

**REPORT OF THE WHITEFIELD
ROADS COMMITTEE**

**SUBMITTED TO THE WHITEFIELD BOARD OF
SELECTMEN**

ON DECEMBER 23RD, 2014

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I. EXECUTIVE SUMMARY

The Whitefield Roads Committee was established by the Town Selectmen to review the condition, maintenance, financing, and administrative support of the Whitefield road network to ensure that Whitefield has the best quality roads possible, consistent with safety, usage needs, and town resources. The Committee met with State highway experts, engineering firms, representatives of other Maine towns, Whitefield officials and others. Committee members surveyed all of the roads in Whitefield maintained by the Town. The Committee used a software package specifically designed for this purpose produced by Maine DOT called "Road Surface Management System-11" (RSMS-11) to evaluate the conditions of the roads and to establish broad parameters for the type and potential cost of any necessary work. Taking advantage of a \$2,000 grant, the Committee engaged a consulting engineer to review the Committee's work, examine Town roads, and provide recommendations on appropriate repair options for problems identified.

Of the approximately 66 miles of roadway in Whitefield, the State is responsible for maintaining 27.97 miles and the Town the rest, of which 27.2 miles are paved and 11.33 gravel. From FY 2006 until FY 2014 Whitefield's annual spending on roads averaged \$117,727. In recent years there has been a tendency to increase funds appropriated for Whitefield roads. For FY 2015 the amount appropriated was \$265,000.

In its road survey the Committee found that over half of the Whitefield paved road network needed substantial work, including various repaving options. Parts of over 60% of Whitefield's gravel roads need reconstruction according to the results of the survey. Keeping water off, away, and out from under the surface is crucial to maintaining good road condition but the Committee's survey found that approximately 60% of the Whitefield road network has poor drainage due to such problems as shoulders absent or blocked by accumulations of winter sand, the absence or blockage of roadside drainage ditches, damaged or inoperable culverts and the like. Resolving these problems and discouraging their recurrence through regular road maintenance will improve road quality and save money in the long term.

For a variety of reasons, funding has historically been insufficient to prevent deterioration of the road network. It will continue to worsen at recent levels of funding, which only allows for capital improvement such as repaving or resurfacing of each mile in the Whitefield paved road network approximately every 30 years. Experts the Committee consulted agreed that the most cost-effective approach over the long term is to keep good roads in good shape by providing necessary regular maintenance. An increase in road expenditures now, to bring the Town's roads, over time, up to good condition, should save money over the long term.

As a first step toward the creation of a long term plan for the maintenance and capital improvement of the Whitefield road network, the Committee submitted to the Selectmen a proposed roads budget for fiscal year 2015-2016 which represents the first installment of the prioritized long-term plan the Committee recommended the Town adopt for its roads. It represents the Committee's best estimate of the costs of the various types of work contained in the budget but the costs in the out years will necessarily need to be

refined based on actual experience. The objective of the budget is to restore the Whitefield road network to good condition over time in a fashion that meets the needs identified by the Committee and by the professionals it consulted and is also affordable to the Town. The budget breaks down proposed road expenses into three categories of 1) routine maintenance work, 2) professional services, and 3) capital improvements. Within these categories it breaks down expenditures by type as an aid to planning, implementation, and record keeping. The amounts in the budget are shown as if they are to be spent in each year for the period discussed. While the total amount spent over a given time period will not exceed the total amount shown, amounts may be accelerated or deferred from one year to another in order to realize efficiencies, accommodate contractor availability, and react to weather events and other unforeseen circumstances.

The Committee also considered issues connected with sighting distance, safety, and use of the roads by pedestrians and non-motorized vehicles. The rural character of Whitefield roads makes it important to take into account such factors as drainage, safety, and equitable distribution of costs in locating new driveways. In addition to their primary purpose as motorways, Whitefield's roads are also used by walkers, bicyclists, and non-motorized vehicles. As the Town carries out maintenance and reconstruction projects, it should seek to ensure that the interests of pedestrians and people who use non-motorized vehicles are considered as practicable.

Committee recommendations include the following:

- Establish, fund, and implement prioritized plans for capital improvement and regular maintenance of the Whitefield road network;
- Increase annual roads funding based on carrying out the plans described above, with an initial rough allocation of two-thirds for capital improvement and one-third for regular maintenance.
- Establish a consolidated record keeping system for spending on roads, to create a readily retrievable record of what types of capital improvements and routine maintenance have been done over time to Whitefield roads.
- Promptly establish a standing roads committee to take action on the recommendations in this report.
- When major capital improvements are being carried out, the Town should use the services of a consulting engineer to ensure the most efficient and cost-effective approach. This would also provide the ability to inspect the materials being used and the work being performed to ensure that the project specifications are being met.
- Consideration of rules governing safety thresholds for new driveways, policies to preserve the safety and rural character of the Town's roads, and improvements to selected roads with pedestrian use and safety in mind.

II. INTRODUCTION

Mission: The Whitefield Roads Committee was established by the Selectmen to review the condition, maintenance, financing, and administrative support of the Whitefield road network with a view to ensuring that Whitefield has the best quality roads possible, consistent with safety, usage needs, and available town resources. Over the coming years this goal should drive both planning and budgeting. It would point toward avoiding some of the most expensive and frequent types of maintenance but, at the same time, not wasting dollars in tasks such as repeatedly paving over a failed road surface. The objective over a long-term planning cycle of approximately 20 years would be to achieve a stable and sustainable situation where Whitefield has no "poor" roads and where the average road is at least "good."

Members: Tom Colpitt and John Del Vecchio, co-chairs, David Hayden, Chris Post, Carl Ribeiro, John Parks, Louis Sell and Dennis Merrill, who also served as the Committee's liaison with the Selectmen.

Activities: The Committee started its work in January, 2014. The Committee met with various experts from the Maine Department of Transportation (MDOT), representatives of other Maine towns which recently reviewed their road networks, the Whitefield Road Commissioner, and engineering firms. Committee members carried out an inspection of all the roads in the Whitefield network that are maintained by the Town. The Committee used software called "Road Surface Management System-11" (RSMS-11) produced by Maine Department of Transportation (MDOT) to evaluate the conditions of the roads and to establish broad parameters for the type and potential cost of needed work. The Committee also utilized MDOT's Local Roads Center, a unit that helps municipalities maintain and improve their roads. Staff from the Center visited Whitefield on three occasions to meet with the Committee and provide advice and training. They are available in the future to help with questions and to provide technical assistance.

The Committee received a grant of \$2,000 from the Lincoln County Regional Planning Commission, which it used to engage the services of Jim Coffin of Coffin Engineering in Augusta to review the Committee's work, examine Town roads, and provide recommendations on appropriate repair options for the problems identified. The Committee provided Coffin with copies of the RSMS-11 reports and he accompanied the Committee on inspections of selected roads.

In the written report which Coffin provided to the Committee (attached as Appendix A), he highlighted many problems which degrade drainage on the Town roads. The absence of crown on most Town roads, even those recently shimmed, prevents water run-off from getting to the shoulder. Some road ditches have little or no slope and as a result water does not flow away from the road or into culverts. Several culverts were blocked with sediment. All of this contributes to the development of alligator cracking and potholes. Where these features are severe there are likely also bad subsurface soils and these areas will continue to exhibit pavement deterioration until the subsurface problems are corrected. The need to deal with subsurface soil problems is one reason

Coffin emphasized the importance of conducting soil test borings in areas of poor road condition.

The Committee also met with the Town Road Commissioner David Boynton, who reviewed this report and shared its general thrust. Commissioner Boynton agreed that the Town is going backward on the condition of its roads. The recent rise in spending over the last couple of years has helped but under current conditions the deterioration will only continue. He also raised the possibility of the Town engaging a part-time public works employee to handle some of the Town road work since the Town Road Commissioner under current arrangements simply cannot afford to spend the time needed to accomplish all road maintenance tasks.

On specific points Boynton mentioned that there are several places in the Whitefield road network where blasting to remove subsurface rock would allow ditching to be done and thereby improve drainage and allow the long-term correction of some perennial problem areas. He also emphasized the importance of good record keeping and the need for better forms to allow work done on the roads to be more accurately and legibly recorded.

The Committee's survey found that approximately 60% of the Whitefield road network has poor drainage.

Commissioner Boynton also assisted the Committee by providing cost estimates for various activities based on his long experience working on Whitefield's roads.

III. DEFINITIONS and BACKGROUND

The Committee considered matters connected with the upkeep and financing of the Whitefield road network; it did not deal with snow removal and plowing except as that might affect the condition of the roads. Nor did it address the potential issue of the replacement of bridges or large culverts that could be major expense items.

Basic road upkeep requires capital improvement at periodic intervals as well as more regular -- often annual -- maintenance activities. For purposes of this report we are using the following definitions:

"Capital improvement" includes such major tasks as repaving or resurfacing a road, repair or replacement of a road base, replacement of culverts and other important features.

"Maintenance" includes such activities as ditching alongside a road, repair of road shoulders, fixing cracks or potholes, grading, and emergency repairs such as fixing washouts and the like.

