

## **ABSTRACT**

CLARK, CRAIG RICHARD. Funding Local Rural Highways. (Under the direction of Dr. Joseph Hummer.)

Funding of transportation infrastructure and highways in the United States is being discussed at the national level with aging infrastructure, increasing cost of replacement, and the decreasing revenue from the current motor fuel tax. There is a perfect storm where needs are increasing and revenue is decreasing. Local highways are often outside the national highway funding discussion. Receipts and disbursements data at the national, state, and local levels were reviewed for development of a local rural highway funding model. Ownership of local rural highways affects funding; thus, New York State, where 86 percent of local highways are owned locally; and North Carolina, where 80 percent of the highways are state owned, are interesting extremes and were reviewed in this report.

Revenue options that include an increase in property tax, sales tax, motor fuel tax, and a vehicle miles traveled fee were studied. A survey of experts in each state and a review of the revenue options resulted in conclusions that sales taxes targeted to highways might be acceptable if the public could be convinced that there would be no diversion. Motor fuel tax increases appear to be the best option, in many ways, but with the public and political opposition, this tax increase appears unlikely. In both states, the current diversion of motor fuel tax needs to be reviewed, with NYS having only 50 percent of motor fuel related taxes going to highways in any manner, for example.

Property tax increases appeared to be the most unlikely funding option reviewed. State ownership of local highways results in mostly direct funding, including motor fuel taxes, with known pavement conditions under a statewide pavement management system. Locally owned highway systems result in a reliance on indirect funding through primarily sales and property taxes with the need for an improved pavement condition survey and better review using life cycle cost for pavement management. The review of vehicle miles traveled (VMT) fees indicates that local rural highways would be in trouble with greatly reduced funding, if based on revenue generated on the low VMT on these highways. With over 50 percent of the national highway system consisting of local rural highways, future national discussions need to include the funding issues unique to local rural highways.

Funding Local Rural Highways

by  
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## **DEDICATION**

This work is dedicated to my loving wife Judy Clark and my three sons Travis, Justin, and Derrick. The success was only possible through their support and understanding.

## **BIOGRAPHY**

Craig R. Clark, grew up in Frewsburg, NY, and graduated from Frewsburg High School in 1973. In 1975, he earned an Associate of Science degree in Engineering Science from Jamestown Community College and, in 1978, a Bachelor of Science degree in Civil Engineering from the University of Colorado at Boulder. Craig began his teaching career at Alfred State College in 1979 in Civil Engineering Technology and, in 1981, completed his Master of Science degree in Civil Engineering at North Carolina State University. Over the next several years, he worked at Al Rajehi Law Engineering in Saudi Arabia (for a total of six years) as a materials engineer, rising from department manager, to branch manager and, finally, general manager of Saudi Arabian operations. In between his times in Saudi Arabi, he returned to the United States to teach at Alfred State and work as a civil engineer at R.M. Brown Engineering. In 1990, he returned to Alfred State College to teach in the Civil Engineering Technology Department and becoming department chair in 1994. Craig has been Dean of the School of Applied Technology and Executive Director of the Wellsville Campus since 1996 through the completion of this Doctor of Philosophy degree in Civil Engineering in 2014. He was licensed as a professional engineer in 1985 and maintains his license in NYS. Craig served on the Village board of Alfred from 1995-2005 and was mayor of Alfred from 2005-2013. While at Alfred State he helped develop statewide Asphalt Certification programs for the New York State Construction Materials Association in 1996 and the Associated General Contractors of New York State in 2005 which he continues to administer, working with the New York State Department of Transportation. Research interests include construction materials, transportation, and construction management.

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## **1.0 INTRODUCTION**

Transportation infrastructure funding continues to be an important topic of discussion in the United States. There have been many recent findings and studies outlining both the overall problem and the underfunding issue of the transportation infrastructure. This includes reports of transportation infrastructure being underfunded by two-thirds of the anticipated needs by all levels of government (Financing Commission 2009). A large part of the United States transportation infrastructure depends on the highway system. Most of the highway transportation discussion at the national level has focused on the interstate system and congestion in the urban areas where a majority of the population resides. Local rural roads are often not discussed since rural communities have less than 17 percent of the population spread over 50 percent of the land in the United States (TRIP 2011). In the rural communities, highways are critical because other modes of transportation, including public transportation, railroads, and air transportation, are very limited and typically accessed by the local rural highway system. Agriculture in rural America also depends on this local rural highway system with truck transportation used for 46 percent of the ton miles traveled. Economic development and tourism in rural America also rely heavily on this local rural road system.

Politicians and transportation experts are currently debating how the highway trust fund should change to a vehicle miles traveled (VMT) fee or mileage based user fee (MBUF) to replace the current motor fuel tax system. Without this change to a per mile traveled basis, the current underfunding of highways will continue to go up as the fuel tax revenue goes down. The use of alternative fueled vehicles and more efficient gasoline and diesel powered vehicles continues to erode the fuel taxes collected and funds available for the highway trust fund. Eventually, a vehicle miles traveled (VMT) fee will be installed in the United States and various models are being proposed and tested. A VMT fee may assure stabilization of highway funding, nationally, that currently is based on the motor fuel tax. Unfortunately, this may have little to no impact on the underfunding of local rural highways because these highways, if owned locally, typically receive little to no motor fuel tax

revenue. There would be a need for a significant increase in VMT fee, above the current motor fuel tax collection totals, and a change in philosophy by states to share any such VMT fee revenues with local government before there would be any positive impact on local rural highway funding.

### 1.1 Local Rural Definition

The US Department of Transportation Rural Program Guide, "Serving Rural America," defines rural in two ways. First, rural is anything outside an area with a population of 5,000 for highway functional classification and outdoor advertising regulation. A second definition, being outside a metropolitan area of 50,000, is used for planning purposes. They further define three types of rural including basic rural, developed rural, and urban boundary rural. "Basic" rural is a region or county with few or no major population centers of over 5,000 in population. These are typically stable or declining in population, and based on agriculture or natural resource economies. The "developed" rural has one or more centers over 5,000 in population and tend to have mixed economies with industrial and service economies in the population centers, and agriculture and natural resources economies in the rural areas. These areas tend to be stable or growing and have transportation issues having to do with freight and commuting. The "urban boundary" rural includes counties or regions that border a metropolitan area. High growth is often the issue, with population and transportation issues tied to the metropolitan area. The primary focus of this dissertation is on the basic and developed rural that is not associated with a metropolitan area. It will include local rural highways and not deal with interstates and state highway systems. These local rural highways are typically neglected in the financing and funding studies because of the limited populations they serve. (U.S. Department of Transportation Federal Highway Administration 2012.)

Basic rural includes most of Appalachia and much of the central or northern plain states. The Rocky Mountain States and southern states have vast regions viewed as basic rural.

Even denser northeastern states have pockets of basic rural areas. These areas often have declining populations with budgets for transportation that are also often declining. Funding is typically outside any Federal programs with agriculture and tourist attractions relying on the highway infrastructure. Rail abandonment has reduced freight service over the years and there is limited public transportation because of the limited population. The highway funding issue in basic rural areas is not growth, but preservation of the highway system. Highway funding is often an issue since highways are off the Federal aid system with limited public transportation. Basic rural areas typically have limited staff and expertise.

These rural definitions are useful but difficult to use with the available highway funding data. Most highway funding data are available by government jurisdiction which is compiled at state, county, town, city and village level. County level highway funding data are readily available so an initial review of local rural highway funding was conducted using a modified rural definition of 75,000 residents per county. After this initial local rural highway funding review the North Carolina Rural Economic Development Center “rural” definition, based on a population density of 250 people per square mile or less for a rural county, was adopted for the final review in this effort. Using a population density by county to define rural allows using the existing highway funding data already compiled by county and will allow others to use the developed model with population density information being readily available. A population density definition also reflects the nature of a rural community with a dispersed population that depends on local rural highways.

## 1.2 Problem

Local rural highways are funded in various ways throughout the United States, but the amount of funding that is directly tied to the highway trust fund or motor fuel taxes is limited when the highways are owned locally. Most all of the funding of local highways owned locally is indirect, with 31 percent from local government general funds, 24 percent

from state government, and 12 percent from local property taxes (FHWA 2007). These three revenue sources fund 67 percent of local government receipts for locally owned highways. Very few of these highways obtain any Federal aid and the local rural highway funding support from the state motor fuel taxes varies greatly across the United States. It is often not direct, but indirect, through the state aid to local government. The National Association of County Engineers (NACE) notes that 75 percent of the nation's highways (2.9 million miles) are owned by counties, cities, and townships. Only about 8 percent of local transportation funding is from motor fuel or vehicle taxes, with most local government funding being based on general tax revenue, including property taxes or dedicated sales taxes. With much of the local rural highway funding depending on local property taxes and with many states imposing limits on the increases in these property taxes, the ability to continue funding local highways is in jeopardy.

There is a need to review and study the current local rural highway funding and develop a model so we can assess the future viability of the local rural road system. With over 50 percent of the local rural roads in the United States being either locally owned or considered local by function, this is an important topic. Current discussions are underway on abandoning highways, turning paved highways into gravel, and delaying maintenance if revenue does not expand as needed. Some local governments are reviewing revenue options, working on various new revenue sources including sales taxes, and imposing various user fees at the county and state levels.

The national problem of insufficient revenue to fund highways is a well-known problem and one promising solution that continues to be discussed is changing from the current motor fuel tax to vehicle miles traveled (VMT) fee or mileage based user fee (MBUF). This may or may not be a solution that assists local government in funding local highways. To assess the

extent to which a VMT fee or other innovation could help fund local highways, local governments need a model to predict the viability of these revenue changes and the effect on the disbursement side of local funded roads. A revenue model developed using existing receipt and disbursement data would be an asset in developing ways to solve the local government funding of highways. This would include a way to review the impact of additional receipt or revenue streams, including a VMT fee. The study developed a highway funding model for local rural highways which is a subset of the local government highway funding issue that includes urban areas. Local rural highway funding issues are heightened because of the limited population and limited traffic volume to charge a user fee.

### 1.3 Study Focus

This dissertation focused on developing a model to fund local rural highways. An issue in developing the model is that local highway funding varies, by state, from the State of Delaware funding 95 percent of local road expenditures in its state to the State of Michigan funding only 25 percent (Rall, Wheet, Farber and Reed 2008). Therefore, how directly the state is involved in local rural road funding and ownership determines the review process. Another issue is that local government funding and ownership data at the national level often also includes metropolitan areas with high density populations and heavy traffic. The data at the national level was reviewed and edited when possible to include only local rural highways. This review was conducted, using the local government data compiled by the state and submitted to FHWA for the national data. There is a large variation of how local government and states fund and own local roads; national data are not separated out for only local rural highways. Two states that are at opposite ends of the spectrum were reviewed in more detail for this effort. This included North Carolina, a state that owns 77 percent of its roads, and New York, a state that owns only 13 percent of its roads. North Carolina funds and maintains its local rural highways while the towns, counties, and villages in New York fund and maintain its local rural highways. The local rural highway funding model was developed using an overview of existing national-level data on local roads. The

model was refined for local rural highways, using more detailed local and state government information from North Carolina and New York. The local rural highway funding model used by particular governments will depend on local and state laws and ownership of the local rural highways.

This dissertation developed a model using existing receipt and disbursement data from local governments that can be used as a baseline for helping local governments judge proposals to improve local rural highway funding. Local governments are being stressed with increasing labor and material costs and limited ways to increase revenues for highway infrastructure. Most local funding is based on property taxes, and with property tax rates being capped in many states the ability to raise revenue from property taxes is limited. The model will be helpful assessing future funding issues and potential solutions that might include using new revenue streams, such as, local option transportation taxes (LOTT) and VMT fees. A way to review local rural highway funding is important because the overall highway network in the United States starts at the local rural level. Local rural highways drive the local economy in rural America because few transportation options are available in many rural areas. Highways are the primary transportation option for farm products, manufacturing, and economic development. The issue of safety is also a growing concern with a 2.5 times higher fatality rate on rural highways over urban highways (Reagin 2002). Lastly, the issues of educational attainment and rural health care also depend on the transportation over local rural roads.

#### 1.4 Objective

This objective of the work was to develop a model of receipts and disbursements for local rural highways that can be used by local government and states to determine ways to assure sustainability of local rural highways. First, the model can assist in predicting the future by allowing an assessment of the lowering of local government funding through property taxes, for example. Secondly, the model can be a way to review the effect of

potentially increasing or changing funding to direct methods, such as a VMT fee, to indirect methods, as a LOTT, or to other methods of revenue enhancement. Lastly, the model can be used to assist in defining policy changes related to revenue enhancement or disbursement that will assure adequate capital outlay and maintenance of the local rural road system. These might include changing highway ownership, converting paved roads to gravel, or abandoning roads.

Particular tasks that were used to achieve the objective included:

1. Compile information on existing funding for local rural highways from the literature.
2. Review FHWA data on receipts and disbursements and other information, including mileage data.
3. Review two states' receipts and disbursement data for local rural highways (North Carolina, which owns almost 80 percent of its local highways, and New York, which owns less than 15 percent of its highways). These data were from the state level in North Carolina and the local government level in New York, based on ownership.
4. Use the local rural highway funding balance sheet model of existing receipts and disbursements to review changes in receipts, including anticipated changes in property tax revenue and potential changes in revenue from sources such as a VMT fee, LOTT, or other innovative revenue streams.
5. Use a survey of knowledgeable officials in the two states regarding local rural highways to verify how local rural highways are funded and what is projected in the future for both receipts and disbursements, filling in remaining gaps in the knowledge base carried over from previous tasks.
6. Work with national associations at the state level, including the National Association of County Engineers (NACE) and the Local Technical Assistance Programs, for input into the funding model development.
7. Exercise the model to develop policy options that would assure the sustainability of local rural roads.

### 1.5 Scope

The scope of the project was to develop a local rural highway funding model that will improve the ability to judge investments in the local rural highway system. This objective was met by developing a model based on a FHWA data, data from New York and North Carolina, and review of the literature. The model can be a base for further review of state and national support for local rural road funding.

### 1.6 Research Contributions

Local governments and issues, such as, local rural highway funding, are often neglected in studies because of the rural nature of the areas and low population densities. The much larger issue of national and state government highways and transportation in the urban centers and interstate system is reflected in most studies. However, developing a local rural highway funding model is important since about 80 percent of the national highway system is local and over 50 percent of the national highways are local rural roads, either by ownership or functional classification. The local rural highway system is core to rural America, including access to most agriculture, much manufacturing, and a high percentage of recreation in the United States. A local rural highway funding model will be useful in developing a receipt and disbursement policy that assures that the local rural highway system is sustainable in the future. Currently, there is no such model available for local governments and no known tools that can be used for the evaluation of changes in the highway funding situation at the local level.

## **2.0 LITERATURE REVIEW**

A literature review was conducted for the purpose of understanding the current highway funding system and, particularly, local rural highway funding. The first part of the review focused on the overall highway funding issue with national reports that quantify the overall depth of the highway funding issues. These reports were also reviewed for any nationally identified local highway funding issues and long-term funding stream issues. The next part of the review was to identify the unique issues related to funding local rural highways, particularly those funded by local governments. This included national reports and articles that focused on the issues, both nationally and at the state level. The different aspect of local rural highway usage and funding based on highway ownership was reviewed. Since highway ownership greatly affects local rural highway funding, two states with very different local highway ownership were identified for further review: North Carolina and New York. A few other states were also reviewed that highlight state differences on local rural highway funding. Lastly, any innovative local rural highway financing and safety issues with local rural highways were reviewed. The literature review was the basis to develop a local rural highway funding model for local government along with any potential policy changes to improve local rural highway funding.

### **2.1 The Highway Funding Issue**

Transportation infrastructure funding is at a critical stage in the United States and this topic has been studied and highlighted in many forums and papers. In 2009, the National Surface Transportation Infrastructure Financing Commission published, "Paying Our Way – A New Framework for Transportation Finance". This and other such reports highlight the need to address the deterioration of the surface transportation system in the US. This report notes that not only does the US have a deterioration of the existing infrastructure, but it has a congestion problem with a 97 percent increase in traffic from 1980 to 2006 and only a 4.4 percent highway lane mile increase during the same time period. The anticipated shortfall in all government levels is about two-thirds of the anticipated needs to maintain and

improve the surface transportation system. All levels of government are spending only about one-third of the required \$200 billion necessary each year that is required to improve and maintain the transit and highway systems in the US. There is a similar underfunding at the Federal level with the annual Highway Trust Fund revenues estimated to be at about \$32 billion versus a need of about \$100 billion a year. This need is growing each year with this type of underfunded investment in our infrastructure (Financing Commission 2009).

There are two additional concerns that make this underfunding a larger issue. First, the highway trust fund is on the way to insolvency with a severe lack of funding due to the decreased funding through the current dependency on motor fuel tax. The Highway Trust Fund at the Federal level is funded 97 percent by motor fuel taxes. The revenues that depend on fuel usage are lower because of increased efficiency of vehicles and the introduction of hybrids and electric vehicles. Second, the taxes are not indexed to inflation and the cost of construction continues to rise, so the difference between revenues and expenditures is increasing every year. A possible solution includes having a better direct charge, including tolling, and changing the funding of the Highway Trust Fund to a more direct mileage charge using a vehicle miles traveled (VMT) fee. The current motor fuel tax revenue decreases make the Highway Trust Fund unsustainable unless there is a change to something, such as, a VMT fee or a substantial motor fuel tax increase. When and if this change is made, the Highway Trust Fund may stabilize and grow if the VMT fee is indexed to inflation. Otherwise, a VMT fee will also have similar issues as the motor fuel tax of decreasing in value over time (Financing Commission 2009).

The “Status of the Nation’s Highways, Bridges, and Transit: Conditions and Performance ” (U.S. Department of Transportation 2008) notes that the percent of local roads is around 77 percent with state roads being around 20 percent and Federal roads being the remaining 3 percent (based on 2006 data). Rural roads make up about 74 percent of all highway mileage

with urban roads accounting for about 26 percent of the mileage carrying 66 percent of all traffic. Local rural roads make up about 51 percent of the mileage, but carried only 4.3 percent of the vehicle miles traveled. Local rural road ownership varies by state. Much of the funding discussion has been about the more heavily traveled roads for various reasons, including the congestion problems for both vehicle and freight traffic. The Interstate currently carries about 50 percent of the truck traffic and 75 percent of the freight truck traffic when serving places over 50 miles apart. Transportation financing, at the federal level, is 92 percent from fuel tax and vehicle fees and 69 percent, at the state level, from fuel tax and vehicle fees. Only about 8 percent of local transportation funding is from fuel or vehicle tax with most all of the funding comprised of general tax revenue through property taxes or dedicated sales taxes. Every state is unique regarding funding and how local roads are owned and maintained. The percent of state expenditures on local highway construction and operation vary greatly by state, from a high of 95 percent in Delaware to a low of only 25 percent in Michigan. The states that fund around 80 percent of local highway expenses include: Connecticut, Utah, Kentucky, North Carolina, South Carolina, Rhode Island, and West Virginia. Another group of states funding less than 55 percent include: California, New York, Oregon, Wisconsin, Iowa, and Minnesota. The financing issue in each state is, therefore, very different depending on how the infrastructure is owned and funded.

The Executive Committee of the Transportation Research Board's, "Critical Issues in Transportation 2009 Update" is a summary of the critical issues in transportation. Although Americans are the most mobile people on earth, and freight moves efficiently across the US, the system is being pushed to its limits with increasing population, technology changes, and globalization. The population is growing slowly, but passenger demand may still double by 2040, demand may intensify in certain regions, and the population will be older and more diverse. Information technology and global trading will also increase the demand on

transportation. The report lists congestion, energy and environment, aging infrastructure, inadequate revenues, equity, emergency response, safety, mismatch of institutions, and inadequate investment in human capital as important issues for transportation. Congestion is a major issue, particularly in metropolitan areas, along with the need for improved mass transit. Transportation infrastructure in the US is aging and there is a need for about \$154 billion a year to improve and fix existing old infrastructure while the US is spending only about \$80 billion a year. Highways depend on a tax structure that was developed over 50 years ago that is not keeping up with inflation and demands for transportation. Local and state governments are beginning to use sales taxes to fund transportation infrastructure, which places a disproportionate burden on people with lower incomes. There is a need to revamp the gas tax due to newer technologies and to assure that users pay for use of the highways. Low income people in many areas depend on cars with limited mass transit options. The disadvantaged population and seniors in rural areas will become isolated with little mass transit available. There is also concern for evacuation routes and response to natural disasters. In safety, the US is falling behind parts of the world that have stricter laws and enforcement. Vehicle safety is something the US leads in; however, there is a need for stricter laws and enforcement to change motorist behavior. There is a concern that institutions are failing to manage and plan the various modes of transportation within a system. Local and state governments are no longer mostly dealing with growth, but maintenance, and there is concern about local decisions that do not look at the entire transportation system. The whole process of approvals, especially environmental, has become very slow and cumbersome (TRB 2009).

#### 2.1.1 Vehicle Miles Traveled Fee Proposals

A 2011 Policy Review by Randall O'Toole calls for a fairly quick decision to change to a more efficient VMT fee. He states that this is a more efficient direct charge to drivers that would solve many problems, including congestion on the roads through congestion pricing. The

current motor fuel tax has many issues, including the fuel tax not being linked to inflation, indirect charging that does not give the user a true feel for the cost per mile traveled, local roads that receive little to no gas tax benefit, and local roads that tend to be in poor condition since they are based on general funds. Lastly, environmental and other groups have been attacking highways and trying to promote cultural change to transit that tends to drive state and local officials to neglect highways. The main problem with the gas tax, according to O'Toole, is that it is indirect and, therefore, the system is inefficient and potentially drives consumers and highway owners to the wrong solutions. In addition to inflation and fuel efficient vehicle concerns, there are the issues that the highway cost to a user is not reflected in the charges and that gas taxes typically are only used for federal and state highways. A review of the average highway motor tax user fees, general funds, and offsetting diversions to other than highways indicates that, from 2000-2009, both federal and state systems had a net gain of about \$3 billion each from the highway motor tax user fees. At the same time, local governments had a \$29 billion cost from their general funds. The goal of a new VMT fee would be direct disbursement to local governments or whomever owns the highway system used by the drivers paying the fee. If all highways were funded directly, based on a new VMT fee, the actual cost per user would have to go up dramatically since the current user fees, according to O'Toole, are around \$107 billion. Adding another \$29 billion to a new VMT fee to replace the general fund cost for local government would be an increase of around 30 percent to the user fees currently collected. The increase may even be more since the current \$107 billion collected through motor fuel taxes is known to be insufficient for current needs. According to O'Toole, a direct disbursement to local government of a new VMT fee would be fairer to local government. A vehicle mile user fee would allow local government to reduce deficient bridges and improve highway conditions. A VMT fee would end the political war on highways with a goal to have people change to using transit since the VMT fees would go directly to highways. He also

suggests that the general fund use for highways, tied primarily to property taxes, would be stopped if a local VMT fee was instituted.

A recent national review of the move to a mileage-based road user charge (VMT fee) reviewed 2,650 volunteers that drove over 23,000,000 miles across 48 states. The systems used an onboard computer and a GPS system for monitoring highways traveled with the data downloaded, along with billing information, over a wireless system. They used several taxing jurisdictions with the goal of having the overall charges cost neutral with motor fuel taxes. This included different charges based on overall miles per gallon of the vehicle with a typical federal mileage charge of 0.9 cents per mile for 19.5 to 21.6 MPG vehicles.

Participants started out being 41 percent favorable of a VMT fee charge and were 70 percent favorable at the end of the study. The participants had three different ways to review the billing and preferred the method that had some details of monthly travel on the invoicing to allow better verification of charges. Only 0.6 percent of total miles traveled could not be assigned a jurisdiction. The study indicates a VMT fee implementation is workable (Hanley and Kuhl 2011).

However, will increases in the overall fees be acceptable past the current motor vehicle taxing rates, and will additional VMT fees for other jurisdictions be accepted if the overall fee structure goes up? Will states allow local government to directly collect VMT fees in states where currently only the states and the federal government collect and have access to the current motor fuel tax? A VMT fee may be part of a new local rural highway funding model if allowed by states. Currently, states have control of the majority of motor fuel taxes and changing to a direct disbursement for local rural highways will be an interesting debate during the VMT fee implementation. Many local rural roads also have limited traffic, so the funding through a VMT fee may not, in fact, be beneficial to local rural roads. In very rural

areas there will need to be some type of cross subsidies. An example is in Montana where there are only 66 people per centerline mile versus the national average of 332 people per centerline mile. Any VMT fee system would need to be reviewed for the impact on rural systems. This concern was raised based on the 2001 National Travel Survey where rural citizens drive 34 percent more than urban and this travel is most likely higher in western states (Financing Commission 2009).

#### 2.1.2 Vehicle Miles Traveled Fee Equity

A 2011 study noted that two Congressional commissions (on revenue and finance) suggest that an eventual VMT fee is needed and a temporary increase of the national fuel tax from 10 cents to 28.4 cents per gallon is needed as a short-term fix. They reference a 2010 paper by Parry and Small that suggests an optimal motor fuel tax in the United States should be \$1.01 per gallon for both state and federal fuel taxes, compared to the current average of \$0.40 per gallon. The authors develop a model using the 2001 National Household Travel Survey (NHTS) dataset and examining different policy scenarios. They studied switching the increase to the motor fuel tax by \$0.10 per gallon and changing the increased motor fuel tax value to a VMT fee. The pure increase in fuel tax had the smaller decrease in consumer surplus for households (\$103.48 per household) and decreased vehicle miles traveled by 2.5 percent. This policy showed the largest disparity between different incomes, age, and ethnic groups, but reduced overall household surplus the least. The flat VMT fee change created a slightly larger decrease in consumer surplus (\$105.33), but the difference in social welfare is small. The research also showed that neither an increase in gas tax nor a VMT fee is equitable, with both having large disparities on individuals based on income groups, ethnic groups, and regions. Both are regressive, but if the goal is to simply increase revenue, the increase in gasoline tax has a slightly lower burden on drivers. The paper references the need to develop policy to assist the lower income levels since they are the population most affected by the increases. A policy review for equity is also needed for those using fuel

efficient vehicles and alternative fuel vehicles. The paper recommends additional research on variable VMT charges and on green transportation financing. There also should be review of redistribution of revenue for highways and a review of alternative financing policies at state and federal levels (Robitaille, Methipara, and Zang 2011).

Equity is an issue with any transportation financing scheme and was reported on by a committee of the Transportation Research Board in 2011. The report noted that most transportation financing is indirect and regressive in nature. Any changes in financing need to consider equity from at least five perspectives that include income, geography, mode, generation, and race-ethnicity. The move to sales taxes to fund transportation is an equity issue since it is both indirect and regressive with respect to income. The committee recommends that public policy makers and staff should engage their constituents and stakeholders, from the beginning, on finance mechanisms while assessing impacts, use lessons learned elsewhere, use outreach programs, and exploring ways to remedy inequities. Research needs to include conducting before and after cross sectional studies that include short- and long-term behavioral shifts in response to the financing mechanisms, conducting verifiable analyses, and avoiding oversimplification or preconceived notions. They also recommend that, as analysts develop advanced travel behavior and land use models, they should incorporate features on equity analyses of transportation finance policies. Funding of these recommendations should be integrated into future Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) projects as part of the federal aid program (Schofer 2011).

### 2.1.3 Vehicle Miles Traveled Fee – Highway Self-financing Model

A case study for Indiana's implementation of a VMT fee for highway self-financing was completed in 2007. The study reviewed various scenarios that included reviewing equity charges to several classes of vehicles that would assure vehicles were paying their fair share based on road damage. The study indicated that trucks should pay much higher cents per

mile because of the damage they cause to highways. The overall VMT charge for passenger vehicles was calculated as 0.89 cents per mile while the equitable charge for trucks from 25,000 to 50,000 pounds was 3.78 cents per mile, and for trucks over 50,000 pounds it was 6.75 cents per mile. If simplified to one charge for any class vehicle, the charge was 1.23 cents per mile. The overall recommendation, based on types of roads in the state, resulted in a VMT fee of 1.6 cents per mile for a state charge to cover current highway costs and 2.7 cents per mile to cover both state and federal aid. The VMT fee model will need to be reviewed during implementation to assure that an equitable charge is paid by each user. There is also a need to discuss having a charge for congestion pricing and reviewing a differential charge based on class of road. There is concern about class of road pricing since a higher cost for a higher class of road may drive a larger volume of traffic to highways with a lower charge and lower safety standards. This would be an issue based on design of the road and weight of the vehicles (Oh, Lai, and Sinha 2007).

#### 2.1.4 Vehicle Miles Traveled Fee – Public Opinion

There are still many objections and barriers to a VMT fee. There are technical issues, privacy issues on the information, and equity issues for users. Recent polls, conducted by the Mineta Transportation Institute in 2010 and 2011, concluded that a VMT fee is very unpopular with only 22 percent supporting a 1 cent per mile fee; however, adding an environmental component may increase the acceptance of such a fee. Public acceptance of a VMT fee will require public education and linking the change to benefits to the consumer. A motor fuel tax increase was typically supported by less than 50 percent of respondents, but was supported by as high as 62 percent of respondents if linked to maintenance of highways. The study indicated that, although support for a gas tax increase is typically low, this could be made more acceptable by modifying the implementation over the years and identifying the true cost and use of funds to drivers annually. These polls were conducted before the more recent issues with overall high gas prices. The ability to increase revenues

through any direct charges is currently a very difficult political issue. Delay of a solution to appropriately fund the Highway Trust Fund will have both an immediate and long-term effect on funding of the surface transportation system at the Federal level. The report is based on a survey of 1,519 people across the United States (Agrawal and Nixon 2011).

#### 2.1.5 Future Funding Projections Related to Gasoline Usage

The US Energy Information Outlook 2013, published by the US Energy Information Administration (EIA), has detailed information and projections on energy usage in all sectors. Figure 1 has two projections regarding motor gasoline consumption. The current Annual Energy Outlook (AEO2013) has lower projections than the Annual Energy Outlook 2012 (AEO2012) projections, but both follow a similar trend in the near future. The major projection change past 2020 is because of the anticipated more stringent corporate average fuel economy standards and the limited growth in diesel fuel consumption driven by the probable increased use of natural gas in vehicles. The motor fuel discussion in the AEO2013 includes supply assumptions that are subject to considerable uncertainty. There are three important assumptions that greatly affect the projections:

1. Vehicle miles traveled (VMT) related to transportation activities,
2. The efficiency of vehicles, and
3. Changing to alternative fuels that replace liquid fuels including using liquefied natural gas (LNG), biofuels, or electricity.

All of these items are interrelated with the VMT being dependent on economic conditions, cost of fuel, and efficiency of vehicles among many variables. VMT increases when overall transportation cost decreases with a fuel cost decrease or vehicle efficiency increases. The available modes of transportation, size and age of population, household composition and many other factors have also affect VMT. Other factors changing VMT and driving patterns are E-commerce, telecommuting, and other changes in technology. Overall the EIA is projecting a more moderate annual VMT growth than the 3.1 percent in 1971- 1995 and the

2.0 percent growth rate from 1996-2007 with a projected annual VMT growth rate of 1.2 percent from 2011 to 2040. This VMT increase is offset by both the increases in vehicle efficiency through established and anticipated increasing CAFE standards and switching to alternative fuels including natural gas, biodiesel, and electrical sources. The projections of light-duty vehicle liquid fuel usage show small decreases overall in the near future with the AEO2013 showing a much higher decrease further out in the future. From 2013 to 2020 the projections show an overall 4 to 5 percent drop liquid fuel usage which would mean that any projected state revenues for motor fuel taxes based on the lower liquid fuel usage projection would also fall 5 percent unless there was a corresponding increase in the motor fuel tax rates.

