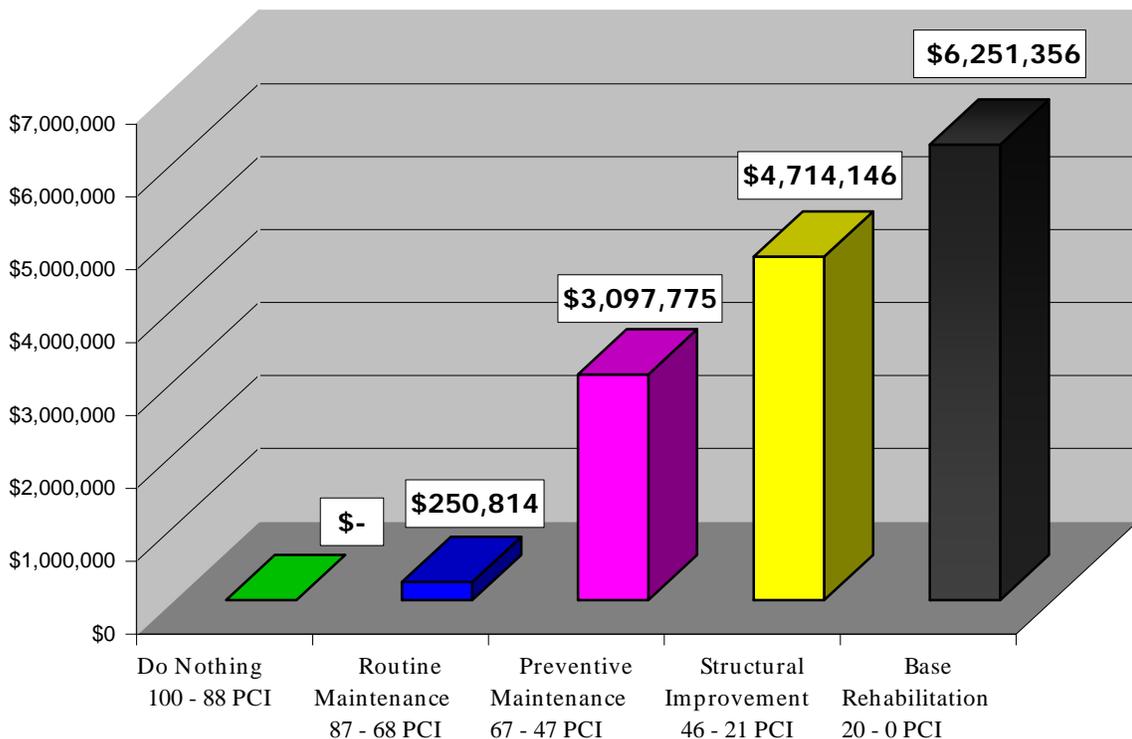
The actual system for each of the repair alternatives and unit costs can be found in Appendix C. For planning purposes, Base Rehabilitation type repairs approach the \$50 per square yard range, structural overlay improvement costs are closer to \$20 per square yard, preventive maintenance costs about \$8 per square yard, and routine maintenance is in the \$0.75 per square yard range.

Current Roadway Backlog:

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 Spencer roadway network is in terms of its present physical condition, but 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 utilities, drainage, sidewalk, curbing, signals, signs, or pavement marking costs, unless specified within the activity (see Appendix C).

As of Spring 2009, Spencer's backlog of pavement repair work totaled over \$14,314,091. This cost estimate consists of \$6,251,356 in base rehabilitation; \$4,714,146 for structural improvement work; \$3,097,775 in preventive maintenance, and \$250,814 in routine maintenance. Figure 3 summarizes costs by treatment band. Note that the base rehabilitation category represents nearly 1/2 of the repair dollars though it accounts for less than 14% of the total road miles as shown in Figure 2.

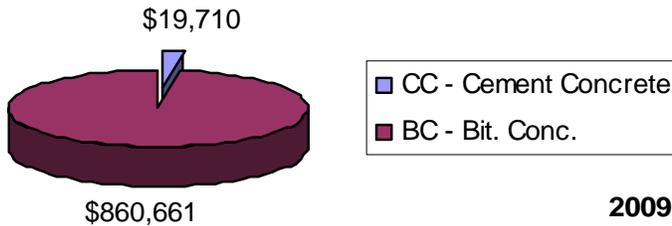
Figure 3
Dollar Backlog of Outstanding Repairs



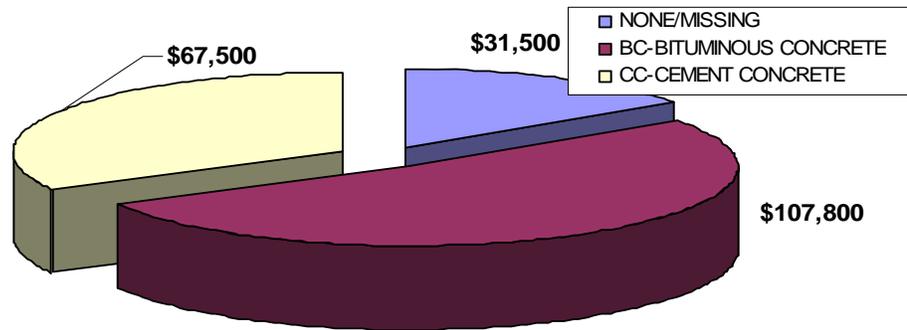
Current Sidewalk, Pedestrian Ramp, and Sign Backlog: \$1,205,071

In addition to the pavement backlog, FST inventoried other right-of-way public infrastructure including the sidewalks, pedestrian ramps, and signs during our field assessment and have found the resulting backlog of repair work as follows: ²

2009 Sidewalk Backlog = \$880,371

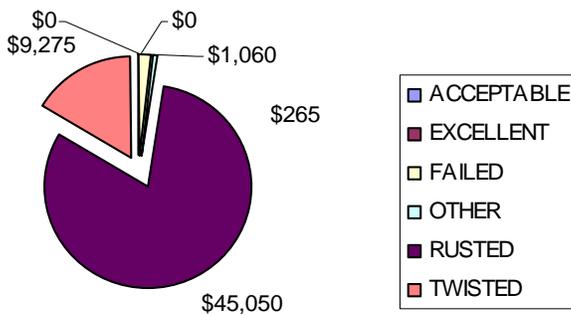


2009 Pedestrian Ramp Backlog = \$206,800

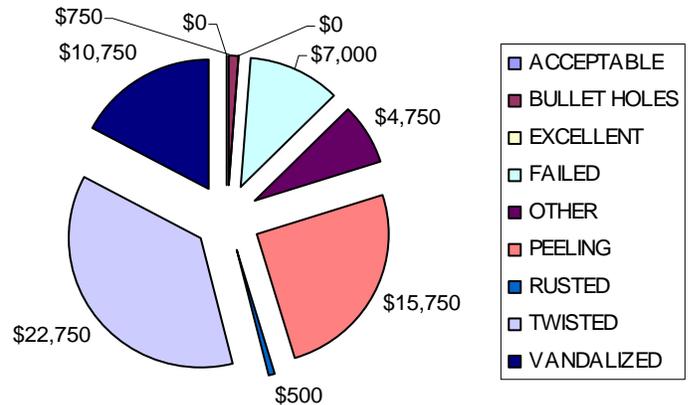


2009 Sign and Support Backlog = \$117,900

Sign Supports



Signs



² FST did not perform any future financial models to sustain Spencer's sidewalk, ramps, and signs backlog.

4. Model/Planning Process

Budget Analysis:

The analysis software of the pavement management system 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 Office of Utilities and Facilities and FST, for overall desired roadway network conditions.

A **regressive** spending program occurs when insufficient funds are invested in road repairs, resulting in an ever-increasing repair backlog. An **equilibrium** program spends just enough money each year to keep the backlog stable. A **progressive** program provides sufficient improvement funds to result in a reduction of the backlog over time. Various scenarios were analyzed for Spencer to measure the effects of alternative funding levels, and to determine the funding needed to avoid regressive spending.

The planning process determines the most beneficial improvement plan based on the dollars available for each repair type and other factors. Pavement management pulls together these components in its Network Priority Ranking (NPR) value in order to develop a cost-effective program. As previously stated, the NPR was configured to maximize roadway funds. In all of the following model projections (except the Historical Budget Worst-First), the power of the software was used to allocate funding amounts by best NPR value, based on the pavement management theory. Pavement management theory recognizes that roads deteriorate in an accelerated fashion after the first 75% of their service life and consequently, programs timely road expenditures to avert far more costly and widespread repairs.

Appendix A contains a backlog report of the suggested segment repairs, the associated costs, PCI and NPR - as detailed in the Methodology section, the NPR number reflects the comparative merit of repairing one road section over another, in light of life cycle cost, traffic volume, and factors other than simply observed pavement distresses. This report has been ordered alphabetically. The balance of this section explains the results of Spencer's scenario projections, and concludes with a long-term action plan based on the scenario findings.

Scenario Findings:

What follows is an overview of the budget/planning model results. Five budget/planning scenarios were modeled:

- Zero Budget
- Historical Budget (Worst First)
- Historical Budget
- Maintain Backlog Funding Scenario
- Aggressive Funding Scenario

After determining Spencer's existing backlog of work, FST projected the network average pavement condition index and backlog at a zero annual appropriation rate for ten years; the expected historical appropriation rate for ten years with a priority on repairing the worst streets first; and the same historical allotment with a priority on repairing the best streets first; then a ten year scenario showing funding levels needed to maintain the current backlog; and finally, the impact of an aggressive ten year funding scenario.

All the scenarios accounted the "optimum" NPR with the exception of the Historical Budget (Worst First) where NPR focuses on repairing the worst segments first. The dollar amounts appropriated incorporate a 4.0% annual inflation rate. **Therefore, where the annual roads program appropriation appears to remain the same, it in fact represents a net budget decrease due to the impact of inflation.** It should be noted that Spencer's annual roads program historically has only been funded by State Chapter 90 aid.

In the scenario specific summary tables that follow, each plan begins with the same network average PCI, then shows the new network average PCI at the end of each plan period. The tables also use the same amount of outstanding repair work (backlog) at the start of each plan period, so the first plan year backlog will appear the same for each of the scenarios. The successive years document the impact of the funding plan on comparison of road network average conditions and backlog.

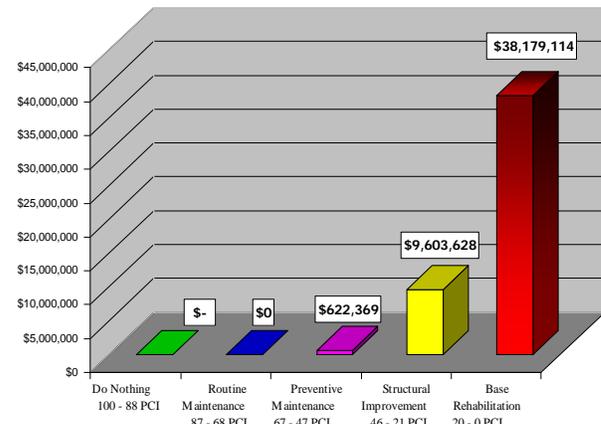
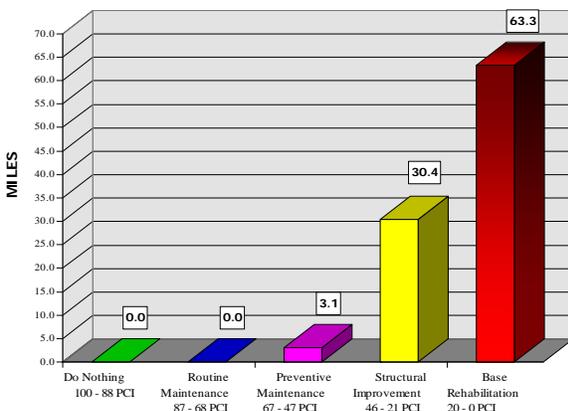
Zero Budget:

In recent history, funding for Spencer road repairs has come primarily from State Aid sources, with additional funding appropriated locally. Given the unreliability of consistent State funding, a worst-case scenario was developed to show how severely the Town would be impacted, over a ten-year period, by not funding any road maintenance.

Table 2
Zero Budget

| <u>YEAR</u> | <u>FUNDING</u> | <u>PCI LEVEL</u> | <u>BACKLOG</u> |
|-------------|----------------|------------------|----------------|
| 05/2009 | | 54.4 | \$14,314,091 |
| FY 2010 | \$0 | 54.0 | \$14,273,631 |
| FY 2011 | \$0 | 49.2 | \$17,739,511 |
| FY 2012 | \$0 | 44.1 | \$20,393,145 |
| FY 2013 | \$0 | 39.5 | \$23,865,661 |
| FY 2014 | \$0 | 35.2 | \$26,903,873 |
| FY 2015 | \$0 | 31.3 | \$31,131,099 |
| FY 2016 | \$0 | 27.9 | \$34,542,048 |
| FY 2017 | \$0 | 24.9 | \$39,211,296 |
| FY 2018 | \$0 | 22.2 | \$43,625,658 |
| FY 2019 | \$0 | 20.0 | \$48,405,111 |

In only a ten-year period, the scenario shows that with no road maintenance funding, the network average PCI dropped from a PCI of 54 (the middle of the Preventive Maintenance band) down to a PCI of 20 (the top of the Base Rehabilitation band). Further, the numbers show the repair backlog nearly *3.5 times* the original backlog at \$48,405,111. The system-wide deterioration was dramatic because the concentration of roads in the Preventive Maintenance band quickly slipped into the Structural Improvement type repairs, and roads in the Structural Improvement band fell into the most expensive repair band, the Base Rehabilitation treatment range. This is regressive spending at its worst and this level of deterioration would not be expected to occur. Below are charts reflecting the resulting FY 2019 backlog by treatment band in miles and dollars.



Historical Budget (Worst First):

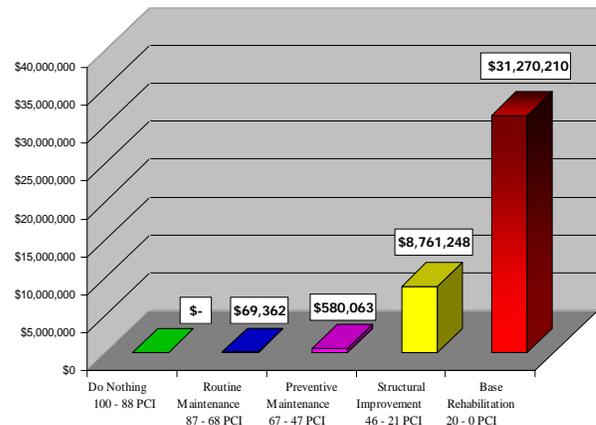
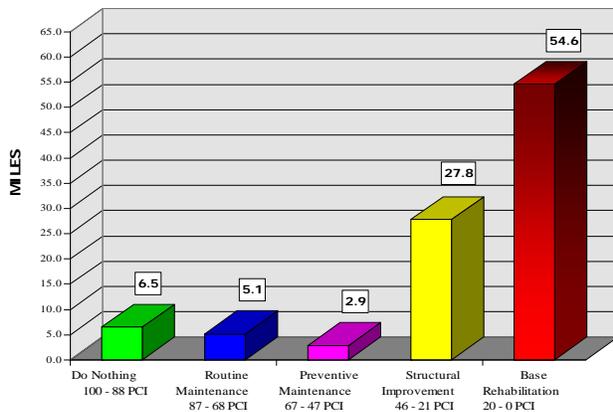
FST met with Spencer’s Utilities and Facilities officials to review historic funding levels. As confirmed by the Office, the current Spencer annual appropriation for roadway repairs is from the State Aid Chapter 90 program and limited local funding sources. The Historical Budget scenario based the five-year projection on the \$394,000 funding level that the Town can rely on to maintain and repair its roads.

The Historical Budget (Worst First) scenario prioritized the worst street segments first, since these represent most citizen complaints and repair requests.

**Table 3
Historical Budget (Worst-First)**

| <u>YEAR</u> | <u>FUNDING</u> | <u>PCI LEVEL</u> | <u>BACKLOG</u> |
|-------------|----------------|------------------|----------------|
| 05/2009 | | 54.4 | \$14,314,091 |
| FY 2010 | \$394,000 | 55.4 | \$13,879,943 |
| FY 2011 | \$394,000 | 51.3 | \$16,871,886 |
| FY 2012 | \$394,000 | 47.4 | \$18,958,865 |
| FY 2013 | \$394,000 | 44.0 | \$21,735,258 |
| FY 2014 | \$394,000 | 40.8 | \$23,925,508 |
| FY 2015 | \$394,000 | 38.0 | \$27,256,088 |
| FY 2016 | \$394,000 | 35.6 | \$29,355,213 |
| FY 2017 | \$394,000 | 33.5 | \$33,085,514 |
| FY 2018 | \$394,000 | 31.8 | \$36,273,170 |
| FY 2019 | \$394,000 | 30.3 | \$40,680,883 |

The network average PCI dropped from a PCI of 54 (the middle of the Preventive Maintenance band) down to a PCI of 30 (the middle of the Structural Improvement band). If this funding level remains unchanged, by the year 2019, the present backlog of \$14,314,091 will have grown to \$40,680,883 in the tenth year of the projection. This reflects a regressive spending program. Below are charts reflecting the resulting FY 2019 backlog by treatment band in miles and dollars.



