

Town of Chichester

2016 Report of the Road Advisory Committee

December 14, 2016



Work on Horse Corner Road during the reconstruction project in 2016

Road Advisory Committee

Allen Mayville, Jr. (Chairman), Brian Eldredge, Guy Goodwin, Doug Hall,
Tom Jameson (Selectman ex-officio), Jim Plunkett (Road Agent)

(showing road reconstruction done 2013-2016 and planned for 2017)



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Executive Summary

The Chichester Road Advisory Committee has worked hard in 2016 to update its comprehensive Road Management Plan for the town.

The committee's charter currently states that its primary responsibility *"shall be to develop a written Road Management Plan, or update annually any existing Road Management Plan, for the Town of Chichester. The Road Management Plan shall include short-term and long-term repair goals, and shall also identify, develop "best estimate" project costs, prioritize, and establish a schedule for any future roadway reconstruction projects or major repair/upgrading projects."*

The committee consisted of only six members this year and is currently seeking one additional member. It has met monthly and has worked with the Road Agent assessing road conditions throughout town. The Road Agent has maintained information in the Road Surface Management System (RSMS), which allowed the Committee to further assess the immediate and long-term needs for road repair.

The town is responsible for maintaining 38.5 miles of roads in Chichester. There are 68 paved road segments totaling 24.3 miles and there are 31 gravel road segments totaling 14.2 miles. The average segment is slightly more than 1/3 mile.

Maintaining paved roads is a complicated process. With an estimated average life of a paved road being 20 years, the town needs to reconstruct 1.2 miles per year to maintain existing conditions on average. Prior to 2013 the town unfortunately had been doing much less. Existing paved roads had been on a 60-70 year repaving cycle. The result was that our paved roads had deteriorated badly. In 2013, 2014, 2015, and 2016 the town's voters agreed with this committee and committed significant tax dollars to improve the many paved roads in Chichester that had fallen into disrepair. This report contains our recommendation for continuing this process.

The goal of this Committee's plan is to bring all the roads in town to a good or better condition and keep them in this condition for the average 20 year life span. To do this the town will need to significantly improve 1.2 miles of paved roads every year. When a road deteriorates beyond needing preventative maintenance during a 20 year life span, it becomes more costly to restore it to good condition.

At current costs, the committee estimates that the work to reconstruct and pave 1.2 miles per year is approximately \$360,000. However this can vary significantly, primarily because of fluctuating asphalt costs, but also special issues like ledge or significant wet areas.

The committee and Road Agent have created a detailed inventory of roads, road segments, their conditions, importance, and traffic counts. The Road Agent uses a computer database (RSMS) to maintain this information. The committee has prepared a plan to maintain and improve the conditions of our paved roads that includes reconstruction of the highest priority segments during the next 2 years.

2017: The committee recommends two road reconstruction projects for completion.

- Bear Hill Road segment #2, from 66 Bear Hill Road to Ferrin Road. Length is 0.789 miles.
- Pleasant Street segment #5, from Jones farm to the Loudon town line. Length is 0.250 miles.

Our computer calculated cost for the two projects is \$327,249. Requests for Bids on the two projects were sent out. The good news is that the low bidder's bid is \$244,231. In contrast, the highest bidder was \$566,557, considerably more than two times that of the low bidder.

2018: The committee lists six possible projects but does not make a final recommendation at this time. Possible projects include Bear Hill Road segments 5, 6, & 7; East Ricker Road segment 1; Horse Corner Road segment 8; Horse Corner Road segment 10; Kelley's Corner Road segments 1 & 2; and King Road segments 1, 2, 3, & 4. The committee will again assess the condition of these roads in 2017 and will make a recommendation in next year's report for segments that total about 1.2 miles in length.

2019 to 2033: The committee recommends that 1.2 miles of paved road reconstruction be completed in each of the subsequent years of the 20 year plan. The committee will make recommendations for specific segments only after completing surveys of road conditions within 12 months of the time work is to be done. Costs in future years will be dependent primarily on the cost of asphalt which can fluctuate considerably. We suggest that our cost estimate of \$300,000 per mile be adjusted by 3% annually to make long-term projections.

It is now up to the citizens of Chichester to decide. Will the town continue to implement our 20 year plan as it has for the past four years? With guidance from this committee, the Capital Improvement Program Committee, the Budget Committee, and the Board of Selectmen, ultimately the voters at town meeting will be asked to decide how much money will be invested in our paved roads. The Road Advisory Committee urges all voters to understand the tradeoff we face between deteriorating road conditions and a willingness to pay for system-wide repair and upgrading.

Details can be found in the following sections of this report.

1. Introduction

1.A: Legal Basis

The Road Advisory Committee was originally established by a vote of the townspeople at the Chichester Town Meeting held on March 19, 2005. The original warrant article read as follows; *“To see if the town will vote to direct the Selectmen to establish a committee of not less than 7 citizens plus the road agent to prepare a written long term proposal for roads to be delivered to the Selectmen at a public meeting no later than the last week in October 2005”*.

By virtue of the specific language of the warrant article, the article did not call for an annual report or for a continuing committee. Subsequently, the Committee’s charter was amended and updated on February 15, 2011, under the authority of the Board of Selectmen. The changes made to the original charter were; 1) to make this Committee a permanent ‘standing’ committee, 2) minor changes in the membership structure of the Committee, 3) to require an annual ‘Road Management Plan’, and 4) updating the Mission Statement of the original Charter to more accurately define the Committee’s responsibilities so as to work more in concert with the Town’s Capital Improvement Committee.

1.B: Mission of the Committee

The mission statement of the Committee currently states that its primary responsibility *“shall be to develop a written Road Management Plan, or update annually any existing Road Management Plan, for the Town of Chichester. The Road Management Plan shall include short-term and long-term repair goals, and shall also identify, develop “best estimate” project costs, prioritize, and establish a schedule for any future roadway reconstruction projects or major repair/upgrading projects.”*

“The Committee is established to cooperatively promote better road repairs by assisting the Road Agent, Selectmen, Budget Committee, and Capital Improvement Program Committee (CIP) with the evaluation, planning, and scheduling of road work.”

It should be noted that the committee’s charter does not include the oversight and planning of roadway maintenance work. The Road Agent will be reporting on the yearly maintenance accomplishments in the Road Agent’s report which is included in the annual Town Report.

1.C: Committee Membership

The Committee’s Charter establishes its membership as consisting of “a minimum of seven (7) members, the Road Agent and one Selectman who shall serve as an ex-officio member of the Committee. The five appointed members shall be appointed by the Board of Selectmen. All appointed members of the Committee shall be residents of the Town of Chichester. It is expected that at least one of the appointed members would have either engineering experience in roadway design/construction or field experience in roadway construction and/or project management.”

The current members of the Committee are: Allen Mayville, Jr. (Chairman), Brian Eldredge, Guy Goodwin, Doug Hall, Tom Jameson (Selectman ex-officio), Jim Plunkett (Road Agent). There has been one vacant position this year.

2. Road Surface Management System

2.A: Establishment of Road Segments

The Road Surface Management System (RSMS) software from the Maine Local Roads Center is in daily use by the Road Agent and helps organize information about Chichester's town roads and budget money for their rehabilitation and maintenance.

For evaluation and planning purposes, longer roads have been divided into segments based on road condition and/or logical locations. This is necessary to ensure that conditions and needs of one segment of road are not implied to be the same over the entire length of that road. Endpoints of segments may be shifted in one direction or another as conditions change. Longer segments may be further subdivided. Short adjoining segments with similar conditions may be combined. These changes may be made during the year as required.

2.B: Inventory of Roads

Table 1 on the following pages contains the inventory of town-maintained road segments in Chichester as of October 3, 2016. This inventory shows a total length of 38.5 miles, broken into 99 town maintained road segments.

68 segments are paved and total 24.3 miles while 31 segments are gravel and total 14.2 miles.