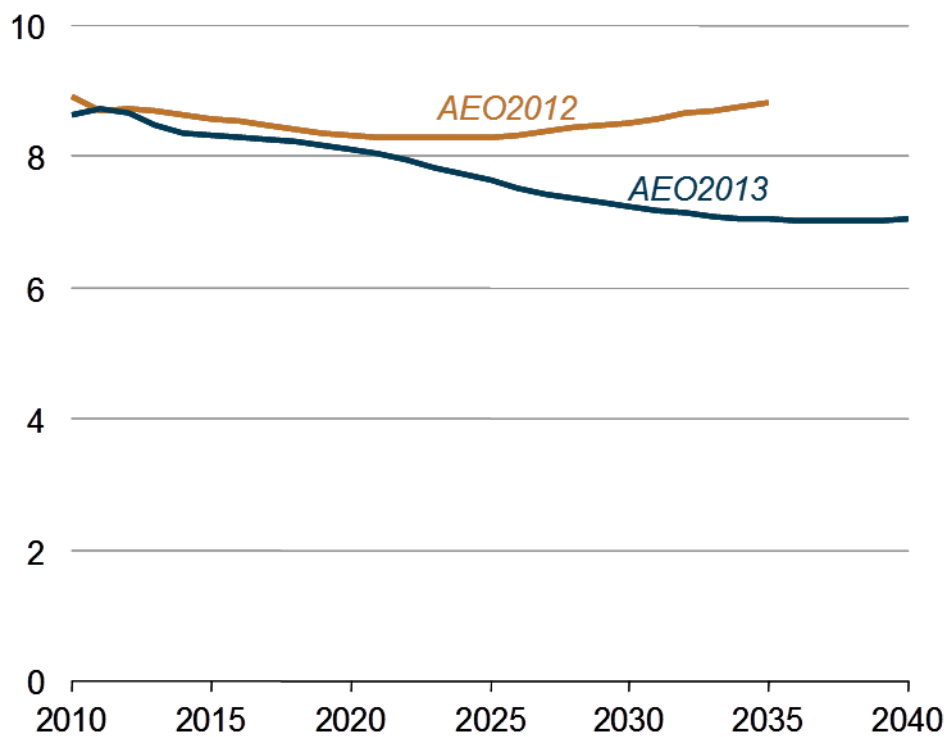


Figure 1 Liquid fuel consumption by light-duty vehicles in the United States (millions of barrels per day) from AEO2013

### 2.1.6 Vehicle Miles Traveled Fee Issues

A vehicle miles traveled (VMT) fee is something that has been recommended by many reports and is being studied today as a viable option to replace motor fuel taxes. Recent reports regarding VMT note that a successfully implemented MBUF may have similar issues as the motor fuel tax if VMT continues to decrease. One such report, by the U.S. PIRG Education Fund and Frontier Group in spring 2013, uses 2012 data from U.S. Department of Transportation's (U.S. DOT) Traffic Volume Trends series of reports and data from previous years from U.S. DOT's Highway Statistics series of reports that is outlined in the Figure 2 showing actual VMT over time. The report discusses how the recent downward trend may be more permanent, with either ongoing decline or at least an enduring shift, and that it is unlikely that we will see a return to future of ever increasing VMT. (Dutzik and Baxandall 2013).

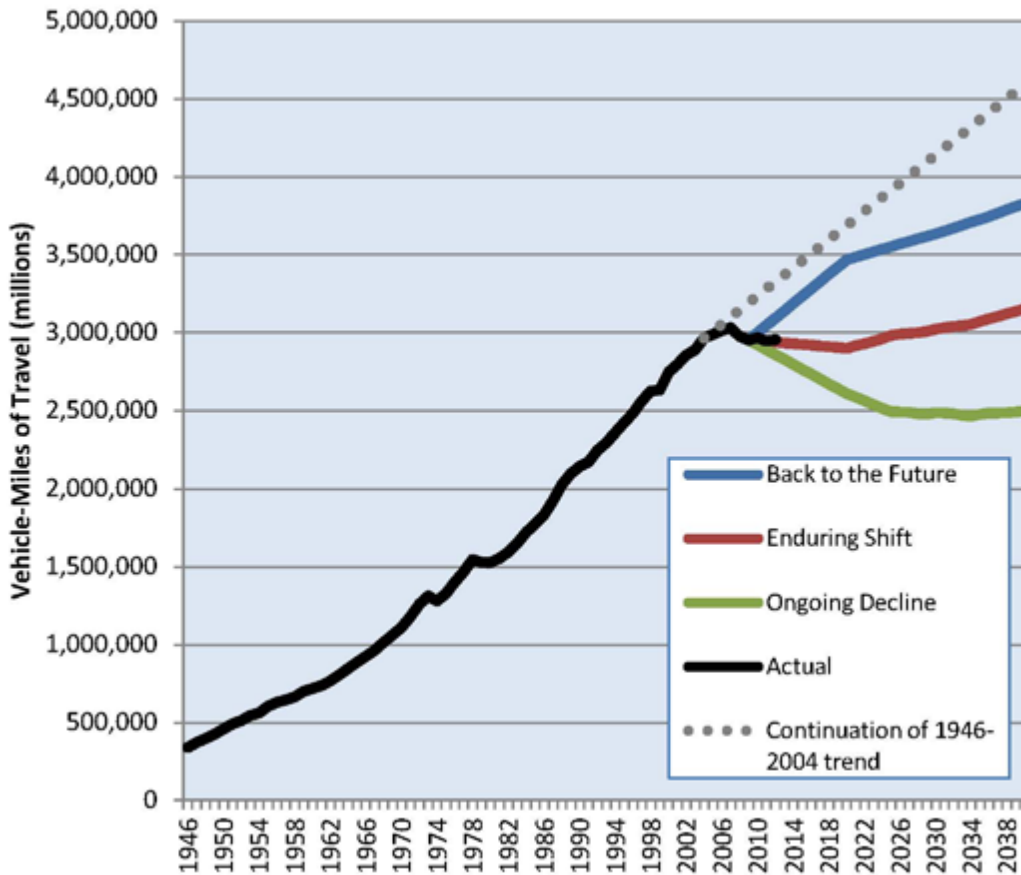


Figure 2 Vehicle Miles Traveled Projections – Dutzik and Baxandall

The reasons for a decreasing VMT are many and include that members of the millennial generation tend to drive less, the retiring baby boomers are driving less, and many other changes including e-commerce and telecommuting which all result in less VMT per capita. When one projects a lower VMT along with less gasoline use due to increases in fuel efficiency in vehicles, and the increase sales of hybrids and electric vehicles, the anticipated decrease in motor fuel tax collections in the future appear to be a real concern. In all scenarios, from a small positive increase in VMT to the ongoing decline in VMT, the collection of motor fuel tax revenue is very bleak as shown in Figure 3.

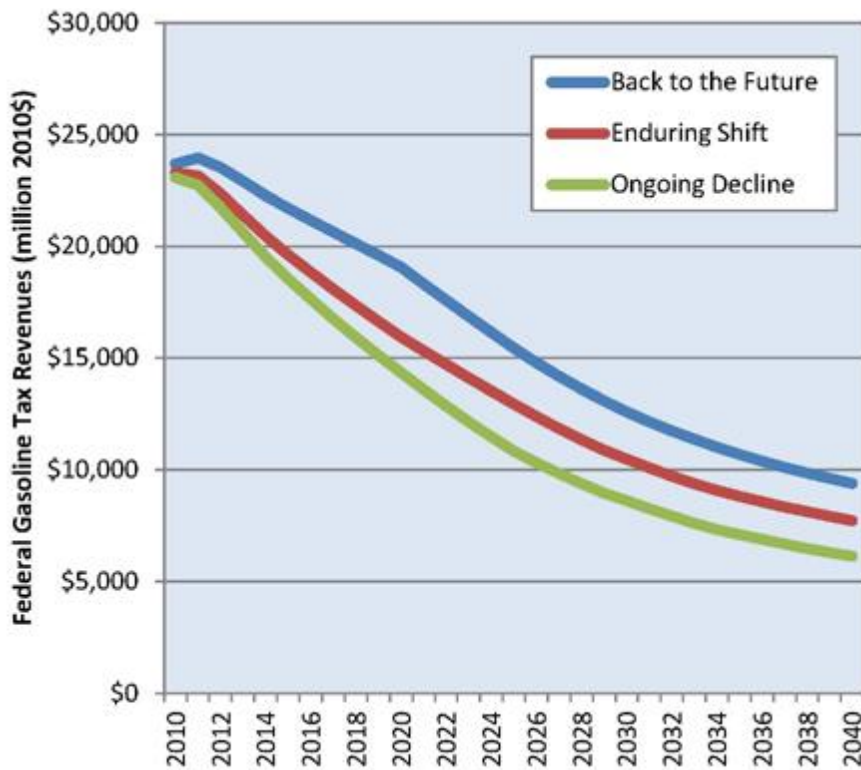


Figure 3 Federal Gasoline Tax Revenue Projections – Dutzik and Baxandall

These changes in VMT trends would also affect the sustainability of funding from MBUF based on VMT. VMT fee charges would need to become significantly higher over time with the projected VMT declines to generate the same amount of revenue as the current motor fuel tax in the future. The report recommends revising national, state, and local policies to assure that they match this potential long term decline in VMT. The authors stress the need to increase other modes of transportation including public transportation and review the need to increase highway capacity. It is clear that with a slower growth of VMT or a decrease in VMT over time there will be a negative effect on motor fuel taxes and an MBUF based on VMT. If the trend continues and VMT decreases this also may have impacts on the need for capital spending on highways.

### 2.1.7 The End of Highway Trust Fund

Another highway funding solution is to drop the direct user fee link altogether and start to plan and execute infrastructure funding through the governmental general fund. It is likely that some sort of VMT fee will eventually be implemented if the technical problems are solved. However, there will continue to be the matter of sharing revenue, such as with the motor fuel taxes. There is an ongoing debate on sharing the federal motor tax fee portion along the lines of who gets what motor fuel tax revenue based on each state and whether the state is a donee or donor state. The same sharing issues will exist with a VMT fee. States will want a guarantee, like the federal motor fuel tax guarantee, where states receive at least 92.5 percent of the federal motor fuel taxes collected in a state. There also is the topic of sharing this VMT fee revenue with local governments. The possible transparency of the VMT fee might be more acceptable to both states and local governments and result in direct disbursement to both state and local government. It is interesting to consider the possibility of full abolishment of the Highway Trust Fund as a way to have better planning and more consistent funding for transportation based upon need. Using general fund revenues would allow development of a comprehensive federal transportation policy, vanquish the donor-donee issue, and base projects and funding on need rather than who generated the revenue (Schank and Rudnick 2011).

## 2.2 Local Rural Highway Issues

### 2.2.1 Critical Funding Concerns

Local highway financing is becoming critical because of the overall concern of underfunding of highways, the increase in construction costs, and the reliance on primarily general revenue through property tax at the local level of government. Many states are trying to control property taxes, such as the recent property tax cap passed in New York State capping annual increases in property tax rates. This tax cap rate is insufficient to deal with the ever increasing cost of labor, especially with rising health care costs and pension costs.

This leaves local governments few options to increase or even maintain revenue for transportation budgets. The transportation funds from the federal and state governments to assist local government are also decreasing. In the early 1980s local governments received about 7 percent of their transportation related revenues from the federal government, and by 2006, this reached a record low of 1.3 percent. (Yusuf, O'Connell and Abutabenjeh 2011). Similarly, the transfer from states to local governments has decreased from 30 percent to only 21 percent in 2006 (Forckenbrock 2006). The values are averages and very greatly by state. So, there has been a shift of responsibility from states to their localities and this is resulting in a crisis for locally owned roads. This crisis includes: 1) an increase in developed land and locally owned roads, 2) a rise in construction and maintenance costs, 3) devolution of highway financing responsibility from the states to local government with a reduction in intergovernmental transfers, and 4) more wear and tear on roads due to increased vehicle miles traveled. Local governments can delay maintenance and also build fewer new facilities, but eventually, local governments will seek new sources of revenues to fund their growing responsibilities. Several potential financing mechanisms include: 1) impact fees and smart growth policies; 2) local option transportation taxes; 3) nontraditional taxes and fees, such as transportation utility fees and land taxes; and 4) low-cost debt financing from state infrastructure banks. There are many challenges faced by local governments in continuing to meet their responsibilities and financing needs by charging for use needs to be developed (Yusuf, O'Connell and Abutabenjeh 2011).

### 2.2.2 National Transportation Research Group

The recent report "Rural Connections: Challenges and Opportunities in America's Heartland," in Sept. 2011 by the National Transportation Research Group (TRIP), outlines the following, with rural America defined as urban centers with a population of 5,000 or less:

- Rural America includes about 17 percent of the population (50 million people) encompassing about 83 percent of the farming population and most of the nation's 2.2 million farms;

- Between 2000 and 2010, the rural population grew 4.5 percent versus urban America's growth of 11 percent;
- Most of the rural population growth was in the South and West with Upper Plain and Central states more likely to see population losses;
- Agriculture production is \$2.2 trillion in the US and, although only 6 percent of jobs in rural America are farming, another 7 percent of jobs are related or supporting jobs for the farming jobs;
- The United States Department of Agriculture (USDA) notes how transportation is key to rural economies, especially including truck transportation that provides 46 percent of ton miles of travel for food related industries;
- Transportation is becoming a more critical component of food distribution because of the need to support urban areas through a more dispersed food system;
- Travel and tourism rely on the rural transportation network and are valued at \$700 billion a year in revenues, including the national parks that have over 300 million visitors a year;
- Significant new oil and gas fields are placing a much increased load on highways in the areas of this development; and
- Ethanol and bio-refineries continue to increase dramatically and need access to adequate highway systems for distribution to and from these facilities.

The report also notes many real challenges:

- Rural interstates' travel per lane mile has increased 34 percent from 1990 to 2009 while travel on non-rural interstates increased by 15 percent;
- Abandonment of over 100,000 miles of rail lines in past decades has reduced rail transportation access to rural America and increased reliance on trucking of freight on local roads. This was confirmed by a recent American Association of State

- Highway and Transportation Officials' (AASHTO) report that also stated there is an issue of access to interstate highways with the distance between these highways;
- Rural roads have a traffic fatality rate three times higher than all other roads;
  - Crashes on rural non-interstate systems resulted in 51 percent of all traffic deaths in 2009;
  - There are many design factors, including narrow lanes with dangerous roadside obstacles, that affect the safety of rural roads;
  - There are many low- to moderate-cost safety design issues that can be implemented to improve the safety of rural roads;
  - In 2008, 12 percent of the major rural roads' pavement conditions were rated poor and 43 percent were rated fair, while 12 states had over 20 percent of their rural roads' pavement conditions rated poor; and
  - In 2010, 13 percent of rural bridges were structurally deficient with 10 percent being functionally obsolete and five states having 20 percent or more rural bridges considered structurally deficient.

The report suggests improvements that include:

- Widen and extend key routes, including rural interstates, to facilitate economic growth and access to jobs, education, and healthcare. This will support and improve access for agriculture, energy, manufacturing, forestry, tourism, and any other segments of the rural economy;
- Modernize the major two-lane roads in rural America;
- Adequately fund the low- and moderate-cost safety improvements to the rural highways; and
- Adequately fund local and state transportation programs to maintain transportation service and increase truck traffic to support the rural economy.

This report is one of the few recent national reports that discusses the ongoing issues of rural roads in some detail relating to the rural economy. Rural highways are competing with issues in urban areas having a much higher population base where congestion is a huge concern.

### 2.2.3 Local Roads Matter-National Association of County Engineers

The National Association of County Engineers (NACE) is an active group with state associations that has engaged in a national campaign called Local Roads Matter. Their case is very compelling and their literature notes that, nationally, 75 percent of the nation's roads (2.9 million miles) are owned by counties, cities, and townships. Counties own most of these roads and are responsible for 1.74 million miles. About 51 percent of bridges (298,638 bridges) are locally owned. Counties are responsible for 219,000--or most--of these local bridges. NACE notes that local roads and bridges are competing for scarce local property tax revenues and limited state funding. Since every state is unique, they reference a number of states and their current issues. The following are examples from the NACE literature on some states and their local road funding issues.

“California’s 478 cities and 58 counties own 81 percent of the state’s roads. A 2007-2008 survey shows that California’s local streets and roads are on the edge of a cliff. On a scale of zero (failed) to 100 (excellent), the statewide average pavement condition index (PCI) is 68 (“at risk” category). If current funding remains the same, the statewide condition is projected to deteriorate to a PCI of 58 in 10 years, and further decline to 48 (“poor” category) by 2033. It will cost \$67.6 billion to bring the local road network up to best management practice in 10 years and approximately \$1.8 billion a year, thereafter, to maintain it at that condition. The funding needs, over the next 10 years, exceed current funding availability by \$71.4 billion. Preserving the public’s \$271 billion pavement investment will require at least \$7 billion annually in new money going directly to cities and counties, the equivalent to about a 38 cent gas tax increase.”

“New York’s local highways are owned by over 1,600 towns, villages, cities, and counties - encompassing 97,000 centerline miles of roadways and over 8,600 highway bridges. Expenditures on local roads are not even close to keeping pace with the deterioration process and bridge conditions are also slipping. Forecasts show local bridge deficiencies will grow to 45 percent by 2030 and this forecast does not take into consideration the debilitating effects of construction inflation brought on by escalating highway construction costs. Approximately \$1.2 billion is needed annually in additional pavement and bridge investment to reverse the deterioration process.”

“North Dakota has a significant level of deficiencies on its roads, highways, and bridges, as well as an insufficient amount of transportation funds to keep pace with needed repairs, expansion, and maintenance. A recent study, by the North Dakota State University’s Upper Great Plains Transportation Institute (UGPTI), shows that transportation funding for North Dakota’s state and county roads and bridges, as well as urban streets and township roads, is vastly insufficient. The funding needed to maintain the state and local road and bridge system is \$254 million per year greater than the available funding. The unmet needs of state-maintained roads and bridges account for \$117 million of the \$254 million annual shortfall, while county roads and bridges, urban streets, and township roads make up \$137 million per year (TRIP 2009).”

The NACE statement references the overall fact that the US needs to be spending around \$240 billion a year on surface transportation and is only spending \$68 billion a year. The additional concern is that the federal funds allocated to the infrastructure go primarily to interstates, federal roads, and state roads, with local roads often shut out of the sub allocation process. The message includes that the motor gas tax is responsible for 90 percent of the Highway Trust Funds; however, little of these funds go to 75 percent of the roads used by the motorists. The NACE group supports an increase to the next highway bill

of 10 cents per gallon in the gasoline tax, increasing the set-aside for the Highway Bridge Replacement and Rehabilitation Program (HBRRP), and raising the minimum funding for off-system bridges from 15 to 25 percent. There is also support to reduce the federal review times and environmental clearances to drop the project costs. Also, the need exists to find a way to achieve better access to these federal funds at the local level, including establishment of a local roads office in the federal system to improve access by local government to federal aid. There is a need for additional federal aid at the local level since 75 percent of all roads are local, they are in generally poor condition, they have higher fatality rates, and there is an overall fairness issue.

#### 2.2.4 United States Department of Agriculture

The United States Department of Agriculture (USDA) has published a number of reports on rural roads. The latest full report, "Rural Roads and Bridges: Financing Local Roads and Bridges in Rural Areas," is a good example from 1997 that was based on 1987 and 1994 surveys. The USDA published shorter summaries on rural roads after the 1997 report. This report states that rural road use has now changed from mostly farm related uses to serving commuters and other uses due to the decrease in farming in rural areas. There also have been many changes to local transportation funding with General Revenue Sharing (GRS) being eliminated in 1987 to fund local roads and bridges. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) also eliminated "Federal Aid Secondary" which supported many county roads with "Highways of National Significance" and "Surface Transportation Program". ISTEA, at that time, placed rural highways in direct competition with urban areas and other transportation modes. These changes all have had a negative effect on local road funding. The report is based on highway statistics by the Federal Highway Administration (FHWA), the US Bureau of Census Report on Governments, and a mail survey conducted in 1987 and 1994, sent nationally to county and town officials.

The survey information concluded that about 50 percent of counties and 34 percent of towns had inadequate funding but did not cut services. About 20 percent of counties and 10 percent of towns had inadequate funds and reduced services. About 28 percent of counties and 50 percent of towns had adequate funding but no room for increased services. Compared to 1987 data, these survey data were about the same or slightly worse. Overall, road revenue per capita in 1992 doubled to \$656.30 per resident from 1987; but considering inflation, that increase was only 46.5 percent. During this same period, federal aid decreased from \$21.57 to \$14.96 per resident; however, with inflation, this really was a 49.4 percent decrease. At the same time, state aid increased from \$106.63 to \$211.08 per person which was only a 10.5 percent increase with inflation. Most of the county revenue increase was due to property tax increases of 58.8 percent in constant dollars and 56.5 percent in other fees. It is hard to trace the actual highway budgets, but FHWA estimated the budget used on rural roads at about \$763 per mile, in 1982, compared to \$1,084 in 1992. In constant dollars this was a 19.6 percent increase. All of these data showed an increase more than inflation in tax revenue and highway expenditures. The survey also asked questions regarding tax increases; responses showed that many counties and towns were concerned about tax levy maxima and needs for referenda to support local roads and bridges. At the county level, over 50 percent noted that such referenda had failed while, for towns, it was around 22 percent. Where referenda were successful, revenue increases of 20 percent, on average, were achieved.

A small percentage of local governments (about 13 percent of counties and 7 percent of towns) used nontax revenues, such as license fees, to support highways. Volunteer labor was noted as a way to expand services; however, 40 percent of counties and 47 percent of towns had policies against using volunteer labor. The last questions asked in the survey were in regards to what should be done in the short- and long-term with inadequate revenue. Counties ranked cutting expenditures first while towns ranked increasing taxes

first in the short-term. In the longer-term, jurisdictions typically ranked postponing new construction or reconstruction as a priority.

Rural transportation has changed with deregulation and expanded state and local responsibilities for surface transportation. This has also created strains on the system because of the booming economy of the 1990s. The recent recession and heightened security have disrupted air transportation. Overall, in remote non-metro areas, the air service quality has declined and access to bus service has been reduced. The quality of roads in rural America generally improved in the 1990s, especially the interstates. Rural traffic vehicle miles traveled grew 29.8 percent from 1990 to 2002, and the national road network only grew 2.6 percent. Overall, only 14 percent rural roads were rated “poor” or “mediocre” while 26 percent of metro roads were rated “poor” or “mediocre” in 2003 (USDA 2005). Rural bridges also changed from 32.8 percent deficient in 1993 to 26 percent deficient in 2003. Approximately 92.7 percent of rural households had access to a car in 2000 while 88.9 percent of metro households had access to cars. However, rural households are more dependent on cars and those on public assistance may not have access to them. Public transportation is available in 60 percent of rural counties with only about 25 percent of rural services operating in a multi-county area. Rural long-distance bus service was available in 89 percent of rural counties with some areas in the Great Plains having little access to this type of service. The trucking industry, with deregulation and the strong economy of the 1990s, loaded the nation’s highway network with a 43 percent increase of freight shipments between cities from 1990 to 2001. International trade also increased due to the 1994 North American Free Trade Agreement (NAFTA). This increase doubled the value of agricultural shipments to Mexico from 1994 to 2002. The data indicate that rural America depends more heavily than ever on highways and personal vehicles, and access to high quality rural highways is imperative for individuals and businesses in rural America (USDA 2005).

### 2.2.5 USDOT/FHWA Data

FHWA data from 2007 indicated that there were 4,048,529 miles of public road in the US with a split of 2,987,767 rural road miles (74 percent) and 1,057,660 urban road miles (24 percent). The overall percentage of roads owned by state highway agencies was 21 percent of the rural roads and 14 percent of the urban roads. Counties owned 54 percent of rural roads and 18 percent of urban roads while town, township, or municipal ownership was at 19 percent of rural roads and 67 percent of urban roads. There is high variance between the states within these sectors. This dissertation reviewed rural locally owned highways that would include highways owned by counties, towns, townships, and municipalities comprising of a total of 73 percent of the rural roads and 53 percent of all public roads in the US. This is approximately 2.18 million miles of roads. In most states, the majority of the local roads are owned by counties, but in nine states (Illinois, Maine, Minnesota, New York, North Dakota, Ohio, Pennsylvania, Vermont, and Wisconsin) the majority of local roads are owned by towns, townships or municipalities. There are also a few states, such as North Carolina, Delaware, Virginia, and West Virginia, where most all local roads are owned by the state. These ownership differences have an effect on how local rural roads are funded, especially where the states own most of these roads. The lane mileage data, by function, indicate that 68 percent of the lane miles in rural areas are designated local roads. These local rural roads are also about 51 percent of the total lane miles in the US. The local road designation by function is similar to, but not exactly the same as, the lane miles owned by local government since the local designation by function deals with how the road serves the local land use. States, such as North Carolina, where the state own most all roads still have about 70 percent of the rural roads in the state being designated local.

Local government disbursements for highways are approximately \$68 billion with about 33 percent of that outlay being spent on capital expenditures and 27 percent spent on maintenance. The only other percentage reaching 10 percent was highway law enforcement and safety, with snow removal, other traffic services, administration, interest,

bond retirement, and transfer to state governments all being from 1 to 7 percent and making up the remainder of the disbursements. Funding for highways from local governments was approximately \$70 billion, with 31 percent being appropriations from general funds and another 12 percent from property taxes. General funds are also heavily based on property tax so the overall support from property taxes is much higher than reported at the national level. The other large percentage of funding was 24 percent payments from state governments. The remaining revenues were from 2 to 9 percent each, including local highway user taxes, road tolls, other local imposts, miscellaneous, and bond receipts. The Federal government payment to local government for highways was only 2 percent. The local government spending and revenue at the national level is not divided into rural vs. urban and was reviewed at the state level in this effort.

#### 2.2.6 Rural Highway Planning and Policy

Rural highway planning is typically part of the local government planning process, based on the government level that is funding the highways. There is a need for broader planning of local rural highways and the National Rural Assembly and others have called for the establishment of Rural Planning Organizations (RPOs, Jackson 2008). Since the 1960s, there have been Metropolitan Planning Organizations (MPOs) that were mandated by the Federal transportation laws with funding directed to the MPOs. The state DOTs have had the responsibility for any federal-aid planning and prioritization for rural highways. In 2003, the FHWA and the FTA issued implementation rules for the Transit Equity Act for the 21<sup>st</sup> Century (TEA-21) that gave rural officials more statewide participation in statewide and regional transportation planning without any dedicated funding stream. The adoption of Rural Planning Organizations varies, by state, because the language in TEA-21 was general and called for states to enhance consultation outreach with rural officials. In 1998, there were 17 states with some type of formal RPO and that grew to 25 states in 2005 (NADO 2005). This varies greatly by state, with New York State having no formal contracts or RPOs, for example. NYSDOT relies on its regional NYSDOT offices that have written formal

procedures on this consultation. The procedure includes a section with best practices and how each region in the state maintains its own unique consultative approach on rural highways (NYSDOT 2011). The other extreme is North Carolina that instituted 20 RPOs across its state in 2002. Every area in the state is now represented by either an MPO or an RPO with a statewide RPO organization. The RPO structure was funded with \$80,000 to \$100,000 for each RPO in state funds with a 20 percent local match.

### 2.2.7 Gravel Roads

Local rural roads in many areas are also low volume roads that are still gravel in numerous areas. In South Dakota, approximately 60 percent of local roads have earth or gravel surfaces. Many of these local roads carry less than 50 vehicles per day (Huft 2009). Some counties in Iowa, Michigan, California, and South Dakota, among others, are beginning to turn paved roads back to gravel. Ken Skorseth, lead author on FHWA's "Gravel Roads Maintenance and Design Manual," was quoted as saying that in parts of South Dakota one can place eight inches of gravel for the cost of one inch of asphalt pavement. Many local governments are discussing if they can afford to continue to maintain paved roads (Taylor 2010). Even states like North Carolina, that had enacted a Highway Trust Act in 1989 to pave all 10,000 miles of state maintained gravel roads with traffic over 50 vehicles per day in six years, are questioning the paving of gravel highways. In 2006, there was a review and the Fiscal Research Division questioned the set-aside for paving the remaining gravel roads in the state (Fiscal Research Division 2007). In North Dakota, where larger agriculture operations have been placing a higher stress on local gravel roads, a survey of producers indicated only 32 percent would be willing to pay for improved highways. However, most agriculture operations would pay more for fuel if this resulted in faster times for transporting goods to market (Van Wechel and Vachal 2004). This unwillingness to pay for improved roads is common and was the same theme in Oregon where the local rural road system in Washington County has not been improved, except through limited grants and

cooperative agreements (Clemmons and Saager 2011). Low volume roads create a funding issue because of their limited use and the low number of properties and businesses they typically serve. A 2011 study in North Dakota calculated the average annual cost to resurface and maintain paved agricultural roads is \$18,300 per mile, while the average annual cost to maintain gravel surface agricultural roads ranged from approximately \$3,900 to \$6,600 per mile, depending on traffic volumes (Tolliver, Dybing, Lu, and Lee 2011).

Recently the Texas Department of Transportation has been reviewing the need to change paved highways to gravel and plans to change 80 miles of paved highways to gravel. These rural paved highways with heavy transport vehicles supporting agriculture and energy development have been damaged sufficiently to require full repaving. The current limited Texas state highway budgets have driven the Texas DOT to decide on reverting these paved rural highways to gravel rather than repave. But the county, local residents, and state senators have objected to the plan. (Floyd 2013)

The question of when to change a paved road to gravel is similar to the more often asked question of when to pave a gravel highway. Many of the questions are technical in nature but many are also political in nature. Currently two thirds of the highway system in the United States is unsurfaced or lightly surfaced and the Kentucky Transportation Center has published "When to Pave a Gravel Road" to assist in the review process. The paper stresses the need to review 10 items including developing a road management program, commitment to effective management, traffic demands , adoption of standards , safety and design, drainage improvements, life cycle costs , user costs, and public opinion. The report outlines the need to review all of these items for highways from 50 to 400 vehicles per day before highways are paved. They discuss how user costs are much higher on gravel highways and why some agencies give serious consideration for paving gravel highways when ADT is above 125 vpd because of the higher user cost. Public opinion is the last consideration after review of the other technical considerations. In New York State a local

highway manual, “Highway Standards for Low Volume Roads in New York State” published by the Cornell Roads Programs in 2009, defines low volume roads as those with under 400 ADT and outlines a proposed local law for minimum maintenance of highways under 50 vehicles per day. The local law includes a process of designating minimum maintenance highways that includes the need for public hearings, school board review, and minimum highway maintenance practices. An even more severe case is full abandonment of these local rural highways. This model law also has a provision that would allow a petition to discontinue the minimum maintenance.