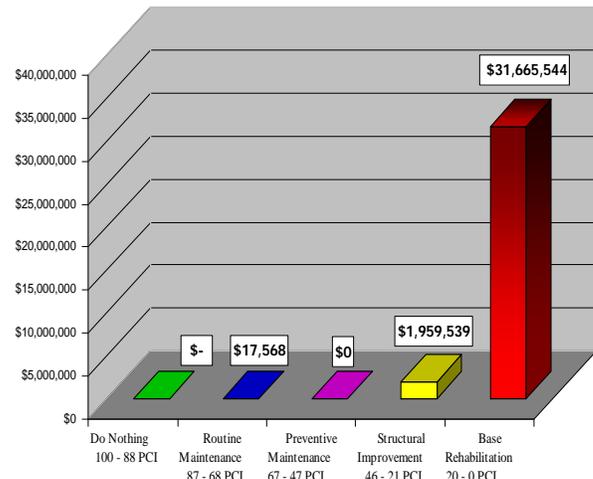
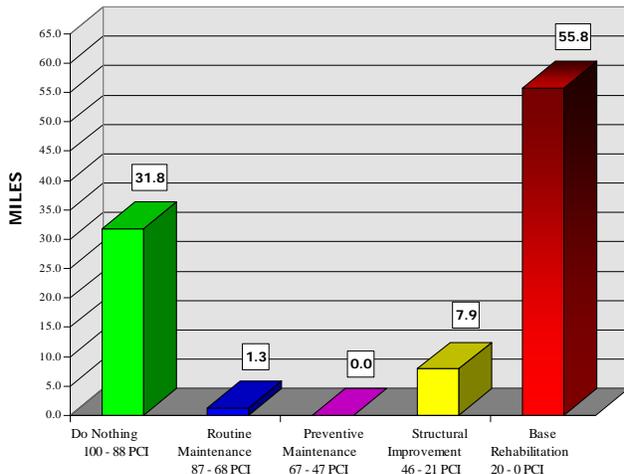
Historical Budget:

The Historical Budget uses the same funding level as the previous scenario, except utilizing a Network Priority Ranking (NPR) that prioritizes “good” roads. By addressing the preventive maintenance type repairs, and deferring the “poorer” roads, the network average PCI slightly decreases to 46. More importantly, by simply changing repair strategy, at the end of this ten-year scenario, the Town will have saved over \$7.0 million dollars (note: the backlog difference in year 2019) by adhering to the pavement management concept.

**Table 4
Historical Budget**

| <u>YEAR</u> | <u>FUNDING</u> | <u>PCI LEVEL</u> | <u>BACKLOG</u> |
|-------------|----------------|------------------|----------------|
| 05/2009 | | 54.4 | \$14,314,091 |
| FY 2010 | \$394,000 | 57.9 | \$13,879,759 |
| FY 2011 | \$394,000 | 55.2 | \$16,568,134 |
| FY 2012 | \$394,000 | 52.8 | \$18,211,966 |
| FY 2013 | \$394,000 | 50.4 | \$19,933,675 |
| FY 2014 | \$394,000 | 48.7 | \$21,789,269 |
| FY 2015 | \$394,000 | 47.9 | \$23,817,456 |
| FY 2016 | \$394,000 | 46.9 | \$25,099,676 |
| FY 2017 | \$394,000 | 46.5 | \$27,746,962 |
| FY 2018 | \$394,000 | 46.0 | \$30,489,036 |
| FY 2019 | \$394,000 | 45.8 | \$33,642,651 |

While this budget represents regressive spending, the scenario illustrates the importance of not directing roadway funds towards the worst streets, but rather “preservation” maintenance repair types such as crack sealing and surface treatments. The following funding scenarios utilize the best-first approach, as seen here. Below are charts reflecting the resulting FY 2019 backlog by treatment band in miles and dollars.



Maintain Backlog Funding Scenario:

Recognizing that an increase in local dollars will be needed to improve Town-wide road conditions, a scenario that would keep the backlog at today's levels over a ten-year time period, was evaluated.

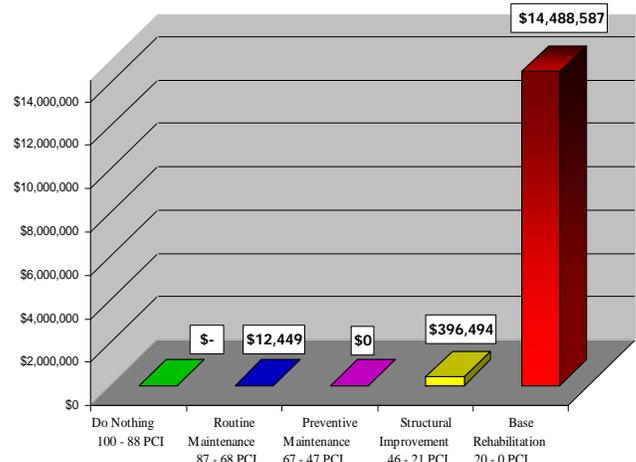
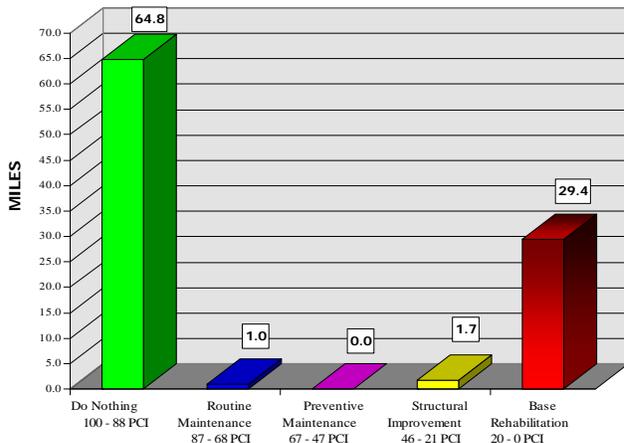
This alternative would perform cost-effective repair work identified by existing conditions to maintain the current backlog. The work would be done over a ten-year period, costing \$16,400,000 of which would require between \$800,000 and \$1,800,000 per year.

By slowly chipping away at the backlog, the PCI increasing to 73 (at the bottom of the Routine Maintenance band), and the backlog of repair work increasing slightly to \$14,897,530 in the year 2019, this funding program will place Spencer in an equilibrium spending program.

**Table 5
Maintain Backlog Funding Scenario**

| <u>YEAR</u> | <u>FUNDING</u> | <u>PCI LEVEL</u> | <u>BACKLOG</u> |
|-------------|----------------|------------------|----------------|
| 05/2009 | | 54.4 | \$14,314,091 |
| FY 2010 | \$800,000 | 59.6 | \$13,473,859 |
| FY 2011 | \$1,300,000 | 59.1 | \$14,995,369 |
| FY 2012 | \$1,700,000 | 60.5 | \$15,150,496 |
| FY 2013 | \$1,800,000 | 60.8 | \$14,885,738 |
| FY 2014 | \$1,800,000 | 61.4 | \$14,625,484 |
| FY 2015 | \$1,800,000 | 63.3 | \$14,325,010 |
| FY 2016 | \$1,800,000 | 66.1 | \$13,532,269 |
| FY 2017 | \$1,800,000 | 70.3 | \$13,283,485 |
| FY 2018 | \$1,800,000 | 71.9 | \$13,994,913 |
| FY 2019 | \$1,800,000 | 73.4 | \$14,897,530 |

Below are charts reflecting the resulting FY 2019 backlog by treatment band in miles and dollars.



Aggressive Funding Scenario:

In keeping with good pavement management practice, a funding scenario that would aggressively address the backlog was evaluated. The proposed scenario looks at spending a little over \$14,000,000 over the next ten years. Starting with spending \$2,500,000 for the first three years, \$1,250,000 the next four years, and cutting the funding in half, once again, to a reasonable future funding level of \$512,000 for the last three years.

At the end of the ten-year projection, this funding level results in a substantial improvement in road network condition, with the PCI rising 30%, to 77, while the backlog decreases to \$10,647,834.

Table 6
Aggressive Funding Scenario

| <u>YEAR</u> | <u>FUNDING</u> | <u>PCI LEVEL</u> | <u>BACKLOG</u> |
|-------------|----------------|------------------|----------------|
| 05/2009 | | 54.4 | \$14,314,091 |
| FY 2010 | \$2,500,000 | 66.2 | \$11,773,931 |
| FY 2011 | \$2,500,000 | 68.9 | \$11,368,123 |
| FY 2012 | \$2,500,000 | 70.9 | \$ 9,952,134 |
| FY 2013 | \$1,250,000 | 71.0 | \$ 9,604,384 |
| FY 2014 | \$1,250,000 | 71.9 | \$ 9,591,895 |
| FY 2015 | \$1,250,000 | 76.0 | \$ 9,794,835 |
| FY 2016 | \$1,250,000 | 78.4 | \$ 9,367,885 |
| FY 2017 | \$512,000 | 78.1 | \$ 9,700,851 |
| FY 2018 | \$512,000 | 77.6 | \$ 9,829,176 |
| FY 2019 | \$512,000 | 77.4 | \$10,647,834 |

By countering pavement deterioration aggressively in its early stages, at today's costs, this scenario would allow the Town to implement a pro-active pavement maintenance program – making the necessary capital repairs while maintaining the streets in the maintenance categories simultaneously, and better managing Spencer's future pavement backlog. This truly is a progressive funding program. Below are charts reflecting the resulting FY 2019 backlog by treatment band in miles and dollars.

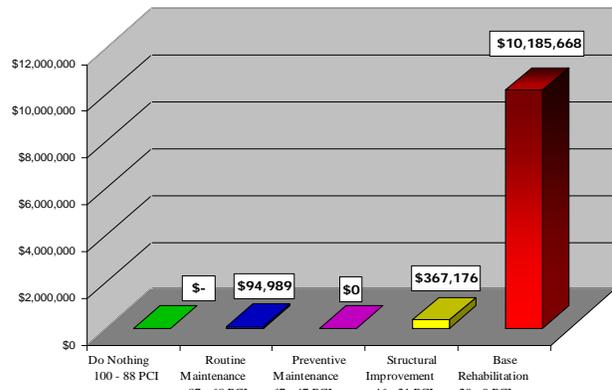
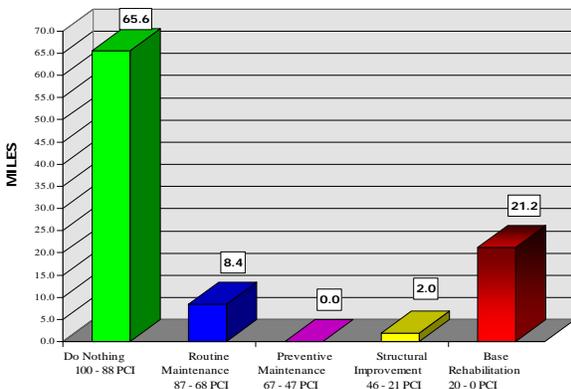
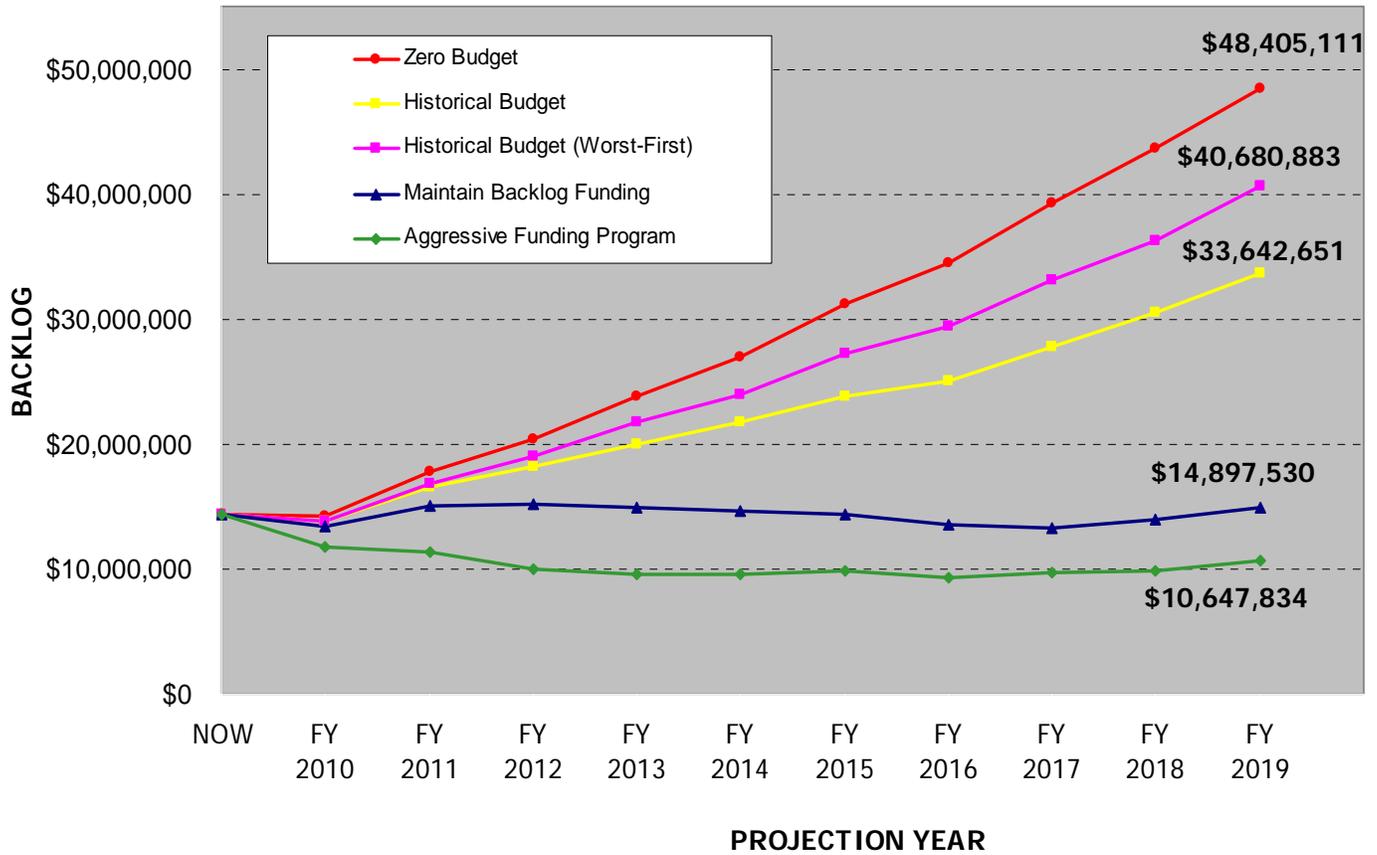


Figure 4
Summary of Roadway Funding Scenarios



5. Conclusion

Recommended Plan of Action:

The overall roadway network in the Town of Spencer is currently in fair condition. However, this study shows that future diligence will immediately be necessary to preserve and improve town-wide pavement conditions. The findings in this report illustrate current funding levels are severely low and will not sustain expected roadway deterioration. Future roadway funding levels need to be increased as soon as possible, as Spencer's street network is on the brink of extensive town-wide roadway rehabilitation.

If pre-emptive action is not taken, the large mileage of streets currently in need of preventative maintenance will rapidly digress to poorer conditions that would subject the town to far more expensive roadway work. Today's roadway network currently sits slightly below the "critical point" where the window of opportunity to perform cost-effective roadway repairs is presented. The town should strive to secure between \$12,000,000 and \$14,000,000 for the next ten years, to aggressively tackle its roadway backlog, as found in the **Aggressive Funding Scenario**, and gain better control of its rapidly deteriorating roadways. Also, the town should continue keeping abreast of the latest developments in pavement restoration technology that might offer a more cost-effective alternative to pavement maintenance or rehabilitation over the pavement's life cycle.

It's easy to forget that pavements are a community's single largest asset. The Town has a major investment in its 96.9-mile roadway network. Simply considering the pavement surface alone, without water, sewer, drainage, curbing, or sidewalks assets, it would cost Spencer slightly over \$69,000,000 in today's dollars to completely replace the existing pavement infrastructure. Pavements are not perpetual, they're one of Town's fastest deteriorating assets, due to environmental effects, increased traffic loading, and utility cuts.

Bonding rates are at an all time low, and a viable alternative to investigate for additional roadway capital. **Additional roadway funding will protect Spencer's pavement assets, resulting in better overall roadway conditions, and satisfaction that taxpayer dollars have been well spent.**

Pavement Management System Maintenance:

Pavement management is a systematic process that needs the long-term commitment of Town decision-makers and support of practitioners to maintain the pavement management system. The Town of Spencer has purchased pavement management software to update the Town's roadway database in the future. Standard management and upkeep of the database include the following practices:

- Post all annual pavement management segment improvements into the database. Both the pavement condition ratings and the repair history information should be entered.
- Re-inspect Arterial and Collector roadways annually; local roads every two (2) years; dead end and cul-de-sacs every three (3) years.
- Add any new roadways to the database as soon as the Town accepts them. Pavement and roadside data can be added as it becomes available.
- Update repair type unit costs and inflation rates annually, re-calculate applicable funding models and analyses.
- Implement a sound departmental quality control/assurance program, with particular focus on major pay items such as hot mix asphalt.
- Form a Pavement Management Committee. Members should include representatives from different Town departments and committees, and from both management and operational levels.