This inventory does not include roads in Chichester that are privately owned and maintained or owned and maintained by the state.

This table contains important information about each road segment. Each segment has an importance ranking from low to high and also has a traffic ranking from low to high. Based on field inspection of actual roadway conditions, a computation in the RSMS software suggests the type of work required to correct deficiencies in that segment's surface.

Each entry in the Surface and Drainage columns of Table 2 also contains a number from 2 through 10. This number represents a calculated combination of the "Traffic" and "Importance" characteristics. A "-10" designates a road segment that is most urgent because it has high traffic and importance ratings. On the other hand, a "-2" designates a road segment with the lowest possible traffic and importance ratings. Numbers 3 through 9 are intermediate.

Segments are not fixed. Road segment numbers and lengths change from year to year as work proceeds and conditions change. The Highway Department re-measured many segments this year and made some changes to the data in RSMS. Segments are used to identify logical units for evaluation, consideration in priority setting, and work planning. For example, three previously listed segments of Horse Corner Road have been combined into one segment because needed reconstructions work was done on all three as a single project and they are now in similar condition.

Table 1

Inventory of Chichester Maintained Road Segments from RSMS.							11/15/2016		
Gravel Road Segments									
Road Name	S	From	To	Surfa	Mil	Importan	Traffic	Surface	Drainage
Back Rd	1	Ferrin Rd	Mailbox#15	Gravel	0.140	low	low	Routine-2	Good-2
Bailey Rd	2	Connemara Dr	Horse Corner Rd	Gravel	0.520	medium	low	Routine-4	Poor-4
Blackman Rd	1	Short Falls Rd	To end of roadway	Gravel	0.400	low	low	Routine-2	Good-2
Chichester Ln	1	US Route 4	End Chichester Ln	Gravel	0.090	low	low	Routine-2	Poor-2
Cross Rd	2	House #50	Granny Howe Rd	Gravel	0.472	medium	low	Routine-6	Good-6
Deer Run Rd	1	Highland Dr	End of Deer Run Rd	Gravel	0.155	low	low	Routine-2	Good-2
Devyn Dr	1	King Rd	End Devyn Dr	Gravel	0.136	low	low	Routine-2	Poor-2
Durgin Rd	1	Bear Hill Rd	End of Durgin Rd	Gravel	0.780	medium	low	Routine-4	Good-4
Ferrin Rd	1	Durgin Rd	Bear Hill Rd	Gravel	1.050	low-med	low-med	Routine-4	Good-4
Garvin Hill Rd	1	Horse Corner Rd	End Garvin Hill Rd	Gravel	0.720	low	low	Routine-2	Poor-2
Granny Howe Rd	1	Main St	Epsom TL	Gravel	0.691	low	low	Routine-2	Good-2
Hilliard Rd	1	Swiggey Brook Rd	End of Hilliard Rd	Gravel	1.190	low	low-med	Routine-3	Good-3
Hutchinson Rd	1	Short Falls Rd	House #48	Gravel	0.490	med-high	low-med	Reconstruct-7	Good-7
Hutchinson Rd	3	House #91	Pembroke TL	Gravel	0.468	med-high	low-med	Reconstruct-6	Good-6
Kaime Rd	1	Ring Rd	Pittsfield TL	Gravel	0.570	low	low	Reconstruct-2	Good-2
Leavitt Rd	1	Horse Corner Rd	End of Leavitt Rd	Gravel	0.284	low	low	Routine-2	Good-2
Lovers Ln	1	Short Falls Rd	Smith Sanborn Rd	Gravel	0.350	low-med	low	Routine-3	Good-3
Martel Rd	1	Route 28	End of Martel Rd	Gravel	0.492	low	low	Routine-2	Good-2
Mill Rd	1	Webster Mills Rd	End of Mill Rd	Gravel	0.120	low	low	Routine-2	Good-2
Paradise Ln	1	Hutchinson Rd	End of Paradise	Gravel	0.189	low	low	Routine-2	Good-2
Perry Brook Rd	1	Hilliard Rd	End of Perry Brook	Gravel	0.468	low	low	Routine-2	Good-2
Perry Rd	1	Bear Hill Rd	End of Perry Rd	Gravel	0.470	low	low	Routine-2	Good-2
Pound Rd	1	Main St	End non-maintained	Gravel	0.160	low	low	Routine-2	Good-2
Ring Rd	2	Kaime Rd	End of Ring Rd	Gravel	0.357	low	low	Routine-2	Good-2
Short Falls Rd	1	Leavitt Rd	House #61	Gravel	0.345	low	low	Routine-2	Good-2
Short Falls Rd	2	Lane Rd	Epsom TL	Gravel	0.790	low-med	low	Routine-3	Good-3
Smith Sanborn Rd	1	Lane Rd Int	Highland Dr	Gravel	0.764	medium	medium	Routine-6	Good-6
Staniels Rd	2	West Rd	Pembroke TL	Gravel	0.320	med-high	low-med	Routine-6	Good-6
Towle Rd	1	Horse Corner Rd	End Towle Rd	Gravel	0.510	low	low	Routine-2	Good-2
Trap Rd	1	US Route 4	Loudon TL	Gravel	0.314	low	low	Routine-2	Good-2
West Rd	1	Staniels Rd	End West Rd	Gravel	0.388	low	low	Routine-2	Good-2
					14.193				
Paved Road Segments									
Road Name	Seg	From	To	Surface	Miles	Importance	Traffic	Surface	Drainage
Bailey Rd	1	US Route 4	Connemara Dr	Paved	0.290	medium	low-med	Routine-5	Good-5
Bear Hill Rd	1	NH Route 28	West PL # 66	Paved	0.686	high	med-high	No Maint-9	Good-9
Bear Hill Rd	2	#66 Bear Hill	Ferrin Road	Paved	0.789	high	med-high	Rehabilitate-9	Good-9
Bear Hill Rd	5	Ferrin Rd	Brown cemetery	Paved	0.388	med-high	medium	Preventive-7	Good-7
Bear Hill Rd	6	Brown cemetery	#255 Bear hill	Paved	0.450	med-high	medium	Preventive-7	Good-7
Bear Hill Rd	7	#255 Bear hill	Loudon Town Line	Paved	0.208	med-high	medium	No Maint-7	Good-7
Burnt Hill Rd	1	Lovers Ln	# 68 Burnt Hill	Paved	0.430	medium	low-med	No Maint-5	Good-5
Burnt Hill Rd	2	#68 Burnt hill	Highland Drive	Paved	0.330	medium	low-med	No Maint-5	Good-5
Burnt Hill Rd	3	Highland Dr	Smith Sanborn Rd	Paved	0.310	medium	low-med	No Maint-5	Good-5
Canterbury Rd	1	Main St	House # 66	Paved	0.635	high	med-high	No Maint-8	Good-8
Canterbury Rd	3	House # 142	Loudon TL	Paved	0.580	high	high	Reconstruct-10	Good-10
Carpenter Rd	1	Route 28	#49 Carpenter rd	Paved	0.290	low	low	Preventive-2	Good-2
Carpenter Rd	2	#49 Carpenter rd	Route 28	Paved	0.260	low	low	Preventive-2	Good-2
Center Rd	1	Bear Hill Rd	Canterbury Rd	Paved	1.520	high	med-high	Preventive-8	Good-8
Connemara Dr	1	Bailey Rd	#40 Connamara	Paved	0.220	low-med	low	Preventive-3	Good-3

Table 1 (continued)