With the ongoing shift of population from rural areas there continues to be the question of when highways should be abandoned. Empirical analyses that have studied the abandonment of highways indicate the overall net gain to society would be positive in a limited number of highway abandonment cases when the cost savings to government outweighs the additional costs to the traveling public. This limited abandonment will not solve local government rural highway funding crisis. Other changes that would assist local highway budgets would be lowering maintenance levels on low volume highways, converting dead end and low volume roads to driveways, and reconstructing some low volume bridges (Hamlett & Baumel 1990). When the public benefit and individual benefit is high turning these highway back to individuals would be an appropriate option. When the political outcry outweighs the technical reasons to abandon highways the option to change to lower maintenance levels may be more acceptable to the public and owners.

### 2.3 Local Highways – States

Local and state funding from the federal government is a real concern since the General Accountability Office (GAO) has questioned whether a federal role is needed and “predicts that federal grant assistance for transportation may decline or even terminate in the future.” The \$177 billion spent for construction, operation, and maintenance of highways and transit nationwide in 2006, was 52 percent state-funded, 28 percent federal-funded, 15

percent local- and special districts-funded, and 5 percent funded from tolls. States know they need to increase revenues and the following strategies are cited as options: heavy truck fees at the state level in some states, motor fuel tax increases indexed to the price of fuel, registration and user fees, sales taxes, property taxes, and tax revenue. Typically, property taxes are used extensively at the local level and fund 25 percent of local highway expenditures. Tolling may be an option on many more highways, especially interstates and highways in urban areas. Congestion pricing and the use of VMT fees are other options that need to be reviewed. Debt financing and borrowing is becoming more popular with the public skepticism of tolls and public challenges with raising the gas tax and vehicle taxes and fees. Asset leases through public-private partnerships are other potential alternatives. The overall shift to local and regional funding for transportation has resulted in increased financing of transportation through local tax revenues and ballot measures. From 1995 to 1999, local transportation funding increased 22 percent through property taxes, 28.6 percent through local general funds, and 55.7 percent through local sales taxes. This type of funding continues to increase with 33 states authorizing over \$70 billion of new taxes for transportation funding since 2000. Local governments are concerned that raising transportation revenues will compete with other local needs for schools, libraries, police, fire, and rescue. Local officials are also concerned that states should fund transportation since nonlocal travel is not paying the full cost through the current motor fuel tax system. There is also a need to review how developers are asked to pay for local transportation improvements with impact fees (NGA 2007).

Decision making at the State DOT can greatly affect local rural roads depending on how these highways are built into the state system. Often there is a conflict between State DOT decisions with political and legislative interests. Political interests and interest groups may trump the DOT plans that are based upon measurable needs. There are often local goals that conflict with the general needs of a DOT plan. A long-term commission at the state

level that outlasts these local or political goals may be one way to combat the local versus general goals. An empirical study, in 2008, reviewed four areas, including long-term planning, project selection or prioritizing, financial management, and policy development. The study also used the Government Performance Project of 2000 to 2003 that rated efficiency and performance on project planning, project management, and asset maintenance. All 50 states were reviewed with 36 states having some type of oversight body reviewing the State DOT. The study indicated that the commissioner's term length was a negative predictor on overall capital management with larger commissions appearing to be positive. Commissions with long-term plans positively affected the capital management capacity. The overall conclusion was that commissions can improve management by increasing openness and transparency. The report also concluded that there is a need for additional research regarding the ability of commissions to influence DOT decision making (Yusuf, O'Connell, Hackbart and Wallace 2008).

The efficient mix of state and local funds within a state is another important issue since the percent of state support varies greatly across the United States. This funding also depends on the percent of state owned local rural highways. A complicated economic analysis model developed in 2002 by Levinson and Yerra concluded that, in 1996, approximately \$13 billion of the \$69 billion spent on highways could have been saved by shifting the responsibility for lower class roads from local governments to state governments (Levinson and Yerra 2002). Most of this savings estimate was based upon the economies of scale with centralized administration and centralized purchasing of equipment and materials. Not all states were studied because of the lack of traffic volume data in seven states and some volume data, at road levels, had to be estimated for the 12 classes of highways reviewed. This particular study involved looking at capital outlay and maintenance costs in 1996. The percent funded by the state varied from a low of 42.5 percent in New York State to a high of 97.3 percent in Kentucky.

### 2.3.1 New York

New York State, like many states, has a high percentage of locally owned roads. More than 113,000 miles of roads and 17,400 bridges are the responsibility of the state and local government. However, only 15,000 miles of highways miles are the responsibility of the state. In 1991, the state enacted a Dedicated Highway and Bridge Trust (DHBT) fund with a goal of being a pay-as-you-go financing system that would use revenue from highway taxes, motor fuel taxes, motor vehicle taxes and fees, petroleum business taxes and fees, and other smaller resources. A 2009 State Controller report was very concerned that, since 1993, the system has been using a bonded system and projected that debt service was to be 30 percent of the DHBT in 2008-2009, and could go as high as 39 percent of the DHBT in 2013-2014. On top of the bonding issue, there has been a shift of state operations, including snow and ice removal, moving to the DHBT fund. The end result is that the capital projects were only 27 percent of the disbursements with state operations using 42 percent of disbursements. The shift of the DHBT to a bond paying and operational fund will eventually wipe out its ability to conduct any capital projects. This is also an issue for locally funded roads since the two state funded local highway programs have been caught up in this bonding issue. The Consolidated Local Street and Highway Improvement Program (CHIPS) is a core program that typically funds around \$400 million for local roads, annually, to villages, towns, counties, and cities based on road mileage. The Marchiselli aid program is smaller and uses state funds to help local governments match their share of federal aid highway matching requirements. In some local governments, CHIPS funds are the only funds used for capital projects for highways. The program is relying on bonding and, through 2009, \$3.1 billion had been bonded with a projection of reaching \$4.7 billion of bonding by 2013-2014. Since there is a bond cap of \$5.7 billion, the ongoing issue of a deficit budget at the state level and the issue with the DHBT fund, the CHIPS funds appear to be in jeopardy. Failure to fund CHIPS could, and probably would, shut down most of the capital highway local rural road projects in New York State.

### 2.3.2 North Carolina

A project funded by the NC Justice Center, “At the Crossroads: Recommendations for the Future of Transportation in North Carolina,” in 2008 outlines both issues and solutions for the perfect storm regarding the transportation infrastructure in the state. The main concerns revolve around the growing demand through population growth, increasing building and repair costs, declining gas tax funding, and the aging infrastructure. This all leads to an estimated funding gap in North Carolina of \$65 billion from 2005 to 2030. In 1931, the state took over the county roads and this has resulted in the state now owning about 77 percent of road miles. The state is, therefore, one of the few states where local property taxes are not a source for the majority of local roads. Since the state owns 77 percent of its roads, about 63 percent of highway expenses are funded by the state, compared to a national average of 50 percent. Local governments contributed only 14 percent to road funding in North Carolina compared to the 29 percent average in the US in 2004. Discussing rural and local funding of highways in North Carolina means primarily state funding. The revenue used for transportation in the state has three major sources that include the gas tax; the highway user tax; and the license, title, and registration fees. About 75 percent of the gas tax revenue goes into the state highway fund with 50 percent used on road maintenance and another 25 percent of the gas tax going to the Highway Trust Fund. Fifty percent of these funds are used for major road construction. The total gas tax, in 2008, was 29.9 cents which was slightly above the national average state gas tax of 28.5 cents per gallon, but the report notes the concerns about raising the fuel tax since the federal tax will probably be increasing. The real issue of relying on the gas tax is the ever-increasing efficiency of vehicles. Vehicle changes have resulted in state gas tax revenue continuing to decline while vehicle miles traveled have increased. The report suggestion is to go to toll roads and a VMT fee based on a GPS system on the vehicle. The highway use tax (HUT) is a special motor vehicle sales tax where vehicle owners and long-term leases are taxed 3 percent which goes to the Highway Trust Fund. This charge is lower than in most southern

states, with Tennessee being the highest at 7 percent. Another issue is that revenue generation has not kept pace with spiraling construction costs.

The NC Justice Center report is critical of the prioritization process for projects in North Carolina, including emphasizing new construction over maintenance, roads over public transportation, and a higher level of expenditure per capita in rural areas compared to urban areas. The maintenance matter is highlighted by the 2006 American Society of Civil Engineers rating of roads being a “D” and bridges rated a “C minus”. With only 3 percent of NCDOT spending being on public transportation, this has negative consequences in larger urban areas regarding commute times. This low spending on public transportation ignores students, the poor, and the elderly who may not have access to motor vehicles. There also is a statutory formula for road construction that is based on equity with three components looking at the interstate system, population share, and regional equity. This formula causes some rural, sparsely populated, areas to receive 2.5 times the per capita funding received in urban areas. The rationale is that, if per capita funding was equal, the rural roads would not be in as good condition as in urban areas and this would negatively affect rural economic growth. The report suggests that the state discontinue being responsible for paving its unpaved secondary roads. They suggest the state use the funds designated to pave the remaining 2,369 miles of unpaved secondary roads for more critical needs. The report also suggests that counties be allowed to conduct this work, using property taxes or some type of local car registration fee. They do not want the state to allow the counties to use a locally designated sales tax.

### 2.3.3 Oregon State – Case Study

Washington County, Oregon is a suburb of Portland with a population that has doubled over the past 30 years. The increased tax base in urban areas has allowed the urban highways to keep pace with needs. However, with a limited tax base in the rural areas, there were insufficient funds for the local rural road infrastructure. Creative ways were used to pave

and upgrade over 80 low volume rural gravel roads. The gains noted have been because of extensive work with the public and using defined clear policies. About 90 percent of the county lives in the urban area with 10 percent living in the rural area. The county has 1,279 miles of highway split about equally between urban and rural. Included in the 659 miles of rural highways are 413 miles of low volume roads which contain the 250 miles of gravel highways. The \$17 million annual road maintenance fund is financed from gas taxes, truck taxes, and vehicle registrations which are split about equally between urban and rural roads. A traffic impact fee allowed the county to upgrade and spend \$925 million in urban areas otherwise funded through property taxes. Urban area low volume roads became neglected, but then a property tax fee was ratified to improve these roads through the Urban Road Maintenance District (URMD). Rural, low volume, roads continued to deteriorate because a much higher tax rate increase was needed and not passed because of the many fewer residents in this district. In 1994, the Rural Roads Operations and Maintenance Advisory Committee (RROMAC) was formed by residents and businesses within the rural district. This group worked with the Road Maintenance Division. In 1997, with unusual flooding and severe winter, the old chip sealed rural roads from the 1970s were failing which resulted in having 10 miles of road reverting back to gravel. The unpopular decisions of reverting to gravel roads led RROMAC to recommend that 10 percent of any new road funds be used for upgrading gravel roads to pavement.

There was an ongoing discussion with the public, based on the law that notes that highway upgrades need to be paid by the property owners. Cost was also reviewed and it was determined that the break even to upgrade a gravel road to chip seal was 145 vehicles a day with below that number making gravel roads more economical. This indicated there were 40 miles of gravel roads that should be upgraded at a cost of \$4.4 million with no funds available. Limited upgrades have taken place through federal grants, state bonds, county money, and private sources since the upgrade need was calculated. The greatest success in

the county has been the URMD where an additional tax rate of \$0.245/\$1,000 results in \$3.5 million for maintenance of the 430 miles of low volume local roads in the urban area. In 2004, the Oregon Transportation Investment Act resulted in \$1.5 million to the county and the 10 percent RROMAC recommendation resulted in \$150,000 for a rural gravel road upgrade, based on the list of gravel roads needing to be upgraded. HUD grant funds were used to upgrade a gravel road. Another rural highway, that served an organic farm with increasing traffic volumes, used a combination of Co-op payments and Road Resource funds to upgrade to five-inch pavement over the typical chip seal improvement (Clemmons and Saager 2011).

#### 2.3.4 South Dakota

In January 2009, the 2008 Local Roads Needs study was released in South Dakota that was commissioned by the State legislature to review road networks owned by counties, municipalities, and townships. The study included a local agency survey and used similar methods to those of a 1998 local road study. The survey of local officials included a section on condition of roads, expenditures on roads and funding needs, as well as ways to improve efficiency. Most all counties responded (65 of 66) and about 50 percent of all larger municipalities (of over 500 residents) responded. The response rate for smaller than 500-resident municipalities and townships was about 1 in 8. The South Dakota Legislature Audit was used to estimate expenditures. The overall trend on expenditures on local roads, by all levels, was fairly flat from 1998 to 2007 with some variability, indicating a steady decline when the cost of inflation and increase in construction was factored in to the tables. Most county, city, and town officials thought that highway funding was either inadequate or seriously inadequate. Local officials saw the most critical need for additional funding was road surface maintenance for counties, towns, and cities. When asked about supplemental funding, several respondents suggested opting out of the property tax freeze that limits raising revenues. Since highway funds compete with other critical needs, including law

enforcement, there is a need to increase revenue. Other suggestions included increasing the maximum wheel tax, tax more wheels since the limit is four per vehicle, and adopt a statewide wheel tax in all counties. There was the suggestion to impose developer fees to offset the cost for infrastructure to support residential, commercial, or agricultural development. The efficiency question resulted in the proposal for more inter-municipality cooperation with sharing of manpower and equipment. This report did not recommend agency consolidation because of the concern about loss of local control. New materials and innovative construction methods, such as warm asphalt, were also mentioned as potential cost savings.

Conditions of bridges were somewhat worse than in 1998; while approximately half needed treatment in 1998, in 2008, it was estimated that two-thirds needed treatment. It was projected that, over a 20-year period, about \$25 million per year was needed for major structures at all local levels. South Dakota has 125,000 lane miles at the local level with 60 percent of county roads being earth or gravel surfaces. Most county secondary roads and township roads typically carry less than 50 vehicles per day. Only county roads and cities have substantial proportions of roads that carry over 100 vehicles per day. Highway ratings had improved at the county, township, and city levels from 1998 to 2008. There was a detailed cost estimate to maintain and improve the current road conditions, using 25 percent of funds to rehab roads in good condition, 25 percent to use on fair condition roads, and 50 percent to use on poor condition roads. This balanced condition required \$137 million a year, as a minimum. Other strategies to achieve a higher target condition of roads that erases all poor roads could cost up to \$214 million a year. The analysis indicated a current need of \$181 million, annually, for highway and structures to maintain their current status with an existing expenditure of about \$100 million annually. The shortfall is about \$81 million a year even with the high percentage of low use and unpaved roads. There was no real answer to the shortfall except the minor items mentioned above.

### 2.3.5 Oklahoma Counties

Some states, including Oklahoma, directly share revenues with counties where the county highway funding is based on state motor fuel taxes. Highway funding is primarily from excise taxes on gasoline, diesel, special fuels, gross oil and gas production, and motor vehicle licenses and registration. Gasoline taxes in Oklahoma, in 2004, were 17 cents per gallon and 32 percent of these taxes were directly shared with the counties, amounting to some \$94 million. This is based on having 5.82 cents of the gasoline motor fuel tax being allocated to counties, based on a formula using road mileage, population, and land area. Additional funds are distributed based on a complex method for rural counties. Diesel motor fuel taxes amount to 13 cents per gallon in Oklahoma and 16 percent of the taxes (amounting to some \$24 million) are also distributed to the counties in a similar method as gasoline taxes. Special fuel taxes are 16 cents per gallon for combustible fuels that are gaseous at 60 degrees Fahrenheit. This distribution to counties is only \$52,000 total and is 34 percent of the collected value. Gross production taxes on oil and gas are shared based on the amount of production in that county. This sharing amounts to \$44 million and 7 percent of the overall collections. The state has an excise tax on vehicles bought and annual registration fees that are all also shared with the counties. This amounts to 11 percent of the overall taxes collected, or about \$80 million (Lansford 2004).

### 2.4 Safety

The National Association of Counties raised concerns about rural road safety in 2000 because of the higher fatality rate on such roads (Reagin 2002). The United States General Accounting Office (GAO) 2001 report, "Highway Safety," reviewed the federal data regarding safety. The report notes that 23 percent of road miles are urban and 77 percent are rural. From 1992 to 2000, states spent 41 percent of federal funds on rural roads. On a per-mile basis, states spent federal funds at the highest rate of \$80,900 per urban freeway mile to the lowest rate of \$100 per mile on local rural roads. The fatality rate was 2.5 times higher on rural roads compared to urban roads. About 60 percent of all fatalities take place

on rural roads, although these same roads have only 40 percent of the vehicle travel. States have authority to target the funds within areas financed through the federal programs. The state departments of transportation and the local metropolitan planning organizations rank projects using a long-term planning process that is supposed to include safety planning (Reagin 2002).

Traffic is increasing in many areas, including Wyoming and North Dakota, due to oil and gas drilling. Many roads lack safety features and experience a higher rate of serious crashes. The University of Wyoming developed the Wyoming Rural Road Safety Program (WRRSP) to have a strategy to obtain funding for crash reduction measures. A local road safety advisory group was formed using WDOT, the Wyoming Local Technical Assistance Program (LTAP), the Wyoming Association of County Engineers and Road Supervisors, the Wyoming Association of Municipalities, and FHWA. Using three counties as a pilot, a five-step process that included crash data analysis, level 1 field observation, a ranking system based crash data, and field evaluation, was used to find the best sites to conduct level 2 evaluations to determine countermeasures and a cost benefit ratio. After analysis of 10 years of data, sites were ranked from 0 to 10 in five risk categories, including: general, intersection and railroad crossings, signage and pavement markings, fixed objects, and shoulder and right-of-way issues. This resulted in several low-cost countermeasures with 20 projects being funded. One-third of the 23 counties have now implemented this program. The program has distributed \$1.5 million to local governments for these low-cost safety improvements. North Dakota has implemented a similar program (Ksaibati, Carlson, and Beard 2011).

## 2.5 Innovative Financing

### 2.5.1 Innovative Financing for the Midwest and Mountain Plain States

A 1997 report was produced by the Upper Great Plains Transportation Institute that identified eight innovative financing methods local governments used in Colorado, Iowa, Minnesota, Montana, North Dakota, South Dakota, Utah, and Wyoming (Hough, Smadi, and

Bitzan 1997). The lack of local funding was noted, in 1992, where the states in the report generated \$39 billion in road related revenues and spent \$54.4 billion while local governments received only \$15.3 billion in road related revenues. The report references the concern that the change from small farms to larger farms has altered the rural roads needs from small, local access rural roads to larger, better rural roads for heavier equipment. They also reference the need for year-around roads for more rural residents because of the change to off-farm income and commuters. Lastly, the abandonment of railroads has increased the truck traffic to move commodities on these rural roads. There is a need for better maintenance and improved rural roads which will have to be funded locally. The report noted the fear that fewer federal dollars would reach the states which would impact the limited funds the local roads already receive from the states. The innovative financing ideas in the report were based on a mail survey to those eight states, using the Local Technical Assistance Program (LTAP) administrators. A 38 percent response rate was achieved by the 177 of the 460 mailings returned from county engineers and supervisors.

The findings included:

- Property taxes were found to be responsible for about 26 percent of the weighted average of the highway budgets of all states combined.
- Seven of the eight states used county fuel taxes which was about 17 percent of the weighted average highway budget for all states combined.
- Six of the eight states used vehicle registration for about 13 percent of the weighted average highway budget for all states combined.
- A mill levy, a type of property tax, imposed by four of the eight states for highway projects supplied another 10 percent of the weighted average highway budgets for all states combined.

There were another nine innovative methods of highway finance listed, including:

- Five of the states stated they used county sales taxes;
- A special ownership tax in three states, including a tax in South Dakota on mobile homes, remained in the county and could be used for highways;
- South Dakota noted a wheel tax of \$4 per wheel up to \$16 for all vehicles that financed typically 17 percent of highway budgets;
- In Montana and North Dakota, a special assessment district could be made for rural subdivisions that needed highway work not included in the county budget;
- A severance tax for mineral extraction was assessed for heavier use due to larger trucks on the highway; however, the extent was somewhat limited.
- Bonds were noted as a way to fund county projects, but made up less than 5 percent of road budgets;
- Cost participation was mentioned in one county in Minnesota where other municipalities shared in the cost;
- Traffic violation revenues were listed as being used in some counties; and
- One county in South Dakota listed using a percentage of the telephone tax to fund a limited part of the county highway fund.

The report also included a list of cost-saving strategies, and discussions on each, regarding the true cost savings and life-cycle costs, including:

- Chip seal of roads as a less expensive wearing course;
- The use of soil stabilizers on gravel roads to increase hardness of the surface and lessen the maintenance needs;
- Reduction of the level of maintenance which may even limit road usage;
- Blade gravel roads less;
- Make the road width smaller;

- Close roads or bridges; and
- Convert paved roads to gravel roads.

Management strategies to save costs were also listed and discussed, including:

- Consolidate equipment;
- Reduce employees;
- Share engineers;
- Better management, including contracting work out;
- Work together on joint projects with cities and counties; and
- Require a cost-benefit analysis of each project.

The report suggests that any innovative financing needs to be reviewed for ease of collection, revenue certainty, inflation sensitivity, public acceptance, and equity before use.

#### 2.5.2 Local Option Transportation Taxes (LOTT)

Funding of transportation is changing because of the devolving fiscal responsibility from federal to state to local governments. In many cases, this has forced local governments to rely more heavily on general revenue instead of user fees. The shift to local revenue has legislators finding other ways to pay for transportation including local option transportation taxes (LOTTs). A LOTT may be a vehicle tax that is used in 33 states and earmarked to fund transportation. Sales taxes have emerged as one of the most significant LOTTs and politically feasible options for metropolitan infrastructure projects. Thirty-three states have allowed such sales taxes for multiple uses. Many states, such as, NY, Ohio, and Tennessee are fairly flexible allowing for sales taxes to be earmarked for transportation, other uses, or general revenue. Some states require sales taxes to be earmarked for particular uses or even specific projects. Weight based severance taxes on natural resource extraction is another LOTT that, in five states, is used for transportation. Impact fees exist in many

communities to pay for development costs associated with transportation in new developments. Four states and five New York City areas have taxes on the sale of property to use for transit operations. Some areas, such as Nevada; New Orleans, LA; and Myrtle Beach, SC tax tourists for transportation through lodging. Most LOTTs started in the 1960s and 1970s; however, use is expanding to most states. Sales taxes have taken over as being the most popular LOTT since the 1990s. This is changing the direct link for user fees like motor fuel taxes for transportation. The use of LOTT sales taxes has shifted the funding away from metropolitan planning organizations (MPOs) and directly to the taxing authority. California and Nevada require that MPOs have direct authority over local option transportation taxes. Typically, these local sales taxes are targeted for specific projects that assure voters the use of these funds (Goldman and Wachs 2003). Although Goldman and Wachs view LOTTs as more of a regional or metropolitan tax, these might be used in rural communities, if there is adequate population to collect sufficient taxes for the highway budget or a highway project.

LOTTs on a regional or county level for transit systems appear to be more successful when there is state support and a champion at the state level. There also needs to have a regional planning authority involved with clear expectations outlined for the public, emphasizing visualization of the solution. Support from businesses will be instrumental to the process and via donations to the project (Callahan 2009). Similar requirements would be needed for rural LOTTs, although the difficulty of obtaining state support and support from businesses for the rural highway projects may be an impediment.

## 2.6 Summary

The literature is very clear that the US is underfunding transportation and highway infrastructure nationally by as high as two thirds to over 100 percent. The federal and state level motor fuel taxes are the most direct way of funding highways in the United States besides tolls, which are not used on local rural highways. Although 75 percent of highways

are owned locally, very little of the federal motor fuel taxes reach local governments for local highways. The main exception is funding on bridges where federal sharing is often available through the state. The distribution of any state motor fuel taxes from states to local highways is unique by state based on who owns the local highways. Some states, such as Oklahoma, distribute a percentage of the motor fuel taxes directly to local government, but many have a more indirect method of disbursement through various funding mechanisms that may include grants. The primary funding for locally owned highways, at the local government level in most states, is through property tax and general revenue. The amount of funding, by state, that goes to local highways varies dramatically across the United States, as does the amount of local highways owned by the states. When a state owns most of its local highways, the funding stream is not typically based on local property taxes or local general revenue but based on state motor fuel taxes. The different types of local highways also vary by state, with some places in the Midwest having 60 percent gravel roads to a very low percentage in other regions. Although VMT based fees appear to be an answer in the future, the form and amount of these fees is yet to be determined. The potential long term change in VMT by the public and the overall potential lower use of gasoline may have effects on both motor fuel taxes and the potential change to a VMT based fee structure. Local rural highway funding is critical to the rural communities since it finances the primary mode of transportation and local rural highways encompasses over 50 percent of the highways in the United States. This local rural highway system is critical for agriculture, economic development, educational attainments, health care, and the general well-being of rural America that still houses 17 percent of the population.

### **3.0 DATA SOURCES**

Data sources to develop the local rural highway funding model included existing receipt and disbursement data at the federal, state, and local levels. The local rural funding model will be a tool for local governments to evaluate changes in the highway funding situation at the local level including changes in current funding streams and adding new funding streams. The national FHWA data were used for initial model development understanding that the national local highway information collected by state includes both rural and urban highways based on local highway ownership. Because the model was developed for local rural highways, data were reviewed using the rural county level data for local rural highways. Most information collected at the state level still includes urban and municipal highways. The best data for the model would be collected directly from the local rural governments. The existing county level data were used because of availability of data in the same receipt and disbursement categories that existed at the national level. Some states like North Carolina own most all the local rural highways so state funding and spending data were reviewed to eliminate any urban counties from the state secondary system data. Initial review used a rural definition of 75,000 people per county but final review used counties with a population density of 250 people or less per square mile. Using rural counties allowed using existing county highway data but did include limited urban highways in these rural counties.

The Office of Highway Policy Information Highway Statistics' 2007 reports and Excel spreadsheets were the primary data source at the federal level for initial model development. The year 2007 was used since that is the most recent year with complete data and 2007 is before the last economic downturn and before any stimulus funds were distributed. The FHWA data include state and local government information (FHWA 2007). The two states selected for the model calibration are very different regarding local and state ownership and were chosen for more detailed analysis because of this difference. New York State owns less than 15 percent of its highways and most all its local rural

highways are owned and funded locally. North Carolina owns almost 80 percent of its highways and most all the local rural highways are included in the NCDOT state secondary road system which is funded by the state. The data entered for New York from the FHWA form 536 (“Local Highway Finance data”) at the rural county level was used for local government calibration. New York’s Office of the State Controller data for 2007 for counties, towns, and villages was used for additional review for the model (NYSOSC 2007). The North Carolina Department of Transportation data for the local rural roads or secondary highways was used for North Carolina since the local rural roads are owned by the state in the secondary system in the state. This included state level data on the secondary road system at the county level supplied by the NCDOT.

### 3.1 FHWA DATA

The FHWA data available at the national level include both state and local government level data, with receipts and disbursements, for state- and local government-owned roads. There is also data regarding road mileage ownership, by rural and urban, for state and local ownership (county and town/municipal). The graphs provided below indicate how the states vary in state ownership of roads, and the amount of local rural roads by state and local rural roads by function in each state. This variation in ownership has a great impact on both receipts and disbursements in each state. Highway receipts and disbursements vary by type of road and funding is driven by funding sources.

Figure 4 is based on 2007 FHWA data where the county and townships/municipal urban and rural roads were combined. The local government owned roads range from zero in the District of Columbia and 9 percent in West Virginia to a high of 92 percent in Iowa and Kansas. In New York, 86 percent of its roads are owned locally, while 20 percent of North Carolina’s roads are owned locally. The overall local ownership is 76 percent in the US (3.1 million miles). Local ownership translates to a high percentage of roads in the United States being funded primarily by local funds. These local funds are mostly derived from local

receipts including property taxes and general revenue. The percent of state support for local roads, any direct support from motor fuel taxes, and other direct revenue vary by state but may be quite low for locally owned roads.

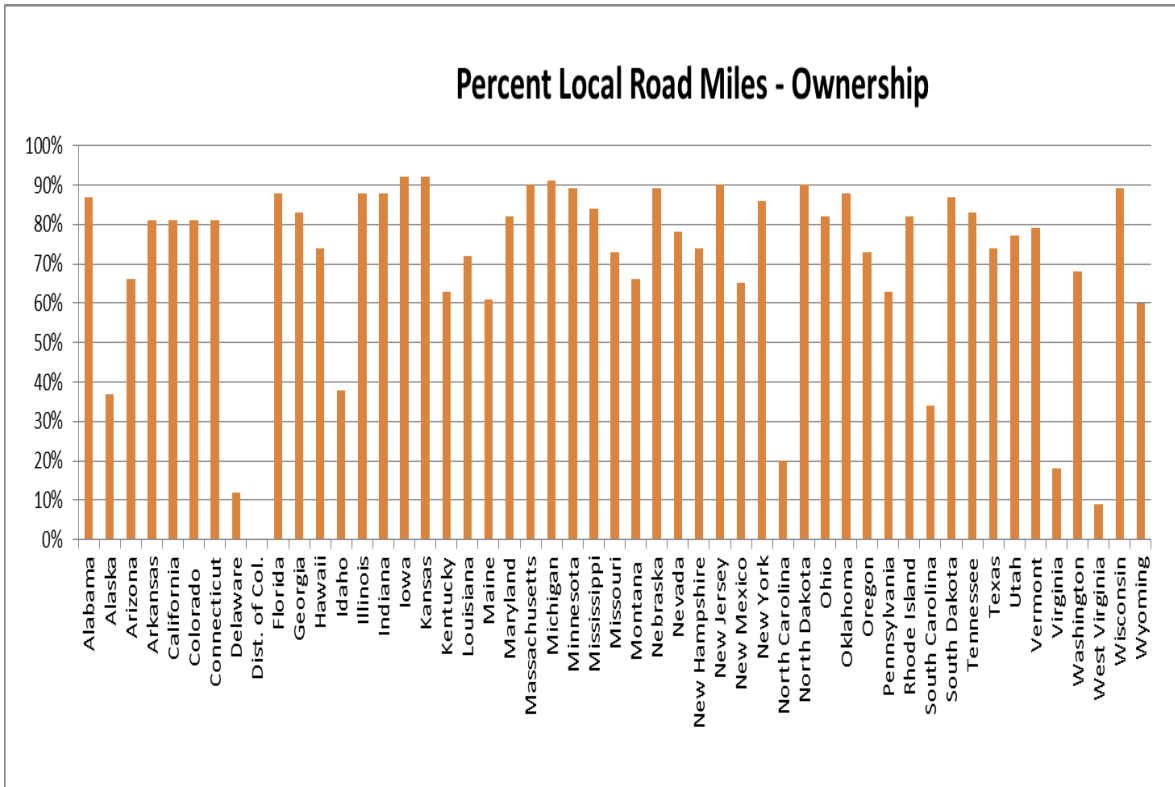


Figure 4 Percent Local Miles Based on Ownership – FHWA 2007

Figure 5 is also based on 2007 FHWA data and shows that the local rural roads range from zero in the District of Columbia and 1 percent in Virginia to a high of 88 percent in North Dakota and 84 percent in South Dakota. North Carolina is at 5 percent and New York is at 49 percent. Most local rural roads in North Carolina, as in some states, are owned by the state and funded as secondary state roads. Figure 5 is based on ownership and does not reflect the local rural roads that are often classified as secondary rural roads that are owned by the

states. Overall, 54 percent of the roads in the United States are local rural roads by ownership (2.2 million miles).