FST can support this proposed action plan using our transportation expertise and talents. In summary, the pavement management system should serve as a valuable tool to the Town of Spencer and to Spencer decision-makers in their proactive approach to managing Spencer's roadways.

APPENDIX A

Segments FST Analysis Recommendations by Plan Year

| | |
|--------------------|------------------------------------|
| Filter | (..\Model ID = "1") |
| Working Set Filter | <Not Applicable> |
| Sort | Segment ID\Description, Segment ID |
| Group By | Plan Year |

Segments FST Analysis Recommendations by Plan Year

Scenario [Back](#) **Description** [FY2010 Roadway Repair Backlog](#)
Protocol [FST Roadway](#) [\\$14,314,091 Pavement Costs Only](#)
Budget [Unlimited](#)
Time Frame [1](#)

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------|------------------------------|------------------------------|-------------|---------------------------------|-----------|-------|-------|
| ADAMS STREET | MAPLE STREET | CLARK STREET | 579.00 ft | BC - 2" Overlay Local | \$26,660 | 21.10 | 46.49 |
| ADAMS STREET | CLARK STREET | MCDONALD STREET | 385.00 ft | BC - Crack Seal and Patch | \$838 | 74.23 | 62.84 |
| ALIX ROAD | LYFORD ROAD | DEAD END | 770.00 ft | BC - Reclaim Local | \$38,329 | 10.85 | 28.72 |
| ALTA CREST CROSS ROAD | NORTHWEST ROAD | DEAD END | 1,655.00 ft | GR - Gravel & Drain Improvement | \$5,929 | 43.04 | 29.40 |
| ALTA CREST ROAD | NORTH SPENCER ROAD | 300' W OF NORTH SPENCER ROAD | 300.00 ft | BC - 2" Overlay Local | \$8,880 | 33.70 | 37.29 |
| ALTA CREST ROAD | 300' W OF NORTH SPENCER ROAD | DEAD END | 1,189.00 ft | BC - Crack Seal or Patch | \$1,353 | 79.56 | 49.86 |
| ARCTIC POLAR SPRING ROAD | MAIN STREET | DEAD END | 2,042.00 ft | GR - Gravel & Drain Improvement | \$7,315 | 40.32 | 30.10 |
| ARSENAULT DRIVE | SUNDBERG ROAD | DEAD END | 341.00 ft | BC - 2" Overlay Local | \$6,449 | 19.16 | 31.28 |
| ASH STREET | MAIN STREET | CLARK STREET | 2,265.00 ft | BC - Shim, Crack Seal & Patch | \$27,610 | 64.04 | 59.70 |
| ASH STREET | CLARK STREET | R JONES ROAD | 5,483.00 ft | BC - 1-1/4" Overlay | \$133,822 | 57.36 | 57.65 |
| ASH STREET | R JONES ROAD | EAST CHARLTON STREET | 3,604.00 ft | BC - 1-1/4" Overlay | \$81,679 | 56.32 | 57.33 |
| ASHVIEW DRIVE | ASH STREET | CUL-DE-SAC | 1,288.00 ft | BC - Reclaim Local | \$118,210 | 11.35 | 30.42 |
| BACON HILL ROAD | CHARLTON ROAD | EAST CHARLTON ROAD | 5,047.00 ft | BC - Reclaim Col | \$416,532 | 17.56 | 54.63 |
| BARCLAY ROAD | NORTH SPENCER ROAD | PAXTON TOWN LINE | 809.00 ft | BC - Shim, Crack Seal & Patch | \$10,505 | 64.81 | 71.48 |
| BAY PATH ROAD | MEADOW ROAD | OLD FARM ROAD | 2,038.00 ft | BC - 1-1/4" Overlay | \$71,058 | 51.76 | 55.93 |
| BELL STREET | MAIN STREET | WALNUT STREET | 758.00 ft | BC - Crack Seal or Patch | \$1,240 | 81.40 | 65.05 |
| BEMIS STREET | MAPLE STREET | MECHANIC STREET | 695.00 ft | BC - 2" Overlay Local | \$22,858 | 34.76 | 50.70 |
| BIXBY ROAD | WEST MAIN STREET | DEAD END | 2,116.00 ft | Do Nothing | \$0 | 91.63 | 55.12 |
| BLUEBERRY HILL DRIVE | CHARLTON ROAD | CUL-DE-SAC | 1,030.00 ft | BC - Crack Seal or Patch | \$1,904 | 83.37 | 52.58 |
| BOND STREET | MAIN STREET | LEICESTER TOWN LINE | 1,664.00 ft | BC - Crack Seal or Patch | \$2,248 | 78.92 | 64.28 |
| BORKUM ROAD | CLARK ROAD | CHARLTON TOWN LINE | 8,306.00 ft | BC - 2" Overlay Local | \$293,663 | 31.16 | 49.59 |
| BRIARCLIFF LANE | BACON HILL ROAD | CHARLTON TOWN LINE | 2,738.00 ft | BC - Crack Seal and Patch | \$5,551 | 76.32 | 63.48 |
| BROOKS POND CROSS ROAD | BROOKS POND ROAD | 750' N OF BROOKS POND ROAD | 752.00 ft | BC - 2" Overlay Local | \$24,114 | 26.60 | 45.11 |
| BROOKS POND CROSS ROAD | 750' N OF BROOKS POND ROAD | NORTHWEST ROAD | 2,328.00 ft | BC - Reconstruction Local | \$199,639 | 13.58 | 41.10 |
| BROOKS POND ROAD | NORTHWEST ROAD | 150' S OF WASHBURN ROAD | 6,372.00 ft | BC - Crack Seal and Patch | \$13,863 | 69.75 | 61.46 |
| BROOKS POND ROAD | 150' S OF WASHBURN ROAD | NORTH BROOKFIELD TOWN LINE | 622.00 ft | BC - Reclaim Local | \$32,897 | 9.07 | 42.79 |
| BROWN STREET | GROVE STREET | HIGHLAND STREET | 778.00 ft | BC - Reclaim Local | \$53,250 | 14.21 | 44.37 |
| BROWNING POND ROAD | NORTH SPENCER ROAD | OAKHAM TOWN LINE | 8,649.00 ft | BC - Shim, Crack Seal & Patch | \$100,847 | 63.20 | 70.22 |
| BUTEAU ROAD | CLARK ROAD | CHARLTON TOWN LINE | 4,436.00 ft | BC - Shim, Crack Seal & Patch | \$42,319 | 66.02 | 60.31 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|-----------------------------|-----------------------------|-------------|-------------------------------|-----------|-------|-------|
| CASEY STREET | MAPLE STREET | MECHANIC STREET | 449.00 ft | BC - 2" Overlay Local | \$14,029 | 26.32 | 45.02 |
| CHARLTON ROAD | MAPLE STREET | EAST CHARLTON ROAD | 4,055.00 ft | BC - Reclaim Col | \$461,290 | 16.86 | 57.50 |
| CHARLTON ROAD | EAST CHARLTON ROAD | SUNBERG ROAD | 5,467.00 ft | BC - Reclaim Col | \$646,306 | 18.06 | 57.86 |
| CHARLTON ROAD | SUNBERG ROAD | CRANBERRY MEADOW ROAD | 4,882.00 ft | BC - Reclaim Col | \$577,147 | 18.38 | 57.96 |
| CHARLTON ROAD | CRANBERRY MEADOW ROAD | CHARLTON TOWN LINE | 3,820.00 ft | BC - 3" Overlay Art/Col | \$200,881 | 30.49 | 61.69 |
| CHARRON STREET | PROSPECT STREET | DEAD END | 931.00 ft | BC - Reclaim Local | \$46,343 | 10.57 | 30.18 |
| CHERRY STREET | MECHANIC STREET | MAPLE STREET | 535.00 ft | BC - Reclaim Local | \$48,269 | 9.97 | 43.07 |
| CHERRY STREET | MAPLE STREET | MAY STREET | 1,298.00 ft | BC - Crack Seal and Patch | \$3,466 | 68.28 | 61.01 |
| CHERRY STREET | MAY STREET | GREENVILLE STREET | 2,214.00 ft | BC - 1-1/4" Overlay | \$60,469 | 55.36 | 57.03 |
| CHESTNUT STREET | MAPLE STREET | VALLEY STREET | 2,136.00 ft | BC - 3" Overlay Art/Col | \$131,046 | 42.06 | 65.25 |
| CHICKERING ROAD | CLARK ROAD | 150' W OF GREENVILLE STREET | 5,549.00 ft | BC - 3" Overlay Art/Col | \$231,011 | 23.31 | 57.94 |
| CHICKERING ROAD | 150' W OF GREENVILLE STREET | LEICESTER TOWN LINE | 450.00 ft | BC - Crack Seal or Patch | \$688 | 82.40 | 76.12 |
| CHURCH STREET | MAPLE STREET | TEMPLE STREET | 979.00 ft | BC - 2" Overlay Local | \$35,418 | 22.80 | 47.02 |
| CHURCH STREET | TEMPLE STREET | EARLEY STREET | 414.00 ft | BC - Reclaim Local | \$29,624 | 16.93 | 45.21 |
| CLARK ROAD | EAST CHARLTON ROAD | CHICKERING ROAD | 4,410.00 ft | BC - Reclaim Local | \$267,540 | 9.78 | 43.01 |
| CLARK ROAD | CHICKERING ROAD | LEICESTER TOWN LINE | 6,111.00 ft | BC - Crack Seal or Patch | \$10,429 | 81.65 | 65.12 |
| CLARK STREET | ASH STREET | ADAMS STREET | 1,344.00 ft | BC - 2" Overlay Local | \$49,728 | 42.40 | 53.05 |
| CLARK TERRACE | CLARK STREET | DEAD END | 468.00 ft | BC - 2" Overlay Local | \$11,544 | 18.39 | 31.04 |
| COLLIER CIRCLE | OAKLAND DRIVE | COLLIER CIRCLE | 2,644.00 ft | BC - 1-1/4" Overlay | \$92,187 | 55.12 | 56.96 |
| CONDON DRIVE | SOUTH SPENCER ROAD | DEAD END | 1,446.00 ft | BC - Crack Seal and Patch | \$2,359 | 72.20 | 49.14 |
| COONEY ROAD | NORTH SPENCER ROAD | HASTINGS ROAD | 4,377.00 ft | BC - Crack Seal or Patch | \$6,848 | 81.55 | 65.09 |
| CORNFIELD ROAD | TREADWELL DRIVE | CUL-DE-SAC | 584.00 ft | Do Nothing | \$0 | 87.30 | 53.78 |
| COTTAGE STREET | CHERRY STREET | HOLMES STREET | 682.00 ft | BC - Crack Seal and Patch | \$1,888 | 70.45 | 61.68 |
| CRAIG ROAD | LINCOLN STREET | GRANT STREET | 273.00 ft | BC - Shim, Crack Seal & Patch | \$2,821 | 59.84 | 55.34 |
| CRANBERRY MEADOW ROAD | LYFORD ROAD | JOLICOEUR ROAD | 7,090.00 ft | BC - Crack Seal and Patch | \$16,126 | 69.54 | 61.40 |
| CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 200' W OF BRIARCLIFF LANE | 3,267.00 ft | BC - Crack Seal or Patch | \$6,156 | 77.68 | 63.90 |
| CRANBERRY MEADOW ROAD | 200' W OF BRIARCLIFF LANE | 650' E OF BRIARCLIFF LANE | 881.00 ft | BC - Crack Seal and Patch | \$2,091 | 76.68 | 63.59 |
| CRANBERRY MEADOW ROAD | 650' E OF BRIARCLIFF LANE | CHARLTON ROAD | 1,507.00 ft | BC - Crack Seal or Patch | \$2,465 | 78.16 | 64.05 |
| CROWN STREET | WALNUT STREET | SUMNER STREET | 997.00 ft | BC - Crack Seal or Patch | \$1,489 | 79.70 | 64.52 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|-------------------------------|---------------------------------|--------------|-------------------------------|-----------|-------|-------|
| DEPOT ROAD | SOUTH SPENCER ROAD | DEAD END | 1,171.00 ft | BC - Reclaim Local | \$51,004 | 15.85 | 31.80 |
| DONNELLY CROSS ROAD | DONNELLY STREET | 250' N OF DONNELLY STREET | 255.00 ft | Do Nothing | \$0 | 90.32 | 67.79 |
| DONNELLY CROSS ROAD | 250' N OF DONNELLY STREET | LEICESTER TOWN LINE | 5,220.00 ft | BC - Reconstruction Local | \$539,806 | 18.20 | 45.60 |
| DONNELLY STREET | MAIN STREET | 250' N OF DONNELLY CROSS ROAD | 1,975.00 ft | BC - Shim, Crack Seal & Patch | \$19,365 | 59.60 | 58.34 |
| DONNELLY STREET | 250' N OF DONNELLY CROSS ROAD | PAXTON ROAD | 3,072.00 ft | BC - 2" Overlay Local | \$101,035 | 22.78 | 47.01 |
| DOWGIELEWICZ DRIVE | NORTHWEST ROAD | DEAD END | 865.00 ft | BC - 1-1/4" Overlay | \$12,567 | 50.22 | 40.84 |
| DUFAULT ROAD | HOWE RD | DEAD END | 525.00 ft | BC - 2" Overlay Local | \$12,518 | 22.84 | 43.95 |
| DUGGAN STREET | GROVE STREET | HIGHLAND STREET | 384.00 ft | BC - 2" Overlay Local | \$13,892 | 32.88 | 47.04 |
| DUSTIN STREET | MAPLE STREET | MECHANIC STREET | 535.00 ft | BC - 1-1/4" Overlay | \$12,125 | 53.28 | 56.39 |
| EAGLETON ROAD | PLEASANT STREET | WIRE VILLAGE ROAD | 553.00 ft | BC - 1-1/4" Overlay | \$13,818 | 54.08 | 53.56 |
| EARLEY STREET | CHESTNUT STREET | DEAD END | 808.00 ft | BC - Crack Seal or Patch | \$977 | 74.60 | 49.88 |
| EAST CHARLTON ROAD | CHARLTON ROAD | G HENRY WILSON ROAD | 4,057.00 ft | BC - 2" Overlay Local | \$166,788 | 44.74 | 53.77 |
| EAST CHARLTON ROAD | G HENRY WILSON ROAD | CLARK ROAD | 4,439.00 ft | BC - Crack Seal or Patch | \$6,629 | 81.15 | 64.97 |
| EAST CHARLTON ROAD | CLARK ROAD | BACON HILL ROAD | 1,250.00 ft | BC - 2" Overlay Local | \$38,028 | 46.32 | 54.25 |
| EAST CHARLTON ROAD | BACON HILL ROAD | CHARLTON TOWN LINE | 6,164.00 ft | BC - 2" Overlay Local | \$177,386 | 34.76 | 50.70 |
| ELM STREET | MAIN STREET | CHESTNUT STREET | 924.00 ft | BC - 2" Overlay Local | \$31,909 | 40.42 | 52.44 |
| EMMETT STREET | MAIN STREET | CROWN STREET | 366.00 ft | BC - Reclaim Local | \$18,788 | 18.68 | 42.67 |
| FOURTH AVENUE | SCHOOL STREET | MEADOW ROAD | 1,313.00 ft | BC - Crack Seal and Patch | \$2,857 | 69.12 | 61.27 |
| FRANKLIN STREET | SCHOOL STREET | SAMPSON STREET | 650.00 ft | BC - 2" Overlay Local | \$26,722 | 39.45 | 49.06 |
| G HENRY WILSON ROAD | EAST CHARLTON ROAD | CHICKERING ROAD | 6,993.00 ft | BC - Reclaim Local | \$445,998 | 10.54 | 43.24 |
| GALE DRIVE | SOUTH SPENCER ROAD | DEAD END | 864.00 ft | GR - Grade | \$1,512 | 81.60 | 41.26 |
| GAUTHIER ROAD | CHARLTON ROAD | CRANBERRY MEADOW ROAD | 4,896.00 ft | BC - Crack Seal or Patch | \$6,963 | 81.70 | 65.14 |
| GOLD NUGGET FARM ROAD | HASTINGS ROAD | PAXTON ROAD | 4,975.00 ft | BC - Crack Seal and Patch | \$10,331 | 75.54 | 71.70 |
| GRANT STREET | PLEASANT STREET | DEAD END | 1,884.00 ft | BC - 2" Mill & Overlay Local | \$76,264 | 32.96 | 50.14 |
| GREENVILLE STREET | MAIN STREET | CHICKERING ROAD | 15,662.00 ft | BC - Crack Seal or Patch | \$24,502 | 88.88 | 78.89 |
| GROVE STREET | MAIN STREET | HIGHLAND STREET | 2,280.00 ft | BC - 1-1/4" Overlay | \$74,196 | 52.16 | 56.05 |
| HASTINGS ROAD | WILSON STREET | 150' S OF WIRE VILLAGE ROAD | 2,838.00 ft | BC - Shim, Crack Seal & Patch | \$36,851 | 65.24 | 60.07 |
| HASTINGS ROAD | 150' S OF WIRE VILLAGE ROAD | 300' S OF GOLD NUGGET FARM ROAD | 2,359.00 ft | BC - 2" Overlay Local | \$75,645 | 28.15 | 48.66 |
| HASTINGS ROAD | 300' S OF GOLD NUGGET | 100' N OF GOLD NUGGET FARM | 382.00 ft | BC - Shim, Crack Seal & Patch | \$3,948 | 65.42 | 60.13 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------------|---|-------------------------------|-------------|-------------------------------|-----------|-------|-------|
| HASTINGS ROAD | FARM ROAD 100' N OF GOLD NUGGET FARM ROAD | ROAD NORTH SPENCER ROAD | 8,653.00 ft | BC - Crack Seal and Patch | \$17,114 | 71.78 | 62.09 |
| HEBERT ROAD | CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 1,210.00 ft | BC - Crack Seal and Patch | \$1,974 | 76.38 | 74.27 |
| HEBERT ROAD | JOLICOEUR ROAD | SOUTH SPENCER ROAD | 1,958.00 ft | BC - Crack Seal and Patch | \$3,679 | 69.51 | 72.16 |
| HIGH STREET | MAIN STREET | PLEASANT STREET | 1,745.00 ft | BC - Shim, Crack Seal & Patch | \$23,121 | 62.54 | 59.24 |
| HIGHLAND STREET | LAKE STREET | GROVE STREET | 1,564.00 ft | BC - Reclaim Local | \$94,883 | 18.62 | 45.73 |
| HIGHLAND STREET | GROVE STREET | WILSON STREET | 1,588.00 ft | BC - Shim, Crack Seal & Patch | \$21,883 | 67.58 | 60.79 |
| HOLMES STREET | ASH STREET | MAY STREET | 354.00 ft | BC - 2" Overlay Local | \$10,770 | 34.68 | 47.59 |
| HOLMES STREET | MAY STREET | DALE STREET | 605.00 ft | Do Nothing | \$0 | 95.34 | 69.34 |
| HOWARD HURLEY ROAD | DONNELLY CROSS ROAD | LEICESTER TOWN LINE | 1,266.00 ft | BC - Shim, Crack Seal & Patch | \$14,091 | 62.78 | 56.24 |
| HOWE ROAD / HOWE POND RD | LYFORD ROAD | CHARLTON ROAD | 6,755.00 ft | BC - Shim, Crack Seal & Patch | \$69,813 | 63.74 | 59.61 |
| I CAPEN ROAD | CHARLTON ROAD | EAST CHARLTON ROAD | 1,978.00 ft | BC - Crack Seal or Patch | \$2,813 | 84.76 | 63.00 |
| IRVING STREET | GREENVILLE STREET | MUZZY STREET | 1,008.00 ft | Do Nothing | \$0 | 93.59 | 68.80 |