Paved Road Segments									
Road Name	Seg	From	To	Surface	Miles	Importance	Traffic	Surface	Drainage
Connemara Dr	2	#40 Connemara	Horse Corner Rd	Paved	0.378	low-med	medium	Rehabilitate-5	Good-5
Cross Rd	1	US Route 4	House #50	Paved	0.085	medium	low	No Maint-4	Good-4
Deer Meadow Rd	1	Main St	Epsom TL	Paved	0.448	medium	low-med	Rehabilitate-5	Good-5
Depot St	1	Route 28	Epsom TL	Paved	0.214	low-med	medium	Preventive-7	Good-7
East Ricker Rd	1	Bear Hill Rd	#256	Paved	0.270	med-high	medium	Rehabilitate-7	Good-7
East Ricker Rd	2	House #256	Loudon TL	Paved	0.430	med-high	medium	No Maint-7	Good-7
Fred Wood Dr	1	Highland Dr	Smith Sanbord Rd	Paved	0.226	low	low	Reconstruct-2	Good-2
Guernsey Ct	1	Harvest Rd	End Guernsey Ct	Paved	0.243	low	low	Preventive-2	Good-2
Harvest Rd	1	King Rd	Guernsey Ct	Paved	0.170	low-med	low	Preventive-6	Good-6
Harvest Rd	2	Guernsey Ct	Holstein Ct	Paved	0.450	low-med	low	Preventive-6	Good-6
Harvest Rd	3	Holstein Ct	Loudon TL	Paved	0.340	low-med	low	Preventive-6	Good-6
Healy Pasture Rd	1	Pleasant Rd	End of Healy Past.	Paved	0.380	low	low	Rehabilitate-2	Good-2
Higgins Rd	1	Horse Corner Rd	Pembroke TL	Paved	0.389	medium	medium	No Maint-6	Good-6
Highland Dr	1	Smith Sanbord Rd	Fredwood drive	Paved	0.432	medium	medium	Preventive-6	Good-6
Highland Dr	2	Fredwood drive	Burnt Hill Rd	Paved	0.426	medium	medium	No Maint-6	Good-6
Hillview Dr	1	Smith Sanborn Rd	Epsom TL	Paved	0.419	low	low	Rehabilitate-2	Good-2
Holstein Ct	1	Harvest Rd	End Holstein Ct	Paved	0.142	low	low	Preventive-2	Good-2
Horse Corner Rd	1	Higgins Road	Pembroke town Line	Paved	0.140	low	low	Preventive-2	Good-2
Horse Corner Rd	10	#79 Horse corner	Towle Rd	Paved	0.220	high	high	Rehabilitate-10	Good-10
Horse Corner Rd	2	Higgins Rd	Dame Farm Road	Paved	1.341	high	high	No Maint-10	Good-10
Horse Corner Rd	6	Dame Rd	Garvin Hill Rd	Paved	0.251	high	high	No Maint-10	Good-10
Horse Corner Rd	8	#125 Horse Corner	Garvin Hill Rd	Paved	0.450	high	high	Reconstruct-10	Good-10
Horse Corner Rd	9	#79 Horse corner	#125 Horse Corner	Paved	0.463	high	high	No Maint-10	Good-10
Hutchinson Rd	2	House #48	House #91	Paved	0.368	med-high	low-med	No Maint-8	Good-8
Kara Dr	1	Deer Meadow Rd	End of Kara Dr	Paved	0.094	low	low	No Maint-2	Good-2
Kellys Corner Rd	1	NH Route 28	House #13	Paved	0.220	medium	medium	Rehabilitate-6	Good-6
Kellys Corner Rd	2	House #13	Pleasant St	Paved	0.133	medium	medium	No Maint-6	Good-6
Kellys Corner Rd	3	Pleasant St	Ring Rd	Paved	0.160	medium	medium	No Maint-6	Good-6
Kellys Corner Rd	4	Ring Rd	NH Route 28	Paved	0.241	medium	medium	No Maint-6	Good-6
King Rd	1	Loudon TL	House #114	Paved	0.270	high	high	Preventive-10	Good-10
King Rd	2	House #114	Harvest Rd	Paved	0.440	high	high	Preventive-10	Good-10
King Rd	3	Harvest Rd	Culvert at#26	Paved	0.404	high	high	Rehabilitate-10	Good-10
King Rd	4	#26 culvert	Route 4	Paved	0.200	high	high	Rehabilitate-10	Good-10
Lane Rd	1	Horse Corner Rd	House #32	Paved	0.300	medium	medium	Routine-8	Good-8
Lane Rd	2	House #32	Smith sanborn Rd	Paved	0.400	medium	medium	Routine-7	Good-7
Lane Rd	3	Smith Sanborn Rd	Hutchinson Rd	Paved	0.250	med-high	low-med	Routine-6	Good-6
Limerick Dr	1	Connemara Dr	End of Limerick Dr	Paved	0.120	low	low	No Maint-2	Good-2
Mason Rd	1	US Route 4	End of Mason Rd	Paved	0.420	low	low	No Maint-2	Good-2
Meeting House Rd	1	Main St	Pound Rd	Paved	0.060	low	low	No Maint-2	Good-2
Pleasant St	1	Kellys Corner Rd	Healy Pasture Rd	Paved	0.440	high	med-high	No Maint-9	Good-9
Pleasant St	2	Healy Pasture Rd	Berry Rd	Paved	0.450	high	med-high	No Maint-9	Good-9
Pleasant St	3	Berry Rd	#117 Trailer Park	Paved	0.240	high	med-high	No Maint-9	Good-9
Pleasant St	4	#117 Trailer Park	#161 Pleasant St	Paved	0.400	high	medium	No Maint-9	Good-9
Pleasant St	5	#161 Pleasant St	Loudon TL	Paved	0.250	high	medium	Rehabilitate-9	Good-9
Ring Rd	1	Kellys Corner Rd	Kaime Rd	Paved	0.168	low	low	Rehabilitate-2	Good-2
Robinson Rd	1	US Route 4	End of Robinson Rd	Paved	0.094	low	low	Routine-2	Good-2
Smith Sanborn Rd	2	Highland Dr	US Route 4	Paved	0.230	medium	medium	Preventive-6	Good-6
Staniels Rd	1	Horse Corner Rd	West Rd	Paved	0.370	med-high	low-med	No Maint-6	Good-6
Swiggy Brook Rd	1	South of Stream	NH Route 28	Paved	0.330	medium	low-med	No Maint-5	Good-5
Swiggy Brook Rd	2	North of Stream	NH Route 28	Paved	0.420	medium	low-med	No Maint-5	Good-5
Webster Mills Rd	1	NH Route 28	House # 131	Paved	0.280	medium	med-high	Routine-7	Good-7
Webster Mills Rd	2	House #131	Pittsfield TL	Paved	0.610	medium	med-high	Routine-7	Good-7
Wexford Dr	1	Connemara Dr	End Wexford Dr	Paved	0.290	low	low	No Maint-2	Good-2
					24.345				

2.C: Road Conditions

There are seven types of observable conditions that are recorded during onsite inspection: (1) rutting, (2) potholes and patching (3) roughness, (4) alligator cracking, (5) edge cracking, (6) transverse and longitudinal cracking, and (7) roadside drainage. If any condition exists at all it is then rated for both its severity and its extent. Severity can be rated low, medium, or high. Extent is also rated low, medium, or high.

For example, a particular road segment might be categorized this way:

- 1) Rutting: low severity and low extent
- 2) Potholes and patching: none
- 3) Roughness: low severity and low extent
- 4) Alligator cracking: high severity and medium extent
- 5) Edge cracking: medium severity and high extent
- 6) Transverse and longitudinal cracking: low severity and low extent
- 7) Road side drainage: medium severity and low extent

The RSMS software has a built-in computation that combines all of the information on observable conditions and produces two recommendations for consideration. One is a simple statement of roadside drainage as either “poor” or “good.” The more complicated recommendation is the type of maintenance or repair that would most benefit the road segment. There are five such categories.

1. No Maintenance:

No action required. The road segment is in very good condition.