The basic parts of a road system should work together to form a surface that is safe and long lasting. Roads should be designed and maintained to accommodate the traffic and loads they carry. According to MDOT, one 80,000 pound truck can cause as much wear and tear on a road as some 9,600 passenger vehicles. Thus, a quiet residential side road probably does not need as heavy construction as a road having through traffic and

commercial vehicles. The Local Roads Center advocates that towns “keep good roads good” by doing preventative maintenance to avoid or delay more costly capital improvements.

The objective of the budget is to restore the Whitefield road network to good condition over time in a fashion that meets the needs identified by the Committee and by the professionals it consulted and is also affordable to the Town.

Drainage is the most important factor in maintaining good roads. Simply put, water is the enemy of a road surface and its base, especially in cold climates where freezing can be destructive. The MDOT promotes getting water off of, out from under, and away from a road. Doing so requires a well designed and properly constructed base, sloped shoulders, and a ditch below the base of the road. Not addressing these factors will mean that the road surface, be it gravel or pavement, will have premature problems such as cracking, potholes, puddles, etc. Money paid to maintain a road surface will not be well spent if good drainage is not in place.

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In addition to drainage, culverts play an important role in moving water across or away from roads. Culverts that are undersized, damaged or clogged will cause water to flow onto a road, creating obvious problems. Culverts are also needed to keep water flowing along roadsides to reach low spots where it can be dispersed.

The road’s shoulder abuts the travel surface and should be sloped to allow water to flow away from it. Shoulders also provide a space for pedestrians and allow vehicles to pull off the road safely. A significant problem can be the buildup of sand along edge of the road surface that effectively forms a small dam that prevents water from running off the road. Accumulated sand must be periodically removed in order to allow proper drainage; failure to do so means damage to the road surface and potentially dangerous standing water and ice on the roadway.

A road’s base supports the surface and provides under drainage to move water away from the surface. It is important to use proper materials that are well drained and compacted. Soils with a high content of “fines” such as clay or silt will cause poor drainage with resulting damage to the road surface. No matter how much is invested in a road surface, it will not last if it is set on a sub-standard base. A pithy MDOT saying encapsulates this point well -- “Roads wear from the top down, but fail from the bottom up.”

A road’s surface can be gravel or pavement. Pavement consists of asphalt and mineral material. Many years ago, sand was used but now crushed stone of various sizes is used as the aggregate in pavement. For new or reconstructed roads, pavement is typically applied in two layers; larger aggregate in a bottom or “binder” layer, topped with a small aggregate mix on top. For routine maintenance, an overlay layer is placed on top of the existing surface. This essentially paves over whatever surface and bed that is already there – for better or worse. Generally, the thicker the pavement and the larger the

aggregate size, the more load a pavement will carry. Paved roads should have a crown or slope from the centerline to the edge of at least $\frac{1}{4}$ inch per foot. The total pavement depth should be 3" to 4", depending on the use of the road.

Gravel roads should have 12" to 18" of good, well drained gravel as a base with a 3" surface of finer gravel. Gravel roads can experience problems with ruts, potholes, washboards and wet areas. Water and poor drainage are usually the root of these problems. In wet areas or where there have been problems with drainage, a geotextile can be placed under new gravel to help improve the situation. Maintenance consists of addressing wet areas, drainage problems, and ensuring a good surface by adding new gravel as needed and re-grading. Gravel roads should have a crown or slope from the centerline to the edge of at least $\frac{1}{2}$ inch per foot.

IV. CURRENT SITUATION

Whitefield Road Network: There are approximately 66 miles of roadway in Whitefield of all types. Routes 17 and 126, totaling 8.02 miles in Whitefield, are defined as state highways by MDOT. Routes 194, 218, and the Cooper Road, totaling 19.95 miles in Whitefield, are defined as state aid highways. The remainder of the Whitefield road net, amounting to 38.53 miles, is considered Town way. The State is responsible for maintenance of state highways and state aid highways; the Town of Whitefield is responsible for the maintenance of the rest. This includes 27.2 miles of paved roads and 11.33 miles of gravel roads.

Spending: Money to spend on roads can come from three sources: funds appropriated by the Town at annual meeting, annual state subsidies, and the proceeds from excise taxes on vehicle registration. In recent years there has been a tendency to increase funds appropriated for Whitefield roads. For FY 2015 the amount appropriated was increased by \$100,000 over the previous fiscal year with money taken from surplus, to a total of \$265,000. In FY 2013 \$150,000 was appropriated for roads. For a number of years the state provided the Town with \$59,376 in annual support for road maintenance. Over the last two years that amount has fallen to \$46,444 and is likely to decline further in the future.

From FY 2005-2006 until FY 2013-2014 Whitefield's annual spending on roads ranged from a low of \$63,969 in FY 2012-2013 to a high of \$168,455 in FY 2005-2006. Average annual spending on Town roads over this period was \$117,727. Road maintenance has run between 8-22% of the total non-educational budget. (In most years, road maintenance and snow removal expenditures together have generally been around half of total Town non-educational spending.) Inflation has significantly reduced the real value of Whitefield spending on roads. For example, to maintain a purchasing power equal to the \$168,455 the Town spent on roads in FY 2005-2006, it would have had to spend \$198,819 in 2013.

Administrative Structure: Responsibility for the Whitefield road network is shared between the Town Road Commissioner, who is elected to the position on an annual basis, and the Selectmen. The Road Commissioner monitors the condition of the Town's roads,

According to Maine DOT, one 80,000 pound truck can cause as much wear and tear on a road as some 9,600 passenger vehicles.

takes action on small-scale repair jobs and decides, together with the Selectmen, which parts of the Whitefield network need more significant reconstruction in the coming year. The Selectmen have responsibility for putting together a proposed annual budget, including spending on roads, for decision at the annual town meeting. The Road

Commissioner has often but not always performed much of the road maintenance work, for which he is reimbursed by the Town. Larger road reconstruction projects are let through a competitive bidding process. All expenditures on roads are invoiced and recorded in the Town's regular financial record-keeping system, maintained by the Town Treasurer.

V. FINDINGS OF THE COMMITTEE'S ROAD SURVEY

The Committee used a "RSMS - 11" road maintenance software package that has been developed by MDOT to assist towns in evaluating the status of their roads and in determining the type and cost of work that might be needed to bring the roads up to good condition. In June and July 2014, Committee members used RSMS-11 to inventory all 38.5 miles of Town roads by riding them and recording the conditions observed. In that process, MDOT representatives visited Whitefield to provide the Committee with training on the use of the system, including actually rating several roads. In carrying out the surveys, Committee members made observations and reached a consensus on each factor being rated. The information collected was entered into the RSMS-11 program, which allowed the computer to rate the road segments and recommend various options.

The program produces various reports and includes estimated costs for work based on the MDOT's figures. It also allows local costs to be used in place of or in addition to the State values. The program also acts as a database for recording work that is done and can serve as a planning tool for projecting future work and budgets.

For paved roads, the seriousness and extent of various types of cracks, potholes, rutting and roughness were recorded for entry into the computer database. For example, a section of road may have a medium severity problem over 10% to 30% of its length. For gravel roads, the type of surface, rutting, corrugations, potholes and the road's crown were recorded. For both paved and gravel roads, the roadside drainage is also scored. The length and width of each road are logged. Each road can be rated as to its importance considering its use, the number of homes or businesses and other factors that may cause a road to be important to a community. The amount of traffic can also be rated considering not only the relative number of vehicles but the type as heavier vehicles cause more wear.

The following section summarizes the key findings of the Committee's survey of the Whitefield road network using the RSMS - 11 software. Appendix B shows the roads

grouped by surface conditions and Appendix C shows the roads listed by costed repair options.

A. Paved Road Findings.

Of the 27.2 miles of paved road that Whitefield is responsible for maintaining, the Committee's survey found that eight road segments, composing 9.18 miles or 34% of the total, fell into the category of "No Maintenance" needed. This group includes roads paved in recent years. Although these roads are in relatively good shape and currently require no major repair work, it is nevertheless important that necessary routine maintenance is performed to prevent degradation. It is interesting to note that this group has 6.98 miles of "Good" drainage conditions, more than the other paved roads groups combined. However, 2.2 miles of "no maintenance" road have "Poor" drainage and are candidates for improving drainage to help protect the relatively good paved surfaces. Not addressing drainage problems can easily lead to the good pavement going bad.

Three roads segments, comprising 3.3 miles or 12% of Town paved roads, were identified as needing "Routine Maintenance." RSMS-11 categorizes routine maintenance as patching potholes and sealing cracks with liquid asphalt to help stop water entering. This must be done correctly to avoid snowplows from ripping up the sealing material. Two of these three segments have "Poor" drainage. The total cost estimated by RSMS-11 for this group is \$35,860.

4.65 miles (17%) of paved roads fall into the Preventive Maintenance category. Of these, a segment of the Palmer Road is included because the edge of the pavement is badly damaged due to poor drainage in a relatively small area. Repair of this specific problem and fixing a few potholes would move this 0.6 mile segment to the no maintenance group. The remaining 4.0 miles of road are projected to need repaving. RSMS-11 offers paving options ranging from "sand seal" to "mill and fill with 1.25" of new pavement, and the costs vary widely among the various options. However, placing more than one inch of overlay pavement will likely result in a longer-lasting surface, given the nature and use of the roads involved since they are relatively important with higher traffic use. Based on the above and using a current cost estimate of \$105,000 per mile, a total of \$420,000 is a reasonable estimate for this work.