| IRVING STREET | MUZZY STREET | MAY STREET | 1,226.00 ft | BC - Shim, Crack Seal & Patch | \$16,894 | 64.76 | 59.93 |
| JOLICOEUR ROAD | CRANBERRY MEADOW ROAD | HEBERT ROAD | 1,861.00 ft | BC - 1-1/4" Overlay | \$41,095 | 55.85 | 65.65 |
| JONES STREET | POPE STREET | STARR STREET | 358.00 ft | Do Nothing | \$0 | 96.80 | 66.71 |
| KINGSBURY ROAD | GREENVILLE STREET (N) | GREENVILLE STREET (S) | 4,348.00 ft | BC - 2" Overlay Local | \$135,851 | 31.08 | 49.56 |
| KITTREDGE ROAD | NORTHWEST ROAD | NORTH BROOKFIELD TOWN LINE | 3,578.00 ft | BC - 1-1/4" Overlay | \$74,852 | 52.72 | 56.22 |
| LAKE STREET | MAIN STREET | RENE DRIVE | 509.00 ft | BC - 2" Mill & Overlay Local | \$20,604 | 34.60 | 50.65 |
| LAKE STREET | RENE DRIVE | DEAD END | 1,449.00 ft | BC - Crack Seal and Patch | \$2,937 | 74.09 | 62.80 |
| LANGEVIN STREET | MECHANIC STREET | TEMPLE STREET | 384.00 ft | BC - 2" Overlay Local | \$12,314 | 45.46 | 50.91 |
| LANGEVIN STREET | TEMPLE STREET | DEAD END | 445.00 ft | BC - Reclaim Local | \$22,151 | 9.87 | 28.42 |
| LEONARD ROAD | WILLIAM CASEY ROAD | DEAD END | 608.00 ft | GR - Grade | \$1,064 | 67.52 | 38.47 |
| LINCOLN STREET | PLEASANT STREET | WILSON ST | 1,300.00 ft | BC - 1-1/4" Overlay | \$33,240 | 55.20 | 55.45 |
| LINCOLN STREET | WILSON STREET | DEAD END | 935.00 ft | BC - 2" Overlay Local | \$33,826 | 21.82 | 33.64 |
| LINDEN STREET | MAIN STREET | CHERRY STREET | 670.00 ft | BC - 1-1/4" Overlay | \$20,246 | 57.20 | 57.60 |
| LLOYD DYER DRIVE | ELM STREET | WALL STREET | 353.00 ft | BC - 2" Mill & Overlay Local | \$16,775 | 28.69 | 45.75 |
| LYFORD CROSS ROAD | SOUTH SPENCER ROAD | LYFORD ROAD | 606.00 ft | BC - Crack Seal and Patch | \$959 | 76.84 | 60.57 |
| LYFORD ROAD | SOUTH SPENCER ROAD | HOWE ROAD | 4,065.00 ft | BC - Shim, Crack Seal & Patch | \$49,552 | 61.20 | 58.83 |
| MAIN STREET | SUMNER STREET | 50' E OF PLEASANT STREET | 2,771.00 ft | BC - 1-1/4" Overlay | \$136,872 | 53.38 | 74.12 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|----------------------------------|----------------------------------|--------------|-------------------------------|-----------|-------|-------|
| MAIN STREET | 50' E OF PLEASANT STREET | 75' E OF LINDEN STREET | 1,261.00 ft | BC - 1-1/4" Overlay | \$61,554 | 49.11 | 72.80 |
| MAIN STREET | 75' E OF LINDEN STREET | PARK STREET | 2,054.00 ft | BC - Crack Seal and Patch | \$8,226 | 70.60 | 79.42 |
| MAIN STREET TERRACE | NORTH STREET | MAIN STREET | 440.00 ft | BC - 1-1/4" Overlay | \$17,643 | 47.28 | 51.47 |
| MAPLE STREET | MAIN STREET | CHERRY STREET | 513.00 ft | BC - 3" Overlay Art/Col | \$26,977 | 27.60 | 60.80 |
| MAPLE STREET | CHERRY STREET | ADAMS STREET | 529.00 ft | BC - Reclaim Col | \$66,078 | 11.36 | 55.80 |
| MAPLE STREET | ADAMS STREET | 750' N OF CHARLTON ROAD | 2,808.00 ft | BC - Reclaim Col | \$288,116 | 9.92 | 55.36 |
| MAPLE STREET | 750' N OF CHARLTON ROAD | CHARLTON ROAD | 748.00 ft | BC - 3" Overlay Art/Col | \$40,974 | 29.14 | 61.27 |
| MAPLE TERRACE | MAPLE STREET | CHERRY STREET | 360.00 ft | BC - 3" Overlay Art/Col | \$16,565 | 44.30 | 65.94 |
| MARBLE ROAD | EAST CHARLTON ROAD | CLARK ROAD | 4,168.00 ft | BC - 2" Overlay Local | \$133,654 | 42.10 | 52.95 |
| MARTIN DRIVE | CRANBERRY MEADOW ROAD | DEAD END | 715.00 ft | BC - Crack Seal or Patch | \$686 | 79.64 | 49.89 |
| MAY STREET | MAIN STREET | HOLMES STREET | 1,313.00 ft | Do Nothing | \$0 | 95.34 | 69.34 |
| MCCORMACK ROAD | GOLD NUGGET FARM ROAD | 1675' N OF GOLD NUGGET FARM ROAD | 1,675.00 ft | BC - 2" Overlay Local | \$46,826 | 34.56 | 47.56 |
| MCCORMACK ROAD | 1675' N OF GOLD NUGGET FARM ROAD | THOMPSON POND ROAD | 10,329.00 ft | BC - Shim, Crack Seal & Patch | \$104,013 | 59.04 | 58.17 |
| MCDONALD STREET | SALEM STREET | MECHANIC STREET | 1,389.00 ft | BC - 1-1/4" Overlay | \$35,515 | 56.72 | 57.45 |
| MCDONALD STREET | MECHANIC STREET | CHARRON STREET | 278.00 ft | BC - Reclaim Local | \$19,460 | 7.90 | 39.35 |
| MEADOW ROAD | WEST MAIN STREET | PLEASANT STREET | 8,210.00 ft | BC - 3" Overlay Art/Col | \$512,687 | 36.84 | 63.64 |
| MEADOWBROOK LANE | PLEASANT STREET | PIONEER VALLEY ROAD | 734.00 ft | BC - Shim, Crack Seal & Patch | \$11,476 | 61.60 | 55.88 |
| MECHANIC STREET | MAIN STREET | CHESTNUT STREET | 900.00 ft | BC - Shim, Crack Seal & Patch | \$13,356 | 63.62 | 59.58 |
| MECHANIC STREET | CHESTNUT STREET | DEAD END | 2,669.00 ft | BC - 1-1/4" Overlay | \$89,957 | 48.88 | 55.04 |
| MILL STREET | MAIN STREET | VALLEY STREET | 411.00 ft | BC - Shim, Crack Seal & Patch | \$4,139 | 58.08 | 54.79 |
| MUZZY STREET | IRVING STREET | CHERRY STREET | 435.00 ft | BC - 1-1/4" Overlay | \$10,617 | 52.00 | 52.92 |
| NORCROSS ROAD | WOODSIDE ROAD | NORTH BROOKFIELD TOWN LINE | 2,924.00 ft | BC - 1-1/4" Overlay | \$64,568 | 48.24 | 51.77 |
| NORTH BROOKFIELD ROAD | NORTH SPENCER ROAD | NORTH BROOKFIELD TOWN LINE | 7,341.00 ft | BC - Reclaim Col | \$704,104 | 17.40 | 57.66 |
| NORTH SPENCER ROAD | PLEASANT STREET | BARCLAY ROAD | 22,698.00 ft | BC - Crack Seal or Patch | \$51,651 | 78.48 | 76.46 |
| NORTH SPENCER ROAD | BARCLAY ROAD | PAXTON TOWN LINE | 2,090.00 ft | BC - Shim, Crack Seal & Patch | \$26,585 | 60.26 | 70.85 |
| NORTH STREET | MAIN STREET | HIGHLAND STREET | 931.00 ft | BC - 1-1/4" Overlay | \$22,723 | 58.93 | 70.44 |
| NORTHWEST ROAD | NORTH SPENCER ROAD | 2300' N OF BROOKS POND ROAD | 10,395.00 ft | Do Nothing | \$0 | 92.84 | 68.57 |
| NORTHWEST ROAD | 2300' N OF BROOKS POND ROAD | 1400' S OF DOWGIELEWICZ ROAD | 4,988.00 ft | BC - 2" Overlay Local | \$164,050 | 33.96 | 50.45 |
| NORTHWEST ROAD | 1400' S OF DOWGIELEWICZ | OAKHAM TOWN LINE | 5,000.00 ft | BC - 2" Overlay Local | \$156,222 | 26.68 | 48.21 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|---------------------|----------------------------|----------------------------|-------------|--------------------------------|-----------|-------|-------|
| | ROAD | | | | | | |
| NOTTINGHAM CIRCLE | SHERWOOD DRIVE (S) | SHERWOOD DRIVE (N) | 1,270.00 ft | BC - 1-1/4" Overlay | \$41,329 | 48.88 | 55.04 |
| OAKLAND DRIVE | DONNELLY CROSS ROAD | COLLIERS CIRCLE | 595.00 ft | BC - Reclaim Local | \$27,767 | 0.73 | 40.22 |
| OLD FARM ROAD | SMITHVILLE ROAD | MEADOW ROAD | 2,516.00 ft | BC - 1-1/4" Overlay | \$86,262 | 54.24 | 56.69 |
| OLD MEADOW ROAD | MEADOW ROAD (N) | MEADOW ROAD (S) | 1,232.00 ft | BC - Crack Seal and Patch | \$2,132 | 71.71 | 58.99 |
| OLDE MAIN STREET | MAIN STREET | 300' E OF MEADOW ROAD | 1,115.00 ft | BC - 2" Overlay Local | \$66,008 | 31.16 | 49.59 |
| OLDE MAIN STREET | 300' E OF MEADOW ROAD | MEADOW ROAD | 308.00 ft | BC - Shim, Crack Seal & Patch | \$5,224 | 65.90 | 60.28 |
| PARENT STREET | TEMPLE STREET | DEAD END | 462.00 ft | BC - 1-1/4" Overlay | \$12,350 | 51.42 | 41.21 |
| PARK STREET | MAIN STREET | DEAD END | 550.00 ft | BC - Crack Seal or Patch | \$587 | 84.25 | 51.31 |
| PAXTON DRIVE | PAXTON ROAD | DEAD END | 267.00 ft | Do Nothing | \$0 | 90.62 | 54.81 |
| PAXTON ROAD | MAIN STREET | 300' S OF WILSON STREET | 1,708.00 ft | BC - 3" Overlay Art/Col | \$89,818 | 35.60 | 62.49 |
| PAXTON ROAD | 300' S OF WILSON STREET | 750' N OF WILSON STREET | 1,062.00 ft | BC - Crack Seal and Patch | \$2,258 | 71.76 | 73.62 |
| PAXTON ROAD | 750' N OF WILSON STREET | LAKEVIEW STREET | 4,694.00 ft | BC - 1-1/4" Overlay | \$128,204 | 48.29 | 66.40 |
| PAXTON ROAD | LAKEVIEW STREET | 5000' N OF LAKEVIEW STREET | 5,000.00 ft | BC - 3" Overlay Art/Col | \$224,589 | 32.71 | 61.60 |
| PAXTON ROAD | 5000' N OF LAKEVIEW STREET | THOMPSON POND ROAD | 5,198.00 ft | BC - 3" Overlay Art/Col | \$256,261 | 44.30 | 65.17 |
| PEARL STREET | ELM STREET | VALLEY STREET | 1,071.00 ft | BC - Reclaim Local | \$63,308 | 13.83 | 44.26 |
| PIONEER VALLEY ROAD | SMITHVILLE ROAD | CUL-DE-SAC | 850.00 ft | BC - Shim, Crack Seal & Patch | \$14,416 | 59.40 | 45.20 |
| PLEASANT STREET | MAIN STREET | 175' N OF SMITHVILLE ROAD | 3,177.00 ft | BC - 3" Mill & Overlay Art/Col | \$227,952 | 43.25 | 66.38 |
| PLEASANT STREET | 175' N OF SMITHVILLE ROAD | MEADOW ROAD | 1,561.00 ft | BC - 3" Overlay Art/Col | \$92,349 | 38.35 | 64.88 |
| PLEASANT VIEW ROAD | LANGEVIN STREET | DEAD END | 370.00 ft | BC - Reclaim Local | \$18,993 | 3.37 | 26.42 |
| POND STREET | CLARK STREET | MCDONALD STREET | 283.00 ft | BC - Crack Seal and Patch | \$756 | 76.44 | 60.44 |
| POPE STREET | GROVE STREET | BROWN STREET | 1,177.00 ft | BC - Shim, Crack Seal & Patch | \$12,788 | 63.38 | 59.50 |
| POWERS STREET | NORTH STREET | LAKE STREET | 643.00 ft | BC - Reclaim Local | \$39,009 | 19.19 | 42.83 |
| PROSPECT STREET | MAPLE STREET | TEMPLE STREET | 988.00 ft | BC - Reclaim Local | \$64,549 | 19.57 | 46.02 |
| PROUTY STREET | PLEASANT STREET | HIGH STREET | 423.00 ft | BC - Reclaim Local | \$24,346 | 18.60 | 42.65 |
| R JONES ROAD | ASH STREET | KINGSBURY ROAD | 6,306.00 ft | BC - 2" Overlay Local | \$191,842 | 45.40 | 53.97 |
| RAWSON ROAD | GREENVILLE STREET | LEICESTER TOWN LINE | 685.00 ft | Do Nothing | \$0 | 89.08 | 76.64 |
| ROBIN ROAD | SHERRY LANE | CUL-DE-SAC | 447.00 ft | BC - 1-1/4" Overlay | \$15,326 | 50.52 | 40.93 |
| SALEM STREET | LACAIRE LANE | DEAD END | 545.00 ft | BC - Crack Seal or Patch | \$891 | 77.28 | 50.70 |
| SAMPSON STREET | MAIN STREET | DEAD END | 688.00 ft | BC - 2" Overlay Local | \$29,416 | 36.16 | 36.51 |
| SCHOOL STREET | MAIN STREET | MEADOW ROAD | 2,781.00 ft | BC - 1-1/4" Overlay | \$90,500 | 53.44 | 56.44 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|--------------------------|-----------------------------|--------------|--------------------------------|-----------|-------|-------|
| SHERRY LANE | EAST CHARLTON ROAD | CUL-DE-SAC | 1,247.00 ft | BC - 1-1/4" Overlay | \$44,203 | 50.40 | 42.43 |
| SHERWOOD DRIVE | THOMPSON POND ROAD | CUL-DE-SAC | 2,553.00 ft | BC - Shim, Crack Seal & Patch | \$37,887 | 56.46 | 44.30 |
| SMITHVILLE CROSS ROAD | NORTH SPENCER ROAD | SMITHVILLE ROAD | 2,691.00 ft | BC - Shim, Crack Seal & Patch | \$27,811 | 66.14 | 60.35 |
| SMITHVILLE ROAD | PLEASANT STREET | MEADOW ROAD | 1,575.00 ft | BC - 2" Mill & Overlay Local | \$62,370 | 35.40 | 50.89 |
| SMITHVILLE ROAD | MEADOW ROAD | 900' W OF MEADOW ROAD | 910.00 ft | BC - Crack Seal or Patch | \$1,812 | 83.80 | 65.78 |
| SMITHVILLE ROAD | 900' W OF MEADOW ROAD | 900' N OF LALIBERTE LANE | 4,019.00 ft | BC - Shim, Crack Seal & Patch | \$46,862 | 62.66 | 59.28 |
| SMITHVILLE ROAD | 900' N OF LALIBERTE LANE | EAST BROOKFIELD TOWN LINE | 4,513.00 ft | BC - Shim, Crack Seal & Patch | \$45,446 | 61.52 | 58.93 |
| SOUTH SPENCER ROAD | WEST MAIN STREET | EAST BROOKFIELD TOWN LINE | 18,056.00 ft | BC - 1-1/4" Overlay | \$419,702 | 52.70 | 67.75 |
| SOUTH STREET | SCHOOL STREET | SAMPSON STREET | 567.00 ft | BC - Shim, Crack Seal & Patch | \$8,414 | 61.04 | 58.78 |
| SPINNAKER DRIVE | OAKLAND DRIVE | CUL-DE-SAC | 449.00 ft | Do Nothing | \$0 | 85.80 | 53.32 |
| SPRING STREET | MAIN STREET | CHERRY STREET | 1,020.00 ft | BC - 1-1/4" Overlay | \$30,229 | 56.72 | 57.45 |
| STARR STREET | GROVE STREET | POPE STREET | 607.00 ft | Do Nothing | \$0 | 96.80 | 66.71 |
| SULLIVAN STREET | SCHOOL STREET | CUL-DE-SAC | 633.00 ft | BC - Crack Seal and Patch | \$1,377 | 68.95 | 46.60 |
| SUMMIT STREET | MAIN STREET | WATSON STREET | 1,151.00 ft | Do Nothing | \$0 | 95.08 | 69.26 |
| SUNDBERG DRIVE | SUNDBERG ROAD | DEAD END | 420.00 ft | BC - 2" Overlay Local | \$7,943 | 21.26 | 31.93 |
| SUNDBERG ROAD | CHARLTON ROAD | GAUTHIER ROAD | 3,353.00 ft | BC - 2" Overlay Local | \$93,735 | 34.80 | 47.63 |
| SUNSET LANE | GREENVILLE STREET | 750' W OF GREENVILLE STREET | 750.00 ft | BC - Crack Seal or Patch | \$1,120 | 78.52 | 64.16 |
| SUNSET LANE | GREENVILLE STREET | DEAD END | 557.00 ft | Do Nothing | \$0 | 97.52 | 70.01 |
| TEMPLE STREET | CHESTNUT STREET | LANGVIN STREET | 2,225.00 ft | BC - 1-1/4" Overlay | \$54,305 | 54.00 | 56.62 |
| TERKANIAN DRIVE | NORTH SPENCER ROAD | DEAD END | 1,497.00 ft | BC - Crack Seal or Patch | \$1,756 | 74.48 | 49.84 |
| THOMPSON POND ROAD | NORTH SPENCER ROAD | PAXTON TOWN LINE | 7,246.00 ft | BC - Reclaim Col | \$743,480 | 20.58 | 57.10 |
| TOM CASEY ROAD | SOUTH SPENCER ROAD | EAST BROOKFIELD TOWN LINE | 1,740.00 ft | BC - Shim, Crack Seal & Patch | \$17,983 | 62.00 | 56.00 |
| TREADWELL DRIVE | SMITHVILLE ROAD | DEAD END | 1,818.00 ft | BC - Crack Seal or Patch | \$2,456 | 79.56 | 51.40 |
| TREADWELL TERRACE | TREADWELL DRIVE | CUL-DE-SAC | 606.00 ft | Do Nothing | \$0 | 91.87 | 53.65 |
| VALLEY STREET | ELM STREET | 275' W OF ELM STREET | 278.00 ft | BC - Crack Seal or Patch | \$435 | 75.40 | 50.12 |
| VALLEY STREET | 275' W OF ELM STREET | DEAD END | 2,229.00 ft | BC - 2" Overlay Local | \$80,640 | 23.15 | 32.51 |
| VERNON STREET | CROWN STREET | BELL STREET | 296.00 ft | BC - Crack Seal and Patch | \$644 | 69.33 | 58.26 |
| VINE STREET | SCHOOL STREET | FOURTH AVENUE | 661.00 ft | BC - Crack Seal or Patch | \$799 | 78.92 | 61.21 |
| WALL STREET | MAIN STREET | MECHANIC STREET | 854.00 ft | BC - 2" Overlay Local | \$37,918 | 29.77 | 49.16 |
| WALNUT STREET | SCHOOL STREET | CROWN STREET | 533.00 ft | BC - Crack Seal or Patch | \$606 | 84.00 | 62.77 |
| WATER STREET | VALLEY STREET | MAIN STREET | 939.00 ft | BC - 3" Mill & Overlay Art/Col | \$54,813 | 23.16 | 59.43 |
| WILLIAM CASEY ROAD | JOLICOEUR ROAD | 1100' N OF CHARLTON TOWN | 4,106.00 ft | BC - Crack Seal and Patch | \$7,309 | 68.14 | 60.97 |