2. Routine Maintenance:

For paved roads, sealing cracks and patching potholes for specific small areas. For unpaved roads, filling small areas and grading the roadway. For both road surface types, routine maintenance should include cleaning ditches and culverts. Crack sealing, patching, spot re- grading, ditch and culvert cleaning, and mowing of shoulders and adjacent areas are essential to get the intended service life from a section of pavement.

3. Preventive Maintenance:

For paved roads, shimming and or coating of the surface and chip seals of thin (1 ½ inch) overlays are used to prevent or slow further deterioration. For unpaved roads this includes shaping and grading the road surface, as well as adding minor amounts of material as necessary.

4. Rehabilitation:

Major repairs of the road surface: usually an asphalt overlay after surface preparation for a paved road, adding major amounts of gravel to unpaved roads, or regrading, reshaping, and compacting them.

5. Reconstruction:

Excavation of the road base, the replacement and often the addition of aggregate, and new paved surface or new wearing surface gravel. The road including its sub base has deteriorated to such an extent that the base must be replaced or stabilized. Such conditions are usually caused by too long a period of

inadequate maintenance, and by poor subsurface drainage. In the latter conditions, appropriate repair and/or new construction of ditches and culverts should be included in the project.

It is important to understand the life cycle of a road surface. When a paved road has been well designed and constructed it has a life of approximately 20-25 years. Figures 1 and 2 show the deterioration of a theoretical road segment over time.

Figure 1

(Source: Road Surface Management Software,
Bob Strobel, University of New Hampshire Technology Transfer Center, December 2011)

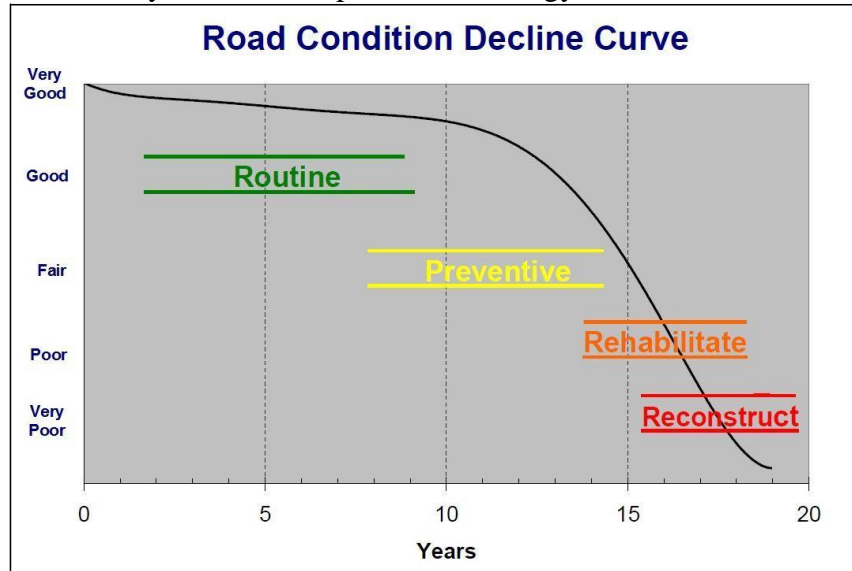
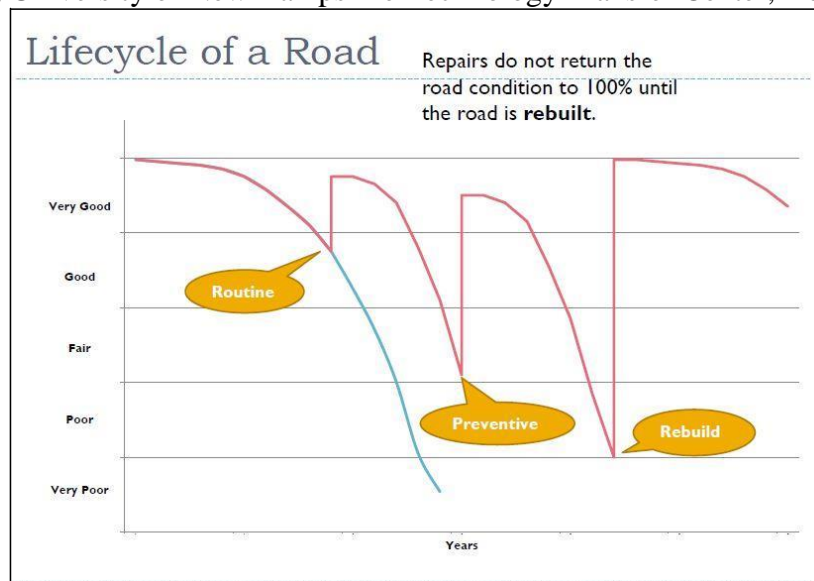


Figure 2

(Source: Road Surface Management Using PWS RSMS Software,
Bob Strobel, University of New Hampshire Technology Transfer Center, December 2011)



If the original construction of a road segment did not include adequate sub-base work, removal of ledge and rocks, crushed stone base, provision for adequate drainage including culverts and crown, then the life may be much shorter. Many of Chichester's oldest paved roads were created by simply laying asphalt on top of old dirt and gravel surfaces. For this reason, many miles of roads show considerable deterioration after only a few years.

For each of the town's road segments, Table 1 displays the suggested need for maintenance or repair as determined by the RSMS computation. This is based on surface observations only and does not take into consideration knowledge of what lies below the surface. The Committee then considered these results, traffic volume, segment importance to the town, and knowledge of subsurface conditions to prioritize which road segments most needed attention and what kind of work should be done. Recommendations for the years 2017-2018 are included in Section 6 of this report.

2.D: Use for Budgeting and Reporting

The RSMS software allows the Road Agent to record Highway Department expenses for maintenance and repair of each road segment. Over time, a history of work on each segment will be built up. This will allow recognition of deteriorating conditions as more maintenance is required from year to year. Until adoption of the RSMS system in 2012, the Department's records of the history of its work was spotty at best and often limited to the tenure of a particular Road Agent. Other than major rehabilitation and reconstruction projects, there was no allocation of maintenance costs to particular roadways.

The software also allows the Road Agent to build an operating budget based on projected maintenance costs of each road segment. The Road Agent has begun to use the system for this purpose and, with the Board of Selectmen, will be able to compare budgeted maintenance against actual costs, not just for the department as a whole, but for maintenance of each road segment.

Table 2 lists the budget and actual amounts for 2016. There is an important difference between the budget column and the actual column. The "Actual" column includes the cost of using town equipment and employees using FEMA issued estimates, while the "Budget" column does not.

Table 2

10/31/2016			
2016 Financial Summary by Road Segment			
Road segment	Recommended Repair	Budget	Actual
Back Road - 1 (Gravel)	Spot grading/blading	\$0	\$665
	Routine grading	\$0	\$120
Bailey Rd - 2 (Gravel)	Routine grading with 4 loads	\$0	\$1,780
	Routine grading		\$120
Bear Hill Rd - 2 (Paved)	replace 4 cross culverts	\$0	\$4,981
Bear Hill Rd -4 (Paved)	replace 2 culverts and hot patch	\$0	\$2,300
Blackman Rd - 1 (Gravel)	Add gravel (up to 4")	\$6,000	\$5,078
Burnt Hill Rd - 1 (Paved)	Shim w/ 2" overlay	\$28,509	\$41,195
Canterbury Rd - 3 (Paved)	shim	\$0	\$26,927
Cross Rd - 2 (Gravel)	Add gravel (up to 4") from pavement to #42	\$3,000	\$1,918
	routine grading	\$0	\$175
Deer Meadow Rd - 1 (Paved)	pot hole repair	\$0	\$384
Deer Run Rd - 1 (Gravel)	Routine grading	\$0	\$450
	routine grading	\$0	\$116
Depot St - 1 (Paved)	pot hole repair	\$0	\$192
Devyn Dr - 1 (Gravel)	Routine grading	\$0	\$425
	Routine grading	\$0	\$120