9.72 miles (36%) of paved road are classified by RSMS-11 as needing Rehabilitation due to their more degraded condition. Repair options range from \$117,000 per mile for shim and 2" overlay to \$220,500 per mile for reclamation with a stabilized base and 3.5" of new pavement. The selection of the method most appropriate for each section of road requires careful site-specific evaluation. This could involve borings to determine underlying soil conditions and engineering analysis. Borings do not need to be done on the entire length of a road, and can be limited to areas showing signs of possible problems in the base such as "alligator" cracking and separating cracks. Borings are typically done at increments of 200 feet. The cost is \$2,800 to \$3,200 for the first day and \$1,500 for subsequent days. Up to 40 borings can be done in a day and the boring company provides analysis of the soils collected and a written report. The locations of borings should be recorded by a land survey or designation on a GIS based system. The survey and boring results can be given to an engineer to design road reclamation based on

that site-specific information. Improvements may consist of reclamation in some areas and repaving in others, depending on the results of the boring. Carrying out borings allows the road work to be better tailored to existing conditions and helps avoid undesirable options such as paving over underlying problems or unnecessarily reclaiming segments that do not need it.

Without the site-specific type information discussed above, reasonable cost estimates for roads in this group are difficult to make. However, a very rough estimate can be made by selecting a median cost from RSMS-11 data. If the total 9.72 miles were to be reclaimed without the need to do major improvements to the road base, the cost would be on the order of \$180,000 per mile, or a total of \$1,656,000.

RSMS-11 recommended Reconstruction for 0.35 miles of the entire paved network, specifically the Palmer Road West of Blueberry Lane. Reconstruction involves removing the existing pavement, adding 18"-24" of gravel and then repaving with 3"-4" of new pavement. The RSMS-11 estimated cost for this work is in the range of \$79,000 to \$105,000.

Appendix D presents a summary of paved roads grouped by the nature of work they require.

B. Gravel Road Findings

The majority of Whitefield's gravel roads are in poor condition, with RSMS-11 recommending Reconstruction of 7.61 miles (67%) of the total 11.33 miles in Town. Some of these roads are short, narrow lanes that serve only a few homes. Libby Lane, Gorman Lane and Nilsen Lane fall into this category. Additionally, the first 0.15-mile segment of Henry Lane is publicly maintained while the remainder of the road is private. One commonly observed problem with the Town's gravel roads is the road surface being lower than the shoulders, most likely due to repeated grading essentially digging the road down and causing drainage problems. This problem can be resolved by lowering the shoulders or adding a layer of new gravel. For Reconstruction of gravel roads, RSMS-11 generally recommends addition of a 12" gravel base plus a 3" gravel surface. In problem areas where water causes potholes and ruts, the use of a drainage fabric (geotextile) should be considered.

Routine maintenance is required for the remaining 3.72 miles of the Whitefield gravel road net. Routine Maintenance may include spot repairs, regular grading and addition of gravel to maintain a good, smooth road surface.

Due to the variability of the work required and the costs of gravel by locality, RSMS-11 does not provide cost estimates for work on gravel roads. As a general approach, gravel roads can first have proper drainage restored by correcting problems with crown, shoulders and ditches. The surface gravel can be added as needed. In areas where problems still persist, those segments should be reconstructed as necessary to improve base conditions and address water problems.

Appendix E presents a summary of gravel roads grouped by the nature of work they require.

B. Drainage and Culverts Findings

The RSMS-11 software allows drainage to be categorized as being either Good or Poor. Taking both paved and gravel roads together, about 40% of Town roads have Good drainage, while some 60% fall into the Poor category. There is a very close correlation between good drainage and good road surfaces that require less maintenance. During its road surveys, the Committee frequently saw problems with drainage where the build-up of material at the edge of the pavement prevented water from flowing freely off the travel surface.

Standing water contributes significantly to damage including ruts, potholes, broken pavement and other problems that require costly repairs. Many instances were observed where road surface defects were closely associated with a particular drainage problem. According to MDOT accumulation from winter sanding can often add one inch of material per year to the side of a road, essentially forming a dam that prevents water from flowing off the road surface. Even where winter sand accumulation is able to flow away from the edge of the road it can often end up filling in a drainage ditch, if there is one. MDOT recommends that drainage be maintained on a regular schedule of once every three to four years. Roadside maintenance can be broken into two activities. First is removal of accumulated sand from the shoulders. Second is deepening ditches to promote under draining of the road bed. Taking care of drainage should be considered an on-going maintenance activity and an important means to prevent a road from degrading and requiring costly repairs.

The Town does not have a program for routine ditching work. In recent years, ditching to improve drainage has been done primarily in preparation for repaving or to address a specific problem, such as a washout. Maintaining the ditch at a level below the road's base provides the opportunity for groundwater under the road to drain away, preventing damage to the surface. A tracked excavator is used to remove accumulated soil from the edges of the pavement and the ditches. Recently, this work has cost approximately \$7,500 per mile; however, this can vary depending on existing conditions and topography. Typically, drainage problems are worst in low areas and not so bad at hilltops. Ditches should have a 3:1 slope from the shoulder to the bottom and a 2:1 slope on the backside. Erosion controls need to be used to prevent the ditch from filling back in quickly and siltation of surface waters. There are locations where ditches cannot be installed due to land uses, the presence of ledge, topography and other factors. In such situations, it may be possible to install a paved gutter along the shoulder to direct water downhill to a place where it may be diverted away from the roadway.

The Committee observed several places during its road surveys where culverts were heavily damaged or blocked altogether. The general practice has been to replace culverts – both crossing a road or at a driveway – when a road is repaved. Additionally, culverts may be replaced when a problem such as a collapse or washout is found. Typically, replacement of a culvert crossing a road or driveway has cost about \$1,000. Water can flow around the outside of a culvert, causing washouts. Putting a seep collar on the culvert can help prevent this. To avoid erosion problems, the soil at the inlets and outlets of the culvert should be stabilized with rip-rap or mats.

Another problem encountered is water flowing around the outside of a culvert and causing a washout of the road. Beavers often dam up culverts, causing floods. Typically, the remedy has been to dig out the sticks and mud at the culvert entrance, but beavers can quickly rebuild. Other methods include deterrents, such as extending pipes into deeper water upstream and avoiding the sound of running water.

Finally, some culverts are installed in such a way that they become barriers for fish. Several such situations have been identified in Whitefield by natural resource agencies. When working on these culverts, the Town should be mindful of fish migration issues and address problems. In

The Maine DOT Local Roads Center advocates that towns “keep good roads good” by doing preventative maintenance to avoid or delay more costly capital improvements.

December 2014, two members of the Committee attended a “Stream Smart” training session that provided the basic concepts of proper design of culvert installations to not only provide fish passage but also result in a long-lasting, properly sized culvert. Going forward, grants or technical assistance may be available to help in this regard.

Appendices F and G present a summary of drainage grouped by surface type and the nature of work they require.

C. Other Road Surface Conditions.

In addition to its work using the RSMS-11 program, the Committee made other observations regarding road conditions.

In many locations, the shoulder has receded from the pavement due to erosion or wear. This leaves the edge exposed and subject to collapse. The result, in addition to the obvious damage to the pavement, is creation of potentially dangerous depressions that could cause a vehicle to veer off the road should the driver not be paying attention.

At many locations, there are wheel ruts near mailboxes caused by the mail carrier’s vehicle. These can result in drainage issues and undermining of the pavement’s edge. Placing a stable material in such places – reclaimed pavement or blue stone – would help to correct this problem.

The Town annually mows the grass and small vegetation along its roadsides, and this is effective as far as it goes. However, the reach of mowing equipment is limited and it is not capable of cutting large growth. On many roads, woody vegetation needs to be cleared back from the roadside to improve visibility and provide additional winter sunlight to help in clearing ice and snow.

VI. SIGHTING DISTANCE AND ROAD SAFETY

Most of the roads in Whitefield are “rural” in nature, that is, they are relatively narrow in width, have narrow shoulders and vegetation—usually trees or woody brush—growing close to the road’s edge. Whitefield’s adopted Comprehensive Land Use Plan addresses the importance of Town roads, their contribution to the Town’s scenic character, and their management as the Town grows. Our roads, originally cart-ways used by farmers, twist and turn as they wind their way across Town. These twists and turns limit the distance we can see ahead of us as we drive, affecting our “sighting distance”, and generally causing us to drive at slower speeds than we would if the roads were widened, straightened, and flattened.

Sighting distance is an important factor for driveway location because drivers on the road must be able to see vehicles entering or leaving driveways in time to react and stop or slow down. Each new home built in Whitefield creates at least one new driveway and potential safety threat, so ensuring that the Town has standards for the location of new driveways is very important.