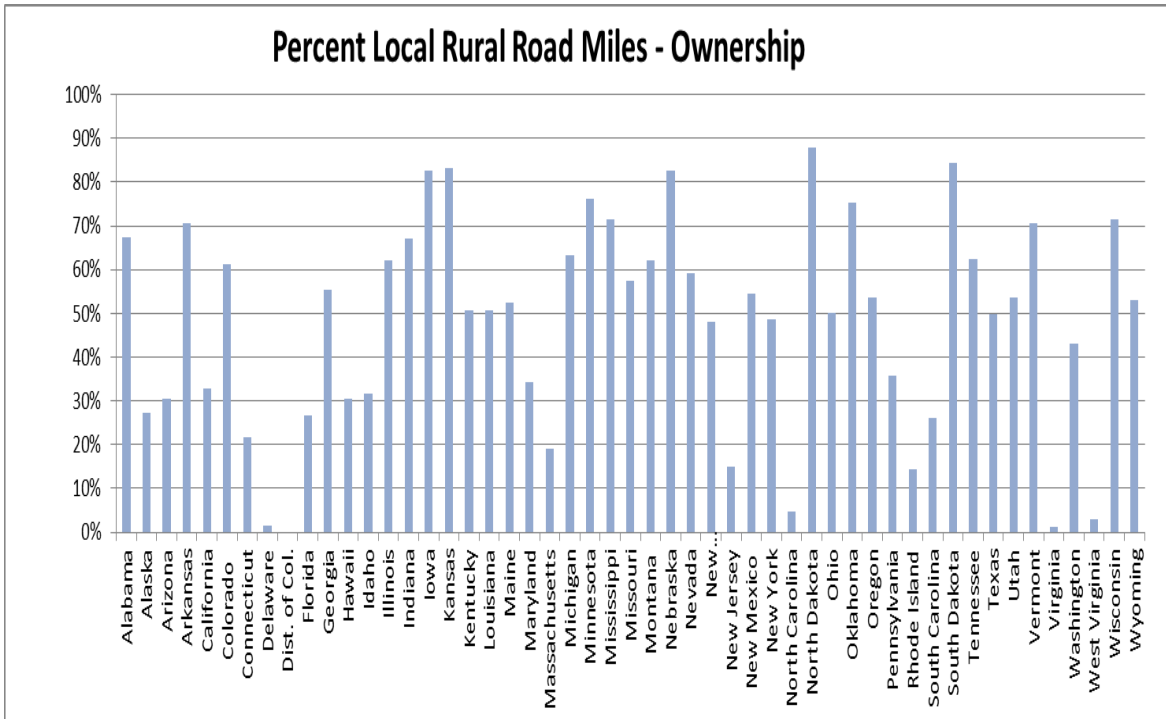


Figure 5 Percent Local Rural Miles Based on Ownership – FHWA 2007

Figure 6 is based on 2007 FHWA data and shows that the local rural roads, by function, range from zero in the District of Columbia and 14 percent in New Jersey to a high of 71 percent in New Mexico and 78 percent in North Dakota. Overall, 51 percent of the roads in the United States are local rural roads, by function (2.0 million miles). There are important changes in local rural roads in some states when reviewing local rural roads, by ownership, or local rural roads, by function. North Carolina owns 77 percent of the roads in the state and has only 5 percent local rural roads by ownership, but only 49 percent of the roads are

local rural roads by function, while New York owns 14 percent of all roads in the state and has 49 percent local rural roads by ownership, but 39 percent by function.

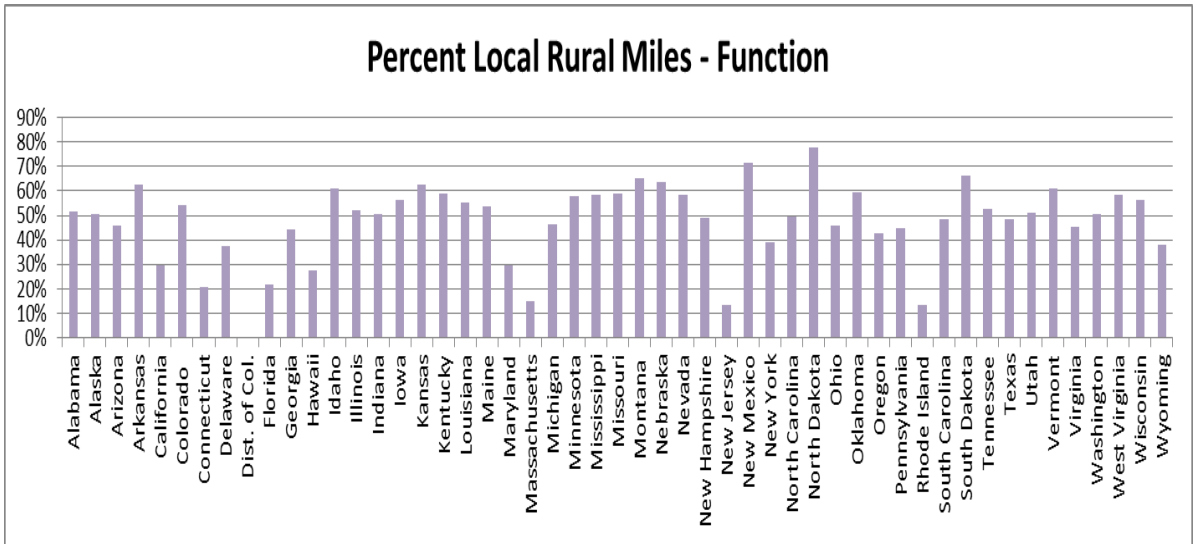


Figure 6 Percent Local Rural Miles Based on Function – FHWA 2007

The FHWA data shown in Table 1 reveal that both North Carolina and New York local governments rely slightly more on general revenue and property taxes combined than the national average. Local rural roads in North Carolina are primarily owned by the state and the local rural road investment, by local government is, therefore, not significant. Both states also have less state and federal combined assistance to local governments than the national percentage.

Table 1 Local Government Highway Funding from 2007 FHWA 2007 Data in Thousands

State	Local Government Local Total Revenue	Local Highway User Tax	Tolls	General Funds	Property Taxes	Other Local Imposts	Misc. Income	Bond Proceeds	From State	From Federal
NY	\$6,023,675	\$122,138	\$473,534	\$2,390,824	\$921,911	\$241,696	\$379,317	\$676,097	\$645,860	\$172,298
NC	\$815,267	\$13,849	\$0	\$478,668	\$3,664	\$11,372	\$46,851	\$117,614	\$141,740	\$1,509
NY		2%	8%	40%	15%	4%	6%	11%	11%	3%
NC		2%	0%	59%	0%	1%	6%	14%	17%	0%
National %	n/a	4%	2%	31%	12%	7%	9%	8%	24%	2%
From 2007 FHWA Table LGF local government funding in thousands										

### 3.2 FHWA State Data and Cost Per Mile

The work to develop a funding model for local rural roads included reviewing two states, New York and North Carolina, which are at different points on the spectrum with North Carolina owning about 80 percent of the lane miles at the state level and New York State owning only about 14 percent of lane miles in the state. State ownership has many effects on short- and long-term funding and what funding sources can and are used for the local rural highway system. The study reviewed NCDOT highway costs for local roads in the state and costs for local government in NYS that includes spending by counties, and towns, compiled at the county level. The data from the New York State Office of State Controller (NYSOSC) were also compared to the NYSDOT data from form 536 and FHWA data and used for revenue review by category. The NYSDOT and NYSOSC data were difficult to compare since the accounting categories used are different. The data used for NYSDOT form 536 has only county and municipal information with the town data included in the county data. The local government NYSOSC data has very detailed accounting codes and the data are readily

available by county, town, and villages, and were used to review sales taxes and property taxes but the accounting codes do not exactly match the FHWA categories used in the model.

The New York Office of the State Controller (NYSOSC) developed a “Local Government Spending on Highway” report in 2011 that includes information in bar chart form. The information is interesting since it indicates that towns spend more on highways (\$1.169 billion) than counties (\$0.86 billion) because they own a higher percentage of roads in NYS (51 percent town vs. 18 percent counties). However, counties spent about 42 percent of the funds on capital expenses vs. 15 percent spent by towns. It may appear that counties are more efficient, but in fact, they own about 80 percent of local bridges which have a higher cost to maintain and replace. Counties also typically assist many towns and villages in bridge reconstruction at low to no cost to the town and village. The report also has tables with the cost per lane mile, by type of local government. The report shows a much higher cost per lane mile in cities, counties, and villages--all about \$20,000 per lane mile per year--while the town cost is about \$10,000 per lane mile per year. The higher cost in urban areas would be anticipated with higher level of service and the related higher infrastructure costs. The costs vary between jurisdictions from less than \$4,000 to almost \$50,000 per lane mile per year. The cost per capita for counties is the lowest at \$77 per capita with cities, towns, and villages all between \$131 and \$141 per capita. This appears to point to the problem of local rural funding with smaller populations and significant rural road infrastructure.

#### Cost Per Mile – Maintenance and Capital:

Costs per mile graphs have been developed to show how various states spend funds on their roads. The spending will reflect both the needs and the available funding in the states. Figure 7 is based on FHWA table SF-2 and table HM-10 in 2007. The cost per mile is based on all the disbursements for a category over all the miles for that category of roads in a state. The cost per mile for both maintenance and capital for state owned roads was

extremely variable. The cost per mile for state roads varied from \$25,894 in West Virginia and \$27,767 in South Carolina to a high of \$1,003,777 in New Jersey and \$499,346 in Florida. The overall state cost per mile in the United States was \$105,984. New York was at the high end with a cost of \$320,487 per mile and North Carolina was toward the bottom with a cost of \$32,003 per mile. Variances may be caused by many reasons including cost of materials, cost of labor, and level of service provided.

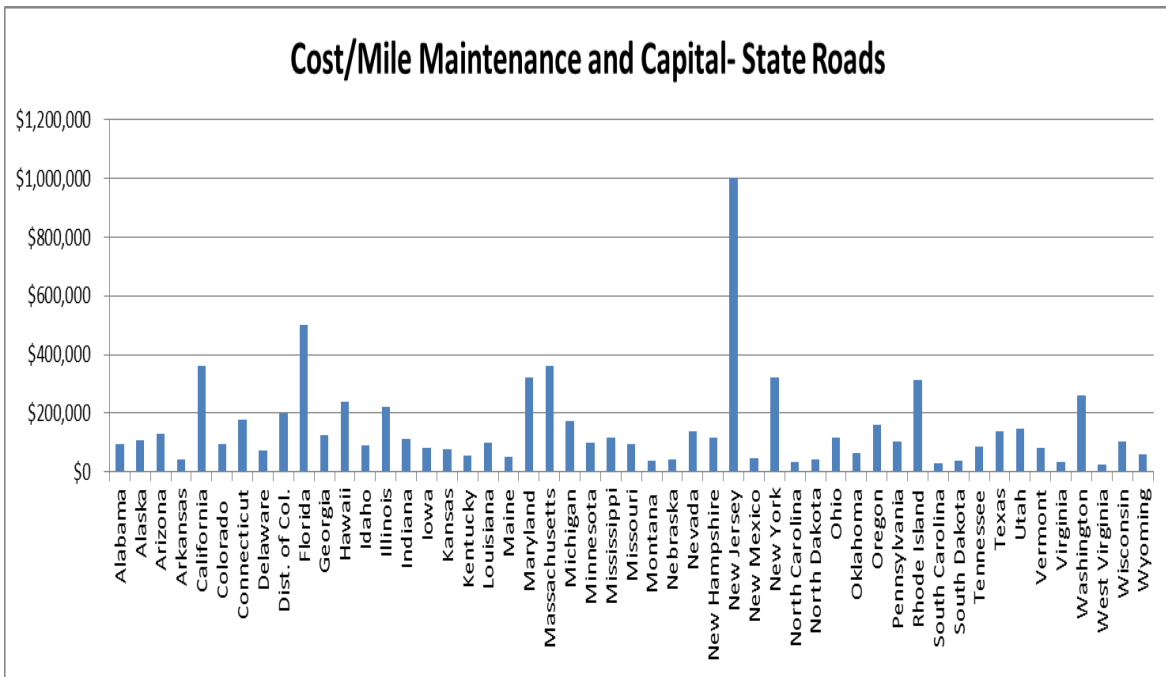


Figure 7 Cost/Mile for Maintenance and Capital for State Roads – FHWA 2007

Figure 8 is based on FHWA table LG -21 and table HM-10 Public in 2007. The cost per mile for both maintenance and capital for locally owned roads was not quite as variable as for state owned roads. The cost per mile for local roads varied from \$2,209 for North Dakota and \$2,241 for Oklahoma to a high of \$59,728 for California and \$63,482 for Virginia. The overall local road cost per mile in the United States was \$15,301. New York was at the high

end with a cost of \$46,267 per mile and North Carolina was toward the middle with a cost of \$18,643 per mile. The overall United States cost per mile for both maintenance and capital for locally owned roads at \$15,301 is much lower than then the \$105,984 for state roads. This much lower cost per mile is both because of the type of roads and the available revenue. In New York the cost for state roads was \$320,487 per mile for state roads and \$46,267 per mile for locally owned roads. Meanwhile, in North Carolina the cost for state roads was \$32,003 per mile for state roads and \$18,643 per mile for locally owned roads. Some of the New York and North Carolina differences are because New York State only owns 14 percent of the roads in the state and North Carolina owns 77 percent of the roads in the state.

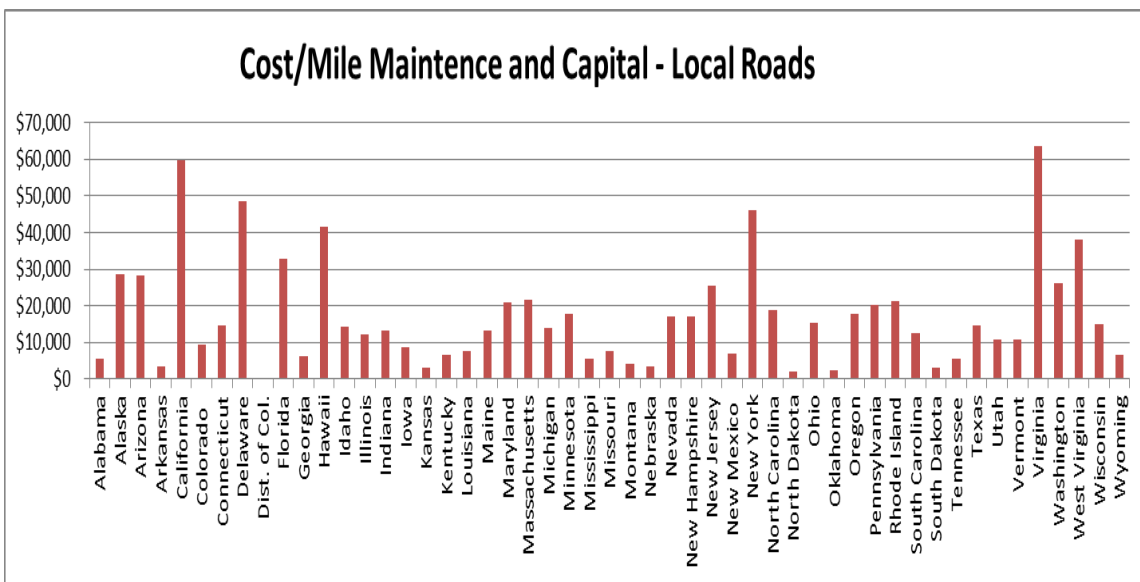


Figure 8 Cost/Mile for Maintenance and Capital for Local Roads – FHWA 2007

**Cost Per Mile – Maintenance:**

Since the cost of capital projects can vary greatly, both regarding improvements and funds spent on bridges, another graph on maintenance only was prepared. Figure 9 is based on reported maintenance costs and the same two data sources: FHWA Table SF-2 and Table HM-10 in 2007. The cost per mile maintenance for state owned roads was still quite variable. The cost per mile for state roads varied from \$2,774 in North Dakota and \$7,063 in West Virginia to a high of \$189,168 in New Jersey and \$139,395 in New York. The overall state cost per mile in the United States was \$25,676. North Carolina was toward the bottom with a cost of \$10,019 per mile.

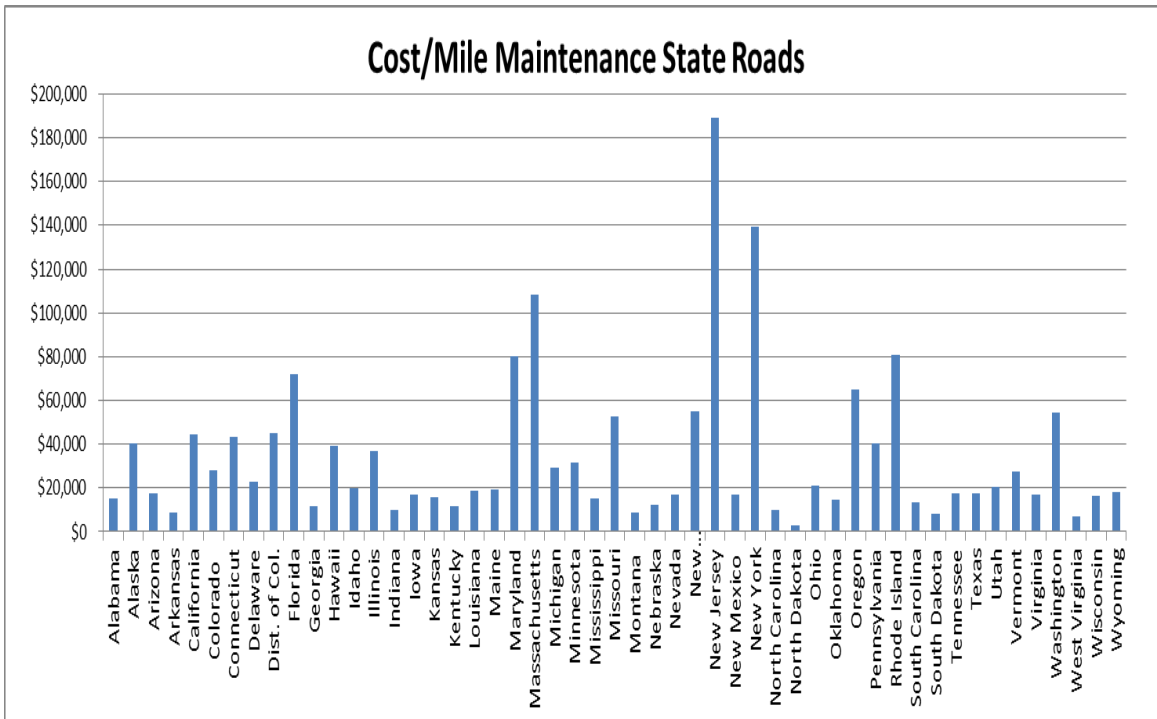


Figure 9 Cost/Mile for Maintenance for State Roads – FHWA 2007

The Figure 10 is based on FHWA table LG -21 and table HM-10. The cost per mile for maintenance for local owned roads was, again, fairly variable. The cost per mile for local roads varied from \$1,140 for Oklahoma and \$1,045 for North Dakota to a high of \$42,876 for Virginia and \$29,345 for West Virginia. The overall local road cost per mile in the United States was \$7,840. New York was at the high end with a cost of \$24,375 per mile and North Carolina was toward the middle with a cost of \$8,787 per mile.

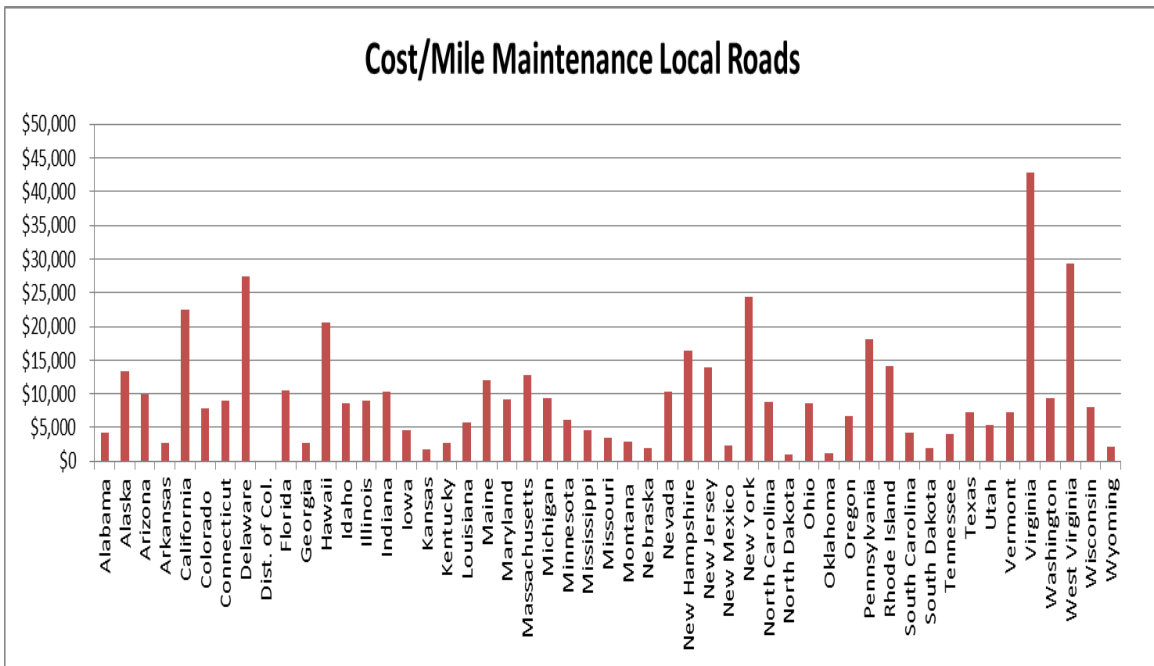


Figure 10 Cost/Mile for Maintenance on Local Roads – FHWA 2007

#### Revenue Per Mile:

The revenue per mile in each state is driven by expenditures and is also determined by the needs to maintain and operate the road system. Since the revenue is driven by the cost per mile of operation in any state some of the differences in revenue per state are also driven by state cost differences such as material costs, labor costs, and the road types included in

the state. Urban road mileage, interstate mileage, and principal arterial mileage in a state government jurisdiction will have a great effect on these costs. Revenue, such as tolling, is another consideration with only four states (Florida, New Jersey, New York, and Pennsylvania) collecting \$3.9 billion of the \$7.4 billion (52 percent) of tolls collected in the United States. Figure 11 outlines the revenue by mile for state roads from FHWA which shows the variability, by state, of revenue per mile. This varies from a low of \$28,640 in South Carolina and \$45,105 in North Carolina to a high of \$1,050,457 in Massachusetts and \$1,386,560 in New Jersey. The overall state revenue per mile in the United States was \$186,291 with New York toward the top with a revenue of \$528,587 per mile.

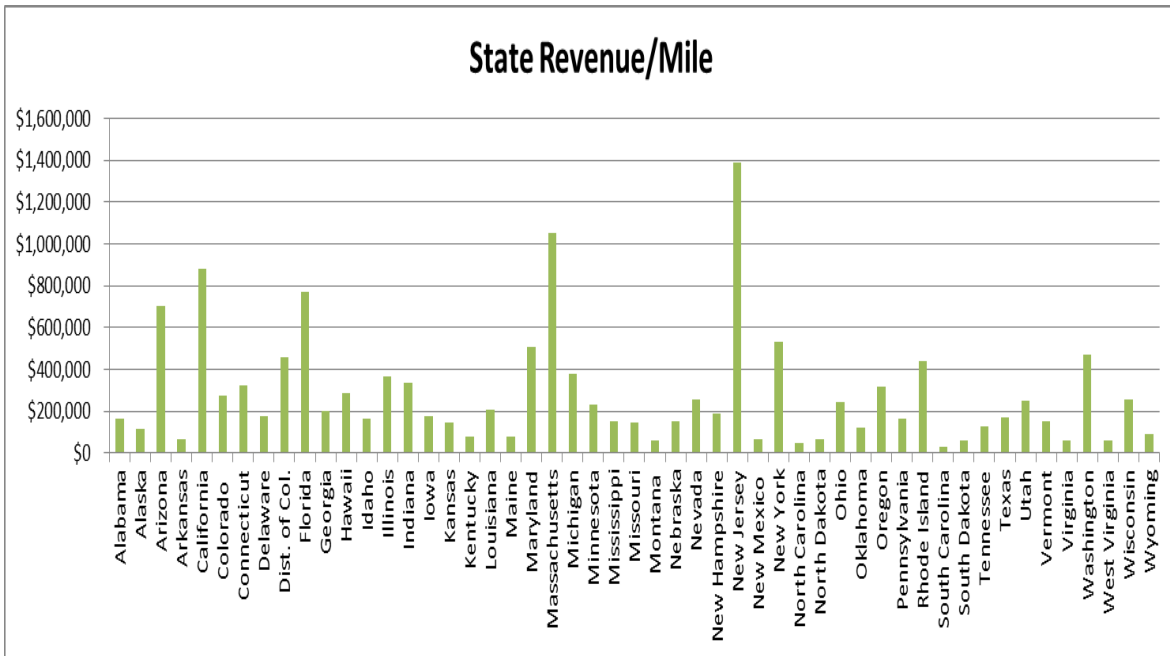


Figure 11 State Revenue per Mile - State Owned Roads – FHWA 2007

Local road cost per mile also depends on many factors, including material and labor costs and also the types of roads that are included. Urban road mileage and principal arterial

mileage in a local government jurisdiction will have a great effect on these costs. Revenue, such as tolling, has little impact on local roads with most tolling being on interstates or urban roads. Overall, receipts will be driven by the needs to maintain and operate local roads and, therefore, drives expenditures. Figure 12 outlines the receipts by mile for local governments, by state, from FHWA data. This varies from a low of \$3,704 in Oklahoma and \$2,651 in North Dakota to a high of \$138,026 in Virginia and \$115,889 in Hawaii. The overall revenue per mile in the United States was \$22,797 with New York toward the top with a revenue of \$61,929 per mile and North Carolina above the middle with a revenue of \$38,780 per mile. The revenue per mile in the United States for state roads was \$186,291 as compared to \$22,797 per mile for local roads.

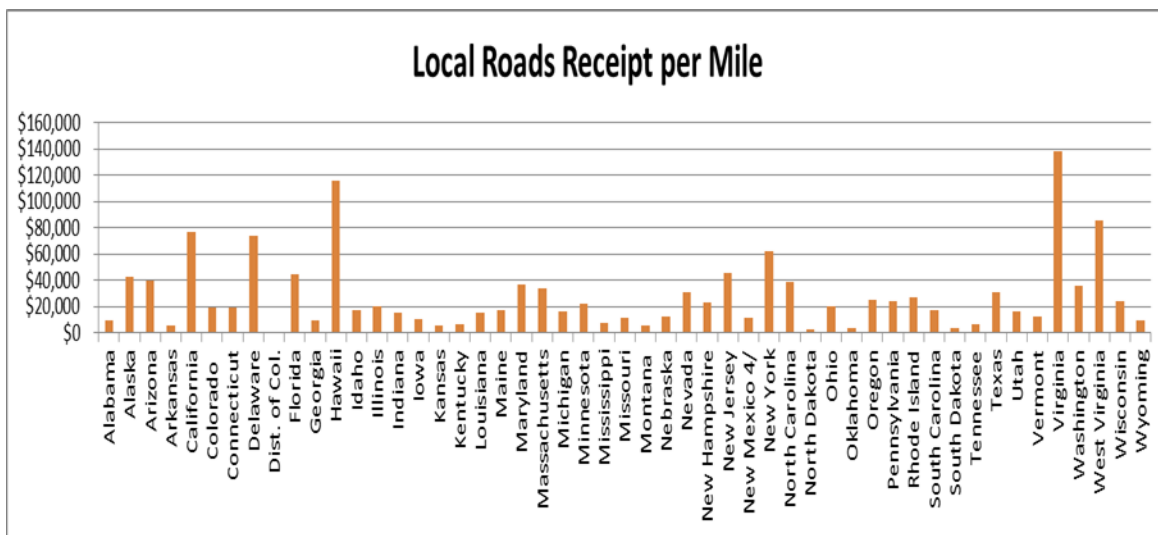


Figure 12 Local Road Receipts per Mile for Local Owned Roads – FHWA 2007

### 3.3 FHWA Data Receipts/Disbursements

The proposed funding model was first reviewed using the readily available information in the FHWA tables. A review of the FHWA data has resulted in Table 2. The available FHWA

local information includes receipt and disbursement data for both urban and local roads, owned by local governments, including counties, towns, and municipalities, compiled by each state. The top receipts or funding areas for local government, in order of importance, are general funds, state government, property tax, and miscellaneous income. These four account for 76 percent of the local road funding. Most receipts are from indirect funding with local imposts, local user taxes, and road/crossing tolls being directly funded from road related receipts. These direct receipts only total 13 percent of all receipts. State and federal receipts may or may not be directly funded by road user receipts and account for 26 percent of receipts. The top disbursements are for maintenance/traffic services, capital, and administration/police safety. These three account for 86 percent of the disbursements.

Table 2 National Receipt and Disbursement Percentages for Local Roads – FHWA 2007

	<b>Receipts</b>		<b>Disbursements</b>
General Fund	31%	Maintenance/Traffic Service	35%
State Government	24%	Capital	34%
Property Tax	12%	Admin/Police/Safety	17%
Misc. Income	9%	Bond Retirement	5%
Bonds	8%	Interest	3%
Other Local Imposts	7%	Payment to States	5%
Local User Tax	4%		
Road/crossing Toll	2%		
Federal	2%		
	99%		99%

Table 3 shows receipts and disbursements for state roads as a comparison to the local road data shown above because North Carolina owns and operates most of its local roads. The FHWA state information includes receipt and disbursement for all roads owned by the state. The top revenue sources for state government, in order of importance, are motor fuel tax, federal, bonds, and motor vehicle and motor carrier taxes. These four account for 73 percent of the state road funding and that mix is dramatically different than for the local roads shown in Table 2. Most revenue is from direct funding with motor fuel taxes, motor vehicle and motor carrier taxes, other state imposts, and road /crossing tolls all being directly funded from road users. These direct receipts total 47 percent for state roads compared to 13 percent for local roads. Federal receipts are also mostly directly funded by road related receipts and account for another 22 percent of receipts. So, approximately 69 percent of funding is direct for state roads which is much different than local roads at around 26 percent. The top disbursements for state roads are maintenance/traffic service, capital, and administration/police safety. These three account for 80 percent of the disbursements. This mix is similar to local roads at 86 percent except that the capital expenditures are much higher for state roads. Capital disbursements for state roads are 52 percent while capital expenses for local roads are at 34 percent.