Table 2 (continued)

2016 Financial Summary by Road Segment			
Road segment	Recommended Repair	Budget	Actual
Durgin Rd - 1 (Gravel)	Routine grading	\$0	\$852
	Routine grading	\$0	\$232
East Ricker Rd - 1 (Paved)	pot hole repair	\$0	\$650
Ferrin Rd - 1 (Gravel)	Add gravel (up to 4")	\$0	\$1,160
	Add gravel (up to 4")	\$0	\$376
	Routine grading	\$0	\$232
Fred Wood Dr - 1 (Paved)	spot repair on hill	\$0	\$245
Garvin Hill Rd - 1 (Gravel)	Add gravel (up to 4") to granite post from top	\$5,000	\$3,368
	replace signage	\$0	\$300
	Routine grading	\$0	\$150
Granny Howe Rd - 1 (Gravel)	Dust control	\$0	\$400
	Routine grading	\$0	\$1,160
	Routine grading	\$0	\$175
Healy Pasture Rd - 1 (Paved)	Pot hole filling	\$0	\$190
Hilliard Rd - 1 (Gravel)	Routine grading	\$0	\$1,274
	Add gravel (up to 4")	\$0	\$256
	Add gravel (up to 4")	\$0	\$1,100
Hillview Dr - 1 (Paved)	Shim w/ 2" overlay	\$28,597	\$25,348
Horse Corner Rd - 1 (Paved)	Ditching	\$0	\$2,000
Horse Corner Rd - 2 (Paved)	total rebuild	\$300,000	\$301,651
Hutchinson Rd - 1 (Gravel)	4" reclaim spot	\$0	\$664
	spot addition 4" reclaim	\$0	\$653
	routine grading	\$0	\$1,765
	routine grading		\$175
Hutchinson Rd - 3 (Gravel)	Grading with added material	\$460	\$649
	routine grading	\$850	\$425
	routine grading	\$0	\$175
Kaime Rd - 1 (Gravel)	minor ditching	\$0	\$2,420
Kellys Corner Rd - 1 (Paved)	pot hole repair	\$0	\$350
King Rd - 1 (Paved)	pot hole repair	\$0	\$170
King Rd - 2 (Paved)	pot hole repair	\$0	\$300
King Rd - 3 (Paved)	pot hole repair	\$0	\$245
King Rd - 4 (Paved)	pot hole repair	\$0	\$200
Leavitt Rd - 1 (Gravel)	Add 12" gravel to base, 3" to surface	\$2,500	\$1,905
	Minor ditching	\$0	\$2,300
Lovers Ln - 1 (Gravel)	culvert replacement w headwall	\$0	\$1,800
	routine grading	\$0	\$116
Martel Rd - 1 (Gravel)	Routine grading	\$0	\$580
Mill Rd - 1 (Gravel)	Routine grading	\$0	\$238
Paradise Ln - 1 (Gravel)	Routine grading; 3 loads gravel & time	\$0	\$389
	remove and replace pipe	\$2,000	\$2,306
	routine grading	\$0	\$175
Perry Brook Rd - 1 (Gravel)	Spot grading/blading	\$0	\$469
Perry Rd - 1 (Gravel)	Add gravel (up to 4")	\$3,800	\$4,102
	Spot grading/blading	\$0	\$290
Pleasant St - 5 (Paved)	pot hole repair	\$0	\$200
Short Falls Rd - 1 (Gravel)	Add gravel (up to 4")	\$3,500	\$2,929
	Minor ditching	\$500	\$930
	routine grading	\$0	\$116
Smith Sanborn Rd - 1 (Gravel)	Routing grading with 4 loads	\$0	\$518
	Add gravel (up to 4")	\$0	\$1,582
	routine grading	\$0	\$290
Staniels Rd - 2 (Gravel)	Spot grade w 4 loads	\$0	\$1,700
	Grading	\$0	\$670
	routine grading	\$0	\$150
Towle Rd (Gravel)	Add 12" gravel to base, 3" to surface	\$2,800	\$3,309
Trap Rd - 1 (Gravel)	Minor ditching	\$0	\$1,100
	routine grading	\$0	\$120
Webster Mills Rd - 2 (Paved)	Patching	\$610	\$780
West Rd - 1 (Gravel)	routine grading	\$500	\$580
	routine grading	\$0	\$175
Total		\$388,626	\$465,115

3. Reconstruction Projects Completed 2013-2016

The town began the 20 year plan to reconstruct paved roads that this committee first proposed in 2013. Table 3 contains the road segments that have been completed in the first four years of this plan.

Table 3

2013	
Segment	Length (miles)
Kelly's Corner Rd 3 & 4	0.401
Pleasant Street #2	0.450
Pleasant Street #4	0.400
	1.251
2014	
Segment	Length (miles)
Horse Corner Road #6	0.251
Horse Corner Road #9	0.463
	0.714
2015	
Segment	Length (miles)
Bear Hill Road #1	0.686
Pleasant Street #3	0.240
	0.926
2016	
Segment	Length (miles)
Horse Corner Road #2	1.341
	1.341

4. Traffic on Chichester Roads

Traffic is an important consideration in planning and prioritizing major highway projects. During 2016 traffic counters were placed at several locations in town by the Central New Hampshire Regional Planning Commission at the request of the committee and the Road Agent..

Average daily traffic volume is an important measure for understanding how a road segment is being used. Simple counts have been collected for many years. Those allow the Committee to understand whether volume has been generally increasing, decreasing, or remaining constant. Table 3 displays the history of average daily traffic volume at different locations in town.

It is important to realize that counts can vary greatly from day to day and from season to season. The Committee has asked that counters be in place for a full 24 hours/7 days and that an average daily count be calculated. Even this averaging can be affected by singular events such as a major road race at Loudon Speedway, diversion of Route 4 traffic onto Horse Corner Road, and temporary problems on feeder roads. For this reason, sometimes subjective understanding leads one to ignore a particular count.

Table 4

History of traffic counts on Chichester road segments								
All counts on this sheet are average vehicles per day								
Road Name	Location of counter	2010	2011	2012	2013	2014	2015	2016
Bailey Road	Horse Corner intersection				165			
Bailey Rd	Route 4 intersection				209	298		
Bailey Rd	At # 28 Bailey rd			58				
Bear Hill Rd	Loudon town line		454	650	458	411	418	
Bear Hill Rd	Route 28 intersection			797		645		
Burnt Hill Road					76			
Canterbury Rd	Loudon town line		529		525		480	
Canterbury Rd	Main St intersection	809		1,262	614			654
Canterbury Rd	East of Center Rd		442					
Center Rd	Bear Hill Rd intersection		433			396	479	
Center Rd	North of Main St			638				
Connemara Dr	Bailey Rd intersection			197				
Cross Rd	Route 4 intersection			146	215			199
Deer Meadow Road					367			
Depot St	At the bridge	501		993		480		
Fredwood Dr	Smith Sanborn Rd intersection			64				
Fredwood Dr	Highland Dr intersection			19				
Harvest Road					168			
Hilliard Rd	West of Swiggy Brook Rd							208
Horse Corner Rd	Route 4 intersection	703	1,329	1,189				
Horse Corner Rd	Lane Rd intersection			1,060				
Horse Corner Rd	Above Lane Rd			592	906			
Horse Corner Rd	East of Bailey Road			955			616	
Horse Corner Rd	Pembroke town line	1,230	1,130	1,212	1,126	1,146	1,447	
Hutchinson Rd	Pembroke town line			238		220	252	
Hutchinson Rd	Lane Rd Intersection		407					
Hutchinson Rd	South of Short Falls Rd							296
Kelly's Corner Rd	Over Sanborn Brook	488			458			
King Rd	Loudon town line		1,165	1,072			1,467	961
King Rd	Route 4 intersection			1,164			1,210	1,327
King Rd	At # 26 King Rd		1,231					
Lane Rd	Horse Corner Rd intersection			1,350		480		
Lane Rd	Hutchinson Rd intersection			407				
Perry Brook Rd	South of Healy Pasture Rd							37
Pleasant St.	Loudon town line				567		559	
Pleasant St	Kelly's Corner Rd intersection		833	756	882	771		
Smith Sanborn Rd	Route 4 intersection		434	267		450		406
Smith Sanborn Rd	Lane Rd Intersection		407					
Staniels Rd	Pembroke town line		262					191
Staniels Rd	Horse Corner Rd intersection		241	603	209			
Swiggy Brook Rd	Over Perry Brook	237				210		
Webster Mills Rd	Route 28 Intersection		669		691			
Webster Mills Rd	Over Suncook River	606	676		560		619	
State maintained roads in Chichester (published by NH Department of Transportation								
https://www.nh.gov/dot/org/operations/traffic/tvr/locations/index.htm								
NH Route 28	North of Bear Hill Rd	13,678	13,307	13,137	13,180	13,291	13,412	
NH Route 28	North of Main St		26,096					
US Route 4	East of Chichester Rd	17,325	16,792	16,509	16,695	16,721	16,965	
US Route 4	Pembroke town line	17,954	15,000		14,000			
Main St	East of Canterbury Rd	8,111			6,700	6,499		
Main St	At Sander's Brook	7,422	6,500		6,000			
Main St	US Route 4 intersection		8,569					