In order to address issues of public safety and expense, as well as drainage associated with driveways, the Committee recommends that the Planning Board, in consultation with the Road Commissioner and other experts or agencies as appropriate, develop:

- Safety Thresholds for New Driveways. A written “checklist” for new driveways that outlines a) minimum sighting distances that are critical for ensuring public safety and b) other provisions or adverse effects on road drainage or flooding.
- Policies to Preserve Safety and Rural Character. Standards for safe siting distance applicable for all new entrances to public Town roads must not allow excessive clearing of vegetation or roadway modification such that it will encourage unsafe vehicle speeds or threaten rural character.
- Drainage and other Provisions for New Driveways. Driveways can affect drainage in a number of ways, most commonly by stopping the flow of water in the roadside ditch if a culvert isn’t properly installed, and by directing more water into the ditch (or actual roadway) if sloping down to the road. It is important for the Town to have provisions for determining what impacts a proposed driveway will have on the Town road, whether with regard to drainage or any other effects that should be addressed.
- Equitable Assignment of Costs. Provisions ensuring that those responsible for creating the need for modifications to ensure roadway safety and integrity bear the cost, rather than the taxpayer.
- Planning for Future Driveways. A plan that identifies stretches along Town roads that are problematic from a safety perspective for locating new driveways/entrances and provides for a method to restrict, and where practical prohibit, new entrances in these locations.

Public Roads as Public Ways

All of the public roads in Town—both state and local—are public ways and as such, exist to serve the public whether they drive a motor or horse-drawn vehicle, ride a bike, walk, roller skate...whatever... Our roads exist to serve all users and motorists should drive with care and safety in mind when encountering pedestrians, cyclists, people on horseback, etc.

Accommodating “Walkers” on Our Roads

Our roads are the only year-round maintained areas for walking in our town. As the Town goes about its routine road maintenance, as well as reconstruction projects, it should seek to ensure that the interests of pedestrians and people who use non-motorized vehicles will be considered as practicable.

Several roads and road stretches in Town are popular and suited for walking. Townhouse Road is popular with walkers year-round, offering relatively gentle terrain,

Our roads, originally cart-ways used by farmers, twist and turn as they wind their way across Town.

public parking at either end, and posted speed limits of 40 mph. Road shoulders are narrow to non-existent in places, however; and vegetation is so close that it extends to the road surface, crowding pedestrians who might wish to step off the road. As the

Town carries out any necessary maintenance or reconstruction projects on Townhouse it could consider, as practicable, improvements to enhance pedestrian use and safety such as:

- Improvement to shoulders, not only for the good of the road, but also for walkers.
- Signs at either end cautioning motorists about pedestrians

The Three Villages

Posted speed limits in our villages are 30 mph in Kings Mills and North Whitefield and 35 mph in Coopers Mills. There are no sidewalks. The Committee recommends that the Selectmen, or future town roads committee, consider the following

- Lowering the posted speed limits to 25 mph in the village areas
- Find out if the State or County has a machine that displays motorists' speed traveling through our villages and other selected road stretches, and if so, borrow the machine from time to time and use it to encourage motorists to slow down in these areas.

VII. CONCLUSIONS

The Road Committee reached the following broad conclusions:

Whitefield's Selectmen, Road Commissioner, and other concerned personnel and citizens have over the past years conscientiously carried out their responsibilities with respect to the maintenance of the Town roads given the level of funding allocated to this purpose, the rising costs of road maintenance and construction, and the plethora of other Town needs. Nevertheless, funding for capital improvement and maintenance has been insufficient to maintain the Town road network at adequate levels of quality and safety.

The Whitefield road network is deteriorating and will continue to worsen at current levels of funding. This problem is likely to grow with the expected further decline in the annual subsidy the state has provided to the Town for road maintenance.

In our northern climate, assuming that periodic maintenance is conducted over the life of a paved road surface, the expected life span of a paved road between major rehabilitations is something in the range of 18-20 years. This life expectancy assumes that periodic maintenance involving surface, shoulders, ditches and culverts occurs throughout that period. Whitefield's paved roads have typically been resurfaced only at long intervals, with little maintenance being done in the intervening years. Consideration of the condition and quality of the road base is seldom addressed at the time of repaving. This approach results in having to use more expensive treatments when a road has been in "poor" condition for some time. In addition, failure to address issues related to the deteriorated condition of the road's base means that re-surfacing of the road at that time results in an even shorter surface life and relapse to "poor" condition. The result is that we will have more roads in "poor" condition in the future – and more expense.

The RSMS 11 program used by the Committee in its road survey found that over half of the Whitefield paved road network needed substantial work, including various repaving options, to bring it up to optimal standards. Portions of over 60% of Whitefield's gravel roads need reconstruction according to the survey. And the entire road network, including those segments currently in good condition, needs to be included in a program of regular maintenance activities, such as winter sand removal, ditching, brush removal and the like.

The RSMS 11 program used by the Committee in its road survey found that over half of the Whitefield paved road network needed substantial work, including various repaving options...

Experts the Committee consulted agreed that the most cost effective approach over the long term is to keep good roads in good shape by providing the necessary regular maintenance. An increase in road expenditures now, to bring the Town's road network, over time, up to good conditions, should save money over the long term.

Experts stress the importance of regular maintenance in prolonging the serviceability of roads and thereby reducing the frequency of expensive capital improvement jobs. Considerable portions of the Whitefield road network do not have adequate drainage due to such problems as shoulders absent or blocked by accumulations of winter sand or other debris and the absence or blockage of roadside drainage ditches. Resolving these

problems will initially be costly but should save money in the long term if appropriate maintenance is carried out regularly. Conversely, failure to establish and implement a regular program will simply accelerate the deterioration of the road network.

Road reconstruction and maintenance costs obviously vary greatly depending on the condition of the road surface, the type of sub-surface on which the road rests, and the adequacy of drainage. The Whitefield Road Commissioner gave the Committee an informal "back of the envelope" estimate, based on his considerable local experience, that resurfacing one mile of an average paved road in Whitefield could be expected to cost roughly \$100,000. (In the fall of 2014 the cost to repave about 1.4 miles of Hunts Meadow Road was \$135,000, not including the costs for ditching and culvert replacement.) At current levels of funding this would mean all Town paved roads would be resurfaced approximately every 30 years.

Whitefield has managed its roads on a year-to-year basis, depending on immediate needs as they arise without any long-range planning or clearly articulated priorities. Some of this is inevitable given the vagaries of weather and unexpected events but the absence of planning and a clearly understood set of priorities leads to an ad hoc approach which is not conducive to the most efficient use of scarce resources.

Records of Town expenditures on roads are not maintained in a way to allow a readily retrievable record of what has been spent on which sections of roads over time, which is an obvious necessity for any rational long-term planning.

VIII. PROPOSED BUDGET

As a first step toward the creation of a long term plan for the maintenance and capital improvement of the Whitefield road network, the Committee submitted to the Selectmen a proposed roads budget for fiscal year 2015-2016 which represents the first installment of the prioritized long-term plan the Committee recommended the Town adopt for its roads. It represents the Committee's best estimate of the costs of the various types of work contained in the budget but the costs in the out years will necessarily need to be refined based on actual experience. The objective of the budget is to restore the Whitefield road network to good condition over time in a fashion that meets the needs identified by the Committee and by the professionals it consulted and is also affordable to the Town. The budget is based on an estimated twenty-year life cycle for paved roads.

The budget breaks down proposed road expenses into three categories of 1) routine maintenance work, 2) professional services, and 3) capital improvements. Within these categories it breaks down expenditures by type as an aid to planning, implementation, and record keeping. The amounts in the budget are shown as if they are to be spent in each year for the period discussed. While the total amount spent over a given time period will not exceed the total amount shown, amounts may be accelerated or deferred from one year to another in order to realize efficiencies, accommodate contractor availability, and react to weather events and other unforeseen circumstances. (The Committee's proposed budget is attached as Appendix H.)

The budget proposes \$117,350 for routine maintenance work, including mowing, brush clearing, patching and crack sealing, shoulders and ditching, grading of gravel roads, and the like. Some of these expenses may be relatively high in the early years due to the poor condition of existing roads, especially things that affect drainage, but if maintenance is done regularly and to appropriate standards, over time these annual costs should be reduced.

The budget provides for two one-time expenditures of \$15,500 for professional services and training. This amount includes cost for borings and soil testing which would be expended in one year and in one subsequent year over the ten year period it is estimated would be necessary under the Committee's plans to rehabilitate the 10 miles of paved road most in need of capital improvement. Roads professionals the Committee consulted emphasized is critical to have an understanding of the sub-surface conditions below the most deteriorated roads in order to determine the appropriate and most cost-effective type of capital improvement. The boring data should not change greatly over time and thus the results of these tests can be kept on file and used by the Town in its roads planning for a number of years.

The budget proposes \$261,000 for capital improvements including repaving, rehabilitation, reconstruction of gravel roads, and culvert replacement. The types of recommended capital improvement for specific road segments are keyed to the conditions and recommended treatments identified by the Committee's survey using the RSMS-11 software. Once necessary capital improvements are completed, and provided appropriate maintenance is performed regularly, it should be possible to shift the Town's funding focus from capital improvements to less costly routine maintenance and preventative work.

The objective of the budget is to restore the Whitefield road network to good condition over time in a fashion that meets the needs identified by the Committee and by the professionals it consulted and is also affordable to the Town.

The total recommended budget of \$ 393,850 represents a significant increase over the amount the Town has budgeted in previous years, one that is necessary in order to restore the Whitefield road network from its current deteriorated state to good condition over time. It amounts to an effort to meet the Town's needs through a "pay-as-you-go" approach and avoiding bonding which some towns in a similar situation to Whitefield have done. This "pay-as-you-go" approach can be accommodated by appropriating each year the approximate historic amount Whitefield has allocated to its roads of \$150,000 together with the additional annual amounts coming from revenues accruing to the Town through recently increased assessed values on some major commercial properties. This approach should also allow the Town's mil rate to be held at roughly the FY 14 value.