Segments FST Analysis Recommendations by Plan Year

Scenario Back

Description FY2010 Roadway Repair Backlog

Protocol FST Roadway

\$14,314,091 Pavement Costs Only

Budget Unlimited

Time Frame 1

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------|-------------------------------|-----------------------|--------------|-------------------------------|-----------|-------|-------|
| | | LINE | | | | | |
| WILLIAM CASEY ROAD | 1100' N OF CHARLTON TOWN LINE | CHARLTON TOWN LINE | 1,100.00 ft | BC - 2" Overlay Local | \$32,560 | 29.56 | 49.10 |
| WILSON STREET | LINCOLN STREET | PAXTON ROAD | 6,813.00 ft | BC - 1-1/4" Overlay | \$154,405 | 50.40 | 55.51 |
| WIRE VILLAGE ROAD | PLEASANT STREET | NUGGET FARM ROAD | 10,050.00 ft | Do Nothing | \$0 | 94.65 | 79.89 |
| WOODSIDE DRIVE | WOODSIDE ROAD | CUL-DE-SAC LOOP | 1,112.00 ft | BC - Reconstruction Local | \$84,141 | 17.84 | 30.87 |
| WOODSIDE ROAD | SMITHVILLE ROAD | NORCROSS ROAD | 4,383.00 ft | BC - Shim, Crack Seal & Patch | \$44,137 | 67.28 | 60.70 |
| WOODSIDE ROAD | NORCROSS ROAD | NORTH BROOKFIELD ROAD | 1,582.00 ft | BC - 2" Overlay Local | \$48,128 | 29.38 | 49.04 |

Plan cost for Plan Year 1

\$14,314,091

Segment Count 213

\$14,314,091

APPENDIX B

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|---------------------------------|---------------------------|------------------|--------------------------------|--------------------|-------|-------|
| JOLICOEUR ROAD | CRANBERRY MEADOW ROAD | HEBERT ROAD | 1861 ft | BC - 1-1/4" Overlay | \$41,056 | 55.85 | 65.65 |
| MAIN STREET | SUMNER STREET | 50' E OF PLEASANT STREET | 2771 ft | BC - 1-1/4" Overlay | \$136,741 | 53.38 | 74.12 |
| MAIN STREET | 50' E OF PLEASANT STREET | 75' E OF LINDEN STREET | 1261 ft | BC - 1-1/4" Overlay | \$61,495 | 49.11 | 72.80 |
| NORTH STREET | MAIN STREET | HIGHLAND STREET | 931 ft | BC - 1-1/4" Overlay | \$22,701 | 58.93 | 70.44 |
| PAXTON ROAD | 750' N OF WILSON STREET | LAKEVIEW STREET | 4694 ft | BC - 1-1/4" Overlay | \$128,081 | 48.29 | 66.40 |
| SOUTH SPENCER ROAD | WEST MAIN STREET | EAST BROOKFIELD TOWN LINE | 18056 ft | BC - 1-1/4" Overlay | \$419,300 | 52.70 | 67.75 |
| Segment Count | 6 | | 5.6 miles | | \$809,374 | | |
| PLEASANT STREET | MAIN STREET | 175' N OF SMITHVILLE ROAD | 3177 ft | BC - 3" Mill & Overlay Art/Col | \$227,639 | 43.25 | 66.38 |
| Segment Count | 1 | | 0.6 miles | | \$227,639 | | |
| CHESTNUT STREET | MAPLE STREET | VALLEY STREET | 2136 ft | BC - 3" Overlay Art/Col | \$130,847 | 42.06 | 65.25 |
| MAPLE TERRACE | MAPLE STREET | CHERRY STREET | 360 ft | BC - 3" Overlay Art/Col | \$16,540 | 44.30 | 65.94 |
| MEADOW ROAD | WEST MAIN STREET | PLEASANT STREET | 8210 ft | BC - 3" Overlay Art/Col | \$511,907 | 36.84 | 63.64 |
| PAXTON ROAD | MAIN STREET | 300' S OF WILSON STREET | 1708 ft | BC - 3" Overlay Art/Col | \$89,681 | 35.60 | 62.49 |
| PAXTON ROAD | 5000' N OF LAKEVIEW STREET | THOMPSON POND ROAD | 5198 ft | BC - 3" Overlay Art/Col | \$255,872 | 44.30 | 65.17 |
| PLEASANT STREET | 175' N OF SMITHVILLE ROAD | MEADOW ROAD | 1561 ft | BC - 3" Overlay Art/Col | \$92,208 | 38.35 | 64.88 |
| Segment Count | 6 | | 3.6 miles | | \$1,097,055 | | |
| ADAMS STREET | CLARK STREET | MCDONALD STREET | 385 ft | BC - Crack Seal and Patch | \$838 | 74.23 | 62.84 |
| BRIARCLIFF LANE | BACON HILL ROAD | CHARLTON TOWN LINE | 2738 ft | BC - Crack Seal and Patch | \$5,551 | 76.32 | 63.48 |
| BROOKS POND ROAD | NORTHWEST ROAD | 150' S OF WASHBURN ROAD | 6372 ft | BC - Crack Seal and Patch | \$13,863 | 69.75 | 61.46 |
| CHERRY STREET | MAPLE STREET | MAY STREET | 1298 ft | BC - Crack Seal and Patch | \$3,466 | 68.28 | 61.01 |
| COTTAGE STREET | CHERRY STREET | HOLMES STREET | 682 ft | BC - Crack Seal and Patch | \$1,888 | 70.45 | 61.68 |
| CRANBERRY MEADOW ROAD | LYFORD ROAD | JOLICOEUR ROAD | 7090 ft | BC - Crack Seal and Patch | \$16,126 | 69.54 | 61.40 |
| CRANBERRY MEADOW ROAD | 200' W OF BRIARCLIFF LANE | 650' E OF BRIARCLIFF LANE | 881 ft | BC - Crack Seal and Patch | \$2,091 | 76.68 | 63.59 |
| FOURTH AVENUE | SCHOOL STREET | MEADOW ROAD | 1313 ft | BC - Crack Seal and Patch | \$2,857 | 69.12 | 61.27 |
| GOLD NUGGET FARM ROAD | HASTINGS ROAD | PAXTON ROAD | 4975 ft | BC - Crack Seal and Patch | \$10,331 | 75.54 | 71.70 |
| HASTINGS ROAD | 100' N OF GOLD NUGGET FARM ROAD | NORTH SPENCER ROAD | 8653 ft | BC - Crack Seal and Patch | \$17,114 | 71.78 | 62.09 |
| HEBERT ROAD | CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 1210 ft | BC - Crack Seal and Patch | \$1,974 | 76.38 | 74.27 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 1

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|-----------------------------|-----------------------------|-------------------|-------------------------------|------------------|-------|-------|
| HEBERT ROAD | JOLICOEUR ROAD | SOUTH SPENCER ROAD | 1958 ft | BC - Crack Seal and Patch | \$3,679 | 69.51 | 72.16 |
| LAKE STREET | RENE DRIVE | DEAD END | 1449 ft | BC - Crack Seal and Patch | \$2,937 | 74.09 | 62.80 |
| LYFORD CROSS ROAD | SOUTH SPENCER ROAD | LYFORD ROAD | 606 ft | BC - Crack Seal and Patch | \$959 | 76.84 | 60.57 |
| MAIN STREET | 75' E OF LINDEN STREET | PARK STREET | 2054 ft | BC - Crack Seal and Patch | \$8,226 | 70.60 | 79.42 |
| PAXTON ROAD | 300' S OF WILSON STREET | 750' N OF WILSON STREET | 1062 ft | BC - Crack Seal and Patch | \$2,258 | 71.76 | 73.62 |
| POND STREET | CLARK STREET | MCDONALD STREET | 283 ft | BC - Crack Seal and Patch | \$756 | 76.44 | 60.44 |
| Segment Count 17 | | | 8.1 miles | | \$94,912 | | |
| BELL STREET | MAIN STREET | WALNUT STREET | 758 ft | BC - Crack Seal or Patch | \$1,240 | 81.40 | 65.05 |
| BOND STREET | MAIN STREET | LEICESTER TOWN LINE | 1664 ft | BC - Crack Seal or Patch | \$2,248 | 78.92 | 64.28 |
| CHICKERING ROAD | 150' W OF GREENVILLE STREET | LEICESTER TOWN LINE | 450 ft | BC - Crack Seal or Patch | \$688 | 82.40 | 76.12 |
| CLARK ROAD | CHICKERING ROAD | LEICESTER TOWN LINE | 6111 ft | BC - Crack Seal or Patch | \$10,429 | 81.65 | 65.12 |
| COONEY ROAD | NORTH SPENCER ROAD | HASTINGS ROAD | 4377 ft | BC - Crack Seal or Patch | \$6,848 | 81.55 | 65.09 |
| CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 200' W OF BRIARCLIFF LANE | 3267 ft | BC - Crack Seal or Patch | \$6,156 | 77.68 | 63.90 |
| CRANBERRY MEADOW ROAD | 650' E OF BRIARCLIFF LANE | CHARLTON ROAD | 1507 ft | BC - Crack Seal or Patch | \$2,465 | 78.16 | 64.05 |
| CROWN STREET | WALNUT STREET | SUMNER STREET | 997 ft | BC - Crack Seal or Patch | \$1,489 | 79.70 | 64.52 |
| EAST CHARLTON ROAD | G HENRY WILSON ROAD | CLARK ROAD | 4439 ft | BC - Crack Seal or Patch | \$6,629 | 81.15 | 64.97 |
| GAUTHIER ROAD | CHARLTON ROAD | CRANBERRY MEADOW ROAD | 4896 ft | BC - Crack Seal or Patch | \$6,963 | 81.70 | 65.14 |
| GREENVILLE STREET | MAIN STREET | CHICKERING ROAD | 15662 ft | BC - Crack Seal or Patch | \$24,502 | 88.88 | 78.89 |
| I CAPEN ROAD | CHARLTON ROAD | EAST CHARLTON ROAD | 1978 ft | BC - Crack Seal or Patch | \$2,813 | 84.76 | 63.00 |
| NORTH SPENCER ROAD | PLEASANT STREET | BARCLAY ROAD | 22698 ft | BC - Crack Seal or Patch | \$51,651 | 78.48 | 76.46 |
| SMITHVILLE ROAD | MEADOW ROAD | 900' W OF MEADOW ROAD | 910 ft | BC - Crack Seal or Patch | \$1,812 | 83.80 | 65.78 |
| SUNSET LANE | GREENVILLE STREET | 750' W OF GREENVILLE STREET | 750 ft | BC - Crack Seal or Patch | \$1,120 | 78.52 | 64.16 |
| VINE STREET | SCHOOL STREET | FOURTH AVENUE | 661 ft | BC - Crack Seal or Patch | \$799 | 78.92 | 61.21 |
| WALNUT STREET | SCHOOL STREET | CROWN STREET | 533 ft | BC - Crack Seal or Patch | \$606 | 84.00 | 62.77 |
| Segment Count 17 | | | 13.6 miles | | \$128,459 | | |
| BARCLAY ROAD | NORTH SPENCER ROAD | PAXTON TOWN LINE | 809 ft | BC - Shim, Crack Seal & Patch | \$10,439 | 64.81 | 71.48 |
| BROWNING POND ROAD | NORTH SPENCER ROAD | OAKHAM TOWN LINE | 8649 ft | BC - Shim, Crack Seal & Patch | \$100,213 | 63.20 | 70.22 |
| NORTH SPENCER ROAD | BARCLAY ROAD | PAXTON TOWN LINE | 2090 ft | BC - Shim, Crack Seal & Patch | \$26,418 | 60.26 | 70.85 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year **1**

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|-----------------------|-------------|-------------|-------------------------------|--------------------|-------|-------|
| OLDE MAIN STREET | 300' E OF MEADOW ROAD | MEADOW ROAD | 308 ft | BC - Shim, Crack Seal & Patch | \$5,191 | 65.90 | 60.28 |
| Segment Count | 4 | | 2.2 | miles | \$142,260 | | |
| Plan cost for Plan Year | 1 | | 33.8 | miles | \$2,499,699 | | |
| Segment Count | 51 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
\$1.25M for year 4 -7
\$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 2