The Committee has used five categories for summarizing traffic counts in RSMS.

Table 5

Traffic Category in RSMS	Average daily vehicle count
Low	0-199
Low-Medium	200-399
Medium	400-599
Medium-High	600-799
High	800 or more

Chichester has 4.6 miles of high traffic road segments, 5.7 miles of medium-high, 6.7 of medium, 7.0 of medium-low, and 14.5 of low traffic road segments.

Table 6 shows the number of segments and mileage by most recent traffic and surface type.

Table 6

Traffic	Gravel		Paved	
	Segments	Miles	Segments	Miles
Low	25	9.9	20	4.6
Low-Med	5	3.5	10	3.5
Medium	1	0.8	19	5.9
Med-High	0	0	9	5.7
High	0	0	10	4.6
Total	31	14.2	68	24.3

These summary tables are provided only as examples. The raw data includes a count for each hour of each day by type, speed, and direction.

This is only the fourth year of Chichester's collection of this more detailed information. The Committee expects it will be helpful in future years and will supplement the raw traffic counts in significant ways. The Committee also expects to conduct vehicle counts in 2017 on road segments for which even basic counts have not previously been made.

5. Two Year Plan: Recommended Projects and Budgets

To determine which of the 68 paved road segments in Chichester are most in need of reconstruction and major repair, the committee has taken three general factors into consideration in setting priorities among road segments (1) observable conditions, (2) road importance, and (3) traffic. Traffic includes not just a measure of average daily traffic volume, but also an understanding of the type of vehicles using the segment. Importance includes whether the road connects to other towns and whether poor conditions could impact public safety vehicles. As described above, the committee assesses seven observable conditions: rutting, potholes and patching, roughness, alligator cracking, edge cracking,

transverse and longitudinal cracking, and roadside drainage. Each observable condition has been rated for both severity and extent.

Combining the various factors is a mixture of science and art. Not everyone will agree with how to weigh traffic against current conditions, etc. Different people viewing the same information will create different sets of suggested priorities. That is why the committee believes it is important for a group of townspeople to review current information and recommend priorities. Six individuals participated in the Committee's process this year. The members represent different experiences and skills. Some have technical qualifications related to highway work or construction. As a group, committee members have discussed many road segments and have come to the conclusion presented here.

The committee recommends that two paved road segments be reconstructed in 2017. The designated segments total 1.04 miles (of the town's 24.3 miles of paved roads). The committee estimated that the Bear Hill Road project could be completed for \$240,616 and the Pleasant Street project for \$86,633 in 2017.

As shown in Table 7, bids from potential contractors have already been received for those two projects showing a wide range of prices. The total for the lowest bids for each project is \$244,231.

These numbers compare to the \$373,000 that was approved by voters for road reconstruction at Town Meeting in 2013. \$373,000 in 2014, \$250,000 in 2015, and \$300,000 in 2016.

Table 7

2017			
Segment	Length (miles)	Estimated Cost	Range of bids
Bear Hill Road #2	0.789	\$240,616	\$181,017 - \$376,885
Pleasant Street #5	0.250	\$86,633	\$63,215 - \$189,672
2018			
Segment	Length (miles)	Estimated Cost	Range of bids
Bear Hill Road #5, 6, & 7	1.046	\$313,800	
East Ricker Road #1	0.430	\$129,000	
Horse Corner Road #8	0.450	\$135,000	
Horse Corner Road #10	0.220	\$66,000	
Kelly's Corner Road #1 & #2	0.353	\$105,900	
King Road #1, #2, #3, & #4	1.314	\$394,200	

6: Recommended Projects for 2017

Bear Hill Road - Segment 2

This segment contains the road surface between 66 Bear Hill Road and Ferrin Road. This section of roadway is approx. 4050 ft. long. In many spots the saturated sub base has lost integrity. The base of this section of roadway was built years ago some of which rests in an active stream bed. The base of this roadway consists of a bony fill containing large and small boulders with a clay type soil. Other sections contain ledge outcrops just under the paved surface As with the other sections of Bear Hill this section also handles 600+ cars per day. The previous work that has been performed on this section of roadway includes an overlay in 1997, culvert repair and shimming, pothole repair and patching.

The detailed roadway survey which was taken in the fall of 2011 showed that this section of roadway was deteriorating. Rutting (collapsing of the base due to water infiltration/poor soils), to cracking (material failure) and pot holes (ledge under the roadway base). This section has large rocks starting to move through the hot top and the two culverts which are RCP are in need of replacement .We did note that the drainage is poor throughout the lower portion of this section. The inclusion of this road in our survey and CIP submittal is based on the importance of this road to the community, being a main thoroughfare with high volume of daily traffic and poor current condition.

Work assigned:

1,300 feet of paved ditch line establishment. The removal of the existing hot top by means of grinding and these ground materials will be incorporated into the sub-base and a Tenstar 140 membrane will be laid on certain sections. This increases the ability of a poor sub base to hold a load. Two sections of ledge will be removed to allow for increased sight distance. A new 4" crushed gravel layer will be installed and compacted. Pavement will then be placed for the entire section. Driveways both paved and gravel would be blended in to the new roadway

Estimated cost using measurements and computer formula: \$240,615.

Bids received in November 2016 range from \$181,016.50 to \$376,885

Table 8

Chichester Highway Department Cost Estimate				
Road Name:	Bear Hill Road			
Segment(s)	2			
Current Condition:	Poor			
Project starting point:	#66 Bear Hill Road			
Project ending point:	Ferrin Road			
Length	4,050	feet		
Width of base	21	feet		
Work duration		days		
PAVING CALCULATION				
Thickness of base pavement:	2.00	inches		
Thickness of finish pavement:	1.00	inches		
Tons of pavement (Base):	1063.13	tons		
Tons of pavement (Finish):	531.56	tons		
Asphalt Cost (Base):	\$72.00	per ton		
Asphalt Cost (Finish):	\$72.00	per ton		
Total cost for paving:				\$114,817.50
PREPARATION & OTHER COSTS				
	Quantity		Cost Per	Total Cost
Number of intersections:	2		\$1,200.00	\$2,400.00
Number of gravel drives:	2		\$165.00	\$330.00
Number of paved drives:	6		\$300.00	\$1,800.00
Grind/replace sub-base:	9,450	sq. yds.	\$1.85	\$17,482.50
Culverts		number		\$0.00
Driveway:		feet	\$7.00	\$0.00
Road:		feet	\$8.00	\$0.00
Headwalls Driveway and Road		Cy		
Ditching:	8,100	feet	\$1.25	\$10,125.00
Ditch re-seeding:		sq. yds.	\$1.75	\$0.00
Shoulder leveling:	8,100	feet	\$0.57	\$4,617.00
Underdrain:		feet	\$18.75	\$0.00
Gravel for subbase upgrades:		ton	\$4.27	\$0.00
Gravel base upgrades:	4,725	ton	\$16.50	\$77,962.50
Comspans:		number		\$0.00
Box Culverts:		sq. yds.	\$150.00	\$0.00
Guard rails:		feet	\$50.00	\$0.00
Equipment rental:		per wk.	\$700.00	\$0.00
Geotextile fabric non woven):	4,246	sq. yds.	\$1.55	\$6,581.30
Blasting/Hammer :	3	per hr.	\$1,500.00	\$4,500.00
Total of other costs:				\$125,798.30
Total Project Cost (Today)				\$240,615.80
Last work done on this segment				
	Paved	Shim	Seal	Other
Year	1997			
Notes regarding this estimate				
An average of 4" base gravel added.				