IX. RECOMMENDATIONS

1) Whitefield should promptly establish a standing roads committee to assist the Selectmen on all matters relating to the Whitefield road network. This committee should be in place in time to take immediate action on the recommendations in this report.

2) Whitefield should promptly create and implement a plan for capital improvement of the road net on a long-term (10 years), medium term (five years), and annual basis.

Funding should be allocated and spent on the basis of this plan, which should establish priorities for paved and gravel roads, crowns, bridges, drainage, pedestrian and other associated uses. The standing roads committee should undertake the preparation of the first such plan with a view to presenting its recommendations in time for the next budget cycle. To support the on-going planning process the committee should create and maintain an inventory of all Whitefield roads. In addition, the RSMS-11 road surveys should be updated every two years. In view of the importance of determining sub-surface conditions in areas that are likely to require costly capital improvement measures, one of the first steps undertaken as part of this plan should be carrying out a program of test boring in appropriate deteriorated road segments. To assist in this planning process the Town should on occasion undertake traffic count surveys to determine road usage patterns.

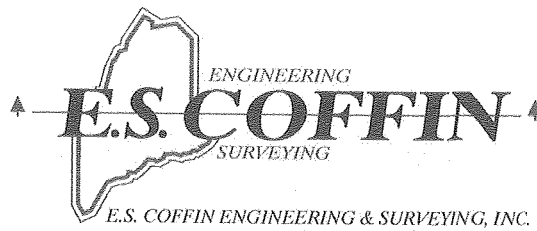
3) The Town should also promptly create and implement a regular road maintenance program which over time should maintain the condition of Whitefield roads, moderate costs, and provide additional benefits such as better safety and less wear and tear on citizens' vehicles. Maintenance funding should be allocated on the basis of this plan beginning with the next budget cycle. These measures include but are not limited to:

- a) Regularly remove roadside sand accumulation after winter plowing
- b) Ensure appropriate maintenance functions are regularly carried out, such as crack sealing, patching, back filling the edges of pavement, and the like.
- b) An on-going ditching program alongside road shoulders to ensure adequate drainage from road surfaces
- d) Annual roadside mowing
- e) Establish and implement a regular roadside brush clearance program
- f) Regularly grade all gravel roads – annually or twice a year, as necessary.

4) Spending on overall road maintenance needs to be increased to prevent further long-term deterioration of the Town road net. The Town should allocate this increased funding based on the prioritized plan described above, on the results of the RSMS road survey, and where necessary on the advice of knowledgeable state officials or private consultants. As a first step in this direction the current road committee submitted to the Selectmen a proposed roads budget for the upcoming FY 16.

- a) Whitefield should keep separate funds for each of the two categories of road work: capital improvements and routine maintenance. Separate allocations should be made each year to each account. Both functions are equally important for the long-term viability of the road network and there should be no “raiding” back and forth between the two. Initially, a rough division of two-thirds for capital improvement and one-third for maintenance seems sensible and can be refined over time based on experience.
 - b) The Town should also do a systematic search for existing road-related grant opportunities and be ready to take advantage of any that may come available in the future.
 - b) The Town should consider setting up a contingency fund in the road budget for unanticipated needs or cost overruns.
 - d) When major capital improvements are being carried out, the Town should use the services of a consulting engineer to ensure the most efficient and cost-effective approach and that all work is done properly.
- 5) The Town should undertake an inventory of existing culverts to establish needs for replacement or repair, restoration of fish passage, and to assist in future budgeting for road maintenance. The Town needs to clarify responsibilities for initial culverts in new driveways and replacement/repair of existing culverts.
- Whitefield should keep separate funds for each of the two categories of road work: capital improvements and routine maintenance.... Both functions are equally important for the long-term viability of the road network...
- 6) The Town office should establish a consolidated record keeping system for spending on roads, broken down by road/section, date, and purpose of the expenditure, to create a readily retrievable record of what types of capital improvements, repairs, and routine maintenance have been done over time to the Whitefield road net. Having a detailed record of work that has been performed across the road net is an essential part of a rational planning and maintenance program.
- 7) The standing roads committee should review various town administrative structures for road management and oversight and recommend changes, if any.

432 Cony Road
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Fax (207) 623-0016
1-800-244-9475

November 13, 2014

Whitefield Road Committee
Balltown Lane
P.O. Box 58
Whitefield, Maine 04353-0058

Subject: Town Roads

Dear Road Committee:

Per our meeting on Tuesday October 28th, 2014 you have asked me to prepare comments to the eight (8) questions that were presented below. In addition you have asked for any general comments that may be relevant to the road rehabilitation process moving forward. Responses to these questions are as follows:

1. *What are the viable options for paved roads needing rehabilitation? When is each option appropriate?*

The options for rehabilitation are replacement, reclamation, overlay or maintenance. The chosen option depends on the condition of the road, adequate crown, ditching and surrounding area.

2. *For roads needing overlay pavement, are there any practical recommendations for materials and thicknesses? Is the use of RAP mix a good choice?*

Overlays generally are from one to two inches in depth and are normally a function of how much funding is available and how much pavement is currently in place. Overlays should utilize Hot Mix Asphalt, 9.5 mm (MDOT 403.210) as this mix is used for surface pavement. Reclaimed Asphalt Pavement (RAP) has had mixed results in the northeast and is dependent on the company performing the service. The volume of traffic on a particular road certainly will play into this decision.

3. *How can we know when a road (or a portion) needs professional advice?*

In general terms if the road exhibits "alligator cracks", significant potholes, etc. there are issues beneath the road surface. These issues may include: poor subbase, silty gravel, poor drainage, etc. Utilizing a geotechnical firm to provide borings will enable the Town to make an educated decision on what course of action is required.

4. ***What are the general elements/tasks in "engineering" a paved road's reclamation? What are the rough costs of this service?***

Engineered road rehabilitation will involve: borings, geotechnical report, topographic survey and engineered drawings. The costs are dependent on the length of the road and width of the right of way.

5. ***Please provide some general guidance on gravel roads: keys or flags for when reconstruction is needed, and techniques.***

As mentioned "alligator cracks", significant potholes, surface water, lack of road crown, lack of ditching or areas where the road has wetlands adjacent to it are all deterrents of a road functioning properly.

6. ***Describe a reasonable ditching and shoulder maintenance program: frequency, depth of ditches, equipment to be used.***

The amount of maintenance required for shoulders and ditching is dependent on the amount of sand that is applied during winter months. Roads having shoulder berms that will not allow runoff to reach the ditches need to be addressed immediately. The method of choice would be to use a bobcat or a piece of equipment with a small blade to relocate the sand onto the paved road and then put into dump trucks. Silt and sand in ditches that deter the ditches from flowing freely need to be removed. This type of work is normally done by hand or if there is a large amount an excavator could be used. The depth of the ditch is generally two feet below the edge of pavement to allow the road base to drain.

7. ***During the ride-around, comments on conditions (good and bad) and general recommendations for next steps.***

I would recommend performing borings in the areas of alligator cracks, potholes or areas where the road shows movement. In addition any section of road that has wetlands adjacent to it would also be candidates for borings to determine if there is a soft subgrade or gravel mixing with it.

8. ***Written report: General observations on the town's roads, and broad recommendations for addressing various conditions. Discuss a good balance between routine maintenance (sealing, reggrading, patching, shoulders and ditching) and capital improvements to make the best use of limited funding.***

Most of the Town roads have no crown, even some of the ones that have been recently shimmed. The road crown sends the runoff to the shoulders instead of allowing runoff to run down the middle of the road. Runoff that can't get to the road shoulder will end up migrating down into the road base. Once the road base contains water it becomes susceptible to frost action. For frost to occur there needs to be silty gravel, water in the base and temperatures below freezing. If you can eliminate one of these three factors you can eliminate frost from affecting roads.

Many of the road shoulders have sand built up on them so that the runoff from the road can't get to the ditch. The shoulders need to be graded in such a way to allow runoff to get to the ditch.

Some of the Town ditches have little to no slope and as a result water does not flow to the culverts. The ditches should be graded to a 3:1 fore slope and 2:1 back slope and then apply curlax matting with loam and seed to achieve vegetation. The ditches should be two feet below the edge of pavement to drain the gravel road base. All ditches should have a positive slope so that water is not "sitting" in the ditch. Any slopes that are steeper than 2:1 on the fore slope should have guardrail.

We observed several culverts that were blocked with sediment or exhibiting signs of failure. Sediment can be removed from the culverts using fire truck hosing or some other method. All culverts should have riprap (stone) at each end to prevent erosion. The Department of Environmental Protection (DEP) does not want to see "hanging" culverts where water cascades downward. The invert of the culvert should be at the same elevation of the riprap on both culvert ends.

Pavement exhibiting temperature cracks need only be sealed. Some of the roads have small potholes that can be patched until such a time that road rehabilitation is necessary. Large potholes and alligator cracking are a result of bad subsurface soils, either silty gravel or a soft road subbase. These areas will continue to exhibit pavement movement until the subsurface situation is addressed.