Table 3 National Receipt and Disbursement Percentages for State Roads – FHWA 2007

	<b>Receipts</b>		<b>Disbursements</b>
General Fund	6%	Maintenance/Traffic Service	16%
Local	2%	Capital	52%
Property Tax	0%	Admin/Police/Safety	12%
Misc. Income	6%	Bond Retirement	4%
Bonds	14%	Interest	5%
Motor Fuel Tax	24%	Payment to Local Government	11%
Motor Vehicle and Motor Carrier Tax	13%		
Road/Crossing Toll	5%		
Federal	22%		
Other Agencies	2%		
Other State Imposts	5%		
	99%		100%

### 3.4 New York FHWA Data Receipts/Disbursements

The initial review of the NYSDOT raw data submitted to FHWA on form 536 for local governments resulted in Table 4 and is based on the 27 rural counties in NYS that have a population of fewer than 75,000 people. This rural definition was later modified to be based on a population density of 250 people per square mile in later sections. The data used for form 536 includes county data where county and town information was combined. For example, Allegany County data included receipts and disbursements for both the county and the 29 towns within that county, all combined. Municipalities, including villages and cities, were listed separately from the counties. Like the FHWA local road data showed, the

top funding for the NYS 27 rural counties, based on a population of less than 75,000, is still from general funds, state government, property taxes, and miscellaneous income. These top four account for 86 percent of receipts in this data set compared to 76 percent for the national data that includes both rural and urban local governments. There also is a large shift to general funds that comprises of 54 percent of the funding in this dataset compared to 31 percent nationally, and much less state funding at only 15 percent in this dataset compared to 24 percent nationally. The top disbursements for rural counties are still for maintenance/traffic service, capital, and administration/police safety with the top three being 96 percent of expenses compared to 86 percent for the national data that include both rural and urban local governments. Maintenance/traffic service for NYS rural counties is 46 percent compared to 35 percent nationally, capital for NYS rural counties is 41 percent compared to 34 percent nationally, and NYS local rural counties are spending 9 percent for administration/police safety as compared to 17 percent nationally. In both receipts and disbursements, more categories are close to zero for rural counties compared to national data. This indicates that the receipts and disbursements are more narrowly defined at the rural county level in NYS.

Table 4 NYS Receipt and Disbursement Percentages for Rural County/Town Roads – FHWA 2007

	<b>Receipts</b>		<b>Disbursements</b>
General Fund	54%	Maintenance/Traffic	46%
State Government	15%	Capital	41%
Property Tax	7%	Admin/Police/Safety	9%
Misc. Income	10%	Bond Retirement	3%
Bonds	4%	Payment to States	0 %
Other Local Imposts	0%	Interest	0 %
Local User Tax	1%		
Road/Crossing Toll	0%		
Federal	8%		
Total	100%		100%

The model was further developed based on a population density definition to include subcategories within the revenue and disbursement areas and include the ability to add innovative funding, such as local option transportation taxes and VMT fees.

### 3.5 New York State Office of State Controller County and Town Level Data

The author conducted an additional review of the available New York State Office of the State Controllers (NYSOSC) 2007 data which includes breakdown by revenues and disbursements reported in appropriate state accounting codes. Tables 5 and 6 are based on the NYSOSC information: one for the 27 rural counties based on 75,000 people per county and all NYS counties and another set for the 411 towns within these 27 rural counties and all the NYS towns. The tables were developed to review the differences between towns and counties which are not available in the FHWA data. The information is broken down by accounting codes and not the headings used in the FHWA data.

Table 5 NYS Receipt and Disbursement for Rural County Roads – FHWA 2007

<b>For Rural Counties (27) in NYS</b>		<b>Percent of</b>	<b>Revenue or</b>	<b>Revenue</b>
<b>Revenue</b>				
Local Transportation Fees	\$35,900,000	16		
Transportation Charges	\$11,700,000	5		
State Transportation Aid	\$54,700,000	25		
Fed Transportation Aid	\$25,100,000	11		
Total Transportation Related	\$127,00,000	58	\$92	\$8,343
Other Revenue	\$90,800,000	42	\$66	\$5,950
Total Highway Revenues	\$218,000,00	100	\$158	\$14,293
<b>Disbursements</b>				
Local Highway Disbursements	\$218,000,00			
Other Government Highway	\$121,000			
Total Highway Disbursements	\$218,000,00	100	\$158	\$14,293

Table 6 NYS Receipt and Disbursement for All County Roads – FHWA 2007

<b>For All Counties (62) in NYS</b>		<b>Percent Total</b>	<b>Cost per Capita</b>	<b>Cost per Lane Mile</b>
<b>Revenue</b>				
Local Transportation fees	\$108,000,000	15		
Transportation Charges	\$34,200,000	5		
State Transportation Aid	\$269,000,000	37		
Fed Transportation Aid	\$150,000,000	21		
Total Transportation Related Revenue	\$561,000,000	77	\$51	\$ 13,526
Other Revenue	\$163,000,000	23	\$15	\$3,933
Total Highway Revenue	\$724,000,000	100	\$66	\$17,459
<b>Disbursements</b>				
Local Highway Disbursements	\$724,000,000			
Other Government Highway Disbursements	\$497,000			
Total Highway Disbursements	\$724,000,000	100	\$66	\$17,459

NYSOSC New York State Rural Counties:

The 27 rural counties, based on 75,000 people or less per county, contain about 50 percent of the land mass in the state, but only 14 percent of the population. The direct local receipts related expressly to transportation were similar in both rural and all the counties with the rural counties being 21 percent and overall counties being 20 percent, as shown in tables 5

and 6. There is a large difference in federal and state support with rural counties having a combined 36 percent of revenue from state and federal government compared to 58 percent combined revenue from state and federal government for all counties. The result is that the rural counties rely on other revenues for 42 percent of the highway budgets compared to 23 percent for all of the counties combined. The data do not specify the source of these other funds used for the highway budget, but they must be allocated from the general fund. According to the same NYSOSC data, the two largest local revenue generators for general funds include sales tax, which is 31 percent of local revenue, and property tax, which is 28 percent of local revenue in the rural counties. Across NYS, sales taxes account for 41 percent of local revenue and property taxes account for 27 percent of all county revenues. Rural counties produce less sales tax with smaller communities, so they rely more on property taxes. The resulting overall transportation cost for rural counties is \$158 per capita compared to \$66 per capita in counties overall since there are many fewer residents to spread the cost over in the rural counties. The other revenue for transportation is \$66 per capita in rural counties compared to \$15 per capita in all counties, combined, in the state.

#### NYSOSC New York State Rural Towns in Rural Counties:

There are 411 towns in the 27 rural counties, based on 75,000 people or less per county, in NYS. A high percentage of local roads are owned by the towns in NYS, with towns being responsible for 51 percent of highways in the state and counties being responsible for 18 percent. The direct local receipts related specifically to transportation are 9 percent in towns which is much less than the 20 percent in the counties. In the rural towns the direct receipts are still lower than counties being 13 percent as shown in Tables 7 and 8. The combined state and federal aid is much less than in counties and is only 16 percent in rural towns and 10 percent for all towns in NYS. These drops have resulted in the reliance on other revenues for 71 percent of the highway budgets in rural towns and 81 percent in all of the towns combined. Again, is not clear how the remaining funds for the highway budgets

are generated, but they must be allocated from the general fund. According to the NYSOSC tables, property taxes account for 56 percent of local revenue and sales taxes account for 13 percent of local revenue for all NYS towns. Similarly, property taxes are 54 percent of local revenue and sales taxes are 10 percent of local revenue for rural towns. So, highway budgets are mostly funded from property taxes at the town level. In both cases, these result in a very high per capita charge of \$186 per capita for highway budgets in rural towns and \$117 per capita for highway budgets for towns across NYS. These costs per capita are probably unsustainable with the current property tax caps in NYS. With ever-rising health benefits and retirement costs, the available funds for highways and other disbursements will be stressed since the overall property taxes will not be able to fund both the benefit increases and the needed disbursements for highways.

Table 7 NYS Receipt and Disbursement for Rural Towns – NYSDOT 2007

<b>Rural Towns (411) in the Rural Counties (27) in NYS</b>		<b>Percent Total</b>	<b>Cost per Capita</b>	<b>Cost per Lane Mile</b>
<b>Revenue</b>				
Local Transportation Fee	\$2,090,000	1		
Transportation Charges	\$26,400,000	12		
State Transportation Aid	\$32,700,000	15		
Federal Transportation Aid	\$2,070,000	1		
Total Transportation Related Revenue	\$63,300,000	29	\$53	\$1,564
Other Revenue	\$158,000,000	71	\$133	\$3,910
Total Highway Revenue	\$222,000,000	100	\$186	\$5,474
<b>Disbursements</b>				
Local Highway Disbursements	\$213,000,000			
Other Government Highway Disbursements	\$8,030,000			
Total Highway Disbursements	\$221,000,000	100	\$186	\$5,474

Table 8 NYS Receipt and Disbursement All Towns – NYSDOT 2007

All Towns (932) in NYS		Percent Total	Cost per Capita	Cost per Lane Mile
<b>Revenue</b>				
Local Transportation Fee	\$22,300,000	2		
Transportation Charges	\$66,600,000	7		
State Transportation Aid	\$94,700,000	9		
Federal Transportation Aid	\$10,600,000	1		
Total Direct Transportation Revenue	\$194,000,000	19	\$22	\$1,675
Other Indirect Transportation Revenue	\$820,000,000	81	\$94	\$7,074
Total Highway Revenue	\$1,010,000,000	100	\$117	\$8,749
<b>Disbursements</b>				
Total Highway Disbursements	\$993,000,000			
Other Government Highway Disbursements	\$21,800,000			
Total Highway Disbursements	\$1,014,000,000	100	\$117	\$8,749

### 3.6 North Carolina Data

The initial review of the FHWA State Road Revenues (FHWA SF-1 -2007) and FHWA State Disbursements (FHWA SF-2 2007) data for North Carolina state highways resulted in Table 9. The local, or secondary, roads in North Carolina account for 81 percent of the highways

owned by the state. The FHWA North Carolina state information includes receipt and disbursement for all state highways. The top highway revenue sources for state government, in order of importance, are motor fuel taxes, federal receipts, other state imposts, and motor vehicle and motor carrier taxes. These four account for 94 percent of the state road funding and this pattern is dramatically different than for data shown previously for local roads. Most revenue in NC is from direct funding with motor fuel taxes, motor vehicle and motor carrier taxes, and local imposts all being direct funding from road-related receipts. These direct receipts total 74 percent of highway funding in North Carolina as compared to 20 percent for rural counties in NYS and 13 percent for rural towns in NYS. Federal receipts are, also, mostly directly funded by road related receipts and account for another 20 percent of receipts. Overall approximately 94 percent of all highway funds are directly funded through user receipts which is a much different pattern than for local roads nationally at 26 percent. The top disbursements are for maintenance/traffic service, capital, and administration/police safety. These three account for 92 percent of the disbursements which is similar to local roads expenditures nationally at 86 percent. Capital expenditures at 51 percent for North Carolina state roads is much higher than the 34 percent for local roads nationally.

Table 9 North Carolina State Highway Receipt and Disbursement – 2007 (FHWA SF-1 & SF-2, 2007)

<b>Receipt/Disbursements for North Carolina State Highways</b>			
	<b>Receipts</b>		<b>Disbursements</b>
General Fund	1%	Maintenance/Traffic Service	23%
Local Government	2%	Capital	51%
Property Tax	0%	Admin/Police/Safety	18%
Misc. Income	1%	Bond Retirement	2%
Bonds	0%	Interest	1%
Motor Fuel Tax	41%	Payment to Local Government	4%
Motor Vehicle and Motor Carrier Tax	16%		
Road/Crossing Toll	0%		
Federal	20%		
Other Agencies	2%		
Other State Imposts	17%		
<b>Total</b>	<b>100%</b>		<b>99%</b>

The following section is from a Secondary Road Program presentation by the Joint Legislative Transportation Oversight Committee on October 5, 2012. The State of North Carolina owns a high percentage of its roads. Of the 79,185 road miles owned, approximately 15,000 miles are primary with approximately 64,000 miles being classified as secondary. Counties currently rely solely on the state for operation and maintenance of these secondary roads.

Currently, approximately 3,800 miles of the secondary roads remain unpaved. Secondary road funding is broken down into four areas that include:

- Routine maintenance (funded by the Highway Fund);
- Contract resurfacing (funded by the Highway Fund);
- System preservation (funded by the Highway Fund); and
- Secondary road improvement program (funded by the Highway Fund and Highway Trust Fund).

Highway Fund appropriations distributed for use within county boundaries is based on the following funding model:

- \$50,000 uniform allocation to each county;
- 90 percent of the remaining funding based on county road miles compared to state road miles; and
- 10 percent of the remaining funding based on county population compared to state population.

General Maintenance Reserve funds are distributed to divisions, based on pro-rata share of lane miles, to help address maintenance needs identified by the NCDOT's Maintenance Condition Assessment Program. This serves as the primary funding source for all routine highway maintenance operations, including mowing, operation of rest areas and welcome centers, patching, guardrail repair, drainage, litter pickup, snow removal, shoulder work, and routine bridge maintenance.

Contract resurfacing provides renewed driving surfaces with the goal of improving ride quality. The resurfacing also reduces patching and frequent maintenance. The funding formula is:

- 50 percent based on needs identified by the NCDOT's Pavement Condition Survey Program;

- 37.5 percent based on lane miles; and
- 12.5 percent based on population.

System preservation funds are used for chip seals, crack sealing, pavement markings and markers, painting structural steel, replacing expansion joints, and waterproofing bridge decks. A portion of the funds is allocated to each division based on the pro-rata share of bridge deck areas for bridge preservation activities. The remaining funds are allocated to each division based on the pro-rata share of total paved lane miles. In 2012-2013, all system preservation funds were allocated for designated bridge improvements.

The secondary road improvement program is used to modernize the paved secondary system and pave unpaved roads. There are specific procedures to allocate the funds in accordance with G.S. 136-44.2A and G.S. 136-44.5. The NCDOT presents programs to county commissions, annually, with progress reports for concurrence, as specified in G.S. 136-44.8. The allocation formula is a strict percentage of the total funds calculated by taking the total miles of secondary roads in a county and dividing by the total miles of secondary roads in the State.

In the year 2007, the amounts for the total funding of secondary roads in North Carolina were \$289.73 million for routine maintenance, \$111.06 million for contract resurfacing, \$35.24 million for system preservation, and \$171.28 million for Secondary Road Improvement Program, for a total of \$607.31 million for the 64,000 miles in the state – or, about \$9,484 per mile of secondary road. This includes both rural and urban secondary roads. (NCDOT Secondary Road Program, 2012)

## **4.0 RESEARCH METHODOLOGY**

This section outlines the methods to be used to meet the goals of the study.

### **4.1 Local Rural Highway Funding Model**

The funding model was developed starting with the available data in the FHWA Office of Highway Policy Information Highway Statistics 2007 reports. The model used the same receipt and disbursement headings as outlined in Receipt/Disbursements for Local Road Funding (FHWA LGF-21 -2007), for inputs. Receipt inputs included the general fund, state government, property tax, miscellaneous income, bonds, other local imposts, local user tax, road and crossing tolls, and receipts from federal sources. Raw data submitted by NYSDOT to FHWA for the local government information on form 536, the Local Highway Finance Report, and data from the NYS Office of the Controller were used to develop the model specifically for local rural highways in NYS, since the FHWA data for local highways includes both rural and urban highways. A county definition based on population density, allowed excluding the urban counties, but not all urban highways. In New York State, some of these receipts, such as other local imposts, local user taxes, and road and crossing tolls were very insignificant at the local rural level. Additional data at the county and town level from the NYSOSC were used to develop the sales tax and property tax options and to allow the model to include local government revenue sources. The receipt inputs developed in the model allow prediction of the receipts based on changes in input, such as property tax rates or sales tax rates that drive the general fund revenue at the local rural level. The majority of the amount of state funds allocated to local government in NYS is driven by disbursement based on a road mileage. The initial local rural model was developed using New York State local rural data; however, the model is general enough to use data from other states. The models for the secondary road systems included only rural counties based on population density. With a rural county defined as one with a population density of 250 people per square mile or less, the data set included 43 of the 62 counties in NYS and 80 of the 100 counties in NC.

The disbursement side of the model used the FHWA categories for inputs. Disbursement inputs included maintenance/traffic service, capital, administration/police/safety, bond retirement, interest, and payment to states. Review of NYS data indicates that payment to states is nonexistent for local rural roads. The model included review of cost per mile estimates for capital and maintenance that can be calculated using FHWA data, the local rural raw data used to submit form 536 by NYSDOT, and values found in the literature. NCDOT information for secondary (local) roads owned by the state was used for model calibration.

The tasks involved in modeling local rural road funding in NC and NY included:

1. Review FHWA local government data for receipts and disbursements for initial local road funding model.
2. Review NYS Office of the Controller and NYSDOT raw data for FHWA form 536 to calibrate the model for local rural roads owned by local government.
3. Review the NCDOT data for receipts and disbursements for calibration of a model for local rural roads owned by the state.
4. Expand the models to allow prediction of the effects of changes to receipts or disbursements.

The result from this process was a local rural funding model that local governments can use to determine how to better balance receipts and disbursements, assuring that local rural roads are sustainable and in good condition. This modeling is important because over 50 percent of the highway system in the United States is owned by local government or is local by function.

#### 4.2 Local Rural Highway Funding Options

The model was reviewed and modified with additional inputs related to funding options, such as a sales tax as a type of local option transportation tax (LOTT), property taxes, motor fuel taxes, or a vehicle miles traveled (VMT) fee. This included reviewing the impact of a

sales tax LOTT and a VMT fee to both augment the current receipts and to replace some existing sources such as property taxes. An ongoing concern in local rural government is insufficient funds for all state and federal mandates; in some places a property tax cap makes the replacement of receipts for local rural roads very attractive. The VMT fee rate was reviewed to estimate the value needed to make a difference or become a major part of the local rural highway funding stream.

#### 4.3 Policy Changes to Local Rural Highway Funding

The last objective was to define and use the local rural highway funding model to assess policies that will assure local rural highway sustainability. A survey was used to verify current local or secondary highway funding and how local rural highway funding could improve in New York State and North Carolina. The survey also included an overview of the conditions of local rural highways and what effect decreasing or increasing receipts would have on the condition of local rural roads. The overall support for innovative funding through a sales tax, LOTT, VMT fee, or other method was surveyed. The survey was used to plug gaps in the knowledge base used in the funding model and determine how receipts or disbursement changes will affect the long-term conditions of the local rural highway system.

Survey respondents included experts from the National Association of County Engineers (NACE) and the Local Technical Assistance Program (LTAP), both in NYS, the New York State Association of Town Superintendents of Highways (NYSATSH), and NCDOT.

## **5.0 NEW YORK STATE LOCAL RURAL HIGHWAY FUNDING MODEL**

### **5.1 Comparison of NYS and NC Local Rural Highway Funding**

In reviewing the data available through FHWA, NYSDOT, NYSOSC, NYS Executive Budget, NCDOT, and the NC Tax Guide (information that would be available in most states), a model using the FHWA receipts and disbursement categories has been developed. The North Carolina Rural Economic Development Center definition that uses a population density of 250 people per square mile or less for a rural county was adopted for this research. In New York State, this population density definition of rural results in 43 of the 62 counties, and the 743 towns in these counties, being classified as rural. These 43 rural counties in NYS account for 30 percent of the state's population spread over 83 percent of the land area in the state. In North Carolina, the population density definition results in 80 of the 100 counties being classified as rural and accounts for 44 percent of that state's population over 72 percent of the land area in the state. The population density in these 43 rural counties for NYS is 85 people per square mile; and in the 80 rural counties in NC the population density is 103 people per square mile.

The capital and maintenance budgets for the local rural highways in the rural counties in NYS were compiled using the raw NYSDOT data collected by county reported on FHWA form 536. The capital and maintenance for the local rural highways in the NC were compiled using NCDOT secondary road system data by county. Table 10 indicates a similar annual highway cost for those living in these rural counties of \$145 per capita in NYS and \$100 per capita in NC. Although cost is similar in both states, their revenue sources are very different. In NYS, local rural roads are decentralized, owned by local governments, and primarily funded by local government revenues based on sales and property taxes. In North Carolina, local roads are primarily owned and funded by the state through motor fuel tax, motor vehicle taxes, and other state imposts.

Table 10 Comparing Rural Counties in NYS and NC – NYSDOT 2007 and NCDOT 2007

<b>Rural Counties NYS and NC 2007</b>					
<b>Disbursements</b>	<b>Amount</b>	<b>Miles</b>	<b>Population</b>	<b>Cost/Mile</b>	<b>Cost/Capita</b>
<b>NYS 43 counties</b>					
Capital	\$262,000,000				
Maintenance	\$214,000,000				
<b>Total</b>	<b>\$476,000,000</b>	<b>52,000</b>	<b>3,280,000</b>	<b>\$9,140</b>	<b>\$145</b>
<b>NC 80 Counties</b>					
Capital	\$197,000,000				
Maintenance	\$203,000,000				
<b>Total</b>	<b>\$400,000,000</b>	<b>43,000</b>	<b>4,010,000</b>	<b>\$9,300</b>	<b>\$100</b>

## 5.2 New York State

In New York State, highway funding data were collected as raw data by county and then submitted for local highways to FHWA on form 536 which includes both receipts and disbursements by local municipalities since the local rural highways are typically owned by local municipalities. Using the definition of rural being counties with less than 250 people per square mile, the 43 rural counties' information on receipts and disbursements has been compiled in Table 11, based on 2007 data. The local rural highways in NYS depend heavily on general funds that are primarily dependent on property taxes and sales taxes for revenue generation. Although property tax is listed separately, a large portion of the general fund is also primarily dependent on property tax for revenue generation.

Table 11 Rural County/Town Roads - Receipts and Disbursements – NYSDOT 2007

<b>NYS - from FHWA NYSDOT Data</b>		
<b>Rural</b>		
<b>Receipt Source</b>	<b>Amount</b>	<b>Percent</b>
Local Highway User Tax	\$3,020,000	0.5
General Fund	\$317,000,000	47.3
<i>Property Tax</i>	<i>\$71,900,000</i>	<i>10.7</i>
<i>Other Local Impost</i>	<i>\$11,400,000</i>	<i>1.7</i>
Misc. Local	\$66,900,000	10.0
Bonds	\$35,600,000	5.3
State	\$101,000,000	15.1
Federal	\$63,200,000	9.4
<b>Total</b>	<b>\$670,000,000</b>	<b>100.0</b>

<b>NYS - from FHWA NYSDOT Data</b>		
<b>Rural</b>		
<b>Disbursement Category</b>	<b>Amount</b>	<b>Percent</b>
Capital	\$262,000,000	39.0
Maintenance	\$214,000,000	31.9
Street Services	\$101,000,000	15.1
General Administration	\$51,800,000	7.7
Law Enforcement	\$8,070,000	1.2
Bonds	\$34,300,000	5.1
<b>Total</b>	<b>\$670,000,000</b>	<b>100.0</b>

The purpose of developing a local rural highway funding model is to project into the future how local rural highways will be funded. This requires a projection of both receipts and disbursements into the future. This first requires projecting disbursement needs into the future for local rural highways. This is difficult in NYS since these highways are owned by the local governments of the 43 counties and 743 towns. There are limited data available to review the condition of these local rural highways in New York State. In 2007, the New York State Association of Town Superintendents of Highways (NYSATSH) commissioned John Shufon to prepare “A 20 Year Needs Assessment of Local Jurisdiction Highways and Bridges in New York State” to project future funding needs for local highways. The 2007 Shufon study for all locally owned highways and bridges throughout New York State estimates the pavement and bridge needs over the next 20 years to be \$45.7 billion, with an estimate of \$22.5 billion in current expenditures (Shufon 2007). Although there has never been a full statewide condition survey of local roads, the NYSDOT regularly does a condition survey of 600 centerline miles of these local roads as part of the ongoing survey of signed shield roads along with roads owned by the state. This condition survey showed that 46 percent of these 600 miles were in poor-to-fair condition, compared to 37.6 percent percent of state owned roads (Pavement Condition 2006). All bridges in the state are surveyed by the state, and in 2007, 38.1 percent of locally owned bridges were considered deficient, compared to 29.1 percent of state owned bridges (Official Bridge Data 2007). The 2007 Shufon NYSATSH study results in a \$23.2 billion or 103.1 percent funding gap over the next 20 years, or about \$1.2 billion annually. This 2007 estimate does not include New York City, but does include urban local roads. The estimate does not include inflation and includes cost estimates based on road classifications including arterial, collector, and local roads. The report was based on the estimated costs to achieve the NYSDOT goal of having all locally owned roads achieve a 12-year treatment “paving cycle” (the industry standard noted in the report).

When we apply this statewide 103.1 percent gap estimate to the \$261 million capital expenses in 2007 for local rural highways, we can estimate the increase required in

disbursements and receipts to be an additional \$270 million dollars in 2007. This \$270 million increase would achieve the NYSDOT goal of a 12-year treatment “paving cycle” for local rural highways. With the goal set to increase disbursements in capital, the increase in receipts will be based on percentages reported to FHWA with all the other values holding constant. This requires a \$270 million per year increase from \$261 million to \$531 million in capital as shown in Table 12. One option under local control to increase revenue is to increase allocations from the general fund in counties and towns. Based on review of the 2007 NYSOSC data, in NYS rural counties, 31 percent of the general revenue is generated by sales tax and 18 percent of the general revenue is generated by property tax; while in rural towns, 13 percent of the general revenue is generated by sales tax and 56 percent of the general revenue is generated by property tax. Counties and towns would have to increase the funds to highways from the general funds by \$270 million per year (from \$317 million to \$587 million per year, or 85.1 percent) to fill the 103.1 percent gap in capital for highways with all other spending and revenues being held constant. Later in this document, I will discuss the ability of local governments to raise these taxes to those levels, allowing such an increase in funding through general revenue at the local level.

Table 12 Projections of General Fund Increase to Fund 103.1% Capital Gap

<b>MODEL WITH GENERAL FUND INCREASE</b>			
<b>Rural NYS County/Town Roads</b>			
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>	<b>Percent of total</b>
0	Local Highway User tax	\$3,020,000	0.3
85.1	General Fund	\$587,000,000	62.4
0	Property Tax	\$71,900,000	10.7
0	Other Local Impost	\$11,400,000	1.7
0	Misc. Local	\$66,900,000	7.1
0	Bonds	\$35,600,000	3.8
0.0	State	\$101,000,000	10.8
0.0	Federal	\$63,200,000	6.7
40.2	TOTAL	\$940,000,000	100.0

<b>MODEL WITH GENERAL FUND INCREASE</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent of total</b>	<b>Increase</b>
Capital	\$531,000,000	56.5	\$270,000,000
Maintenance	\$214,000,000	22.7	0
Street Services	\$101,000,000	10.7	0
General Administration	\$5,820,000	5.5	0
Law Enforcement	\$8,070,000	0.9	0
Bonds	\$34,300,000	3.6	0
TOTAL	\$940,000,000	100.0	\$270,000,000

Two other options include increasing state or Federal aid. The option to increase state aid may be viable and would be based on CHIPS funding (defined previously in Section 2.3.1) from the Dedicated Highway and Bridge Trust Fund (DHBTF). The change is a far reaching state political change that would make a real difference in local rural highway funding. Increasing Federal aid would require a fundamental change of the aid system to local roads and is the change most often mentioned by officials of both the counties and towns in NYS. This option may not be realistic with the current Federal deficit and with the Highway Trust Fund being underfunded. Table 13 shows that an increase of \$270 million per year from the \$101 million of state support in 2007 to local rural highways, or 266 percent, would be needed to obtain a 103.1 percent increase in capital funding for local highways. How to accomplish this increase will be discussed although this magnitude appears quite large.

Table 13 Projections of State Increase to Fund Projected 103.1% Capital Gap

<b>MODEL WITH STATE INCREASE</b>			
<b>Rural NYS County/Town Roads</b>			
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>	<b>Percent of Total</b>
0	Local Highway User Tax	\$3,020,000	0.3
0.0	General Fund	\$317,000,000	33.7
0	<i>Property Tax</i>	<i>\$71,900,000</i>	<i>10.7</i>
0	<i>Other Local Impost</i>	<i>\$11,400,000</i>	<i>1.7</i>
0	Misc. Local	\$66,900,000	7.1
0	Bonds	\$35,600,000	3.8
266.0	State	\$371,000,000	39.5
0.0	Federal	\$63,200,000	6.7
40.2	TOTAL	\$940,000,000	100.0%

<b>MODEL WITH STATE INCREASE</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent of Total</b>	<b>Increase</b>
Capital	\$531,000,000	56.5	\$270,000,000
Maintenance	\$214,000,000	22.7	0
Street Services	\$101,000,000	10.7	0
General Administration	\$51,800,000	5.5	0
Law Enforcement	\$8,070,000	0.9	0
Bonds	\$34,300,000	3.6	0
TOTAL	\$940,000,000	100.0	\$270,000,000

An updated study was released in November 2013 that was commissioned by the New York State Association of Town Superintendents of Highways (NYSATSH). This 2013 “An

Assessment of Local Jurisdiction Highways and Bridge Infrastructure in New York State” projects future funding needs for local highways, is very similar to the 2007 report, and was commissioned to update for the 2015-2030 period (Shufon 2013). The study indicated a 15-year need of \$34.9 billion for highways and bridges, while local government was estimated to spend about \$15 billion over that period at current rates. In 2013, the gap was projected to be 132 percent, as opposed to the projected 103 percent gap from 2007. The gap has widened to approximately \$1.3 billion annually since costs continue to escalate and highway spending locally has remained fairly constant at \$1 billion a year by local governments in NYS. The 2013 report makes a specific recommendation on how this gap for the local highways could be closed. Currently, 46 percent of vehicle miles traveled are on these local highways and, if CHIPS funding reflected this and 46 percent of the gasoline fees and other related highways taxes were given to CHIPS, funding the additional \$1.4 billion annually would fill the \$1.3 billion annual gap.

The 132 percent gap estimated in the 2013 report is reflected in Table 14. When we apply this statewide 132 percent gap estimate to the \$261 million capital expenses in 2007 for local rural highways, we can estimate the increase required in disbursements and receipts to be an additional \$345 million dollars per year. This \$345 million increase would achieve the NYSDOT goal of a 12-year treatment “paving cycle” for local rural highways. With the goal set to increase disbursements in capital by \$345 million, receipts will need to increase that same amount. One option that will be reviewed is to increase receipts under local control, increasing funds from the general fund in counties and towns. Later in this document, I will discuss the ability of local governments to raise property and sales taxes to allow such an increase in funding through general revenue at the local level.

Table 14 Projections of General Fund Increase to Fund 132% Capital Gap

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>	<b>Percent of Total</b>
0	Local Highway User Tax	\$3,020,000	0.3
109.0	General Fund	\$663,000,000	65.2
0	<i>Property tax</i>	<i>\$71,900,000</i>	<i>10.7</i>
0	<i>Other Local Impost</i>	<i>\$11,400,000</i>	<i>1.7</i>
0	Misc. Local	\$66,900,000	6.6
0	Bonds	\$35,600,000	3.5
0.0	State	\$101,00,000	10.0
0.0	Federal	\$63,200,000	6.2
51.5	<b>TOTAL</b>	<b>\$1,016,000,000</b>	<b>100.0%</b>

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent</b>	<b>Increase</b>
Capital	\$607,000,000	59.8	\$345,000,000
Maintenance	\$214,000,000	21.0	0
Street Services	\$101,000,000	9.9	0
General Administration	\$51,800,000	5.1	0
Law Enforcement	\$8,070,000	0.8	0
Bonds	\$34,300,000	3.4	0
<b>TOTAL</b>	<b>\$1,016,000,000</b>	<b>100.0</b>	<b>\$345,000,000</b>

Another viable option to plug the 132 percent funding gap is to increase state aid similar to the 101 percent funding gap increase. However, the increase is now a \$345 million increase from the \$101 million of state support in 2007 to local rural highways, or a 341.8 percent increase. This potential increase will be discussed later, although this magnitude appears quite large and is controlled by state government.