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------|---------------------------------|---------------------------------|------------------|-------------------------------|--------------------|-------|-------|
| ASH STREET | MAIN STREET | CLARK STREET | 2265 ft | BC - 1-1/4" Overlay | \$62,861 | 56.72 | 57.45 |
| CRAIG ROAD | LINCOLN STREET | GRANT STREET | 273 ft | BC - 1-1/4" Overlay | \$6,424 | 51.84 | 52.87 |
| HIGH STREET | MAIN STREET | PLEASANT STREET | 1745 ft | BC - 1-1/4" Overlay | \$52,641 | 54.72 | 56.84 |
| HOWE ROAD / HOWE POND RD | LYFORD ROAD | CHARLTON ROAD | 6755 ft | BC - 1-1/4" Overlay | \$158,945 | 56.32 | 57.33 |
| IRVING STREET | MUZZY STREET | MAY STREET | 1226 ft | BC - 1-1/4" Overlay | \$38,464 | 57.68 | 57.75 |
| MECHANIC STREET | MAIN STREET | CHESTNUT STREET | 900 ft | BC - 1-1/4" Overlay | \$30,408 | 56.16 | 57.28 |
| POPE STREET | GROVE STREET | BROWN STREET | 1177 ft | BC - 1-1/4" Overlay | \$29,115 | 55.84 | 57.18 |
| Segment Count | 7 | | 2.7 miles | | \$378,858 | | |
| CHARLTON ROAD | CRANBERRY MEADOW ROAD | CHARLTON TOWN LINE | 3820 ft | BC - 3" Overlay Art/Col | \$208,623 | 27.32 | 60.71 |
| MAPLE STREET | MAIN STREET | CHERRY STREET | 513 ft | BC - 3" Overlay Art/Col | \$28,017 | 23.70 | 59.60 |
| MAPLE STREET | 750' N OF CHARLTON ROAD | CHARLTON ROAD | 748 ft | BC - 3" Overlay Art/Col | \$42,553 | 25.52 | 60.16 |
| PAXTON ROAD | LAKEVIEW STREET | 5000' N OF LAKEVIEW STREET | 5000 ft | BC - 3" Overlay Art/Col | \$233,244 | 29.71 | 60.68 |
| Segment Count | 4 | | 1.9 miles | | \$512,437 | | |
| DONNELLY CROSS ROAD | DONNELLY STREET | 250' N OF DONNELLY STREET | 255 ft | BC - Crack Seal or Patch | \$411 | 86.32 | 66.56 |
| PARK STREET | MAIN STREET | DEAD END | 550 ft | BC - Crack Seal or Patch | \$605 | 81.15 | 50.35 |
| RAWSON ROAD | GREENVILLE STREET | LEICESTER TOWN LINE | 685 ft | BC - Crack Seal or Patch | \$980 | 85.81 | 75.63 |
| Segment Count | 3 | | 0.3 miles | | \$1,996 | | |
| CHARLTON ROAD | EAST CHARLTON ROAD | SUNBERG ROAD | 5467 ft | BC - Reclaim Col | \$667,876 | 16.53 | 57.39 |
| CHARLTON ROAD | SUNBERG ROAD | CRANBERRY MEADOW ROAD | 4882 ft | BC - Reclaim Col | \$596,410 | 16.69 | 57.44 |
| WATER STREET | VALLEY STREET | MAIN STREET | 939 ft | BC - Reclaim Col | \$103,891 | 20.44 | 58.60 |
| Segment Count | 3 | | 2.1 miles | | \$1,368,177 | | |
| BUTEAU ROAD | CLARK ROAD | CHARLTON TOWN LINE | 4436 ft | BC - Shim, Crack Seal & Patch | \$43,739 | 59.36 | 58.26 |
| HASTINGS ROAD | WILSON STREET | 150' S OF WIRE VILLAGE ROAD | 2838 ft | BC - Shim, Crack Seal & Patch | \$38,088 | 58.32 | 57.94 |
| HASTINGS ROAD | 300' S OF GOLD NUGGET FARM ROAD | 100' N OF GOLD NUGGET FARM ROAD | 382 ft | BC - Shim, Crack Seal & Patch | \$4,080 | 58.56 | 58.02 |
| HIGHLAND STREET | GROVE STREET | WILSON STREET | 1588 ft | BC - Shim, Crack Seal & Patch | \$22,617 | 61.44 | 58.90 |
| OLD MEADOW ROAD | MEADOW ROAD (N) | MEADOW ROAD (S) | 1232 ft | BC - Shim, Crack Seal & Patch | \$11,810 | 65.18 | 56.98 |
| SMITHVILLE CROSS ROAD | NORTH SPENCER ROAD | SMITHVILLE ROAD | 2691 ft | BC - Shim, Crack Seal & Patch | \$28,744 | 59.52 | 58.31 |
| VERNON STREET | CROWN STREET | BELL STREET | 296 ft | BC - Shim, Crack Seal & Patch | \$3,567 | 63.14 | 56.35 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 2

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|----------------------------------|-----------------|-------------------------------|-------------------|-------------------------------|--------------------|-------|-------|
| WILLIAM CASEY ROAD | JOLICOEUR ROAD | 1100' N OF CHARLTON TOWN LINE | 4106 ft | BC - Shim, Crack Seal & Patch | \$40,485 | 62.12 | 59.11 |
| WOODSIDE ROAD | SMITHVILLE ROAD | NORCROSS ROAD | 4383 ft | BC - Shim, Crack Seal & Patch | \$45,617 | 61.04 | 58.78 |
| Segment Count 9 | | | 4.2 miles | | \$238,748 | | |
| Plan cost for Plan Year 2 | | | 11.2 miles | | \$2,500,215 | | |
| Segment Count 26 | | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 3

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|--------------------------|-----------------------------|------------------|---------------------------|--------------------|-------|-------|
| SMITHVILLE ROAD | 900' W OF MEADOW ROAD | 900' N OF LALIBERTE LANE | 4019 ft | BC - 2" Overlay Local | \$157,089 | 46.88 | 54.42 |
| SMITHVILLE ROAD | 900' N OF LALIBERTE LANE | EAST BROOKFIELD TOWN LINE | 4513 ft | BC - 2" Overlay Local | \$152,344 | 45.64 | 54.04 |
| SOUTH STREET | SCHOOL STREET | SAMPSON STREET | 567 ft | BC - 2" Overlay Local | \$28,206 | 45.28 | 53.93 |
| Segment Count | 3 | | 1.7 miles | | \$337,639 | | |
| SALEM STREET | LACAIRE LANE | DEAD END | 545 ft | BC - Crack Seal and Patch | \$1,337 | 68.35 | 47.95 |
| Segment Count | 1 | | 0.1 miles | | \$1,337 | | |
| CORNFIELD ROAD | TREADWELL DRIVE | CUL-DE-SAC | 584 ft | BC - Crack Seal or Patch | \$1,254 | 79.64 | 51.43 |
| IRVING STREET | GREENVILLE STREET | MUZZY STREET | 1008 ft | BC - Crack Seal or Patch | \$2,009 | 86.12 | 66.50 |
| NORTHWEST ROAD | NORTH SPENCER ROAD | 2300' N OF BROOKS POND ROAD | 10395 ft | BC - Crack Seal or Patch | \$17,533 | 85.12 | 66.19 |
| PAXTON DRIVE | PAXTON ROAD | DEAD END | 267 ft | BC - Crack Seal or Patch | \$440 | 83.43 | 52.59 |
| SPINNAKER DRIVE | OAKLAND DRIVE | CUL-DE-SAC | 449 ft | BC - Crack Seal or Patch | \$1,033 | 78.44 | 51.06 |
| Segment Count | 5 | | 2.4 miles | | \$22,269 | | |
| CHARLTON ROAD | MAPLE STREET | EAST CHARLTON ROAD | 4055 ft | BC - Reclaim Col | \$495,758 | 14.86 | 56.88 |
| CHICKERING ROAD | CLARK ROAD | 150' W OF GREENVILLE STREET | 5549 ft | BC - Reclaim Col | \$505,483 | 18.54 | 56.47 |
| MAPLE STREET | CHERRY STREET | ADAMS STREET | 529 ft | BC - Reclaim Col | \$71,015 | 9.36 | 55.19 |
| MAPLE STREET | ADAMS STREET | 750' N OF CHARLTON ROAD | 2808 ft | BC - Reclaim Col | \$309,644 | 7.92 | 54.74 |
| NORTH BROOKFIELD ROAD | NORTH SPENCER ROAD | NORTH BROOKFIELD TOWN LINE | 7341 ft | BC - Reclaim Col | \$756,714 | 15.20 | 56.98 |
| Segment Count | 5 | | 3.8 miles | | \$2,138,615 | | |
| Plan cost for Plan Year | 3 | | 8.1 miles | | \$2,499,860 | | |
| Segment Count | 14 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 4

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|--------------------|-------------------------------|------------------|------------------------------|--------------------|-------|-------|
| MCDONALD STREET | SALEM STREET | MECHANIC STREET | 1389 ft | BC - 2" Mill & Overlay Local | \$60,403 | 36.70 | 51.29 |
| SPRING STREET | MAIN STREET | CHERRY STREET | 1020 ft | BC - 2" Mill & Overlay Local | \$51,413 | 36.70 | 51.29 |
| Segment Count | 2 | | 0.5 miles | | \$111,816 | | |
| DONNELLY STREET | MAIN STREET | 250' N OF DONNELLY CROSS ROAD | 1975 ft | BC - 2" Overlay Local | \$67,513 | 38.50 | 51.85 |
| LINDEN STREET | MAIN STREET | CHERRY STREET | 670 ft | BC - 2" Overlay Local | \$32,188 | 37.00 | 51.38 |
| LYFORD ROAD | SOUTH SPENCER ROAD | HOWE ROAD | 4065 ft | BC - 2" Overlay Local | \$172,758 | 39.50 | 52.15 |
| Segment Count | 3 | | 1.3 miles | | \$272,459 | | |
| BLUEBERRY HILL DRIVE | CHARLTON ROAD | CUL-DE-SAC | 1030 ft | BC - Crack Seal and Patch | \$2,976 | 71.95 | 49.06 |
| Segment Count | 1 | | 0.2 miles | | \$2,976 | | |
| BIXBY ROAD | WEST MAIN STREET | DEAD END | 2116 ft | BC - Crack Seal or Patch | \$3,809 | 81.63 | 52.04 |
| HOLMES STREET | MAY STREET | DALE STREET | 605 ft | BC - Crack Seal or Patch | \$1,016 | 84.68 | 66.06 |
| JONES STREET | POPE STREET | STARR STREET | 358 ft | BC - Crack Seal or Patch | \$573 | 87.60 | 63.88 |
| MAY STREET | MAIN STREET | HOLMES STREET | 1313 ft | BC - Crack Seal or Patch | \$2,626 | 84.68 | 66.06 |
| STARR STREET | GROVE STREET | POPE STREET | 607 ft | BC - Crack Seal or Patch | \$1,093 | 87.60 | 63.88 |
| SUMMIT STREET | MAIN STREET | WATSON STREET | 1151 ft | BC - Crack Seal or Patch | \$1,934 | 84.16 | 65.90 |
| TREADWELL TERRACE | TREADWELL DRIVE | CUL-DE-SAC | 606 ft | BC - Crack Seal or Patch | \$1,260 | 81.87 | 50.58 |
| WIRE VILLAGE ROAD | PLEASANT STREET | NUGGET FARM ROAD | 10050 ft | BC - Crack Seal or Patch | \$18,894 | 86.65 | 77.43 |
| Segment Count | 8 | | 3.2 miles | | \$31,205 | | |
| THOMPSON POND ROAD | NORTH SPENCER ROAD | PAXTON TOWN LINE | 7246 ft | BC - Reclaim Col | \$830,883 | 15.79 | 55.63 |
| Segment Count | 1 | | 1.4 miles | | \$830,883 | | |
| Plan cost for Plan Year | 4 | | 6.5 miles | | \$1,249,339 | | |
| Segment Count | 15 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 5

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|----------------------------------|----------------------|------------------|-------------------------------|--------------------|-------|-------|
| ASH STREET | CLARK STREET | R JONES ROAD | 5483 ft | BC - 2" Overlay Local | \$221,330 | 32.68 | 50.06 |
| ASH STREET | R JONES ROAD | EAST CHARLTON STREET | 3604 ft | BC - 2" Overlay Local | \$135,090 | 32.16 | 49.90 |
| DUSTIN STREET | MAPLE STREET | MECHANIC STREET | 535 ft | BC - 2" Overlay Local | \$20,054 | 30.73 | 49.46 |
| MCCORMACK ROAD | 1675' N OF GOLD NUGGET FARM ROAD | THOMPSON POND ROAD | 10329 ft | BC - 2" Overlay Local | \$377,238 | 33.52 | 50.31 |
| Segment Count | 4 | | 3.8 miles | | \$753,712 | | |
| SUNSET LANE | GREENVILLE STREET | DEAD END | 557 ft | BC - Crack Seal or Patch | \$916 | 86.08 | 66.49 |
| Segment Count | 1 | | 0.1 miles | | \$916 | | |
| BACON HILL ROAD | CHARLTON ROAD | EAST CHARLTON ROAD | 5047 ft | BC - Reclaim Col | \$484,173 | 13.28 | 53.32 |
| Segment Count | 1 | | 1.0 miles | | \$484,173 | | |
| MARTIN DRIVE | CRANBERRY MEADOW ROAD | DEAD END | 715 ft | BC - Shim, Crack Seal & Patch | \$5,952 | 60.96 | 44.14 |
| Segment Count | 1 | | 0.1 miles | | \$5,952 | | |
| Plan cost for Plan Year | 5 | | 5.0 miles | | \$1,244,753 | | |
| Segment Count | 7 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 6

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|-----------------------------|----------------------------|------------------|------------------------------|------------------|-------|-------|
| VALLEY STREET | ELM STREET | 275' W OF ELM STREET | 278 ft | BC - 1-1/4" Overlay | \$8,637 | 48.60 | 41.88 |
| Segment Count | 1 | | 0.1 miles | | \$8,637 | | |
| OLD FARM ROAD | SMITHVILLE ROAD | MEADOW ROAD | 2516 ft | BC - 2" Mill & Overlay Local | \$158,670 | 28.09 | 48.64 |
| SCHOOL STREET | MAIN STREET | MEADOW ROAD | 2781 ft | BC - 2" Mill & Overlay Local | \$166,464 | 27.72 | 48.53 |
| Segment Count | 2 | | 1.0 miles | | \$325,135 | | |
| CHERRY STREET | MAY STREET | GREENVILLE STREET | 2214 ft | BC - 2" Overlay Local | \$104,000 | 28.51 | 48.77 |
| COLLIER CIRCLE | OAKLAND DRIVE | COLLIER CIRCLE | 2644 ft | BC - 2" Overlay Local | \$158,552 | 28.42 | 48.74 |
| EAST CHARLTON ROAD | CLARK ROAD | BACON HILL ROAD | 1250 ft | BC - 2" Overlay Local | \$46,224 | 24.16 | 47.43 |
| KITTREDGE ROAD | NORTHWEST ROAD | NORTH BROOKFIELD TOWN LINE | 3578 ft | BC - 2" Overlay Local | \$128,736 | 27.36 | 48.42 |
| MILL STREET | MAIN STREET | VALLEY STREET | 411 ft | BC - 2" Overlay Local | \$15,609 | 29.53 | 46.01 |
| TEMPLE STREET | CHESTNUT STREET | LANGEVIN STREET | 2225 ft | BC - 2" Overlay Local | \$93,398 | 28.00 | 48.62 |
| Segment Count | 6 | | 2.3 miles | | \$546,520 | | |
| ADAMS STREET | CLARK STREET | MCDONALD STREET | 385 ft | BC - Crack Seal or Patch | \$725 | 87.32 | 66.87 |
| BARCLAY ROAD | NORTH SPENCER ROAD | PAXTON TOWN LINE | 809 ft | BC - Crack Seal or Patch | \$1,696 | 88.00 | 78.62 |
| BELL STREET | MAIN STREET | WALNUT STREET | 758 ft | BC - Crack Seal or Patch | \$1,492 | 87.32 | 66.87 |
| BOND STREET | MAIN STREET | LEICESTER TOWN LINE | 1664 ft | BC - Crack Seal or Patch | \$2,705 | 87.32 | 66.87 |
| BRIARCLIFF LANE | BACON HILL ROAD | CHARLTON TOWN LINE | 2738 ft | BC - Crack Seal or Patch | \$4,802 | 87.32 | 66.87 |
| BROOKS POND ROAD | NORTHWEST ROAD | 150' S OF WASHBURN ROAD | 6372 ft | BC - Crack Seal or Patch | \$11,994 | 87.32 | 66.87 |
| BROWNING POND ROAD | NORTH SPENCER ROAD | OAKHAM TOWN LINE | 8649 ft | BC - Crack Seal or Patch | \$16,279 | 88.00 | 77.85 |
| CHERRY STREET | MAPLE STREET | MAY STREET | 1298 ft | BC - Crack Seal or Patch | \$2,998 | 87.32 | 66.87 |
| CHESTNUT STREET | MAPLE STREET | VALLEY STREET | 2136 ft | BC - Crack Seal or Patch | \$5,117 | 88.00 | 79.38 |
| CHICKERING ROAD | 150' W OF GREENVILLE STREET | LEICESTER TOWN LINE | 450 ft | BC - Crack Seal or Patch | \$828 | 88.00 | 77.85 |
| CLARK ROAD | CHICKERING ROAD | LEICESTER TOWN LINE | 6111 ft | BC - Crack Seal or Patch | \$12,548 | 87.32 | 66.87 |
| COONEY ROAD | NORTH SPENCER ROAD | HASTINGS ROAD | 4377 ft | BC - Crack Seal or Patch | \$8,238 | 87.32 | 66.87 |
| COTTAGE STREET | CHERRY STREET | HOLMES STREET | 682 ft | BC - Crack Seal or Patch | \$1,634 | 87.32 | 66.87 |
| CRANBERRY MEADOW ROAD | LYFORD ROAD | JOLICOEUR ROAD | 7090 ft | BC - Crack Seal or Patch | \$13,952 | 87.32 | 66.87 |
| CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 200' W OF BRIARCLIFF LANE | 3267 ft | BC - Crack Seal or Patch | \$7,407 | 87.32 | 66.87 |
| CRANBERRY MEADOW ROAD | 200' W OF BRIARCLIFF LANE | 650' E OF BRIARCLIFF LANE | 881 ft | BC - Crack Seal or Patch | \$1,809 | 87.32 | 66.87 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 6