Pleasant Street – Segment 5

This segment contains the road surface between Jones Farm and The Chichester/Loudon Town Line. This section of roadway is approximately 1,500 feet long. In many spots the saturated sub base has lost integrity. The base of this section of roadway was built years ago and consists of a bony fill containing large and small boulders with a clay type soil. As with the other sections of Pleasant Street this section handles 600+ cars with a large number of tractor trailers and straight truck utilizing the two commercial entities in both towns. The previous work that has been performed on this section of roadway includes an overlay in 1997, shimming, pothole repair and patching. The other segments of Pleasant Street, totaling more than 1.5 miles have been rebuilt. This will be the last section of this road to be completed.

The roadway survey which was taken in the fall of 2015 showed that this section of roadway was in a high degree of deterioration. Rutting (collapsing of the base due to water infiltration/poor soils), to cracking (material failure) and pot holes. This section has large rocks starting to move through the paved surface. The inclusion of this road in our survey and CIP submittal is based on the importance of this road to the community as a main thorough. It services our commercial community in this section of town, the road has a high volume of daily traffic, and the condition of this section of roadway is poor.

Work assigned:

The removal of the existing 1,500 feet of roadway by means of grinding and these ground materials will be incorporated into the sub-base.. A Tenstar 140 membrane will be laid (This increases the ability of a poor sub base to hold a load) on certain sections. A new 4" crushed gravel layer will be installed, and compacted. Pavement will then be placed for the entire section. Driveways both paved and gravel would be blended in to the new roadway

Estimated cost using measurements and computer formula: \$86,633.

Bids received in November 2016 range from \$63,215 to \$152,850

Table 9

Chichester Highway Department Cost Estimate					
Road Name:	Pleasant Street				
Segment(s)	5				
Current Condition:	Poor				
Project starting point:	Top of paved hill				
Project ending point:	Loudon town line				
Length	1,500	feet			
Width of base	22	feet			
Work duration		days			
PAVING CALCULATION					
Thickness of base pavement:	2.00	inches			
Thickness of finish pavement:	1.00	inches			
Tons of pavement (Base):	412.50	tons			
Tons of pavement (Finish):	206.25	tons			
Asphalt Cost (Base):	\$72.00	per ton			
Asphalt Cost (Finish):	\$72.00	per ton			
Total cost for paving:					\$44,550.00
PREPARATION & OTHER COSTS					
	Quantity		Cost Per		Total Cost
Number of intersections:	1		\$1,200.00		\$1,200.00
Number of gravel drives:	1		\$165.00		\$165.00
Number of paved drives:	4		\$300.00		\$1,200.00
Grind/replace sub-base:	3,667	sq. yds.	\$1.85		\$6,783.33
Culverts		number			\$0.00
Driveway:	0	feet	\$7.00		\$0.00
Road:		feet	\$8.00		\$0.00
Headwalls Driveway and Road		Cy			
Ditching:		feet	\$1.25		\$0.00
Ditch re-seeding:		sq. yds.	\$1.75		\$0.00
Shoulder leveling:	3,000	feet	\$0.57		\$1,710.00
Underdrain:		feet	\$18.75		\$0.00
Gravel for subbase upgrades:		ton	\$4.27		\$0.00
Gravel base upgrades:	1,833	ton	\$16.50		\$30,250.00
Comspans:		number			\$0.00
Box Culverts:		sq. yds.	\$150.00		\$0.00
Guard rails:		feet	\$50.00		\$0.00
Equipment rental:		per wk.	\$700.00		\$0.00
Geotextile fabric (non woven):	500	sq. yds.	\$1.55		\$775.00
Blasting/Hammer :		per hr.	\$1,500.00		\$0.00
Total of other costs:					\$42,083.33
Total Project Cost (Today)					\$86,633.33
Last work done on this segment					
	Paved	Shim	Seal	Other	
Year					
Notes regarding this estimate					
An average of 4" base gravel added; fabric used only in sub-par, sub-base areas. Estimate of yardage.					

7: Projects for 2018

The committee is assessing six roads and segments for consideration for reconstruction in 2018. No decision or recommendation is made at this time as to which should be done. During 2017 we will again assess the conditions of each road. We will then recommend one or more projects among them that total about 1.2 miles in total length in order to maintain the town's plan to keep our roads on a 20 year cycle.

These are the six possible projects that we believe should receive priority attention.

1. Bear Hill Road – Segments 5, 6, & 7

After the recommended project on Bear Hill Road for 2017 is complete, these will be the three segments that remain to be finished on this road. The committee's report last year listed this as one project for future consideration. This project would start at Ferrin Road and end at the Loudon town line. Total length is 1.046 miles.

2. East Ricker Road – Segment 1

This short road segment is in dire need of repair. This project would start at the intersection with Bear Hill Road and stop sign and extend to the house at #256. Total length is 0.270 miles.

3. Horse Corner Road – Segment 8

This is one of the two segments of Horse Corner Road that have not been completed yet under our plan. The committee's report last year listed this as one project for future consideration. This project would start at the house at #125 and extend to Garvin Hill Road. Total length is 0.450 miles.

4. Horse Corner Road – Segment 10

This is one of the two segments of Horse Corner Road that have not been completed yet under our plan. This project would start at Towle Road and the end of the State maintained segment and extend to the house at #79. Total length is 0.220 miles.

5. Kelley's Corner Road – Segments 1 & 2

These two segments remain to be reconstructed on this road. The other two segments were completed in 2013. The committee's report last year listed this as one project for future consideration. This project would start at the intersection with Pleasant Street and the bridge and extend southward to the intersection with Route 28. Total length is 0.353 miles.

6. King Road – Segments 1, 2, 3, & 4

King Road is one of the highest traffic roads in Chichester. Because of deterioration of the road, the town has recently prohibited through truck traffic. This project would be for the entire length of the road in Chichester, from the Loudon town line to the intersection with Route 4. Total length is 1.314 miles.