Table 15 Projections of State Increase to Fund 132% Capital Gap

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>	<b>Percent of Total</b>
0	Local HW User tax	\$3,020,000	0.3
0.0	General Fund	\$317,000,000	31.2
0	<i>Property Tax</i>	<i>\$71,900,000</i>	<i>10.7</i>
0	<i>Other Local Impost</i>	<i>\$11,400,000</i>	<i>1.7</i>
0	Misc. Local	\$66,900,000	6.6
0	Bonds	\$35,600,000	3.5
341.8	State	\$446,00,000	44.0
0.0	Fed	\$63,200,000	6.2
51.5	TOTAL	\$1,015,000,000	100.0%

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent</b>	<b>Increase</b>
Capital	\$607,000,000	59.7	\$345,000,000
Maintenance	\$214,000,000	21.0	0
Street Services	\$101,000,000	9.9	0
General Administration	\$51,800,000	5.1	0
Law Enforcement	\$8,070,000	0.8	0
Bonds	\$34,300,000	3.4	0
TOTAL	\$1,015,000,000	100.0	\$345,000,000

An even worse case scenario would be to increase both capital and maintenance costs, both by the estimated 132 percent. This would require a revenue increase of about double the projected revenue from the previous discussion. It would require an additional \$345 million per year in capital and \$272 million per year in maintenance, or a \$627 million per year total increase, which appears to be way past reasonable expectations. Table 15 shows the increase from the current \$316 million per year to \$944 million per year. To close the funding gap and accommodate increased costs, it would add \$627 million per year and amount to a 198 percent increase to general revenue.

Table 16 Projections of General Fund Increase to Fund Projected 132% Capital and Maintenance Gap

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>	<b>Percent</b>
0	Local HW User Tax	\$3,020,000	0.2
198.0	General Fund	\$944,000,000	72.8
0	<i>Property Tax</i>	<i>\$71,900,000</i>	<i>10.7</i>
0	<i>Other Local Impost</i>	<i>\$11,400,000</i>	<i>1.7</i>
0	Misc. Local	\$66,900,000	5.2
0	Bonds	\$35,600,000	2.7
0.0	State	\$101,000,000	7.8
0.0	Fed	\$63,200,000	4.9
93.6	TOTAL	\$1,300,000,000	100.0

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent</b>	<b>Increase</b>
Capital	\$607,000,000	46.7	\$345,000,000
Maintenance	\$496,000,000	38.2	\$272,000,000
Street Services	\$101,000,000	7.8	
General Administration	\$51,800,000	4.0	
Law Enforcement	\$8,070,000	0.6	
Bonds	\$34,300,000	2.6	
TOTAL	\$1,300,000,000	100.0	\$627,000,000

This worst case scenario, of increasing both capital and maintenance needs, would require a 618.5 percent increase per year in CHIPS funding, from the current \$101 million to \$729 million per year as Table 17 shows, to fund the calculated increase of \$627 million per year.

Table 17 Projections of State Increase to Fund Projected 132% Capital and Maintenance Gap

<b>MODEL WITH REVENUE DRIVING</b>				
<b>Rural NYS County/Town Roads</b>				
<b>% Increase</b>	<b>Receipt</b>	<b>Amount</b>		<b>Percent</b>
0	Local HW User Tax	\$3,020,000		0.2
0.0	General Fund	\$317,000,000		24.4
0	<i>Property Tax</i>	<i>\$71,900,000</i>		<i>10.7</i>
0	<i>Other Local Impost</i>	<i>\$11,400,000</i>		<i>1.7</i>
0	Misc. Local	\$66,900,000		5.2
0	Bonds	\$35,600,000		2.7
618.5	State	\$729,000,000		56.2
0.0	Federal	\$63,200,000		4.9
93.6	TOTAL	\$1,300,000,000		100.0

<b>MODEL WITH REVENUE DRIVING</b>			
<b>Rural NYS County/Town Roads</b>			
<b>Disbursements</b>	<b>Amount</b>	<b>Percent</b>	<b>Increase</b>
Capital	\$607,000,000	46.7	\$345,000,000
Maintenance	\$496,000,000	38.2	\$272,000,000
Street Services	\$101,000,000	7.8	
General Administration	\$51,800,000	4.0	
Law Enforcement	\$8,070,000	0.6	
Bonds	\$34,300,000	2.6	
TOTAL	\$1,300,000,000	100.0	\$627,000,000

The most likely of these scenarios, the 103.1 percent and 132 percent gaps in capital funding only, will be reviewed further in this report since these gap values correspond to the projected shortfalls of recent NYSATSH studies across the state of around \$1.4 billion for local highways (Shufon 2007, Shufon 2013). The calculations assuming that the 103.1 percent and 132 percent gaps are for both capital and maintenance, result in as much as a \$2.54 billion shortfall across the state. This calculated \$2.54 Billion is almost double the projected needs in these NYSATSH studies, are too high and, therefore, will not be reviewed any further. The projected revenue increases in the following sections do not consider changes in behavior reflected by the discussed tax increases. Any significant tax increases in some of the scenarios may result in behavior changes that, in turn, may result in lower than projected revenue increases. The purpose of this report is to discuss the relative merits of various revenue increases and the potential political changes required to implement these changes.

### 5.3 New York Sales Tax

The State government's second largest tax receipt is sales tax which is 19 percent of the tax receipts in the state. Sales tax receipt estimates are a function of the economic activity and the sales tax rate. Some of the major economic indicators that affect the sales tax include consumption of taxable goods, consumption of taxable services, employment, disposable income, vehicle sales and sales tax base (2013-2014 Executive Budget Economic and Revenue Outlook). The model used for the state to project sales tax revenue is very complicated and dependent upon many economic factors (2013-2014 Executive Budget Economic and Revenue Outlook). Local government also relies heavily on sales tax and, from 1998 to 2008, county property tax revenues rose 42 percent while sales tax revenues rose 66 percent. Sales tax revenue now exceeds property tax revenue in 37 counties in NYS accounting for over 25 percent of revenues in all counties in 2008. (NYSOSC 2010) Most, but not all, counties share a portion of the sales tax with cities and towns and townships.

The overall NYS aggregate sales tax is high, compared to other states, with an aggregate rate of 8.45 percent, with local sales tax rates being as high as 4.875 percent. Most local governments have limited staff and use simple methods of projecting sales tax revenue or use the projections developed by the state as a baseline. Another issue in many communities with sales tax is the declining population in upstate New York cities and rural New York. The declining populations can affect sales tax collections and revenue sharing based on populations (NYSOSC 2010). The previous Table 12 notes that the general revenue from local governments to highways would need to increase 85.1 percent to be able to cover a 103.1 percent gap in funding of \$270 million dollars. When the newer 2013 report is used, this means a 109 percent increase in general revenue would be needed to cover the 132 percent gap in funding of \$345 million per year. The sales tax revenue in 2007 for the 43 rural counties was \$1,472 million dollars and for the 750 rural towns it was \$254 million with some towns receiving zero sales tax distribution. That is a total of \$1,726 million dollars of sales tax revenue in rural counties and towns. The \$345 million increase would require an overall 20 percent increase in sales tax and sales tax collections dedicated to capital funds for local roads. With the overall sales tax of 8.45 percent (and 4.875 percent locally), it would require an increase of the local sales tax to 5.85 percent and the overall tax rate to 9.42 percent, which does not appear likely with the current NYS governor and legislature goal of cutting taxes. More reasonable options that could assist in improving local rural highways would be to review the possibility of increasing funding 25 percent or 50 percent over current levels. These sales tax increases would also be politically challenging in the current tax cutting environment. A 50 percent increase in funding, or \$131 million, would require a 7.58 percent increase in local sales tax from 4.875 percent to 5.24 percent and a 25 percent increase in funding, or \$65 million, would require a 3.79 percent increase in local sales tax from 4.875 percent to 5.06 percent. These increases to the local sale tax rate are still high, but somewhat more reasonable. Another option is to shift that same amount to a dedicated highway fund from current sales tax revenue. This

shift would require either cuts in other spending or increases in other revenue to support the change in spending.

Increasing the overall NYS sales tax rate to cover all the required increases in state allocation to all local roads is a different option to review. If we use the typical value of state allocation to local rural roads of \$101 million per year, and we need \$345 million, that would require a 345 percent increase in overall state allocation. With \$415 million in 2007 in state aid to all local highways, it would require an increase to \$1,833 million, or an increase of \$1,418 million using the same allocation of funds based on road mileage. This \$1,418 million increase is about the same increase as proposed in the 2013 NYS needs assessment report (Shufon 2013). In 2007, NYS collected around \$8,009 million into its general fund and around \$11,296 million overall based on a state sales tax rate of 4 percent and other related sales taxes. Using the general fund number of \$8,009 million, the additional \$1,418 million increase would require a state sales tax rate change of 17.7 percent or an increase to 4.71 percent. Financing 50 percent of the needed local rural highway funding would result in a state sales tax rate of about 4.27 percent, and a 25 percent increase would result in about a 4.13 percent state sales tax rate. These last two appear to be more likely to gain approval and would not just address the local rural funding issue but address local road funding issues across the state. The projected revenue increases do not consider changes in behavior reflected by the discussed tax increases.

### 5.3.1 Sales Tax Projections

Sales tax projections are becoming more important with sales tax being a higher percentage of revenue in many NYS counties than property tax, and the second largest revenue stream in New York state government. NYS county and town sales tax revenues' average annual increase was 5.2 percent from 1997 to 2007. But, from 2007 to 2008, county sale tax revenues only increased 1 percent, and sale tax revenue decreased 5.9 percent in 2009. The county by county increases or decreases varied from a 10 percent increase to a 10 percent decrease in 2008 to 2009 (NYSOC 2010). The variability of sales tax is based on many

economic conditions that make the forecasting of sales tax revenues very complicated. State governments use complicated econometric models to forecast sales tax revenues. These models include using a forecast of the gross national product (GNP), personal income, consumer price index (CPI), savings, housing starts, unemployment, and other state data that requires a skilled staff and resources to collect and analyze (NYSOC 2010). Local governments do not have the resources or expertise to apply these complex models and rely on simpler trend analysis using local conditions reviewed by administrators. When various curve-fitting projections were compared to the state forecasts using econometric models, in a 1994 study, there were limited increases in the accuracy of projections using the econometric models. The authors found that, overall, the best method was to combine the various curve-fitting results with the econometric model results. The authors suggested that local governments combine a judgmental forecast with curve-fitting techniques when no econometric model was to be used. (Grizzle and Klay 1994).

A simple trend analysis projection, based on past information and a range for the future projections, was also discussed in a 2009 University of North Carolina School of Government economics bulletin regarding how the global economic crisis effect state and local tax revenues. The bulletin anticipates a return to a higher savings rate with projected lower incomes resulting in a slower sales tax revenue increase than in the past in the United States. They are projecting a possible 8 percent drop in personal retail sales if savings rates return to the historical norm of 8 percent. An 8 percent drop in retail sales per capita would also cause an 8 percent drop in personal sales tax revenue. This sales tax revenue may even approach a 15 percent drop in personal sales tax revenue if the decrease in personal income continues. A drop such as this could result in a permanent reduction in revenue of 5 percent in North Carolina and 2-3 percent for local governments (Smith 2009). The overall projected annual increase in sales tax revenue for the local rural governments could, therefore, be around 3 percent, which is in between the conservative 1 percent annual increase referenced in a recent NYSOSC report when reviewing the last recession (NYSOSC 2010) and

the longer term trend of a 5 percent annual increase before the recession. A 3 percent anticipated annual growth in sales tax will not be sufficient for most local governments to cover their ever-rising health care and pension cost increases. The high NYS tax rate, variability of collections, and the reliance of sales tax for other purposes will make an increased sales tax for specific road use extremely difficult and unlikely.

#### 5.4 New York Property Taxes

In 2007, the NYS rural counties collected \$541 million in property taxes, while the rural towns collected \$618 million in property taxes, for a total of \$1,159 million. The \$345 million increase in capital funds needed annually for local rural highways would require an overall 29.8 percent increase in property tax dedicated to highway capital funds. Currently, there is a property tax cap in New York State, whereby the law requires local governments and school districts to limit annual property tax increases to no more than 2 percent or the rate of inflation, whichever is less. The actual annual property tax calculation increase is very complicated since certain annual spending increases are excluded from the calculations. In addition, local communities may override the 2 percent tax cap with a 60 percent vote by residents for schools, or by a 60 percent vote of the governing body for local governments. In any event, a long term property tax increase remotely close to 28.9 percent dedicated to highways is unlikely to pass in any local community with the current extremely high property tax rates and the NYS tax cap law. The increase or decrease in property values can also affect the tax yield and the required taxes needed to fund government. Increasing the revenues for local rural highways by 50 percent, or \$131 million, would require a property tax increase of 11.3 percent, or increasing the revenue 25 percent for local rural highways would require a 5.64 percent increase. Even these smaller property tax increases would be a real struggle with the high property tax rates and the current property tax cap in NYS.

#### 5.5 New York Consolidated Local Street and Highway Program

The Consolidated Local Street and Highway Program (CHIPS) funding supplied by the state is

the primary funding of most local highway capital projects in NYS. The CHIPS funding that is received by local government from the state is based on mileage owned by the local government. CHIPS funding relies on the New York State Dedicated Highway and Bridge Trust Fund (DHBTF) that was meant to be a pay-as-you-go system. The four largest revenue sources for the DHBTF are currently the Petroleum Business Tax (PBT), transfers from other funds (mostly from the general fund), bond proceeds, and the motor fuel tax, listed in order of revenue. Disbursements from the DHBTF include primarily State highway operations, debt service, and capital (primarily CHIPS) listed in order of disbursements. CHIPS funding has not grown, reflecting either inflation or revenues from 2003 to 2013, and is always in jeopardy because of changes in the DHBTF that currently relies on bonding of projects and the increase in use of the DHBTF for state operations. In New York, the state only owns 14 percent of highways and none of the local rural highways which rely heavily on local revenue of property taxes and sales taxes. The rural towns and counties own most of the local highways. Local rural towns own 37,000 of the 58,000 centerline town miles (64 percent), while the rural counties own 15,000 of the 20,000 centerline county miles (75 percent) in the state. Currently, the state receipt share for local rural road funding is only around 15.1 percent, according to FHWA (FHWA 2007) and reporting through the NYSDOT (NYSDOT 2007). This is low considering 86 percent of the highways in New York State are owned and operated locally. One possible solution to fund the \$345 million gap in the local rural highway projected needs is to increase the CHIPS or state funding to assist local government. This potential increase in state funding is relatively promising since the local governments will have many issues raising property tax or sales tax sufficiently for the future needs of these local rural roads. A \$345 million, or 342 percent, increase from the state to the rural governments would be required to fund the resulting 132 percent increase in capital funds for local rural highways. At first glance, this appears to be unlikely in light of state politics and state budgets. One way to change the funding is to modify the current use for the motor fuel taxes collected, as discussed in the next section.

## 5.6 New York Motor Fuel Tax

The 2013-2014 Executive Budget Economic and Revenue Outlook includes an analysis of the New York State budget that contains a section on Motor Fuel Taxes in the United States. NYS is listed in the top 10 for total state taxes on gasoline at 34.8 cents per gallon in 2013 based on the retail price of \$3.00 per gallon of gasoline. However, these overall gas taxes include one of the lowest state motor fuel taxes (only 8 cents per gallon) that currently goes directly to the NYS DHBTF. Figures 13 and 14 indicate that the motor fuel tax collected has been fairly consistent, at around \$500 million, since 1994 with a small downward trend through 2013. This downward trend may become worse based on reports (AEO 2013, US PRIG 2013) that both fuel usage and vehicle miles traveled may both continue to decrease in the future. The Economic and Revenue Outlook report also showed that capital project funds from the DHBTF have consistently been approximately \$400 million per year, also showing a small downward trend from 2003 until 2012, and were projected to continue at that value in the near future. In 2013, this trend was reversed and, for the first time in recent history, a two-year commitment to add an additional \$75 million for capital was made by the Governor for both 2013 and 2014. The 2013 \$75 million increase has not been added to the graph in Figure 13 since there is no commitment to make this increase permanent.

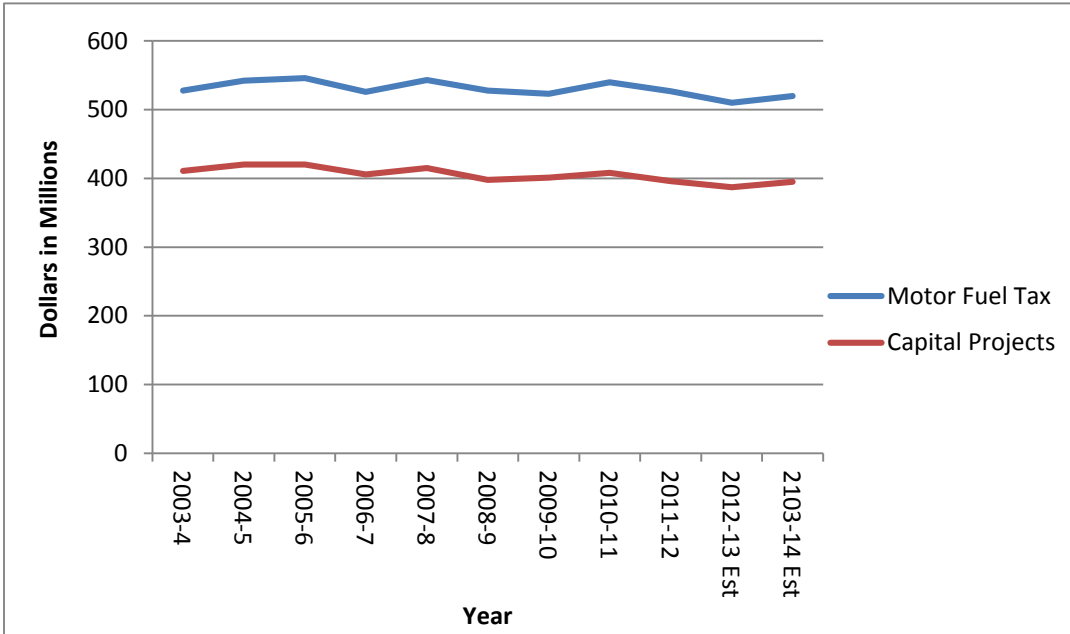


Figure 13 NYS Motor Fuel Tax and State CHIPS Capital Funding (2013-2014 Executive Budget Economic and Revenue Outlook)

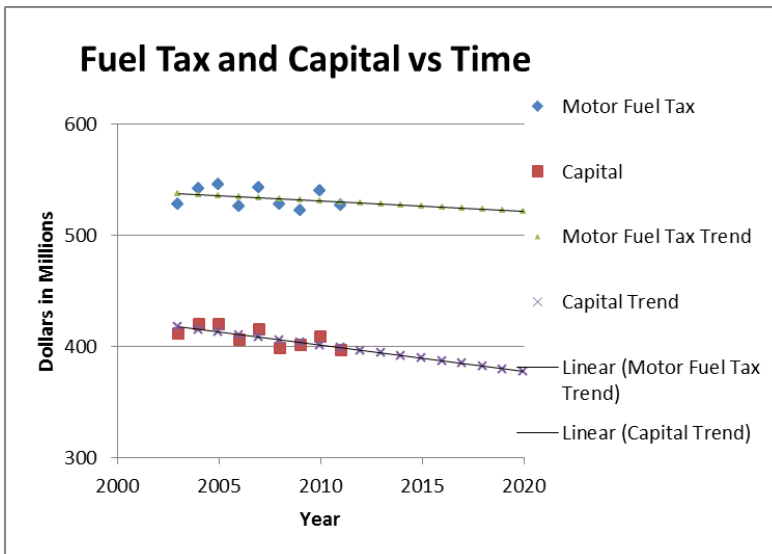


Figure 14 NYS Projected Motor Fuel Tax and State CHIPS Funding

There is another tax on gasoline in New York State called the Petroleum Business Tax (PBT) that is also used for transportation. This tax includes a base rate and a supplemental rate that is reviewed annually; both rates typically increase annually. In 2013, the PBT was 18.6 cents per gallon on highway gasoline and 16.85 cents per gallon on highway diesel. There is also a PBT tax rate on other petroleum products, typically from 4.2 to 10.1 cents per gallon. The overall collection of PBT taxes are almost all based on highway fuels, has been around \$1 billion annually, and was \$1.125 billion in 2012-13. The PBT tax includes a 55 percent (\$660 million) allocation to the DHBTF, a 32.6 percent (\$388 million) allocation to the dedicated mass transportation fund (DMTF), and an 11.9 percent (\$142 million) allocation for the mass transit operating assistance fund (MTOAF). Although NYS has the eighth highest overall total state tax on gasoline of 34.8 cents, only 8 cents per gallon that is the state motor fuels tax and 55 percent of the PBT, or 10.23 cents per gallon, goes toward DHBTF. That is only 18.23 cents of the 34.8 cents per gallon, or 52.4 percent of the taxes on gasoline, that is available in any way to fund highway related projects. The rest of the New York State taxes on gasoline are PBT taxes that go to mass transit or sales taxes that go to the general fund. North Carolina, by comparison, is also one of the top 10 states for overall taxes on motor fuel with 37.5 cents per gallon of gasoline (based on a \$3.00 per gallon price in 2013) as all motor fuel tax. A discussion of the use of the North Carolina motor fuel taxes is in a later section.

There are other issues with the NYS DHBTF revolving around bonding and using funds for state operations. A policy change that would make a difference is changing the taxes on gasoline to become more focused on motor fuel taxes and to dedicate these additional funds to capital projects on the majority of roads in NYS which are local roads. In 2007, the rural county state allocation of the state capital CHIPS funds was \$101 million of the \$415 million in capital funds allocated from the DHBTF. If the rural county state allocation needs to be \$446 million, or a \$345 million increase, the overall capital funds from the DHBTF

would need to rise to just over \$1.8 billion if the rural counties maintain the same percentage of the capital funds from the DHBTF. An increase to \$1.8 billion of CHIPS funding would require significant changes in DHBTF philosophy and possibly funding streams. One possible change would be from the current motor fuel tax rate of 8 cents per gallon to a rate of around 35 cents per gallon, or a 341 percent increase in the motor fuel tax. That would require an overall increase in motor fuel taxes to 53.6 cents since 18.6 cents are also dedicated to the PBT. The total tax would increase to 61.8 cents on a gallon of gas if the other taxes remain as they are now. Another change that would make a difference would be altering how the DHBTF allocates the funds. Since inception, only 35 percent of revenue has been used on capital projects. A change in this allocation would make a substantial difference without increases in taxes.

Figure 15 is based on a 24 percent increase in motor fuel tax each year, over a 7-year period, to obtain this projected 341 percent increase in the motor fuel tax dedicated to capital projects. This is fairly optimistic and would mean that underfunding would continue over that period of time.

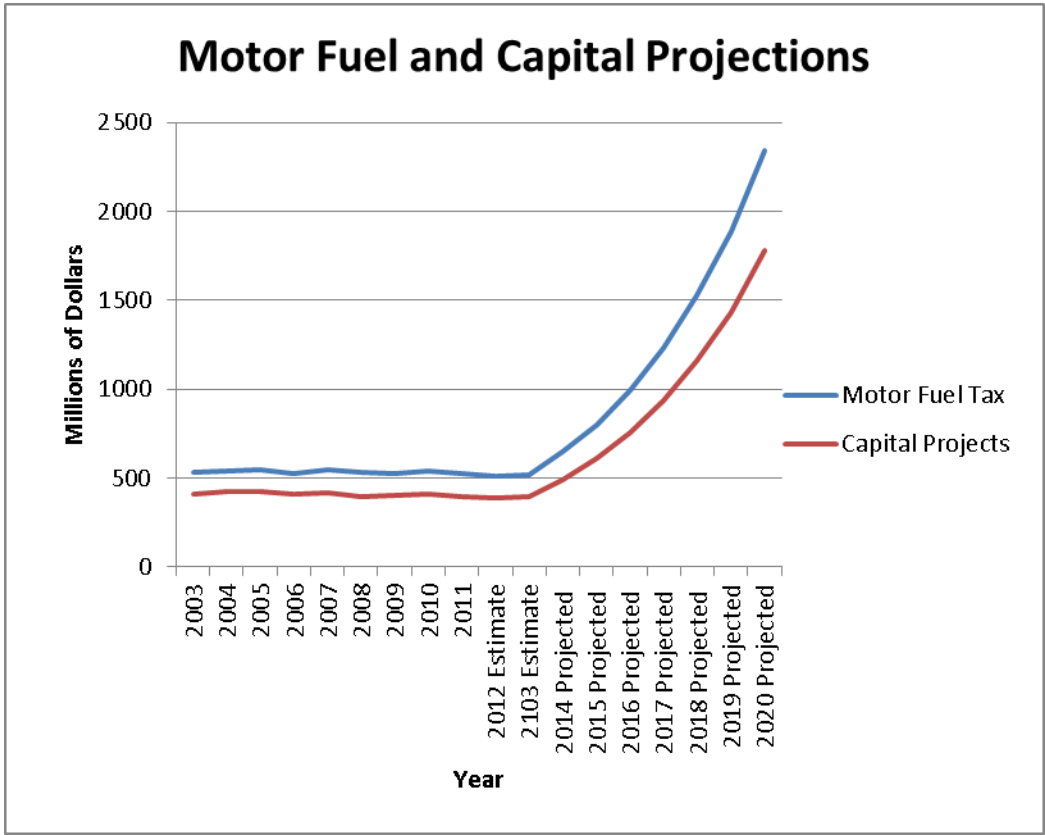


Figure 15 Future State Motor Fuel Tax Increase Dedicated to Capital Project Projected Funding a 132% Gap (\$345 Million)

Figures 16 and 17 include review of both a 50 percent gap (\$131 million) and a 25 percent gap (\$65 million) in local rural highway funding. Funding a smaller gap would still mean a substantial increase in road quality. A 15.4 percent annual increase in fuel taxes could fund a \$131 million gap and, an annual 8.1 percent increase in fuel taxes could fund a \$65 million gap. In either case, the levels of increase in funds could also be met by changing allocations to the DHBTf from the motor fuel taxes that are already collected in the state through reallocation of the collected funds.

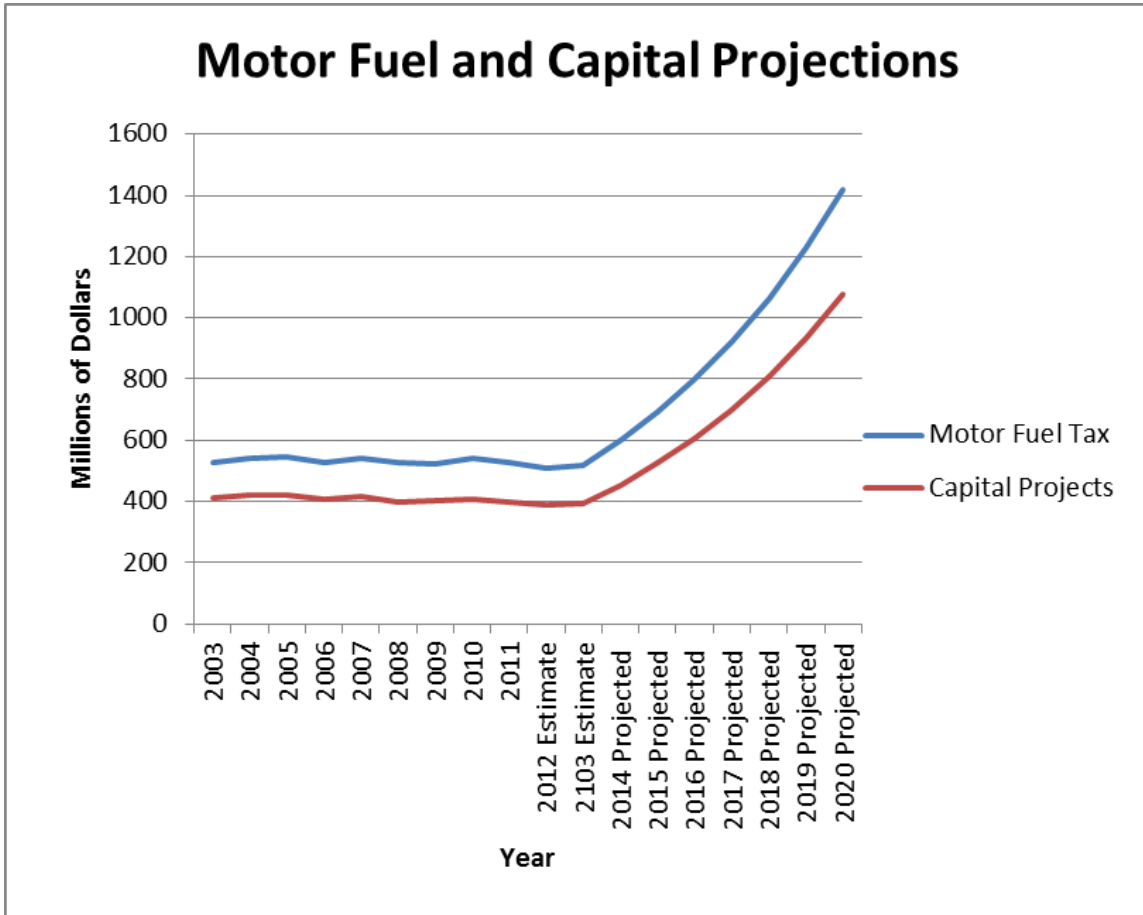


Figure 16 Future State Motor Fuel Tax Increase Dedicated to Capital Projects Projected Funding a 50% Gap (\$131 Million)

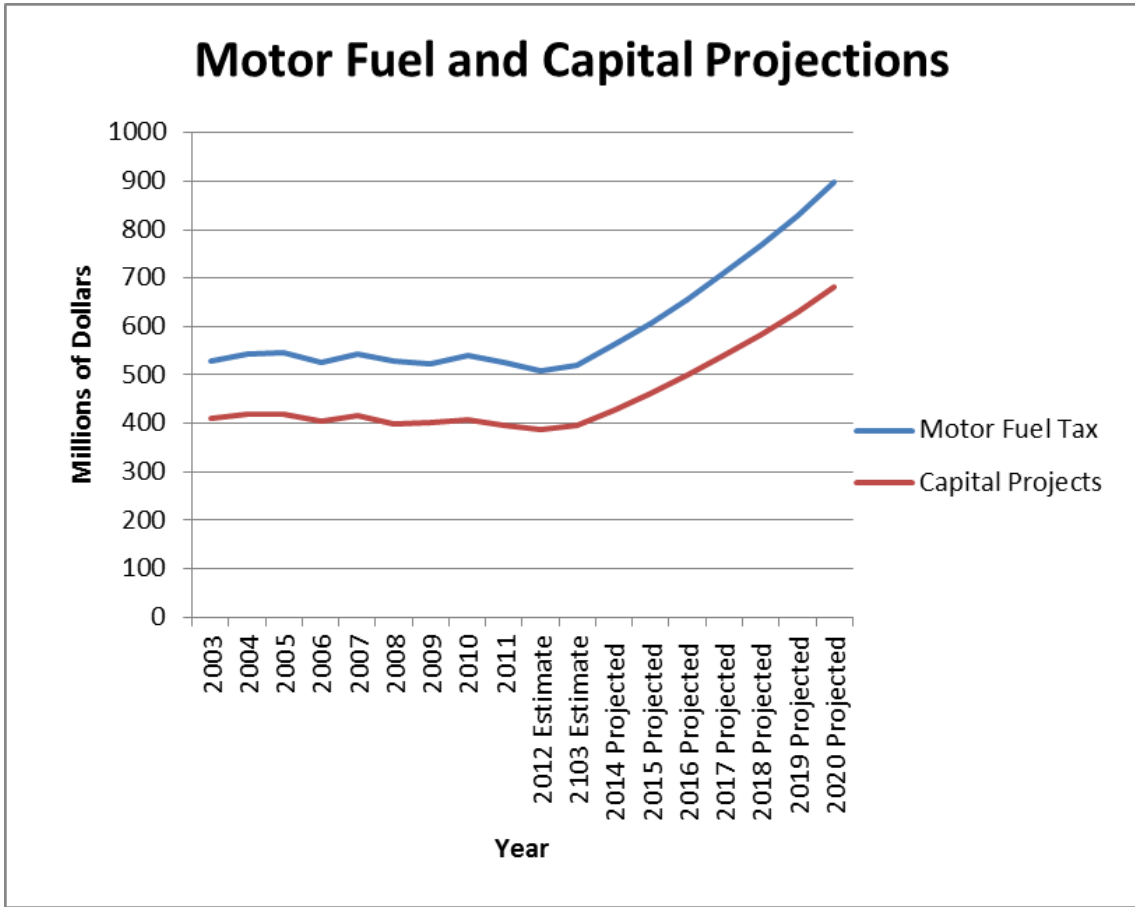


Figure 17 Future State Motor Fuel Tax Increase Dedicated to Capital Projects Projected Funding a 25% Gap (\$65 Million)

A change to fund the 132 percent gap through tax increases would take time and may not take place since the increase in overall taxes is so substantial. The smaller gaps of 25 percent and 50 percent reviewed would also be difficult, but would be more achievable with much smaller tax increases. There also is a need to publically debate changing the gasoline taxes to a higher percent of motor fuel taxes and increasing the percent of taxes on gasoline that go directly to highways while we continue to rely on motor fuel taxes in NYS. The ongoing issue of having inadequate highway capital project funds for local highways based on inadequate motor fuels tax dedicated to highways, even with New York State

having one of the highest overall tax rates on gasoline in the United States, is a problem.