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|-----------------------|---------------------------------|---------------------------|----------|--------------------------|-----------|-------|-------|
| ROAD | | | | | | | |
| CRANBERRY MEADOW ROAD | 650' E OF BRIARCLIFF LANE | CHARLTON ROAD | 1507 ft | BC - Crack Seal or Patch | \$2,965 | 87.32 | 66.87 |
| CROWN STREET | WALNUT STREET | SUMNER STREET | 997 ft | BC - Crack Seal or Patch | \$1,791 | 87.32 | 66.87 |
| EAST CHARLTON ROAD | G HENRY WILSON ROAD | CLARK ROAD | 4439 ft | BC - Crack Seal or Patch | \$7,975 | 87.32 | 66.87 |
| FOURTH AVENUE | SCHOOL STREET | MEADOW ROAD | 1313 ft | BC - Crack Seal or Patch | \$2,471 | 87.32 | 66.87 |
| GAUTHIER ROAD | CHARLTON ROAD | CRANBERRY MEADOW ROAD | 4896 ft | BC - Crack Seal or Patch | \$8,378 | 87.32 | 66.87 |
| GOLD NUGGET FARM ROAD | HASTINGS ROAD | PAXTON ROAD | 4975 ft | BC - Crack Seal or Patch | \$8,938 | 88.00 | 75.54 |
| GREENVILLE STREET | MAIN STREET | CHICKERING ROAD | 15662 ft | BC - Crack Seal or Patch | \$29,479 | 88.00 | 78.62 |
| HASTINGS ROAD | 100' N OF GOLD NUGGET FARM ROAD | NORTH SPENCER ROAD | 8653 ft | BC - Crack Seal or Patch | \$14,806 | 87.32 | 66.87 |
| HEBERT ROAD | CRANBERRY MEADOW ROAD | JOLICOEUR ROAD | 1210 ft | BC - Crack Seal or Patch | \$1,708 | 88.00 | 77.85 |
| HEBERT ROAD | JOLICOEUR ROAD | SOUTH SPENCER ROAD | 1958 ft | BC - Crack Seal or Patch | \$3,183 | 88.00 | 77.85 |
| I CAPEN ROAD | CHARLTON ROAD | EAST CHARLTON ROAD | 1978 ft | BC - Crack Seal or Patch | \$3,385 | 87.32 | 63.79 |
| JOLICOEUR ROAD | CRANBERRY MEADOW ROAD | HEBERT ROAD | 1861 ft | BC - Crack Seal or Patch | \$3,025 | 88.00 | 75.54 |
| LAKE STREET | RENE DRIVE | DEAD END | 1449 ft | BC - Crack Seal or Patch | \$2,541 | 87.32 | 66.87 |
| LYFORD CROSS ROAD | SOUTH SPENCER ROAD | LYFORD ROAD | 606 ft | BC - Crack Seal or Patch | \$830 | 87.32 | 63.79 |
| MAIN STREET | SUMNER STREET | 50' E OF PLEASANT STREET | 2771 ft | BC - Crack Seal or Patch | \$10,076 | 89.00 | 85.08 |
| MAIN STREET | 50' E OF PLEASANT STREET | 75' E OF LINDEN STREET | 1261 ft | BC - Crack Seal or Patch | \$4,531 | 89.00 | 85.08 |
| MAIN STREET | 75' E OF LINDEN STREET | PARK STREET | 2054 ft | BC - Crack Seal or Patch | \$7,117 | 89.00 | 85.08 |
| MAPLE TERRACE | MAPLE STREET | CHERRY STREET | 360 ft | BC - Crack Seal or Patch | \$647 | 88.00 | 79.38 |
| MEADOW ROAD | WEST MAIN STREET | PLEASANT STREET | 8210 ft | BC - Crack Seal or Patch | \$20,019 | 88.00 | 79.38 |
| NORTH SPENCER ROAD | PLEASANT STREET | BARCLAY ROAD | 22698 ft | BC - Crack Seal or Patch | \$62,142 | 88.00 | 79.38 |
| NORTH SPENCER ROAD | BARCLAY ROAD | PAXTON TOWN LINE | 2090 ft | BC - Crack Seal or Patch | \$4,291 | 88.00 | 79.38 |
| NORTH STREET | MAIN STREET | HIGHLAND STREET | 931 ft | BC - Crack Seal or Patch | \$1,673 | 88.00 | 79.38 |
| OLDE MAIN STREET | 300' E OF MEADOW ROAD | MEADOW ROAD | 308 ft | BC - Crack Seal or Patch | \$843 | 87.32 | 66.87 |
| PAXTON ROAD | MAIN STREET | 300' S OF WILSON STREET | 1708 ft | BC - Crack Seal or Patch | \$3,507 | 88.00 | 78.62 |
| PAXTON ROAD | 300' S OF WILSON STREET | 750' N OF WILSON STREET | 1062 ft | BC - Crack Seal or Patch | \$1,953 | 88.00 | 78.62 |
| PAXTON ROAD | 750' N OF WILSON STREET | LAKEVIEW STREET | 4694 ft | BC - Crack Seal or Patch | \$9,438 | 88.00 | 78.62 |
| PAXTON ROAD | 5000' N OF LAKEVIEW STREET | THOMPSON POND ROAD | 5198 ft | BC - Crack Seal or Patch | \$10,006 | 88.00 | 78.62 |
| PLEASANT STREET | MAIN STREET | 175' N OF SMITHVILLE ROAD | 3177 ft | BC - Crack Seal or Patch | \$8,018 | 88.00 | 80.15 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 6

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|----------------------------------|---------------------------|-----------------------------|-------------|--------------------------|--------------------|-------|-------|
| PLEASANT STREET | 175' N OF SMITHVILLE ROAD | MEADOW ROAD | 1561 ft | BC - Crack Seal or Patch | \$3,606 | 88.00 | 80.15 |
| POND STREET | CLARK STREET | MCDONALD STREET | 283 ft | BC - Crack Seal or Patch | \$654 | 87.32 | 63.79 |
| SMITHVILLE ROAD | MEADOW ROAD | 900' W OF MEADOW ROAD | 910 ft | BC - Crack Seal or Patch | \$2,180 | 87.32 | 66.87 |
| SOUTH SPENCER ROAD | WEST MAIN STREET | EAST BROOKFIELD TOWN LINE | 18056 ft | BC - Crack Seal or Patch | \$30,896 | 88.00 | 78.62 |
| SUNSET LANE | GREENVILLE STREET | 750' W OF GREENVILLE STREET | 750 ft | BC - Crack Seal or Patch | \$1,348 | 87.32 | 66.87 |
| VINE STREET | SCHOOL STREET | FOURTH AVENUE | 661 ft | BC - Crack Seal or Patch | \$961 | 87.32 | 63.79 |
| WALNUT STREET | SCHOOL STREET | CROWN STREET | 533 ft | BC - Crack Seal or Patch | \$730 | 87.32 | 63.79 |
| Segment Count 51 | | | 33.8 | miles | \$370,335 | | |
| Plan cost for Plan Year 6 | | | 37.2 | miles | \$1,250,627 | | |
| Segment Count 60 | | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 7

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------|---------------------------------|---------------------------------|------------------|------------------------------|------------------|-------|-------|
| GROVE STREET | MAIN STREET | HIGHLAND STREET | 2280 ft | BC - 2" Mill & Overlay Local | \$141,938 | 23.54 | 47.24 |
| MECHANIC STREET | CHESTNUT STREET | DEAD END | 2669 ft | BC - 2" Mill & Overlay Local | \$172,088 | 22.72 | 46.99 |
| NOTTINGHAM CIRCLE | SHERWOOD DRIVE (S) | SHERWOOD DRIVE (N) | 1270 ft | BC - 2" Mill & Overlay Local | \$79,062 | 22.72 | 46.99 |
| Segment Count | 3 | | 1.2 miles | | \$393,087 | | |
| BAY PATH ROAD | MEADOW ROAD | OLD FARM ROAD | 2038 ft | BC - 2" Overlay Local | \$127,103 | 23.44 | 47.21 |
| R JONES ROAD | ASH STREET | KINGSBURY ROAD | 6306 ft | BC - 2" Overlay Local | \$242,525 | 21.80 | 46.71 |
| WILSON STREET | LINCOLN STREET | PAXTON ROAD | 6813 ft | BC - 2" Overlay Local | \$276,188 | 23.10 | 47.11 |
| Segment Count | 3 | | 2.9 miles | | \$645,816 | | |
| ASH STREET | MAIN STREET | CLARK STREET | 2265 ft | BC - Crack Seal or Patch | \$4,631 | 87.32 | 66.87 |
| BUTEAU ROAD | CLARK ROAD | CHARLTON TOWN LINE | 4436 ft | BC - Crack Seal or Patch | \$7,098 | 87.32 | 66.87 |
| CHARLTON ROAD | CRANBERRY MEADOW ROAD | CHARLTON TOWN LINE | 3820 ft | BC - Crack Seal or Patch | \$8,149 | 88.00 | 79.38 |
| CRAIG ROAD | LINCOLN STREET | GRANT STREET | 273 ft | BC - Crack Seal or Patch | \$473 | 87.32 | 63.79 |
| DONNELLY CROSS ROAD | DONNELLY STREET | 250' N OF DONNELLY STREET | 255 ft | BC - Crack Seal or Patch | \$499 | 87.32 | 66.87 |
| HASTINGS ROAD | WILSON STREET | 150' S OF WIRE VILLAGE ROAD | 2838 ft | BC - Crack Seal or Patch | \$6,181 | 87.32 | 66.87 |
| HASTINGS ROAD | 300' S OF GOLD NUGGET FARM ROAD | 100' N OF GOLD NUGGET FARM ROAD | 382 ft | BC - Crack Seal or Patch | \$662 | 87.32 | 66.87 |
| HIGH STREET | MAIN STREET | PLEASANT STREET | 1745 ft | BC - Crack Seal or Patch | \$3,878 | 87.32 | 66.87 |
| HIGHLAND STREET | GROVE STREET | WILSON STREET | 1588 ft | BC - Crack Seal or Patch | \$3,670 | 87.32 | 66.87 |
| HOWE ROAD / HOWE POND RD | LYFORD ROAD | CHARLTON ROAD | 6755 ft | BC - Crack Seal or Patch | \$11,709 | 87.32 | 66.87 |
| IRVING STREET | MUZZY STREET | MAY STREET | 1226 ft | BC - Crack Seal or Patch | \$2,833 | 87.32 | 66.87 |
| MAPLE STREET | MAIN STREET | CHERRY STREET | 513 ft | BC - Crack Seal or Patch | \$1,094 | 88.00 | 79.38 |
| MAPLE STREET | 750' N OF CHARLTON ROAD | CHARLTON ROAD | 748 ft | BC - Crack Seal or Patch | \$1,662 | 88.00 | 79.38 |
| MECHANIC STREET | MAIN STREET | CHESTNUT STREET | 900 ft | BC - Crack Seal or Patch | \$2,240 | 87.32 | 66.87 |
| OLD MEADOW ROAD | MEADOW ROAD (N) | MEADOW ROAD (S) | 1232 ft | BC - Crack Seal or Patch | \$1,916 | 87.32 | 63.79 |
| PAXTON ROAD | LAKEVIEW STREET | 5000' N OF LAKEVIEW STREET | 5000 ft | BC - Crack Seal or Patch | \$9,111 | 88.00 | 78.62 |
| POPE STREET | GROVE STREET | BROWN STREET | 1177 ft | BC - Crack Seal or Patch | \$2,145 | 87.32 | 66.87 |
| RAWSON ROAD | GREENVILLE STREET | LEICESTER TOWN LINE | 685 ft | BC - Crack Seal or Patch | \$1,187 | 88.00 | 76.31 |
| SMITHVILLE CROSS ROAD | NORTH SPENCER ROAD | SMITHVILLE ROAD | 2691 ft | BC - Crack Seal or Patch | \$4,664 | 87.32 | 66.87 |
| VERNON STREET | CROWN STREET | BELL STREET | 296 ft | BC - Crack Seal or Patch | \$579 | 87.32 | 63.79 |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 7

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|-----------------|-------------------------------|-------------------|--------------------------|--------------------|-------|-------|
| WILLIAM CASEY ROAD | JOLICOEUR ROAD | 1100' N OF CHARLTON TOWN LINE | 4106 ft | BC - Crack Seal or Patch | \$6,570 | 87.32 | 66.87 |
| WOODSIDE ROAD | SMITHVILLE ROAD | NORCROSS ROAD | 4383 ft | BC - Crack Seal or Patch | \$7,402 | 87.32 | 66.87 |
| Segment Count | 22 | | 9.0 miles | | \$88,354 | | |
| CLARK STREET | ASH STREET | ADAMS STREET | 1344 ft | BC - Reclaim Local | \$118,910 | 20.80 | 46.40 |
| Segment Count | 1 | | 0.3 miles | | \$118,910 | | |
| Plan cost for Plan Year | 7 | | 13.3 miles | | \$1,246,167 | | |
| Segment Count | 29 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 8

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|--------------------------|-----------------------------|------------------|--------------------------|------------------|-------|-------|
| IRVING STREET | GREENVILLE STREET | MUZZY STREET | 1008 ft | BC - Crack Seal or Patch | \$2,446 | 87.32 | 66.87 |
| NORTHWEST ROAD | NORTH SPENCER ROAD | 2300' N OF BROOKS POND ROAD | 10395 ft | BC - Crack Seal or Patch | \$21,344 | 87.32 | 66.87 |
| PARK STREET | MAIN STREET | DEAD END | 550 ft | BC - Crack Seal or Patch | \$770 | 84.00 | 51.23 |
| SMITHVILLE ROAD | 900' W OF MEADOW ROAD | 900' N OF LALIBERTE LANE | 4019 ft | BC - Crack Seal or Patch | \$8,252 | 87.32 | 66.87 |
| SMITHVILLE ROAD | 900' N OF LALIBERTE LANE | EAST BROOKFIELD TOWN LINE | 4513 ft | BC - Crack Seal or Patch | \$8,003 | 87.32 | 66.87 |
| SOUTH STREET | SCHOOL STREET | SAMPSON STREET | 567 ft | BC - Crack Seal or Patch | \$1,482 | 87.32 | 66.87 |
| Segment Count | 6 | | 4.0 miles | | \$42,298 | | |
| BEMIS STREET | MAPLE STREET | MECHANIC STREET | 695 ft | BC - Reclaim Local | \$56,835 | 16.94 | 45.21 |
| EAST CHARLTON ROAD | CHARLTON ROAD | G HENRY WILSON ROAD | 4057 ft | BC - Reclaim Local | \$414,715 | 19.79 | 46.09 |
| Segment Count | 2 | | 0.9 miles | | \$471,551 | | |
| Plan cost for Plan Year | 8 | | 4.9 miles | | \$513,848 | | |
| Segment Count | 8 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 9