Roads with wetlands on either side normally have a high water table and as a result are frost susceptible. These situations require geotextile fabric with gravel built up on top. These sections of road are problematic as it is difficult to drain the road base without being able to utilize ditching.

In closing most towns find themselves behind the eight ball in that they haven't been properly maintaining their roads. As a result many of the roads are in terrible condition and now the towns are finding that they have insufficient funds to cover not only the cost of maintaining the roads, but also having to do complete reclamation projects. This entire process comes down to how much funding each town has available to fix/maintain their road infrastructure. If you should have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads "James Coffin".

James E. Coffin, PE

12/17/2014
7:22:26AM

Road Network Inventory

2013

<u>Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>Import</u>	<u>Traffic</u>	<u>Jurisdiction</u>	<u>Surface</u>	<u>Last Survey Date</u>
Bailey Road		Rt 218	Town Line	0.40	low-med	low	Townway	Gravel	07/01/2014
Benner Lane		Rt 126	End	1.05	low-med	low	Townway	Gravel	07/15/2014
Carlton Road		Fowles Road South	Town Line	1.45	low-med	low-med	Townway	Gravel	07/01/2014
Cookson Road		Rt 218	End	0.40	low-med	low-med	Townway	Paved	06/09/2014
Devine Road		Cooper Road	End of pavement	1.00	low-med	low-med	Townway	Paved	06/12/2014
Devine Road	2	End of pavement	Vigue Road	0.94	low-med	low-med	Townway	Gravel	07/15/2014
Doyle Road		Vigue Road	Town Line	1.47	low-med	low-med	Townway	Gravel	07/15/2014
Fowles Road North		Jewett Lane	End	0.10	low	low	Townway	Gravel	07/01/2014
Fowles Road South		Rt 194	End	0.48	low	low	Townway	Gravel	07/01/2014
Gorman Lane		Rt 126	End	0.26	low	low	Townway	Gravel	07/01/2014
Heath Road		Hilton Road	Rt 218	2.73	low-med	low-med	Townway	Paved	07/01/2014
Henery Lane		Rt 126	End of town way	0.15	low	low	Townway	Paved	06/09/2014
Hilton Road		Rt 218	Heath Road	1.30	low-med	low-med	Townway	Gravel	07/01/2014
Hilton Road	2	Heath Road	End of pavement	0.40	low-med	low-med	Townway	Paved	06/09/2014
Hilton Road	3	End of pavement	Town Line	1.20	low-med	low-med	Townway	Paved	06/09/2014
Howe Road		Vigue Road	Rt 17	2.39	medium	medium	Townway	Gravel	07/01/2014
Hunts Meadow Road Center	1	126	R. Downs	1.40	medium	medium	Townway	Paved	06/09/2014
Hunts Meadow Road Center	2	Downs'	Cooper Road	1.00	medium	medium	Townway	Paved	10/06/2014
Hunts Meadow Road North		Cooper Road	Town Line	2.00	medium	medium	Townway	Paved	06/23/2014
Hunts Meadow Road South		Rt 126	Town Line	1.90	medium	medium	Townway	Paved	06/12/2014
Jewett Lane		Rt 194	End	1.10	low	low	Townway	Paved	06/23/2014
Libby Lane		Rt 126	End	0.10	low	low	Townway	Gravel	07/01/2014
Main Street		Rt 17 West	Rt 17 East	1.10	med-high	med-high	Townway	Gravel	07/01/2014
Nilsen Lane		Rt 218	End	0.15	low	low	Townway	Paved	06/09/2014
Palmer Road	1	218	Blueberry Lane	0.65	medium	medium	Townway	Gravel	07/14/2014
Palmer Road	2	Blueberry Lane	Town Line	0.35	low-med	low-med	Townway	Paved	06/23/2014
Philbrick Road		Townhouse	End	1.20	low-med	low-med	Townway	Paved	06/23/2014
Piper Lane		Rt 126	Rt 218	0.38	low	low	Townway	Gravel	07/01/2014
Rooney Lane		Rt 126	End	0.90	low-med	low-med	Townway	Gravel	07/15/2014
Sennott Road		Town Line	Box 184	0.40	low-med	low-med	Townway	Gravel	07/01/2014
Sennott Road	2	Box 184	Rt 218	0.90	low-med	low-med	Townway	Paved	06/09/2014
Somerville Road		Main Street	Town Line	0.29	low-med	low-med	Townway	Paved	06/09/2014
Thayer Road		Town Line	Palmer Road	1.10	medium	medium	Townway	Paved	06/23/2014

12/17/2014
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Road Network Inventory 2013

<u>Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>Import</u>	<u>Traffic</u>	<u>Jurisdiction</u>	<u>Surface</u>	<u>Last Survey Date</u>
Townhouse Road	1	Rt 126	Chases	1.50	med-high	med-high	Townway	Paved	05/28/2014
Townhouse Road	2	Chases	Rt 194	2.90	med-high	med-high	Townway	Paved	06/23/2014
Vigue Road		Stonehouse Court	Town Line	1.80	med-high	med-high	Townway	Paved	06/09/2014
Vigue Road	2	Stonehouse Court	Rt 126	1.50	med-high	med-high	Townway	Paved	06/12/2014
Windsor Road		Main Street	Town Line	0.19	medium	medium	Townway	Paved	06/09/2014
				<u>38.53</u>					

12/17/2014

7:28:36AM

Costed Repair Options

2013

Bailey Road [Gravel] From: Rt 218 To: Town Line (Length: 0.40mi., Width: 20.00ft.)

Surface Status: Reconstruct-3	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-3	<u>Estimated Cost</u>
Ditching (S)	\$ 0
Culverts (S)	\$ 0

Benner Lane [Gravel] From: Rt 126 To: End (Length: 1.05mi., Width: 18.00ft.)

Surface Status: Routine-3	<u>Estimated Cost</u>
Add gravel (up to 4") (S)	\$ 0
Dust control (S)	\$ 0
Spot grading/blading (S)	\$ 0
Routine grading (S)	\$ 0
Drainage Status: Poor-3	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Carlton Road [Gravel] From: Fowles Road South To: Town Line (Length: 1.45mi., Width: 18.00ft.)

Surface Status: Reconstruct-4	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-4	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Devine Road-2 [Gravel] From: End of pavement To: Vigue Road (Length: 0.94mi., Width: 18.00ft.)

Surface Status: Reconstruct-4	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Good-4	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Doyle Road [Gravel] From: Vigue Road To: Town Line (Length: 1.47mi., Width: 18.00ft.)

Surface Status: Routine-4	<u>Estimated Cost</u>
Dust control (S)	\$ 0
Routine grading (S)	\$ 0
Add gravel (up to 4") (S)	\$ 0
Spot grading/blading (S)	\$ 0
Drainage Status: Good-4	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Fowles Road North [Gravel] From: Jewett Lane To: End (Length: 0.10mi., Width: 13.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Costed Repair Options

2013

Fowles Road South [Gravel] From: Rt 194 To: End (Length: 0.48mi., Width: 18.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Good-2	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Gorman Lane [Gravel] From: Rt 126 To: End (Length: 0.26mi., Width: 13.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Heath Road [Paved] From: Hilton Road To: Rt 218 (Length: 2.73mi., Width: 16.00ft.)

Surface Status: Rehabilitate-4	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 43,680
Shim w/ 2" overlay (S)	\$ 283,920
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 436,800
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 535,080
PM RAP reclamation (S)	\$ 535,080
Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 2,730
Ditching (S)	\$ 13,650

Henery Lane [Gravel] From: Rt 126 To: End of town way (Length: 0.15mi., Width: 18.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Ditching (S)	\$ 0
Culverts (S)	\$ 0

Hilton Road [Paved] From: Rt 218 To: Heath Road (Length: 1.30mi., Width: 18.00ft.)

Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,300
Ditching (S)	\$ 6,500

Costed Repair Options

2013

Hilton Road-2 [Paved] From: Heath Road To: End of pavement (Length: 0.40mi., Width: 17.00ft.)

Surface Status: Rehabilitate-4	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 6,800
Shim w/ 2" overlay (S)	\$ 44,200
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 68,000
PM RAP reclamation (S)	\$ 83,300
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 83,300
Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 400
Ditching (S)	\$ 2,000

Hilton Road-3 [Gravel] From: End of pavement To: Town Line (Length: 1.20mi., Width: 18.00ft.)

Surface Status: Routine-4	<u>Estimated Cost</u>
Add gravel (up to 4") (S)	\$ 0
Routine grading (S)	\$ 0
Spot grading/blading (S)	\$ 0
Dust control (S)	\$ 0
Drainage Status: Good-4	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Hunts Meadow Road Center-2 [Paved] From: Downs' To: Cooper Road (Length: 1.00mi., Width: 18.00ft.)

Surface Status: Preventive-6	<u>Estimated Cost</u>
Sand seal (S)	\$ 14,400
Chip seal (latex modified) (S)	\$ 22,500
Thin (3/4 - 1") overlay (S)	\$ 36,000
Shim with 1" overlay (S)	\$ 58,500
Thick (> 1") overlay (S)	\$ 64,800
Overlay w/ 2" cold mix, top w/ 1" HMA (S)	\$ 105,300
Mill and Fill 1.25" (S)	\$ 112,500
Drainage Status: Poor-6	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,000
Ditching (S)	\$ 5,000

Hunts Meadow Road North [Paved] From: Cooper Road To: Town Line (Length: 2.00mi., Width: 18.00ft.)