8. Long Range Planning

8.A: Lifespan of a Road and Its Maintenance

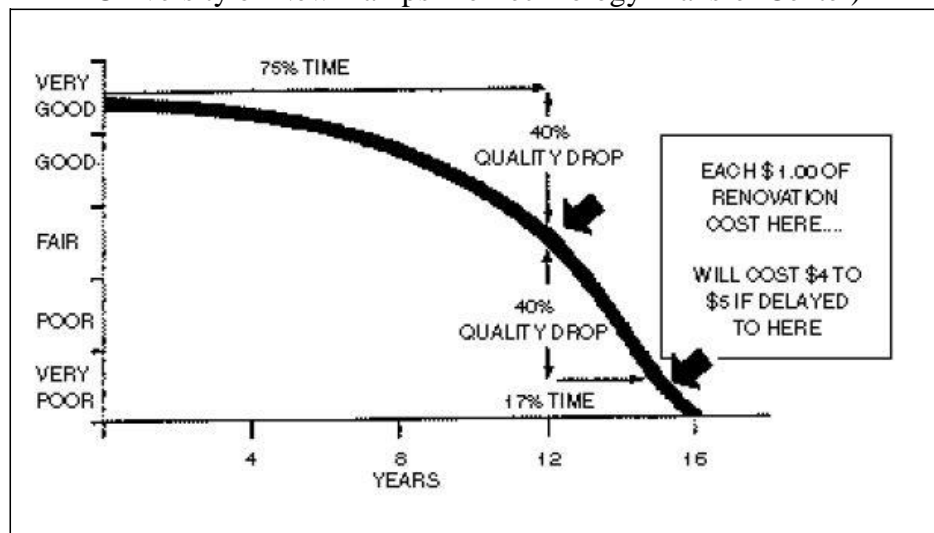
The Committee estimates that the average life span of a paved road in Chichester is 20 years. This estimate is based on input from the Maine Local Roads Center, the developer of the Road Surface

Management System (RSMS), and other sources, including committee members own experiences, Factors used in developing the average life span included traffic volume, types of traffic, drainage of water, and structure of the road. The lifespan of some paved roads may exceed 20 years while others may be less depending on these characteristics. The Committee emphasizes that 20 years is the average, not a prediction of the lifespan of any given road.

In order for a road to attain the average 20 year lifespan, there is a need for regular maintenance and repair. This will include crack sealing, pothole patching, culvert replacement, repaving of limited sections, and other work. Without this regular maintenance, the average lifespan may be much less than 20 years. Figure 3 (see below) shows how the condition of a road deteriorates over time and how early intervention and rehabilitation can cost less and extend the life of a road. The Committee supports the strategy of annual maintenance on the paved roads. However, maintenance activities are outside the purview of the Committee. Unfortunately, many paved roads in Chichester are already beyond the state where simple maintenance will be cost effective.

The goal of this Committee is to bring all the roads in town to an average or better condition and keep them in this condition for the average 20 year life span. To do this the town will need to reconstruct 1.2 miles of paved roads every year.

Figure 3
(Source: Road Surface Management System Workshop Notebook and Reference,
University of New Hampshire Technology Transfer Center)



8.B: Recommendations for 2019-2032

The committee's plan to reconstruct approximately 1.2 miles of paved roads per year was accepted at the 2013, 2014, 2015, and 2016 town meetings. Approximately 1.25 miles of roads were successfully reconstructed during 2013, 0.71 miles in 2014, 0.93 miles in 2015, and 1.34 miles in 2016.

Section 5 of this document contains the specific recommendations for additional miles to be completed over the next two years (2017 and 2018).

If our recommendations for 2017 are accepted, the town will have successfully reconstructed a little more than 5.3 miles of paved roads by the end of 2017. This will leave approximately 19 miles of paved roads to be considered over the next 15 years (2018 – 2032) to complete a 20 year cycle. This is approximately 1.25 miles per year.

The Committee does not yet propose any specific road segments for these later years. The Road Agent and the Committee will use the scientific criteria of RSMS and onsite evaluation to identify the roads that need major improvements to keep them in average or better condition over their 20 year average life span. Regardless of which remaining segments are assessed to be most in need of work beginning in 2019, the principle remains that an average of 1.2 miles must be reconstructed per year in order to continue to improve the condition of all the paved roads in Chichester.

Of course this is subject to change as every year we re-evaluate all roads and possible projects. Road conditions change and priorities must also inevitably change to meet the new realities.

The Road Agent updated calculations of the cost to reconstruct a generic 1.0 miles of paved town road. The actual cost for any particular road will vary based on conditions such as ledge, wet land, poor drainage, condition of culverts, etc. Of course it will also vary over time with the cost of materials: geotextile, asphalt, and gravel base fill. This calculated generic cost is just under \$300,000 and is shown in Table 10. This means that the cost to reconstruct the needed 1.2 miles per year is \$360,000. This is somewhat less than our previous estimate of \$375,000. The Committee also feels that an inflation factor of 3% per year should be added for future planning purposes.

Table 10

Chichester Highway Department Cost Estimate

Road Name:	Generic 1 miles of road				
Segment(s)					
Current Condition:	Typical condition				
Project starting point:	0				
Project ending point:	5,280 feet				
Length	5,280	feet			
Width of base	21	feet			
Work duration		days			
PAVING CALCULATION					
Thickness of base pavement:	2.00	inches			
Thickness of finish pavement:	1.00	inches			
Tons of pavement (Base):	1386.00	tons			
Tons of pavement (Finish):	693.00	tons			
Asphalt Cost (Base):	\$72.00	per ton			
Asphalt Cost (Finish):	\$72.00	per ton			
Total cost for paving:					\$149,688.00
PREPARATION & OTHER COSTS					
		Quantity		Cost Per	Total Cost
Number of intersections:	1			\$1,200.00	\$1,200.00
Number of gravel drives:	5			\$165.00	\$825.00
Number of paved drives:	5			\$300.00	\$1,500.00
Grind/replace sub-base:	12,320	sq. yds.		\$1.85	\$22,792.00
Culverts		number			\$0.00
Driveway:		feet		\$7.00	\$0.00
Road:		feet		\$8.00	\$0.00
Headwalls Driveway and Road		Cy			
Ditching:	10,560	feet		\$1.25	\$13,200.00
Ditch re-seeding:		sq. yds.		\$1.75	\$0.00
Shoulder leveling:	10,560	feet		\$0.57	\$6,019.20
Underdrain:		feet		\$18.75	\$0.00
Gravel for subbase upgrades:		ton		\$4.27	\$0.00
Gravel base upgrades:	6,160	ton		\$16.50	\$101,640.00
Comspans:		number			\$0.00
Box Culverts:		sq. yds.		\$150.00	\$0.00
Guard rails:		feet		\$50.00	\$0.00
Equipment rental:		per wk.			\$0.00
Geotextile fabric n n woven):	2,000	sq. yds.		\$1.55	\$3,100.00
Blasting/Hammer :		per hr.		\$200.00	\$0.00
Total of other costs:					\$150,276.20
Total Project Cost (Today)					\$299,964.20
Last work done on this segment					
	Paved	Shim	Seal	Other	
Year					
Notes regarding this estimate					
An average of 4" base gravel added.					

9. Paving Gravel Roads

The RAC does not recommend paving any gravel roads at this time. However, we recommend a greater investment in materials for gravel road maintenance.

There was discussion at the 2016 Town Meeting about possibly paving one of the town's gravel roads. A proposal to do so was rejected by the voters. The role of the Road Advisory Committee in regard to such proposals was discussed. The mission of the RAC includes making recommendations regarding *"any future roadway reconstruction projects or major repair/upgrading projects."* Certainly, the paving of a gravel road is a major upgrading project. Thus, the RAC should make its recommendations known in this regard. The fact is that since its creation eleven years ago, the RAC has never recommended that a town gravel road be paved. There are two reasons: (1) our existing paved roads had been allowed to fall into considerable disrepair and needed urgent attention; (2) our gravel roads tend to be lower traffic roads than many of our existing paved town roads.

Because of the interest in the possibility of such paving, the RAC decided to measure traffic on four of the existing gravel roads this year: Hutchinson Road, Smith-Sanborn Road, Cross Road, and Hilliard Road. We measured total traffic and traffic by time of day. Table 10 shows average daily traffic measured over a full 7 days. Figure 4 shows the traffic by time of day.

Table 10

Traffic measurement location	Vehicles/day
Hutchinson Road (at intersection with Short Falls Rod)	296
Smith-Sanborn Road (at intersection with Route 4)	406
Cross Road (at intersection with Route 4)	199
Hilliard Road (at intersection with Swiggy Brook Road)	208

Figure 4