The important issue that needs debating is why only about 50 percent of the taxes on motor fuels are available in any manner for highway-related projects or spending.

#### 5.7 New York Mileage Base User Fee

A recent report for the NYSDOT funded by New York State Energy Research and Development Authority (NYSERDA) discussed all the typical implementation concerns of a Mileage Based User Fee (MBUF), including the higher costs of collection and the lower vehicle miles traveled (VMT) noted in other reports resulting from changes in individual public driving patterns (Zupan, Barone and Whitmore 2012). The motor fuel tax decrease in NYS is a perfect storm, as it is across the United States, with the declining personal VMT, more efficient vehicles, and static tax rates, and all the while capital costs continue to rise. Currently, the capital needs for the NYSDOT and the Metropolitan Transit Authority is slightly less than \$16 billion annually, while recent expenditures are only \$8 billion with current fuel taxes being less than \$3 billion and projected to shrink to \$2.4 billion in 2025. Fuel taxes would need to double to 75 cents per gallon to meet current spending needs and reach \$2 per gallon to meet capital needs. The authors estimate a uniform 2.5 cents to 3 cents a mile as a MBUF for the current level of spending, and 8 to 9 cents per mile to meet all spending needs. A more reasonable compromise of a 7 cents per mile MBUF may also be considered. The report also discusses various ways to tier the charge based on road types and with a higher charge for trucks. The authors recommend a number of ways to move forward, including targeting a compromise capital need of \$12 billion annually, tolling as a transition, small increases in motor fuel tax and sales tax, education of the public, and working toward a MBUF. In the report, highway funding was lumped into the overall capital needs discussion for the NYSDOT and the DHBTF. There was no discussion regarding the fact that most capital needs in NYS for local highways are funded locally.

Reviewing the FHWA 2007 statistics, based on local rural roads defined by function, there were approximately 136,737 million annual vehicle miles driven in New York State with approximately 4,646 million vehicle miles, or 3.4 percent, on local rural roads. In North Carolina, FHWA 2007 statistics based on local rural roads by function, there were approximately 103,598 million annual vehicle miles with approximately 5,021 million vehicle miles on local rural roads, or 4.8 percent of vehicle miles traveled. In both cases, these local rural roads do not exactly correspond to the local rural defined by population density in this dissertation; however, the data are useful for discussing the MBUF concern for local rural roads. The dollars collected may be insufficient to fund local rural roads if there is a direct relationship between collections and disbursements or spending on the roads where the fees are collected.

Using the FHWA estimate of an overall 136,737 million annual vehicle miles in NYS, a 1.607 cents per mile MBUF would equal the \$2.197 billion collected by motor fuel related taxes in 2007. This does not include the overcharge that is needed to pay for the collection process. This \$2.197 billion value includes only the state motor fuel taxes, and currently, only 18.23 cents of the 34.8 cents per gallon (52.4 percent) based on motor fuel tax and PBT goes toward the DHBTF and has any potential to be spent on highways. Using the 1.607 cents per mile VMT charge and the 4,646 million vehicle miles driven on local rural roads by function, it would translate to only \$74.7 million MBUF collected. All rural roads, by the FHWA functional definition, make up approximately 44,489 of the 113,740 miles in NYS, or 39 percent of roads. The local rural roads defined by population include 52,000 miles of road or about 46 percent of roads in NYS. According to recent estimates, these local rural roads defined by population density receive approximately \$101 million from the state based on road mileage only and need another \$345 million per year in capital. Using the calculated VMT per mile of road on the 44,489 miles of rural roads by function from FHWA data, we can estimate 5,430 million VMT on the 52,000 miles of local rural roads based on

population density in this report. Using the 1.607 cent per mile fee MBUF to replace current state related motor fuel taxes, this translates to \$87.3 million collected on these local rural highways.

The calculated \$87.3 million is below the \$101 million received from CHIPS funds from the state for local rural roads, based on local rural road mileage only. Using the 1.607 cents MBUF, we would expect the local rural roads by population density to be around \$13 million, or 13 percent, short of the current \$101 million received from the state based on road mileage only. But, this shortfall assumes that all collected fees go directly to highways. Currently only 52.4 percent of collected motor fuel related taxes/fees are being allocated to the DHBTF and available for highways with the remaining portion being allocated to transit. If we recalculate the MBUF collection available to highways using the current 52.4 percent, the MBUF available for local highways drops to \$45.75 million, a 55 percent shortage from the current \$101 million in CHIPS funding. So, a shortage from 13 to 55 percent is possible, and it actually may be more since only 35 percent of the DHBTF currently is allocated to capital projects. Obviously, the MBUF structure would have to be substantially higher than the 1.607 cents per mile to help local rural highway funding; as high as 1.86 cents a mile to fund the current \$101 million allocation and as high 8.21 cents per mile to fund the \$345 million gap. The more likely way to address this shortfall is to change from a direct allocation for these low VMT highways to some type of cross-subsidy. Without a cross-subsidy, a MBUF would be a disaster to local rural highway funding. The already underfunded local rural roads would potentially receive substantially less from the state under a MBUF based on direct payment founded on VMT fee collection on the local rural roads.

#### 5.8 New York Survey Results

Local and state experts in New York and North Carolina were surveyed regarding observations on highway condition, funding status, and future funding needs for local rural

highways. In New York, the NYSDOT is only responsible for 15 percent of highways with the primary responsibility of local rural highways being local government at the town and county levels with minor, although critical, funding from state allocations. Survey participants in NYS were primarily town officials, county officials, and statewide local highway organization representatives all related to the locally owned highways. The survey questionnaire and results are in the appendix with the participant identification excluded. The survey answers in both states were similar in overall content although differences were noted because of the centralized planning and funding in North Carolina as compared to New York State where it is decentralized.

Respondents in both states discussed the level of service of highways as being important for funding the various levels of highways in the local rural highway system. Many of the local rural highways have low VMT with chip seal being most appropriate for them.

The highway funding issue may not always be related to inadequate funding, but related to having adequate planning and strategically using the available funds to extend service life at the required level of service. In NYS, adequate planning is an issue since many of the local rural highways are owned by towns that typically have small highway departments with limited staff and with supervisors who work along with the small crews. These working supervisors may have adequate experience to develop strategic funding plans, but have limited time for long term planning. Most small towns do not have an adequate staff to review pavement conditions and develop strategic highway investment plans. Most of the NYS urban counties have significant highway departments with staff to review pavement conditions and plan for local highway investments. The rural counties are larger and better staffed than the towns, but they also may not have adequate systems with staff to strategically develop a plan based on pavement conditions and service life considerations.

One rural county in NYS was noted as having a simple, but significant, life cycle pavement budgeting and planning system to strategically plan and allocate funds to extend highway pavement service life for local rural highways. The pavement budgeting and planning system uses VMT and pavement condition index for the county roads in determining the required funding request based on life cycle costs. The system uses the pavement condition information to assign appropriate maintenance that would include crack seal, chip seal, or slurry seal, and also hot mix repair that might include recycling. Using an estimated life cycle of the particular repair from 18 to 30 years, the spreadsheet analysis is used to develop an annual pavement budget request to the county legislature for the approximately 700 miles of county highways. The spreadsheet uses current estimated costs for the various pavement maintenance and repair projects on a per mile basis. This pavement budgeting and planning system has resulted in decreasing poor highways in the county from 15 percent to 6 percent from 1998 to 2012. The county does not always fully fund all highway funding requests, but the ability to plan and show the impact of funding life cycle costs has assisted in spending the allocated funds, strategically, and has educated the legislature regarding long term financial needs to maintain the highway infrastructure. Other rural counties and towns discussed processes that reviewed needs, but not in a similar detailed structured process. Most NYS participants were concerned that there was not a consistent process across the state to determine highway pavement conditions that could be used to develop highway funding needs. Most noted that there was often a large change in highway pavement conditions from town to town and often county to county in NYS. Typically, the NYS state highway system was noted as being in better condition than the local system.

Many of the NYS respondents referenced the 2007 and 2013 Needs Assessment of Local Jurisdiction Highways and Bridges (Shufon 2007, Shufon 2013). Both needs assessments reference an unfunded need of over \$1 billion per year for local highway funding. It was noted that the 2007 needs assessment study and the Local Roads Matter New York State

legislative awareness program have been responsible for the recent increase in state funding (CHIPS) to local highways. There is still a need for a statewide highway pavement condition survey of local highways. The condition of bridges is well documented with regular inspection of bridges by the NYSDOT. There is a need to have a similar condition survey of NYS pavements conducted regularly. One respondent suggestion was to start a NYS local highway pavement condition survey with a statistical sample of local highways and that this survey may be something the FHWA would fund. The best solution may be to have pavement condition surveys be the responsibility of the NYSDOT since they already have a structured highway pavement survey program for state owned highways.

Respondents were concerned that either stable or decreasing highway funding will result in the deterioration of highways since the cost of construction and maintenance continues to rise. The rising construction and maintenance costs require an increase in local rural highway funding just to maintain the current highway conditions. Budgets have not been increasing to match these growing construction and maintenance costs.

The survey information indicated there is little chance of receiving additional Federal highway funds for local rural highways. There might be a slim chance to receive additional funds for local bridges, but additional funds are unlikely for local rural highways themselves. Any decrease in Federal funding to the states would have a negative effect on local rural highways since there would probably be a shift of state dollars away from local rural highway systems to critical bridges, other state highways, or the interstate system. Respondents thought there was no reasonable possibility of increasing the motor fuel tax with the legislature because of public opinion and the current political atmosphere of no tax increases. NYS respondents stressed that there is a need to review how the taxes on motor fuel are used, as well as the real issue - the redistribution of these motor fuel tax funds to local highways rather than funding transit, the general fund, and other uses. They generally felt that there is no need to raise NYS motor fuel taxes until state government changes the

distribution of them since only 50 percent go to highways in any form, and only 13 percent go to local highways. Increasing property taxes to fund additional local rural highway funding did not appear to be on the radar screen since a property tax increase was not a realistic option due to the current high property taxes and the recent property tax cap.

Sales tax increases to fund highways were seen as possibilities by respondents if the sales taxes were directly tied to highway improvements. However, there was limited support for sales taxes for highway funding since respondents preferred more direct taxes like motor fuel taxes rather than an indirect sales tax. There is also concern about the ability to raise the NYS sales tax dedicated to highways with the sales tax in NYS already approaching 9 percent. Also discussed was the issue of marketing a sales tax increase dedicated to highways to the public, based on the public believing that any sale tax increase would, in fact, be used for highways. Most agreed that highway officials and government could not be trusted in their ability to be transparent and use a proposed tax increase for its intended purpose. The survey responses also included statements that government has not been able to adequately make the public understand the need for increases in revenue to fund highways.

A major item discussed in NYS was the added regulations imposed by the state for MAP21 Federal funds for local bridges. Most agreed the cost can be double, or more, for a bridge funded by Federal funds due to state requirements. Respondents saw this as a major issue. Some even suggested that the state keep all the MAP21 funds and distribute bridge money like CHIPS funds that are distributed with few regulations and requirements. Although bridge conditions are improving by using the Federal funds, respondents were concerned about culverts and having the funds to replace the current culverts in disrepair.

The possibility of lower VMT over time was not a concern, as many local rural roads already have a low VMT. There was no perceived impact on required highway funding if VMT

dropped since the low VMT highways already require a minimum level of funding not completely based on VMT. One respondent noted that less VMT may be positive to long term performance and the local rural highway system may take longer to deteriorate. The level of service issue typically deals with these issues and no effect was seen with lower VMT. There was recognition that heavy trucks were the major reasons for distress, even on rural highways. This survey included concerns regarding potential fracking and whether the damage and impact on local rural highways would be fully paid for by the fracking companies. One respondent noted that either casino revenue or fracking charges could be used statewide to assist highway funding. Changing to a VMT-based fee or MBUF in the future appeared to be of minimal concern at this time. There was limited concern raised about the potential lower collection of MBUF on local rural highways and impact regarding funds for local rural highways. This was most likely since the low VMT local rural highways were already, in effect, subsidized by higher VMT highways and no one mentioned that this would change in the future. One respondent was very concerned about the cost of administering a MBUF system that would, essentially, require a much higher MBUF fee to cover the higher collection cost. The concern is the administration cost of the MBUF would be much higher than the current motor fuel tax collection cost.

When experts were asked about converting paved roads to gravel, they responded that conversion should be considered but typically is not done in New York State. The lack of highway maintenance is having the same result as reverting to gravel. The county roads typically have higher traffic counts that would not make reversion to gravel acceptable, while town roads often have lower traffic counts and would make revision to gravel possible. However, the perceived reason reversion to gravel is not being considered is that 90 percent of town highway supervisors in NYS are elected. The perception is that the public would not reelect highway superintendents that reverted paved highways to gravel and decreased the level of service on town highways. The reverting to gravel would cause

issues with dust and the level of service expected by the public. The maintenance of gravel highways is becoming a lost art and is highly labor intensive. The traffic level for reverting to gravel was noted as being as low as 8 and 10 AADT to as high as 150 AADT. Other options, instead of reverting to gravel, included chip seal. The need to have good gravel with adequate fines with an upgraded base was expressed for gravel and chip sealed highways. Experts also responded that gravel highways save local government highway funds, but require regular maintenance and transfer higher costs to the user through rougher roads, lower gas mileage, and more vehicle repairs.

#### 5.9 New York Local Rural Highway Funding Conclusions

Table 18 summarizes the model projection for increasing either local sales tax or local property taxes to fund the increase in local highway funding from 25 percent to the projected full-gap of 132 percent. Review indicates, as previously discussed, that both of these options are unlikely with the already high local sales tax and the tax cap on property taxes and the already very high property taxes. Even an increase in local sales tax to fund only the 25 percent increase in local rural highway funding would be difficult to pass with the local legislature since the local tax rate would need to go over 5 percent which would result in the total sales tax being over 9 percent.

Table 18 Comparing Local Tax Increase in NYS for Increased Local Rural Highway Funding

<b>New York State Projections</b>						
<b>Based on Local Tax Increase and Support</b>						
2007	<b>Total Local Rural Expenses (Million)</b>	\$261.5	\$261.5	\$261.5	\$261.5	\$261.5
	<b>Gap ( Percent)</b>	132.0%	103.1%	75.0%	50.0%	25.0%
	<b>Need (Million)</b>	\$345.2	\$269.6	\$196.1	\$130.8	\$65.4
2007	<b>Local Rural Sales Tax Revenue (Million)</b>	\$1,726	\$1,726	\$1,726	\$1,726	\$1,726
Current	<b>Local Rural Sales Tax Rate (Percent)</b>	4.875%	4.875%	4.875%	4.875%	4.875%
	<b>Needed Percent Increase in Sales Tax</b>	20.0%	15.6%	11.4%	7.58%	3.79%
	<b>Needed New Local Sales Tax Rate (Percent)</b>	5.85%	5.64%	5.43%	5.24%	5.06%
2007	<b>Local Rural Property Tax Revenue (Million)</b>	\$1,159	\$1,159	\$1,159	\$1,159	\$1,159
	<b>Needed Increase in Local Property Tax (Percent)</b>	29.8%	23.3%	16.9%	11.3%	5.64%

Table 19 summarizes the model projection for increasing state sales tax to fund the increase in statewide local highway funding from 25 percent to the projected full-gap of 132 percent. Review indicates, as previously discussed, that this option is somewhat unlikely with the already high state sales tax. An increase in state sales tax to fund only the 25 percent increase in local rural highway funding would be difficult to pass with the legislature since the state tax rate would increase to 4.13 percent and this would cause the total typical sales tax rate to rise to 8.98 percent. There might be a small chance to pass this change if there was a direct tie to highways and direct impact shown with a significant increase in funding of local roads statewide. Spending another \$269 million for a total of \$638 million, statewide, on local highways would be significant enough that the public would see the difference in both highway conditions and jobs.

Table 19 Comparing State Sales Tax Increase for Increase Local Rural Highway Funding

<b>New York State Projections</b>						
<b>Based on Statewide Sales Tax Increase and Support</b>						
2007	<b>Total State Support (Million)</b>	\$415	\$415	\$415	\$415	\$415
2007	<b>Total Local State Support (Million)</b>	\$101	\$101	\$101	\$101	\$101
	<b>Local Need (Million)</b>	\$345.2	\$269.6	\$196.1	\$130.8	\$65.4
	<b>Gap (Percent)</b>	341.8%	266.9%	194.2%	129.5%	64.7%
	<b>New State Support for Local Need (Million)</b>	\$1,833.3	\$1,522.8	\$1,220.9	\$952.2	\$683.6
	<b>Increase in State Support (Millions)</b>	\$1,418.3	\$1,107.8	\$805.9	\$537.2	\$268.6
2007	<b>State Sales Tax Revenue (Million)</b>	\$8,009	\$8,009	\$8,009	\$8,009	\$8,009
Current	<b>State Sales Tax Rate (Percent)</b>	4.00%	4.00%	4.00%	4.00%	4.00%
	<b>Needed Percent Increase in State Sales Tax</b>	17.71%	13.83%	10.06%	6.71%	3.35%
	<b>Needed New State Sales Tax Rate (Percent)</b>	4.71%	4.55%	4.40%	4.27%	4.13%

Table 20 summarizes the model projection for increasing the state motor fuel tax to fund an increase in local highway funding from 25 percent to the projected full need of 132 percent. Review indicates, as previously discussed, that this option is very unlikely with the already high overall taxes on motor fuel. Even an increase in state motor fuel tax to fund the 25 percent increase in local rural highway funding would be difficult to pass through the legislature since the state motor fuel tax rate would need to go from 8 to 13.2 cents per gallon with a total tax on motor fuel increasing from 34.8 cents to 40 cents. The model used calculated the relationship of collections to expenses on local highways that is currently in

effect. If that changed, the resulting calculated increase would be different. There might be a small chance of increasing the motor fuel tax if there is a direct and public tie to highways. With the small potential increase of \$31 per year to an individual driving 12,000 miles a year in a vehicle that achieved 20 mpg, this option might be acceptable if the public could believe the funds would be used for local highway projects. This direct tie would show a significant increase in funding to local roads by having an additional \$286.6 million, for a total of \$683.6 million, spent statewide on local highways; significant enough that the public would see the difference in both highway conditions and job creation. A better option might be to change how the current 34.8 cents per gallon of taxes is allocated since only 52.4 percent of these taxes have any possibility of going to highways. That would be difficult to do politically since the \$286.6 million would need to be cut from the general fund or made up in other cuts or tax increases not related to the increased spending on highways.

Table 20 Comparing State Motor Fuel Tax Increase in NYS for Increased Local Rural Highway Funding

<b>New York State Projections</b>						
<b>Based on Statewide Fuel Tax Increase and Support</b>						
2007	<b>Total State CHIP Support (Million)</b>	\$415	\$415	\$415	\$415	\$415
	<b>Local Rural Need (Million)</b>	\$345.2	\$269.6	\$196.1	\$130.8	\$65.4
	<b>New State CHIP Support Total (Million)</b>	\$1,833.3	\$1,522.8	\$1,220.9	\$952.2	\$683.6
	<b>Increase in State Support (Millions)</b>	\$1,418.3	\$1,107.8	\$805.9	\$537.2	\$268.6
2007	<b>Current Motor Fuel Tax Rate Per Gallon</b>	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080
2007	<b>Total State Motor Fuel Tax Collection (Million)</b>	\$543	\$543	\$543	\$543	\$543
2007	<b>Relationship Expenses to Collection</b>	76.4%	76.4%	76.4%	76.4%	76.4%
	<b>New Motor Fuel Tax Collection (Million)</b>	\$2,398.8	\$1,992.5	\$1,597.4	\$1,245.9	\$894.5
	<b>Needed Increase in Motor Fuel Tax (Percent)</b>	341.8%	266.9%	194.2%	129.5%	64.7%
	<b>Needed New Motor Fuel Tax Rate Per Gallon</b>	\$0.353	\$0.294	\$0.235	\$0.184	\$0.132
	<b>Estimated Annual Increase Tax Cost Per Person, if 12,000 Miles Per Year with 20 mpg</b>	\$164.0	\$128.1	\$93.2	\$62.1	\$31.1

Table 21 is a summary of potential increases in sales taxes, property taxes, and motor fuel taxes, as discussed in previous sections. The stated increases are to fully fund the potential 132 percent gap of \$345 million, a 103.1 percent gap of \$270 million, a 50 percent increase

(\$131 million), or a 25 percent increase (\$65 million). Any of these lower increases would still have a positive effect on the overall condition of the local rural roads. The sales tax increase at the lower levels would appear to be the most likely, with property tax increases at any level in the chart being highly unlikely, and with current property tax caps and motor fuel taxes possible but very unpopular with most drivers.

Table 21 Summary of Various Options in NYS for Increasing Funding Local Rural Highways

	Increase	Increase	Increase	Increase
	Local Rural only	State * all local	Local Rural only	State Motor Fuel *all local
<b>Options to Increase Local Rural Highway Funding NYS</b>	Sales Tax	State Sales Tax *	Property Tax	State Motor Fuel Tax*
<b>Fund \$345 Million to Local Rural (132% Increase)</b>	4.875% to 5.85%	4% to 4.71%	29.8% increase	8 to 35.3 cents
<b>Fund \$131 Million to Local Rural (50% Increase)</b>	4.875% to 5.24%	4% to 4.27%	11.3% increase	8 to 18.4 cents
<b>Fund \$65 Million to Local Rural (25% Increase )</b>	4.875% to 5.06%	4 % to 4.13%	5.64% increase	8 to 13.2 cents

\* These options increase state support for all local roads through an increase in statewide CHIPS funding.

The two local rural highway options with increases to only local rural county sales taxes and local rural county property taxes would be difficult to implement for various reasons, including the potential for higher rates than the adjacent non-rural counties. This difference in local tax rates can influence spending and sales of homes in the higher taxed counties.

The two options that increase the overall state funding would not have the local tax rate differences for rural counties compared to non-rural counties and would increase funding for all local roads through CHIPS. The statewide options spread the increase across all consumers, would have the broadest overall benefit in the state, and most visible impact since they increase funding to all local highways and not just local rural highways. Although the state tax options spread the cost across the state, the overall increase in rates is larger since the overall increase for funding of all local roads is substantial. The last column in Table 21, showing motor fuel tax changes, could in fact be instituted in three different ways. The option presented is increasing the overall motor fuel taxes. The other options could include keeping the overall rate the same but changing the amount of the sales tax and PBT tax on motor fuel tax that is dedicated to highways and the DHBTF, or increasing the amount that is distributed from the DHBTF to state aid through CHIPS funding. These last two options would in fact not require any increase in taxes on motor fuel, but a shift to using more of the overall taxes on motor fuels to specifically fund local highways. NYS currently has an overall high tax on gas, but a high percentage of it is PBT tax and sales tax. Only around 50 percent of the overall taxes collected on motor fuel are in fact targeted to highways in any manner. This change would obviously be a large shift in funding philosophy at the state level and require cuts in spending from other state budget items, including mass transit, or require other tax increases to balance this shift.

The following is a summary of the conclusions based on the funding option review and survey results:

- The decentralized local rural highway system in NYS makes the pavement condition and strategic planning for distribution of highway funding allocations difficult. A high percentage of the local rural highways in NY are the responsibility of small rural towns that make centralized strategic planning extremely problematic. Most agree

that the local rural highways are in worse condition than state roads, but limited data are available to confirm this statement.

- The 2007 report, “A 20 Year Needs Assessment of Local Jurisdiction Highways and Bridges in New York State,” calculated there is a 103 percent funding gap in local highways across the state. A more recent 2013 report, “An Assessment of Local Jurisdiction Highway and Bridge Infrastructure Needs in New York State,” calculated a larger (132 percent) gap.
- A funding model for New York local rural highways explored three options for increasing local rural highway funding that included calculating various increases to property taxes, sales taxes, and motor fuel taxes. The most probable political options would include increasing funding in the 25 to 50 percent range, using sales tax at either local or state level. Property tax is not a viable political option with state property tax caps and, motor fuel tax increases with the current high gasoline prices remain very unpopular.
- The current campaign in New York (“Local Roads Matter”) needs to be continued both long-term and consistently to assure the public and legislature are aware regarding the need for additional funding of highways and, particularly, local rural highways. The survey conducted of NY experts noted how poor the public perception is regarding use of specific taxes for specific uses. This poor public perception makes the use of a new property or sales tax directed to highways and a motor fuel tax increase a hard sell. Currently, a tax increase and any resulting gains in level of service are too abstract for most to understand. The million or billion dollar range needed for highway funding is something difficult to translate to the local population. There is a need to translate the cost to an individual-per-year basis since most have no idea what an individual pays for the current motor fuel taxes per

year. There also needs to be a clear set of highway projects and improvements where these increased highway funds will be spent.

- With a MBUF being discussed at the national level, there needs to be a discussion with the public and the legislature on both the process and the allocation of the funds. Again, this should be translated to an individual annual cost so the public can understand the change. Everyone needs to understand that, if local highway funding is based on the collection of MBUF on the low VMT highways, the state highway funding for local rural highways will decrease way below current levels which will cause a negative impact on local rural highway conditions. The cross subsidy from higher VMT highways that exists under the current distribution of highway funds will need to continue, and probably even increase, to assure adequate funding to local rural highways.
- There is a need to review the use of the overall motor fuel taxes with only 50 percent of these taxes currently being directed to highways in any form and 13 percent being distributed to local highways. A change in using most of the overall motor fuel taxes for highway funding could fund the required \$1 billion annual shortfall discussed the 2007 and 2013 needs assessments for local highways and bridges without any motor fuel tax increase. Currently, a high percentage of the motor fuel taxes are targeted to mass transit within the state.
- There needs to be better local rural highway planning and strategic planning for funding highways that requires a statewide condition analysis of all highways across state. Development of funding plans based on pavement condition surveys and life cycle cost is needed as many of the local rural highways are owned by small towns with insufficient systems and staff to conduct pavement condition surveys and life cycle cost planning. The highway condition analysis should be conducted by the state since the state already inspects all bridges across the state. The overall

planning and strategic planning for funding local highways needs to be either a county-led or a state-led program. Using Rural Planning Organizations (RPOs) in NYS would be an option that also should be reviewed. NYS local governments need to maintain control of the actual allocation through this planning process if local rural highway funding continues to be through local government.

- The election of town highway superintendents should be reviewed. Currently 90 percent are elected and only 10 percent are appointed. The hard decisions in the future, including reversions to gravel highways and lower levels of service, may be easier to consider with highway superintendents being appointed.

## **6.0 NORTH CAROLINA LOCAL RURAL HIGHWAY FUNDING MODEL**

In North Carolina, most roads are owned by the State. This includes most all of the local rural highways, except the 10,000 miles of mostly local streets owned by cities and towns. The funding model information is based on the FHWA data on state-owned roads and NCDOT data of expenditures organized by county. The local rural highways are classified as secondary highways, owned by the state, with direct disbursement data for these state-owned highways readily available from the NCDOT. Table 22 shows the revenues and disbursements for all North Carolina highways from FHWA 2007 tables while Table 23 shows the NCDOT disbursements for the secondary highways in North Carolina in 2007.

Table 22 North Carolina State Revenues and Disbursements on All State Highways 2007  
(Source)

<b>NC State Revenues 2007</b>		
<b>Receipts</b>	<b>Amount</b>	<b>Percent</b>
Motor Fuel Taxes	\$ 1,460,000,000	41
Motor Vehicle/Motor Carrier Taxes	\$ 585,000,000	16
Road Crossing /Tolls	\$ 4,880,000	0
General Funds	\$ 23,300,000	1
Other State Imposts	\$ 622,000,000	17
Miscellaneous	\$ 47,700,000	1
Federal	\$ 799,000,000	22
Local Governments	\$ 35,100,000	1
<b>Total</b>	<b>\$ 3,580,000,000</b>	<b>100</b>

<b>NC State Revenues 2007</b>		
<b>Disbursements</b>	<b>Amount</b>	<b>Percent</b>
Capital Outlay	\$ 1,740,000,000	51
Maintenance	\$ 775,000,000	23
Highway & Traffic Services	\$ 19,300,000	1
Admin/Research/Planning	\$ 275,000,000	8
Highway Law & Enforcement	\$ 344,000,000	10
Interest	\$ 36,500,000	1
Bond Retirement	\$ 54,700,000	2
Grants to Local Governments	\$ 138,000,000	4
<b>Total</b>	<b>\$ 3,380,000,000</b>	<b>100</b>

Table 23 NCDOT Secondary Highway Disbursement in 2007

<b>NC Secondary Expenditures 2007</b>				
<b>Disbursements</b>	<b>All</b>	<b>Percent</b>	<b>Rural</b>	<b>Percent</b>
Maintenance	\$297,000,000	51%	\$203,000,000	51%
Contract Resurfacing	\$114,000,000	20%	\$65,000,000	16%
Road Improvements	\$169,000,000	29%	\$132,000,000	33%
Total	\$580,000,000	100%	\$400,000,000	100%

Road improvement program funding is used to modernize the paved secondary system and pave unpaved roads.