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|--------------------|-------------------------------|------------------|--------------------------|------------------|-------|-------|
| CHARLTON ROAD | EAST CHARLTON ROAD | SUNBERG ROAD | 5467 ft | BC - Crack Seal or Patch | \$14,005 | 88.00 | 79.38 |
| CHARLTON ROAD | SUNBERG ROAD | CRANBERRY MEADOW ROAD | 4882 ft | BC - Crack Seal or Patch | \$12,506 | 88.00 | 79.38 |
| CORNFIELD ROAD | TREADWELL DRIVE | CUL-DE-SAC | 584 ft | BC - Crack Seal or Patch | \$1,581 | 84.00 | 52.77 |
| DONNELLY STREET | MAIN STREET | 250' N OF DONNELLY CROSS ROAD | 1975 ft | BC - Crack Seal or Patch | \$3,532 | 87.32 | 66.87 |
| HOLMES STREET | MAY STREET | DALE STREET | 605 ft | BC - Crack Seal or Patch | \$1,228 | 87.32 | 66.87 |
| JONES STREET | POPE STREET | STARR STREET | 358 ft | BC - Crack Seal or Patch | \$692 | 87.32 | 63.79 |
| LINDEN STREET | MAIN STREET | CHERRY STREET | 670 ft | BC - Crack Seal or Patch | \$1,684 | 87.32 | 66.87 |
| LYFORD ROAD | SOUTH SPENCER ROAD | HOWE ROAD | 4065 ft | BC - Crack Seal or Patch | \$9,038 | 87.32 | 66.87 |
| MAY STREET | MAIN STREET | HOLMES STREET | 1313 ft | BC - Crack Seal or Patch | \$3,173 | 87.32 | 66.87 |
| MCDONALD STREET | SALEM STREET | MECHANIC STREET | 1389 ft | BC - Crack Seal or Patch | \$2,954 | 87.32 | 66.87 |
| PAXTON DRIVE | PAXTON ROAD | DEAD END | 267 ft | BC - Crack Seal or Patch | \$555 | 84.00 | 52.77 |
| SALEM STREET | LACAIRE LANE | DEAD END | 545 ft | BC - Crack Seal or Patch | \$1,212 | 84.00 | 52.77 |
| SPINNAKER DRIVE | OAKLAND DRIVE | CUL-DE-SAC | 449 ft | BC - Crack Seal or Patch | \$1,302 | 84.00 | 52.77 |
| SPRING STREET | MAIN STREET | CHERRY STREET | 1020 ft | BC - Crack Seal or Patch | \$2,514 | 87.32 | 66.87 |
| STARR STREET | GROVE STREET | POPE STREET | 607 ft | BC - Crack Seal or Patch | \$1,320 | 87.32 | 63.79 |
| SUMMIT STREET | MAIN STREET | WATSON STREET | 1151 ft | BC - Crack Seal or Patch | \$2,337 | 87.32 | 66.87 |
| WATER STREET | VALLEY STREET | MAIN STREET | 939 ft | BC - Crack Seal or Patch | \$2,178 | 88.00 | 79.38 |
| WIRE VILLAGE ROAD | PLEASANT STREET | NUGGET FARM ROAD | 10050 ft | BC - Crack Seal or Patch | \$22,830 | 88.00 | 77.85 |
| Segment Count | 18 | | 6.9 miles | | \$84,641 | | |
| ELM STREET | MAIN STREET | CHESTNUT STREET | 924 ft | BC - Reclaim Local | \$82,532 | 17.14 | 45.27 |
| MARBLE ROAD | EAST CHARLTON ROAD | CLARK ROAD | 4168 ft | BC - Reclaim Local | \$345,694 | 17.70 | 45.45 |
| Segment Count | 2 | | 1.0 miles | | \$428,226 | | |
| Plan cost for Plan Year | 9 | | 7.8 miles | | \$512,867 | | |
| Segment Count | 20 | | | | | | |

Segments FST Analysis Recommendations by Activity

Scenario Prog1

Description Aggressive Scenario - Attack the Backlog up front at today's dollars.

Protocol FST Roadway

\$2.5M for year 1 - 3
 \$1.25M for year 4 -7
 \$512k for year 8 -10

Budget Aggressive

Time Frame 10

Plan Year 10

| Street | From | To | Length | Plan Activity | Plan Cost | OCI | NPR |
|--------------------------------|----------------------------------|------------------------------|--------------------|--------------------------|---------------------|-------|-------|
| ASH STREET | CLARK STREET | R JONES ROAD | 5483 ft | BC - Crack Seal or Patch | \$11,642 | 87.32 | 66.87 |
| ASH STREET | R JONES ROAD | EAST CHARLTON STREET | 3604 ft | BC - Crack Seal or Patch | \$7,106 | 87.32 | 66.87 |
| BIXBY ROAD | WEST MAIN STREET | DEAD END | 2116 ft | BC - Crack Seal or Patch | \$4,814 | 84.00 | 52.77 |
| BLUEBERRY HILL DRIVE | CHARLTON ROAD | CUL-DE-SAC | 1030 ft | BC - Crack Seal or Patch | \$2,708 | 84.00 | 52.77 |
| CHARLTON ROAD | MAPLE STREET | EAST CHARLTON ROAD | 4055 ft | BC - Crack Seal or Patch | \$10,455 | 88.00 | 79.38 |
| CHICKERING ROAD | CLARK ROAD | 150' W OF GREENVILLE STREET | 5549 ft | BC - Crack Seal or Patch | \$10,660 | 88.00 | 77.85 |
| DUSTIN STREET | MAPLE STREET | MECHANIC STREET | 535 ft | BC - Crack Seal or Patch | \$1,055 | 87.32 | 66.87 |
| MAPLE STREET | CHERRY STREET | ADAMS STREET | 529 ft | BC - Crack Seal or Patch | \$1,498 | 88.00 | 79.38 |
| MAPLE STREET | ADAMS STREET | 750' N OF CHARLTON ROAD | 2808 ft | BC - Crack Seal or Patch | \$6,530 | 88.00 | 79.38 |
| MCCORMACK ROAD | 1675' N OF GOLD NUGGET FARM ROAD | THOMPSON POND ROAD | 10329 ft | BC - Crack Seal or Patch | \$19,843 | 87.32 | 66.87 |
| NORTH BROOKFIELD ROAD | NORTH SPENCER ROAD | NORTH BROOKFIELD TOWN LINE | 7341 ft | BC - Crack Seal or Patch | \$15,959 | 88.00 | 79.38 |
| SUNSET LANE | GREENVILLE STREET | DEAD END | 557 ft | BC - Crack Seal or Patch | \$1,126 | 87.32 | 66.87 |
| TREADWELL TERRACE | TREADWELL DRIVE | CUL-DE-SAC | 606 ft | BC - Crack Seal or Patch | \$1,593 | 84.00 | 51.23 |
| Segment Count | 13 | | 8.4 miles | | \$94,989 | | |
| ALTA CREST ROAD | NORTH SPENCER ROAD | 300' W OF NORTH SPENCER ROAD | 300 ft | BC - Reclaim Local | \$23,886 | 14.45 | 31.37 |
| GRANT STREET | PLEASANT STREET | DEAD END | 1884 ft | BC - Reclaim Local | \$191,672 | 14.49 | 44.46 |
| LAKE STREET | MAIN STREET | RENE DRIVE | 509 ft | BC - Reclaim Local | \$51,784 | 14.90 | 44.58 |
| SMITHVILLE ROAD | PLEASANT STREET | MEADOW ROAD | 1575 ft | BC - Reclaim Local | \$156,752 | 15.08 | 44.64 |
| Segment Count | 4 | | 0.8 miles | | \$424,094 | | |
| Plan cost for Plan Year | 10 | | 9.2 miles | | \$519,083 | | |
| Segment Count | 17 | | 137.0 miles | | \$14,036,459 | | |

APPENDIX C

Spencer's Repair Alternatives and Unit Costs

| Activity | Description | Unit Cost (SY) |
|---------------------------------|---|-----------------------|
| BC - Reconstruction Art | Reclaim, 6" HMA, new base, remodel structures, police detail & line paint | \$55.09 |
| BC - Reconstruction Col | Reclaim, 6" HMA, new base, remodel structures, police detail & line paint | \$55.09 |
| BC - Reconstruction Local | Reclaim, 4" HMA, new base, remodel structures, police detail & line paint | \$44.93 |
| BC - Reclaim Art | Reclaim, 6" HMA, remodel structures, police detail & line paint | \$37.86 |
| BC - Reclaim Col | Reclaim, 6" HMA, remodel structures, police detail & line paint | \$37.86 |
| BC - Reclaim Local | Reclaim, 4" HMA, remodel structures, police detail & line paint | \$27.71 |
| BC - 3" Mill & Overlay Art/Col | 3" mill, 3" HMA, crackseal, tack, police detail & line paint | \$21.66 |
| BC - 3" Overlay Art/Col | 3" HMA, adjust structures, crackseal, patching, tack, police detail & line paint | \$19.51 |
| CH - Chip Seal | Double lift chip seal, patching, police detail & line paint | \$7.90 |
| BC - 2" Mill & Overlay Local | 2" mill, 2" HMA, crackseal, tack, police detail & line paint | \$15.67 |
| BC - 2" Overlay Local | 2" HMA, adjust structures, patching, crackseal, tack, police detail & line paint | \$14.65 |
| BC - 1-1/4" Overlay Local | 1-1/4" HMA, adjust structures, patching, crackseal, tack, police detail & line paint | \$10.35 |
| BC - Novachip | 3/4" Novachip, adjust structures, patching, crackseal, tack, police detail & line paint | \$8.86 |
| BC - Microsurface | Single lift of microsurfacing, patching, tack, police detail & line paint | \$7.57 |
| BC - Hot in Place Recycling | 1-1/4" heat scarification, add rejuvenator and compact | \$5.31 |
| BC - Shim, Crack Seal & Patch | 1" HMA, patch, crackseal, tack, police detail, & line paint | \$4.50 |
| BC - Crack Seal & Patch | Crackseal and surface patch | \$0.88 |
| BC - Crack Seal or Patch | Crackseal or skin patch | \$0.63 |
| GR - Base Rehabilitation | Remove and add stable gravel | \$4.50 |
| GR - Gravel & Drain Improvement | New gravel and drainage improvements | \$2.34 |
| GR - New Gravel | Add gravel, grade & compact | \$2.25 |
| GR - Grade | Grade and compact existing surface | \$0.99 |
| Do Nothing | Do nothing at this time | \$0.00 |

APPENDIX D

Glossary of Terms

DEDUCT POINTS: Points representing the penalty assessed for each identified distress used in the calculation of the Pavement Condition Index. Each distress has multiple severity and extent levels, with a specific number of points at each level. Deduct points may be modified for all nine pavement distress types. The deduct points are ultimately subtracted from a perfect pavement condition of 100.

DETERIORATION RATE: a rate that predicts of the anticipated change in a roadway's condition over time.

DISTRESS: a physical defect or deficiency on the pavement surface that can be observed and quantified through visual inspection of the pavement surface. Broad categories include surface cracking, base related cracking, patching, and surface wear.

DRAINAGE CONDITION INDEX (DCI): an index derived from controlled measurements and evaluations of pavement surface drainage deficiencies and conditions. It is a serviceability rating established for determining the present stature or performance of the drainage features on a scale from 0 to 100, with 100 being excellent.

FUNCTIONAL CLASSIFICATION: Road functional classification places all streets and roads in the network into one of four general categories - arterial, collector, local, or dead end - according to vehicular volume, roadway geometry, and traffic characteristics.

INFRASTRUCTURE MANAGEMENT SYSTEM (IMS): similar to a Pavement Management System, has all the database attributes describing an infrastructure network such as water, wastewater or drainage system. This additional data to the management system database may include drainage features, utilities, traffic signs, pavement markings, sidewalks, pedestrian ramps and other road related elements within the right of way. Because the roadway network system serves as a common location and identification system for roadside elements, the database can be comprehensively evaluated for infrastructure system wide planning and management.

NETWORK LEVEL: an assessment of conditions and/or program needs across the entire roadway system encompassed by the pavement management study.

NETWORK PRIORITY RANKING (NPR): a value computed by PAVEMENTview®Plus at the time it determines the most beneficial recommended repair for a particular pavement section. The Network Priority Ranking formula is:

$$\text{NPR} = (.60 \times \text{PCI}) + (.30 \times \text{Functional Class. Priority}) + (.10 \times \text{Pavement Class. Priority})$$

Where NPR = Network Priority Ranking equals 60% Pavement Condition Index plus 30% Functional Classification Priority Rank plus 20% Pavement Classification Priority Rank.

PAVEMENT CONDITION INDEX (PCI): an index derived from established measurements of pavement surface condition distress or deficiencies. It is a serviceability rating established under controlled conditions having a scale of 0 to 100, with 100 being excellent.

PAVEMENT CLASSIFICATION: Pavement classification identifies the pavement material for streets and roads in the network. There are three categories: BC = Bituminous Concrete, CH = Chip Seal, and GR = Gravel.

PAVEMENT MANAGEMENT (PM): is the effective and efficient directing of the various activities involved in providing and sustaining pavements in a condition acceptable to the traveling public at the lowest life-cycle cost.

PAVEMENT MANAGEMENT SYSTEM (PMS): an established, documented procedure treating many or all of the Pavement Management activities in a systematic and coordinated manner. It consists of five essential elements structured to serve decision-making responsibilities at various management levels.

1. Pavement surveys related to condition and serviceability;
2. Database containing all pavement-related information;
3. Analysis scheme;
4. Decision criteria;
5. Implementation procedures.

PAVEMENT PERFORMANCE: the assessment of how well the pavement serves the user over time. The engineer often associates pavement condition with an arbitrary, but quantifiable, value relating to pavement roughness, pavement distress, or pavement strength. Performance is the measured change of condition and/or serviceability over increments of time.

PREVENTIVE MAINTENANCE: activities performed at planned intervals to protect and seal the pavement. Generally these activities lead to pavement preservation. Seals are designed to provide one or more of the following benefits:

1. Prevent the intrusion of air and moisture;
2. Fill small cracks and voids;
3. Rejuvenate an oxidized binder;
4. Provide a new wearing surface.

PROJECT LEVEL: a detailed assessment or identification of needs relative to a specific roadway, or a section thereof, as opposed to network level applications. It may include on site pavement testing, lab evaluation, life cycle cost analysis, and treatment recommendation for the particular pavement section.

RECONSTRUCTION: the complete removal and replacement of a failed pavement, which might also involve widening, realignment, traffic control devices, safety hardware, and major base and drainage work.

REHABILITATION: any work needed to restore the pavement to a condition that will allow it to perform satisfactorily for several years. Rehabilitation also includes the work necessary to prepare the pavement for an overlay. The major activities involved in the rehabilitation process are:

1. Partial depth patching;
2. Full depth patching;
3. Joint and crack sealing.
4. Grouting and undersealing (filling voids);
5. Grinding and milling (removal of high spots in the pavement.);
6. Overlays.

REPAIR STRATEGIES: PAVEMENTview®Plus represents repair strategies as a decision of user defined "if, then" statements used in the PAVEMENTview®Plus. The recommended repairs are based on five decision factors: Functional Classification, Surface Type, PCI range, curb reveal, and Sidewalk Condition Index (SCI). These criteria input into the decision matrix represent the various conditions for each decision factor.

REPAIR TYPES: the various choices of treatment available for providing a solution to a pavement deficiency or problem. The associated repair type cost is based on a locality's past experience.

RIDEABILITY INDEX (RI): a measure of the smoothness of a pavement, (traveled surface) as perceived by the public traveling in a vehicle at a speed appropriate for the particular surface. It is a serviceability rating having a scale of 0 to 100, with 100 being excellent. A controlled measurement of longitudinal profile pavement surface condition distress or deficiencies can be made using a profilometer and can be correlated to a roughness scale.

OVERALL CONDITION INDEX (OCI): an index derived from controlled measurements of pavement condition, rideability, drainage condition, safety, utility condition, traffic control, sidewalk condition, and roadside maintenance. An acceptable scale for roads and streets is 0 to 100, with 100 being excellent.

ROADSIDE MAINTENANCE INDEX (RMI): an index derived from evaluations of required roadside maintenance activity levels, such as mowing, litter collection, overhanging branches, and sand residue from plowing operations. It is a rating established for determining the present status or relative condition of the roadside maintenance, and is measured on a scale of 0 to 100, with 100 being excellent.

ROUTINE MAINTENANCE: activities performed or steps taken to correct a specific pavement failure or distress area. Routine maintenance usually addresses localized pavement defects and includes activities such as:

1. Full depth patching - more than 2" deep, requiring saw cutting distressed area and removal of pavement and gravel base to a depth of 8", followed by placement of new dense graded gravel base and hot mix asphalt in multiple layers;
2. Skin patching - less than 2" deep, typically no cutting required, placement of hot mix asphalt in 1 layer;
3. Crack sealing – sealing of surface cracks to prevent water intrusion

SIDEWALK CONDITION INDEX (SCI): an index derived from controlled measurements and evaluations of sidewalk and/or walkway and/or pedestrian ramp deficiencies and conditions. It is a serviceability rating established for determining the present status or performance of sidewalks and pedestrian ramps, and is measured on a scale of 0 to 100, with 100 being excellent.

STRUCTURAL IMPROVEMENT: activities performed when the pavement deteriorates beyond the need for preventive maintenance applications and the road base is structurally sound. Activities could include:

1. Thick Overlays;
2. Cold Planning and Overlay;
3. Hot in Place Recycling – Re-heating, scarifying, and adding rejuvenator to existing surface to a depth of 1-1/4" followed by an overlay.

TRAFFIC CONTROL INDEX (TCI): an index derived from factors pertaining to traffic control measures such as traffic signs and signals, lighting, and other warning devices. It is a rating established for determining the performance of the roadway as it relates to traffic control, and is measured on a scale of 0 to 100, with 100 being excellent.

TRAFFIC SAFETY INDEX (TSI): an index derived from measurements and evaluations of stopping sight distance, horizontal and vertical curves, accident data, geometry and other factors which may affect the public safety while traveling on the roadway. It is a rating established for determining the performance of the roadway as it relates to safety, and is measured on a scale of 0 to 100, with 100 being excellent.

UTILITY CONDITION INDEX (UCI): an index derived from controlled measurements and evaluations of utility cuts/patches in the pavement surface area. It is a serviceability rating established for determining the present status or performance of the utility patch on a scale from 0 to 100, with 100 being excellent.