Surface Status: Rehabilitate-6	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 36,000
Shim w/ 2" overlay (S)	\$ 234,000
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 360,000
PM RAP reclamation (S)	\$ 441,000
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 441,000
Drainage Status: Poor-6	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 2,000
Ditching (S)	\$ 10,000

Costed Repair Options

2013

Hunts Meadow Road South [Paved] From: Rt 126 To: Town Line (Length: 1.90mi., Width: 18.00ft.)

Surface Status: Preventive-6	<u>Estimated Cost</u>
Sand seal (S)	\$ 27,360
Chip seal (latex modified) (S)	\$ 42,750
Thin (3/4 - 1") overlay (S)	\$ 68,400
Shim with 1" overlay (S)	\$ 111,150
Thick (> 1") overlay (S)	\$ 123,120
Overlay w/ 2" cold mix, top w/ 1" HMA (S)	\$ 200,070
Mill and Fill 1.25" (S)	\$ 213,750
Drainage Status: Poor-6	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,900
Ditching (S)	\$ 9,500

Jewett Lane [Gravel] From: Rt 194 To: End (Length: 1.10mi., Width: 16.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Good-2	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Libby Lane [Gravel] From: Rt 126 To: End (Length: 0.10mi., Width: 12.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Main Street [Paved] From: Rt 17 West To: Rt 17 East (Length: 1.10mi., Width: 21.00ft.)

Surface Status: Preventive-8	<u>Estimated Cost</u>
Sand seal (S)	\$ 18,480
Chip seal (latex modified) (S)	\$ 28,875
Thin (3/4 - 1") overlay (S)	\$ 46,200
Shim with 1" overlay (S)	\$ 75,075
Thick (> 1") overlay (S)	\$ 83,160
Overlay w/ 2" cold mix, top w/ 1" HMA (S)	\$ 135,135
Mill and Fill 1.25" (S)	\$ 144,375
Drainage Status: Poor-8	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,100
Ditching (S)	\$ 5,500

Nilsen Lane [Gravel] From: Rt 218 To: End (Length: 0.15mi., Width: 12.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Costed Repair Options

2013

Palmer Road-1 [Paved] From: 218 To: Blueberry Lane (Length: 0.65mi., Width: 20.00ft.)

Surface Status: Preventive-6	<u>Estimated Cost</u>
Sand seal (S)	\$ 10,400
Chip seal (latex modified) (S)	\$ 16,250
Thin (3/4 - 1") overlay (S)	\$ 26,000
Shim with 1" overlay (S)	\$ 42,250
Thick (> 1") overlay (S)	\$ 46,800
Overlay w/ 2" cold mix, top w/ 1" HMA (S)	\$ 76,050
Mill and Fill 1.25" (S)	\$ 81,250

Palmer Road-2 [Paved] From: Blueberry Lane To: Town Line (Length: 0.35mi., Width: 20.00ft.)

Surface Status: Reconstruct-4	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 7,000
18" new 9.5mm gravel, 2" binder, 1" surface (S)	\$ 78,750
24" new gravel, 2" binder, 2" surface (S)	\$ 105,000
Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 350
Ditching (S)	\$ 1,750

Philbrick Road [Gravel] From: Townhouse To: End (Length: 1.20mi., Width: 18.00ft.)

Surface Status: Reconstruct-4	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-4	<u>Estimated Cost</u>
Culverts (S)	\$ 0
Ditching (S)	\$ 0

Piper Lane [Gravel] From: Rt 126 To: Rt 218 (Length: 0.38mi., Width: 16.00ft.)

Surface Status: Reconstruct-2	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Poor-2	<u>Estimated Cost</u>
Ditching (S)	\$ 0
Culverts (S)	\$ 0

Rooney Lane [Gravel] From: Rt 126 To: End (Length: 0.90mi., Width: 18.00ft.)

Surface Status: Reconstruct-4	<u>Estimated Cost</u>
Add 12" gravel to base, 3" to surface (S)	\$ 0
Drainage Status: Good-4	<u>Estimated Cost</u>
Minor ditching (S)	\$ 0

Sennott Road [Paved] From: Town Line To: Box 184 (Length: 0.40mi., Width: 18.00ft.)

Surface Status: Routine-4	<u>Estimated Cost</u>
Patching (S)	\$ 360
Crack seal (S)	\$ 3,600
Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 400
Ditching (S)	\$ 2,000

Costed Repair Options

2013

Sennott Road-2 [Paved] From: Box 184 To: Rt 218 (Length: 0.90mi., Width: 18.00ft.)

Drainage Status: Poor-4	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 900
Ditching (S)	\$ 4,500

Thayer Road [Paved] From: Town Line To: Palmer Road (Length: 1.10mi., Width: 20.00ft.)

Surface Status: Routine-6	<u>Estimated Cost</u>
Patching (S)	\$ 1,100
Crack seal (S)	\$ 11,000
Drainage Status: Poor-6	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,100
Ditching (S)	\$ 5,500

Townhouse Road-2 [Paved] From: Chases To: Rt 194 (Length: 2.90mi., Width: 20.00ft.)

Surface Status: Rehabilitate-8	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 58,000
Shim w/ 2" overlay (S)	\$ 377,000
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 580,000
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 710,500
PM RAP reclamation (S)	\$ 710,500
Drainage Status: Poor-8	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 2,900
Ditching (S)	\$ 14,500

Vigue Road [Paved] From: Stonehouse Court To: Town Line (Length: 1.80mi., Width: 20.00ft.)

Surface Status: Routine-8	<u>Estimated Cost</u>
Patching (S)	\$ 1,800
Crack seal (S)	\$ 18,000

Vigue Road-2 [Paved] From: Stonehouse Court To: Rt 126 (Length: 1.50mi., Width: 18.00ft.)

Surface Status: Rehabilitate-8	<u>Estimated Cost</u>
Reclaim pavement, revert to gravel (S)	\$ 27,000
Shim w/ 2" overlay (S)	\$ 175,500
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 270,000
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 330,750
PM RAP reclamation (S)	\$ 330,750
Drainage Status: Poor-8	<u>Estimated Cost</u>
Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 1,500
Ditching (S)	\$ 7,500

Costed Repair Options

2013

Windsor Road [Paved] From: Main Street To: Town Line (Length: 0.19mi., Width: 20.00ft.)

Surface Status: Rehabilitate-6

Estimated Cost

Reclaim pavement, revert to gravel (S)	\$ 3,800
Shim w/ 2" overlay (S)	\$ 24,700
Reclaim incl 6-8" base, 2" binder, 1.5" surface (S)	\$ 38,000
PM RAP reclamation (S)	\$ 46,550
Reclaim incl 6-8" base, stabilized, 2" binder, 1.5" surface (S)	\$ 46,550

Drainage Status: Poor-6

Estimated Cost

Replace/New culverts (S)	\$ 0
Grade shoulders (S)	\$ 190
Ditching (S)	\$ 950

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Paved Network Inventory

By Surface Status
2013

<u>(Prio) Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>division</u>	<u>Import</u>	<u>Traffic</u>	<u>Drainage Status</u>
No Maint								
(8) Townhouse Road	1	Rt 126	Chases	1.50		med-high	med-high	Good
(6) Howe Road		Vigue Road	Rt 17	2.39		medium	medium	Good
(6) Hunts Meadow Road Center	1	126	R. Downs	1.40		medium	medium	Good
(4) Cookson Road		Rt 218	End	0.40		low-med	low-med	Good
(4) Devine Road		Cooper Road	End of pavement	1.00		low-med	low-med	Good
(4) Hilton Road		Rt 218	Heath Road	1.30		low-med	low-med	Poor
(4) Sennott Road	2	Box 184	Rt 218	0.90		low-med	low-med	Poor
(4) Somerville Road		Main Street	Town Line	0.29		low-med	low-med	Good
				9.18				
Routine								
(8) Vigue Road		Stonehouse Court	Town Line	1.80		med-high	med-high	Good
(6) Thayer Road		Town Line	Palmer Road	1.10		medium	medium	Poor
(4) Sennott Road		Town Line	Box 184	0.40		low-med	low-med	Poor
				3.30				
Preventive								
(8) Main Street		Rt 17 West	Rt 17 East	1.10		med-high	med-high	Poor
(6) Hunts Meadow Road Center	2	Downs'	Cooper Road	1.00		medium	medium	Poor
(6) Hunts Meadow Road South		Rt 126	Town Line	1.90		medium	medium	Poor
(6) Palmer Road	1	218	Blueberry Lane	0.65		medium	medium	Good
				4.65				
Rehabilitate								
(8) Townhouse Road	2	Chases	Rt 194	2.90		med-high	med-high	Poor
(8) Vigue Road	2	Stonehouse Court	Rt 126	1.50		med-high	med-high	Poor
(6) Hunts Meadow Road North		Cooper Road	Town Line	2.00		medium	medium	Poor
(6) Windsor Road		Main Street	Town Line	0.19		medium	medium	Poor
(4) Heath Road		Hilton Road	Rt 218	2.73		low-med	low-med	Poor
(4) Hilton Road	2	Heath Road	End of pavement	0.40		low-med	low-med	Poor
				9.72				

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Paved Network Inventory

By Surface Status
2013

<u>(Prio) Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>division</u>	<u>Import</u>	<u>Traffic</u>	<u>Drainage Status</u>
Reconstruct								
(4) Palmer Road	2	Blueberry Lane	Town Line	0.35		low-med	low-med	Poor
				<u>0.35</u>				
				<u>27.20</u>				

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Gravel Network Inventory

By Surface Status
2013

<u>(Prio) Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>division</u>	<u>Import</u>	<u>Traffic</u>	<u>Drainage Status</u>
Routine								
(4) Doyle Road	3	Vigue Road	Town Line	1.47		low-med	low-med	Good
(4) Hilton Road		End of pavement	Town Line	1.20		low-med	low-med	Good
(3) Benner Lane		Rt 126	End	1.05		low-med	low	Poor
				<u>3.72</u>				
Reconstruct								
(4) Carlton Road	2	Fowles Road South	Town Line	1.45		low-med	low-med	Poor
(4) Devine Road		End of pavement	Vigue Road	0.94		low-med	low-med	Good
(4) Philbrick Road		Townhouse	End	1.20		low-med	low-med	Poor
(4) Rooney Lane		Rt 126	End	0.90		low-med	low-med	Good
(3) Bailey Road		Rt 218	Town Line	0.40		low-med	low	Poor
(2) Fowles Road North		Jewett Lane	End	0.10		low	low	Poor
(2) Fowles Road South		Rt 194	End	0.48		low	low	Good
(2) Gorman Lane		Rt 126	End	0.26		low	low	Poor
(2) Henery Lane		Rt 126	End of town way	0.15		low	low	Poor
(2) Jewett Lane		Rt 194	End	1.10		low	low	Good
(2) Libby Lane		Rt 126	End	0.10		low	low	Poor
(2) Nilsen Lane		Rt 218	End	0.15		low	low	Poor
(2) Piper Lane		Rt 126	Rt 218	0.38		low	low	Poor
				<u>7.61</u>				
				<u>11.33</u>				

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Gravel Network Inventory

By Drainage Status
2013

<u>(Prio) Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>Division</u>	<u>Import</u>	<u>Traffic</u>	<u>Surface Status</u>
Good								
(4) Devine Road	2	End of pavement	Vigue Road	0.94		low-med	low-med	Reconstruct
(4) Doyle Road		Vigue Road	Town Line	1.47		low-med	low-med	Routine
(4) Hilton Road	3	End of pavement	Town Line	1.20		low-med	low-med	Routine
(4) Rooney Lane		Rt 126	End	0.90		low-med	low-med	Reconstruct
(2) Fowles Road South		Rt 194	End	0.48		low	low	Reconstruct
(2) Jewett Lane		Rt 194	End	1.10		low	low	Reconstruct
				6.09				
Poor								
(4) Carlton Road		Fowles Road South	Town Line	1.45		low-med	low-med	Reconstruct
(4) Philbrick Road		Townhouse	End	1.20		low-med	low-med	Reconstruct
(3) Bailey Road		Rt 218	Town Line	0.40		low-med	low	Reconstruct
(3) Benner Lane		Rt 126	End	1.05		low-med	low	Routine
(2) Fowles Road North		Jewett Lane	End	0.10		low	low	Reconstruct
(2) Gorman Lane		Rt 126	End	0.26		low	low	Reconstruct
(2) Henery Lane		Rt 126	End of town way	0.15		low	low	Reconstruct
(2) Libby Lane		Rt 126	End	0.10		low	low	Reconstruct
(2) Nilsen Lane		Rt 218	End	0.15		low	low	Reconstruct
(2) Piper Lane		Rt 126	Rt 218	0.38		low	low	Reconstruct
				5.24				
				11.33				

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Paved Network Inventory

By Drainage Status
2013

<u>(Prio) Road/Section Name</u>	<u>Sec</u>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>Division</u>	<u>Import</u>	<u>Traffic</u>	<u>Surface Status</u>
Good								
(8) Townhouse Road	1	Rt 126	Chases	1.50		med-high	med-high	No Maint
(8) Vigue Road		Stonehouse Court	Town Line	1.80		med-high	med-high	Routine
(6) Howe Road		Vigue Road	Rt 17	2.39		medium	medium	No Maint
(6) Hunts Meadow Road Center	1	126	R. Downs	1.40		medium	medium	No Maint
(6) Palmer Road	1	218	Blueberry Lane	0.65		medium	medium	Preventive
(4) Cookson Road		Rt 218	End	0.40		low-med	low-med	No Maint
(4) Devine Road		Cooper Road	End of pavement	1.00		low-med	low-med	No Maint
(4) Somerville Road		Main Street	Town Line	0.29		low-med	low-med	No Maint
				9.43				
Poor								
(8) Main Street		Rt 17 West	Rt 17 East	1.10		med-high	med-high	Preventive
(8) Townhouse Road	2	Chases	Rt 194	2.90		med-high	med-high	Rehabilitate
(8) Vigue Road	2	Stonehouse Court	Rt 126	1.50		med-high	med-high	Rehabilitate
(6) Hunts Meadow Road Center	2	Downs'	Cooper Road	1.00		medium	medium	Preventive
(6) Hunts Meadow Road North		Cooper Road	Town Line	2.00		medium	medium	Rehabilitate
(6) Hunts Meadow Road South		Rt 126	Town Line	1.90		medium	medium	Preventive
(6) Thayer Road		Town Line	Palmer Road	1.10		medium	medium	Routine
(6) Windsor Road		Main Street	Town Line	0.19		medium	medium	Rehabilitate
(4) Heath Road		Hilton Road	Rt 218	2.73		low-med	low-med	Rehabilitate
(4) Hilton Road		Rt 218	Heath Road	1.30		low-med	low-med	No Maint
(4) Palmer Road	2	Heath Road	End of pavement	0.40		low-med	low-med	Rehabilitate
(4) Sennott Road	2	Blueberry Lane	Town Line	0.35		low-med	low-med	Reconstruct
(4) Sennott Road		Town Line	Box 184	0.40		low-med	low-med	Routine
(4) Sennott Road	2	Box 184	Rt 218	0.90		low-med	low-med	No Maint
				17.77				
				27.20				

Appendix H

PROFESSIONAL SERVICES

<u>Borings, soil testing, and Engineering Fees:</u> Estimated cost per year expended in year one and one subsequent year while incurring the Rehabilitation improvements described below.	\$15,000
<u>Training</u>	\$500
TOTAL SERVICES	<u>\$15,500</u>

CAPITAL IMPROVEMENTS

Without identifying the order in which the Town will schedule specific roads or projects for capital improvements, this budget recommends that the general categories of roads in the worst condition and the projects that have the greatest impact on road improvement and preservation be addressed first.

Rehabilitation: Whitefield has about 10 miles of paved road that fall in this category. The Committee recommends the Town will accomplish this task by using the process called reclamation which involves removal and reuse of the paved surface as well as remediation of the road base. Typically, even roads in this category do not require this type of treatment for the full length of the road. Using an estimate that 65% of the length of a given road will require reclamation and that the 35% balance will require a lesser treatment involving an overlay on top of the existing pavement, the Committee recommends using an estimate of \$180,000 per mile (the median RSMS-11 cost). Systematic analysis of soil samples taken from borings done along sections of a distressed road will refine these estimates. These boring samples appear in the professional services portion of the budget. This portion of the project and its cost is spread over a 10 year period at the rate of one mile per year. As a result of addressing weaknesses in the road base, this type of intense capital expenditure over time should reduce the need for this level of maintenance in the future and extend the interval between less expensive preventive maintenance such as some form of pavement overlay.

\$180,000

Preventive Maintenance: Whitefield has about 4 miles of paved road in this category and the Committee recommends this work also occur over a 10 year period resulting in an average of about 0.4 miles per year. The Committee recommends using an estimated cost of \$105,000 per mile. As mentioned above, effective Rehabilitation should increase the expense in this category for future years due to improvements to the road base.

\$42,000

Appendix H

Reconstruction of Gravel Roads: This category is equivalent to the rehabilitation of a paved road by dealing with the base, but without the expense of having to deal with the asphalt. It is more difficult to assess the condition of the base of gravel road in the summer when the Committee conducted its road survey (soil borings or observing the road at the time of spring thaw gives the best information). As a result, the Committee recommends a rough estimate of \$50,000 per mile in part based on discussions with the Road Commissioner in regard to recent past projects. With nearly eight miles of gravel road in this category, the Committee recommends that the Town perform approximately one-half mile of reconstruction per year until this issue is resolved. As discussed with paved roads above, incurring this cost should reduce the annual and preventive maintenance costs by reducing their frequency. \$25,000

Culvert Replacement Culverts are most often replaced when a road is repaved or rehabilitated. Both those crossing a road and at ends of driveways are done as needed. However, these are local drainage only and are not for streams and brooks that are far more costly to replace. From recent projects a typical drainage culvert runs about \$1,000 to replace, not considering paving. The number per mile will vary by the road, so assume 10 per mile, including driveways for the 28 miles of road paved in the 20 year life cycle of a paved road. The general maintenance portion of the routine budget will address damaged culverts and those incidental to gravel road work. \$14,000

TOTAL CAPITAL COSTS \$261,000

TOTAL ANNUAL BUDGET \$393,850