North Carolina published the NCDOT “From Policy to Projects 2040 Plan” in 2012 outlining the overall transportation statewide funding needs including highways. The 30-year plan calculated a need of \$122.83 billion to fund a preferred improved level of service, \$94.13 billion to fund transportation at the current level of service, and \$66.17 billion to fund transportation at the current level of funding. Highways represent \$93.03 billion, or 76 percent, of the \$122.83 billion needed to achieve the targeted level of service in the report, which noted that most of the revenue enhancement options covered are highway related. The sub-regional and regional tiers of highway funding needs are estimated to be \$35.59 billion and \$16.15 billion while the statewide needs are \$41.29 billion. Using the current projection of baseline resources of \$54.03 billion for transportation, the projected gap is from \$5.67 billion (10.4 percent) for current funding levels to \$60.08 billion (111 percent) for preferred level of service. Even the current funding levels have a gap since the motor fuel tax is projected to decline over the period to 2040.

The 111 percent gap is a worst case scenario that will be used in this report since 76 percent of the transportation funding is for highways and over half of the highway funding is

regional or sub-regional in the state. The main proposed revenue enhancements discussed in the report include instituting a VMT fee that would replace the motor fuel tax, interstate tolling, and an auto insurance surcharge. The VMT fee would replace the motor fuel tax in 2020 and, in effect, double what an owner of a 40 MPG vehicle would pay annually (using current motor fuel tax rates) from \$105 to \$240. Interstate tolling would be significant and fund approximately 33 percent of total transportation revenue, but revenue would be targeted for the interstate system. The auto insurance tax rate would be 10 percent of each premium that would provide 9.6 percent of the total transportation revenue. Currently, revenue for highways in NC are primarily based on direct vehicle related sources including motor fuels tax, vehicle registration fees, and title fees that fund the Highway Fund, and motor fuels tax, highway user tax, and other vehicle fees that fund the Highway Trust Fund. These direct fees amount to 75.7 percent of revenue for 2007 state highways in NC with the federal government supplying an additional 22.3 percent of the revenue. In 2012, for the first time, bonds were used to fund the first modern toll road (NCDOT 2040 Plan). The funding of both transportation, in general, and highways, in particular, has a direct impact on the available funds for the secondary or local roads in NC since most of the local roads are owned by the state.

#### 6.1 North Carolina Sales Tax

The State government's second largest tax receipt is from the sales tax which provides 31 percent of state revenues. Sales tax receipts are a function of economic activity and the sales tax rate. Local governments also rely on sales tax: from 2000 to 2010 county sales tax revenue rose 35 percent and property taxes rose from 2.1 to 9.9 percent annually (or 68 percent overall) over that same time period. Sales tax accounts for approximately 20 percent of local revenues, while property tax accounted for 73 percent of local revenue in 2010 (North Carolina Tax Guide 2010). The county board of commissioners decides each year on whether to share the local sales tax revenue, based on the location it was collected or based on some other criteria. The overall NC aggregate sales tax has varied from 6.75 to

7.75 percent in recent history. The state rate has varied from 4.25 to 5.75 percent when there was a temporary increase in state tax rates as the state took over the local portion of Medicaid expense (North Carolina Tax Guide 2010). Currently, the state sales tax rate is 4.75 percent, with the total rate in most counties being 6.75 percent and some being 7 percent. Two counties have added a 0.5 percent sales tax to fund transit needs. The overall population in NC has been increasing due to immigration, but most new migrants have settled in urban centers or adjacent to urban centers with populations in rural North Carolina staying stable or declining slightly (NCDOT 2040 Plan). The declining populations can effect sales tax collections and revenue sharing based on populations. The secondary or local roads are funded by the state through direct funds and, therefore, are not impacted by any local or state sales tax revenue.

One option to increase funding for secondary highways in the state would be to pass a local option sales tax. This option is currently allowed and, as mentioned, two counties presently use this option to fund transit. Collecting local sales taxes that would be allocated for state owned secondary highways in North Carolina would be unusual, but apparently is possible. An additional \$219 million would fund the 111 percent gap outlined in the recent NCDOT “From Policy to Projects 2040 Plan” based on the \$197 million spent in 2007 on contract resurfacing and road improvements on the rural secondary system. In 2007, the local rural counties in North Carolina collected \$1,151 million in sales taxes (North Carolina Tax Guide 2010) and an increase from the typical 2 percent local sales tax to 2.38 percent would collect an additional \$219 million on the same base sales. Base sales are dependent on many variables, including the tax rate. Other options could include funding either a 50 percent or 25 percent increase to the \$197 million spent in 2007 that would require a 2.17 percent or 2.09 percent local sales tax, respectively. Another option would be to increase the state sales tax to increase funding to all the secondary highways in the state. Using the same 111 percent gap and the overall \$283 million spent on contract resurfacing and road

improvements in 2007 on all secondary roads across the state, the state tax rate would need to increase from 4.75 to 5.05 percent to fund a \$314 million increase to all secondary highways. Again, other options could include funding either 50 percent or 25 percent increases of the \$283 million spent in 2007 that would require a 4.88 percent or 4.82 percent state sales tax, respectfully. North Carolina, in 2014, is 11<sup>th</sup> from the bottom of the 45 states that have a state sales tax with the average rate being 5.64 percent (Federation of Tax Administrators). All options appear feasible regarding tax rate increases, although any increase will probably still be politically challenging.

The change to use of sales taxes to fund highways could be compared to what has taken place in Virginia. In 2013, Virginia began funding highways differently by eliminating their motor fuel tax on gasoline and implementing a lower rate of sales tax on motor fuel, increasing the sales tax on all other taxable goods in the state from 5 to 5.3 percent, and targeting the increase in sales tax for transportation funding (Virginia's Road to Future). Virginia included a few other sales tax changes with the net effect of changing highway funding to be primarily funded by sales tax that is to generate a substantial increase in highway and transportation funding. Just dropping the motor fuel tax and replacing it with a 0.8 percent increase in the general sales tax will raise an additional \$607 million annually over five years. The overall changes in funding in the state are projected to add \$3.1 billion to transportation over the next five years. Virginia is similar to North Carolina in that most secondary roads are owned and operated by the state. This type of wholesale change that uses sales tax increases targeted to highways could be considered to fund the gap for highways and secondary roads in NC. An August 2013 NC Board of Transportation Finance and Programming Committee Report presentation by Mark Foster (Foster 2013) includes one slide from the 2007 NCDOT Transportation Management Team (Volume 8, McKinsey Report) with a revenue option of raising \$925 million from a statewide or local sales tax. The slide and the report also shows an option of raising \$1.23 billion per year for

transportation based on an increase from local real property taxes. Local property tax options will be discussed later in this report; however, using local property taxes for secondary highways owned by the state would be a challenge. The sales tax and local property tax options in the 2013 Foster slide show and the McKinsey report are not in the NCDOT “From Policy to Projects 2040 Plan,” published in 2012. Using sales tax or property tax would be a major change in NC where direct funding of transportation, including motor fuel taxes, has been the tradition.

## 6.2 North Carolina Property Taxes

In NC, the local government tax receipts increased from 2.1 to 9.9 percent per year from 2000 to 2010, resulting in an overall increase of 68 percent over that time period (North Carolina Tax Guide 2010). The overall local property tax revenue collection in the 2007-08 fiscal year was \$7.473 billion and was 69 percent of the local government tax receipts. In the 2006-07 fiscal year, 69 percent of the local property taxes were collected by the counties with 27 percent collected by municipalities and 4 percent collected by special jurisdictions. The North Carolina per capita property tax burden was \$853 in 2007-08 which is just below the average southeast property tax burden and well below the average in the United States of \$1,349 per capita (North Carolina Tax Guide 2010). In 2007, North Carolina ranked 39<sup>th</sup> in the nation per capita property tax burden and 35<sup>th</sup> in the nation as a percent of personal income (Federation of Tax Administrators). Although most secondary highways are owned and funded by the state, the 2007 McKinsey NCDOT Transformation Management Team report listed using raising local property taxes as a possibility to greatly increase revenue (2007 McKinsey). The report claimed that increasing the local property tax rate 0.2 percent, or just \$216.60 per homeowner, would raise an additional \$1.229 billion per year. They noted that no localities in neighboring Southeastern states had used property taxes to fund state transportation projects, but as discussed in the report, raising an additional \$1.229 billion would make a significant impact on the funding gap. Reviewing the local rural counties that in 2007-08 collected \$1,897 billion, the ability to fund the

estimated 111 percent gap, noted elsewhere, would require raising an additional \$219 million for the rural secondary highways and an 11.5 percent increase in property taxes. It would be unusual to target local property taxes for secondary highways owned by the state. However, since these are local highways which provide benefits to mostly local users, using local taxes for these local highways appears to be a reasonable and fair option. Funding a smaller gap of 50 percent or 25 percent of the 2007 expenditures on rural secondary highways would require a 5.2 percent or 2.6 percent increase in property tax rates, respectively, which appears to be more reasonable.

### 6.3 North Carolina Motor Fuel Tax

North Carolina has two separate funds that are used for highway funding. The first is the Highway Trust Fund that is financed by the sales tax on non-commercial vehicles (the highway use tax), 25 percent of the motor fuel tax, the fees from certificates of title, and other miscellaneous fees. In 2009, 42 percent of the fund was from the motor fuel tax, 48 percent was from the highway use tax, and 9 percent was from the title and registration fee, with a total collection of \$909 million. The motor fuel taxes collected have varied from an annual decrease of 4.5 percent, in 2002, to an annual increase of 14.4 percent, in 2005. The second fund is the Highway Fund. It receives the other 75 percent of the motor fuel tax, licenses and fees from the Department of Motor Vehicles (DMV), and interest on cash balances held by the state treasurer. In 2009, 66 percent of the tax collections for the Highway Fund were from motor fuel taxes, 29 percent were from various DMV fees, and 5 percent were from interest, for a total of \$1.731 billion of collections. That same year, the overall 30.30 cent per gallon tax on motor fuel for North Carolina was third highest in the nation, above the 18.3 cents per gallon average in the United States, and above the 19.0 cents per gallon average in the southeastern states (North Carolina Tax Guide 2010). The NCDOT "From Policy to Projects 2040 Plan" (NCDOT 2040 Plan) clearly projects that motor fuel collections will continue to decline with increasing fuel efficiency and fuel prices, as shown in Figures 18 and 19.

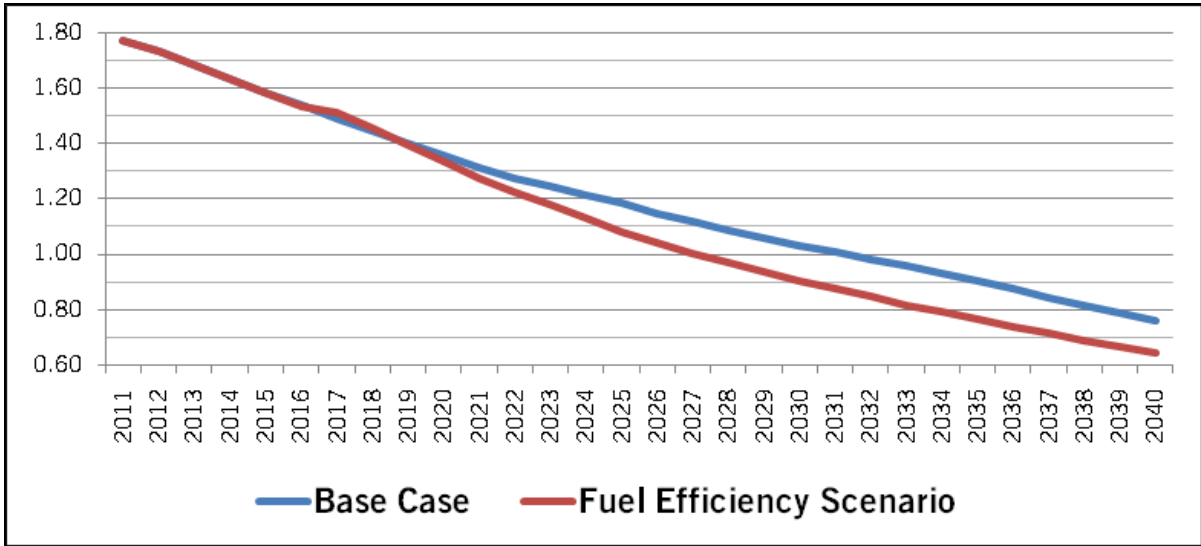


Figure 18 Projected NC Motor Fuel Tax Revenues (billions of 2011 dollars) from NCDOT “From Policy to Projects 2040 Plan” (NCDOT 2040 Plan)

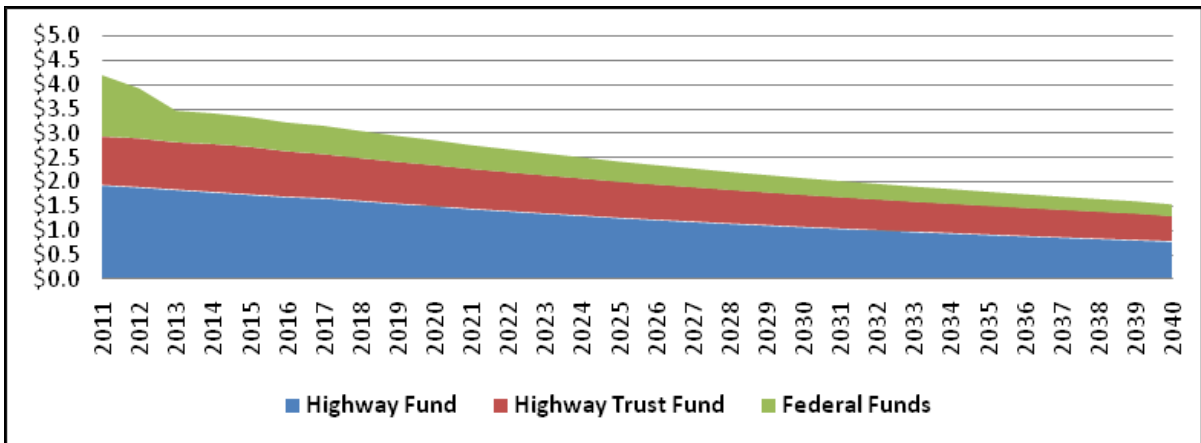


Figure 19 Projected NC Motor Fuel Tax Revenues (billions of 2011 dollars) from NCDOT “From Policy to Projects 2040 Plan” (NCDOT 2040 Plan)

The expected decrease in motor fuel taxes, which fund 42 percent of the Highway Trust Fund and 66 percent of the Highway Fund, will have grave impact on highway funding

without significant changes. These projections are in line with previously discussed Annual Energy Outlook (AEO2013) and the Annual Energy Outlook 2012 (AEO2012) projections.

#### 6.4 North Carolina Mileage Based User Fee Option

In the NCDOT “From Policy to Projects 2040 Plan” (NCDOT 2040 Plan) there is a proposal to change to a mileage based user fee (MBUF) of 2 cents per mile based on vehicle miles traveled, in the year 2020, to replace the motor fuel tax. There is also mention that the MBUF should be indexed to inflation. The report uses an example of a 12,000-mile per year vehicle at 40 MPG that would collect a \$240 fee using the 2-cent per mile MBUF, compared to approximately \$105 per year from a 35-cent per gallon motor fuel tax, which more than doubles the collections of fees from that vehicle based on this example. In 2007, the FHWA tables note that North Carolina collected \$1.654 billion in motor fuel taxes. The FHWA 2007 tables show an estimate of 103,598 million annual vehicle miles traveled in North Carolina with 5,021 million annual vehicle miles traveled on local rural roads by function, or about 4.8 percent of vehicle miles traveled. This is in the same range as NYS which showed 3.4 percent of annual VMT on local rural roads by function. There are 51,473 miles of local rural roads by function in North Carolina, which is not the same as the 43,000 miles of secondary roads in the rural NC counties under review in this project but there is clearly some correlation. If we use the same VMT on these local rural roads by function as on the secondary roads in the rural NC counties defined in this report, we calculate 4,195 million VMT on the secondary roads in the rural North Carolina counties reviewed in this report. The proposed 2 cent per mile collection, as estimated by the NCDOT in their 2040 Plan, would have collected an overall \$2.072 billion in 2007 compared to the \$1.654 billion collected that year on motor fuel taxes. The difference is probably due to the anticipated cost of collecting the fees. A 1.60 cent per mile collection for the 103,598 million VMT is what is required to balance the motor fuel collection, in 2007, without the anticipated cost of collection. Using the 1.6 cent per mile and the 2 cents per mile charges over the 43,000-mile system with a calculated 4,195 million VMT, we would estimate collected fees of \$67

million and \$84 million in 2007, respectively, with no change in VMT. This is well below the \$400 million spent on capital and maintenance on these secondary roads in the rural counties of North Carolina in 2007 as shown in Table 23. If the MBUF fee revenue was earmarked to the secondary road system where the MBUF was collected, there would be a major shortfall in funding. This is the same problem as was identified earlier for NYS. The only way to have sufficient funding for rural secondary roads based on a collection of a per-mile fee on those roads would be to raise the fee to approximately 9.52 cents a mile plus a cost of collection, which is not likely to be approved by the legislature or the public. Another option is cross subsidize the lower VMT highways with lower fee collections with revenue from the higher VMT highways with higher fee collections.

#### 6.5 North Carolina Survey Results

Local and state experts, in both North Carolina and New York, were surveyed regarding observations on highway condition, funding status, and future funding needs for local rural highways. In North Carolina, this included primarily state-level experts since the NCDOT is responsible for 80 percent of highways in the state and the primary funding of local rural highways is through the NCDOT secondary highway system. The survey questionnaire and results are in the appendix with the participant identification excluded. The survey answers were similar in overall content between NC and NYS, although differences were noted because of the centralized planning and funding in North Carolina as compared to New York State where it is decentralized.

Respondents discussed the level of service of highways as being important for funding the various levels of highways in the local rural highway system. Many of the local rural highways have low VMT with chip seal being appropriate for many of these low VMT highways. Chip seal is a cost effective method that is used to lower long-term maintenance cost over hot mix asphalt systems.

The centralized North Carolina local rural or secondary highway system includes a statewide highway pavement condition survey and strategic allocation of funds to maintain the secondary system. In NC, the centralized system has resulted in the state secondary or local rural highways being in similar condition to other state highways with about 70 percent of all highways estimated to be in “good” condition across the system with interstates being held to a higher standard of 85 percent “good”. Respondents were concerned that either stable or decreasing highway funding will result in the deterioration of highways since the cost of construction and maintenance continues to rise. The rising construction and maintenance costs require an increase in local rural highway funding just to maintain the current highway conditions. Budgets have not been increasing to match these increasing construction and maintenance costs.

The recent elimination of chip seal funding from the secondary system budget in NC is of particular concern since this will eventually lead to much less preventative maintenance on many lower level highways. The North Carolina elimination of chip seal funding is anticipated to cause the secondary highway system to drop from the current 70 percent of highways rated as “good” to only 50 to 60 percent in 10 years. The recent political changes in NC and the NCDOT changes in highway funding allocation processes will have an impact on highways that receive funding. If developed areas, urban areas, and larger projects start to be a higher priority, there is concern that the secondary system will suffer budget cuts through this reallocation of highway funds.

There appears to be little chance of additional Federal highway funds being allocated directly for secondary or local rural highways. There might be a slim chance to receive additional Federal funds for local bridges, but it is unlikely for local rural highways themselves. However, any decrease in Federal funding to the states would have a negative effect on secondary or local rural highways since there would probably be a shift of state

dollars away from secondary or local rural highway systems to underfunded bridges, other state highways, or the interstate system.

Respondents thought there was no reasonable possibility of increasing the motor fuel tax in the legislature because of public opinion and current political atmosphere of no tax increases. Increasing local property taxes to fund additional secondary or local rural highway funding did not appear to be on the radar screen since the secondary system is owned by the state. In addition, the NCDOT prefers to fund highways with direct and not indirect taxes.

Sales tax increases to fund highways were seen as possibilities by respondents if they were directly tied to highway improvements. However, there was limited support for sales taxes for highway funding since respondents preferred more direct taxes like motor fuel taxes rather than an indirect sales tax. Marketing a sales tax increase dedicated to highways to the public is based on the public believing that any sales tax increase would, in fact, be used for highways; this an issue in both states studied. Most respondents agreed that highway and other government officials were not trusted in their ability to be transparent and use a proposed tax increase for the intended purpose. The survey also included statements that government has not been able to adequately make the public understand the need for increases in revenue to fund highways. The recent change in Virginia to use sales taxes to fund highways was not seen as a step to be emulated in other states. Sales taxes can be volatile and will follow economic downturns; the result will have highway funding competing with other state funding needs for limited general funds. Respondents generally felt that it is better to keep highway revenue and funding separate from the general fund when possible, as it has been in NC.

Although bridge conditions are improving by using Federal funds, NC respondents were concerned about culvert conditions and having the funds to replace the current culverts in disrepair on its secondary system.

The possible lower VMT in rural areas over time was not a concern with many local rural roads already having a low VMT. There was no perceived impact on required highway funding if VMT dropped since the low VMT highways already require a minimum level of funding and is not based on VMT. The level of service issue typically deals with these issues and no effect was seen with lower VMT. There was recognition that heavy trucks were the major reasons for distress, even on rural highways. Changing to a VMT-based fee or MBUF in the future appeared to be of minimal concern at this stage. There was limited concern raised about the potential lower collection of MBUF on local rural highways and impact regarding funds for these highways. This was most likely since the low VMT secondary or local rural highways were already, in effect, subsidized by higher VMT highways and no one mentioned that this would change in the future. In North Carolina, there has been a discussion that the best way to collect a MBUF would be on a yearly basis with the annual vehicle registration fee. One issue with an annual MBUF fee would be the larger lump sum collection on a yearly basis, but the cost of collecting the MBUF with the annual vehicle registration fee would be minimal. This vehicle registration associated MBUF collection would not match some of the current national MBUF discussions that allow congestion pricing and direct measurement of highway usage using a GPS system. However, a simpler MBUF collection based on mileage only would alleviate the concern regarding monitoring of individuals through a GPS with a much less expensive collection cost.

In NC, there is a group reviewing ways to increase highway funding, through fees or taxes across the state, as a subset of NCDOT's review of NC transportation for the future. The group is working to identify what revenue increases are acceptable to the public. An increase in the Highway User Tax from 3 to 4 percent, collected when one buys a vehicle, is one consideration the public appears to accept, but is not acceptable to car dealers. Another recommendation that is being studied is a surcharge on automotive insurance. Tolling on the interstate and major highways is something that will likely be in effect in the

future in NC. All of these increases would have a positive impact on the NC secondary or local rural highways with more funding available throughout the NCDOT system. Before any revenue increases are proposed, respondents agreed there is a need to stop all diversion from the current highway tax and fee system; the last major diversion is \$200 million annually for the highway patrol.

When experts in North Carolina were asked about reverting to gravel highways, the responses included that this should not be considered at all, that the public would see this as taking something away, and that public opinion should be considered. The reality is that it is easier to obtain funds for resurfacing than to maintain a gravel road and this should be considered. In most cases, experts did not see reversion to gravel as a politically feasible option even though there have been legislative changes so the remaining unpaved highways do not need to be paved. The continued paving of these unpaved roads was something that was not necessary and there is agreement that the funds that were targeted to pave the remaining state-owned unpaved roads should be used for secondary highway rehabilitation. Only very low AADT highways should be gravel because of the need to frequently machine the surface. The best option on low-volume highways remains chip seal or a chip seal/slurry seal combination and good asset management. In discussing gravel versus paved highways, one respondent discussed a 2007 NCDOT study that calculated the long-term cost to maintain a paved road was 36 percent higher than an unpaved road (\$5,400 vs \$3,400/mile) with resurfacing factored in the overall long-term cost.

#### 6.6 North Carolina Local Rural Highway Funding Conclusions

Table 24 summarizes the model projections for increasing either local sales tax or local property taxes to fund the increase in secondary highway funding from 25 percent to the projected full need of 111 percent. This calculation used the 2007 baseline of \$197 million spent on the local rural or rural secondary highways for contract resurfacing and road improvements as the capital expenses. Review indicates that, as previously discussed, both

of these options are possible with the relatively low local sales tax and relatively low property tax in North Carolina. Although all options would be unpopular with the public, an increase in local sales tax or property tax to fund the 25 percent increase in secondary highway funding might be an acceptable way to begin funding increases in the legislature if the increases were tied directly to highway spending that was visible to the public. The main issue would be distributing local tax revenues to the state to be used on targeted secondary state-owned highways. Tax revenues collected locally then being sent to the state may be a reasonable and fair way to fund locally used highways, but a more typical revenue sharing model is state tax collection that is shared with local government.

Table 24 Comparing Local Sales Tax and Property Tax Options in NC for Increasing Funding Secondary Rural Highways

<b>North Carolina Projections - Total Secondary System</b>					
<b>Based on Local Tax Increase</b>					
<b>2007</b>	<b>Rural Secondary Road State Capital Expenses (Million)</b>	\$197	\$197	\$197	\$197
	<b>Gap (Percent)</b>	111.0%	75.0%	50.0%	25.0%
	<b>Need to fund Gap (Million)</b>	\$219	\$148	\$99	\$49
<b>2007</b>	<b>Rural Local Sales Tax Revenue (Million)</b>	\$1,151	\$1,151	\$1,151	\$1,151
<b>Current</b>	<b>Rural Local Sales Tax Rate (Percent)</b>	2.0%	2.0%	2.0%	2.0%
	<b>Needed Percent Increase in Sales Tax</b>	19.0%	12.8%	8.6%	4.3%
	<b>Needed New Local Sales Tax Rate (Percent)</b>	2.38%	2.26%	2.17%	2.09%
<b>2007</b>	<b>Local Rural Property Tax Revenue (Million)</b>	\$1,897	\$1,897	\$1,897	\$1,897
	<b>Needed Increase in Local Property Tax (Percent)</b>	11.5%	7.8%	5.2%	2.6%

Table 25 summarizes the model projection for increasing statewide sales taxes to cover the increase in secondary highway funding from 25 percent to the projected full-gap of 111 percent. This calculation used the 2007 baseline of \$283 million spent on the state-owned local or secondary highways for contract resurfacing and road improvements as the capital expenses. Review again indicates, as previously discussed, that this option is possible with the relatively low state and local sales tax in North Carolina. Although all options would be unpopular with the public, the smaller increase in state sales tax to fund the 25 percent increase in local rural highway funding might be an acceptable method to begin funding increases with the state legislature. If the additional statewide spending across the state on secondary highways was targeted to visible highway improvements, the public may agree with further increases in the future that would assure a long-term improved condition of highways.

Table 25 Statewide Sales Tax Increase in NC for Increasing Funding Local Rural Highways

<b>North Carolina Projections - Total Secondary System</b>					
<b>Based on Statewide Sales Tax Increase</b>					
<b>2007</b>	<b>Total Secondary Road State Capital Expenses (Million)</b>	\$283	\$283	\$283	\$283
<b>2007</b>	<b>Total Secondary Local Expenses (Million )</b>	\$0	\$0	\$0	\$0
	<b>Need (Million)</b>	\$314	\$212	\$142	\$71
	<b>Gap (Percent)</b>	111.0%	75.0%	50.0%	25.0%
	<b>Total Secondary State Need (Million)</b>	\$597	\$495	\$425	\$354
<b>2007</b>	<b>State Sales Tax Revenue (Million)</b>	\$4,981	\$4,981	\$4,981	\$4,981
<b>Current</b>	<b>State Sales Tax Rate (Percent)</b>	4.75%	4.75%	4.75%	4.75%
	<b>Needed % Increase in State Sales tax( Fund Increase)</b>	6.31%	4.26%	2.84%	1.42%
	<b>Needed New State Sales Tax Rate (Percent)</b>	5.05%	4.95%	4.88%	4.82%

Table 26 summarizes the model projection for increasing state motor fuel tax to fund the increase in secondary highway funding from 25 percent to the projected full need of 111 percent, again, using the \$283 million spent statewide on all secondary highways in 2007 as the base of capital expenditures. Review once more indicates, as previously discussed, that this option would be very difficult and unpopular with the relatively high overall motor fuel tax in North Carolina. Even funding a 25 percent increase for secondary highways would be difficult with a change from 17.5 cents to 21.9 cents; that would increase the overall tax motor fuel from 37.6 cents to 42 cents per gallon. The model used the currently calculated relationship of collections of motor fuel taxes to expenses on secondary highways. If this relationship changed, the resulting calculated expense increase based on increased motor fuel taxes would be different.

Table 26 State Motor Fuel Tax Increase in NC for Increasing Funding Local Rural Highways

<b>North Carolina Projections - Total Secondary System</b>					
<b>Based on Statewide Fuel Tax Increase</b>					
<b>2007</b>	<b>Total Secondary Road State Capital Expenses (Million)</b>	\$283	\$283	\$283	\$283
	<b>Need to Fund Gap (Million)</b>	\$314	\$212	\$142	\$71
	<b>New Secondary State Capital Expenses</b>	\$597	\$495	\$425	\$354
<b>Current</b>	<b>Motor Fuel Excise Tax Rate - Dollars</b>	\$0.1750	\$0.1750	\$0.1750	\$0.1750
<b>2007</b>	<b>Total State Motor Fuel Excise Tax Collection (Million)</b>	\$1,168	\$1,168	\$1,168	\$1,168
<b>2007</b>	<b>Relationship Expenses to Collection</b>	24.2%	24.2%	24.2%	24.2%
	<b>New Motor Fuel Excise Tax Collected</b>	\$2,464.5	\$2,044.0	\$1,752.0	\$1,460.0
	<b>Needed Increase in Motor Fuel Excise Tax (Percent)</b>	111.0%	75.0%	50.0%	25.0%
	<b>Needed New Motor Fuel Tax Rate - Dollars</b>	\$0.369	\$0.306	\$0.263	\$0.219
	<b>Overall Needed Taxes on Motor Fuel – Dollars per gallon (including Motor Fuel increase)</b>	\$0.571	\$0.507	\$0.464	\$0.420
	<b>Estimated Annual Tax Cost Per Person, if 12,000 Miles Per Year with 40 mpg</b>	\$171.30	\$152.10	\$139.20	\$126.00

Table 27 is a summary of potential increases in sales tax, property tax, and motor fuel tax as discussed in the various sections above. The stated increases are to fully fund the potential 111 percent gap of \$219 million spent on rural secondary highways, or something less such as \$99 million (a 50 percent increase) or \$49 million (a 25 percent increase). Either of these lower increases would have a positive effect on the overall condition of the secondary rural roads compared to the status quo. The sales tax increase at the lower levels would appear to be the most likely to gain political support with a property tax increase also being possible; motor fuel taxes are currently very unpopular with most drivers and with the legislature.

Table 27 Summary of Various Options in NC for Increasing Funding Local Rural Highways

	Increase	Increase	Increase	Increase
	Rural Secondary	Statewide All Secondary	Rural Secondary	Motor Fuel Excise – Statewide All Secondary
	\$219 Million	\$314 Million	\$219 Million	\$314 Million
<b>Options to Increase Rural Secondary Highway Funding</b>	Sales Tax	Sales Tax *	Property Tax	Fuel Tax*
<b>Fund \$219 Million to Rural Secondary (111% Increase)</b>	2 to 2.38%	5% to 5.05%	11.5% increase	17.5 to 36.9 cents
<b>Fund \$99 Million to Rural Secondary (50% Increase)</b>	2% to 2.17%	4% to 4.88%	5.2% increase	17.5 to 26.3 cents
<b>Fund \$49 Million to Rural Secondary (25% Increase )</b>	2% to 2.09%	4 % to 4.82%	2.6% increase	17.5 to 21.92 cents

\* These options increase funding for all secondary roads statewide.

Table 27 has two options that rely on increasing local taxes only in the local rural counties in North Carolina and improving the secondary highways within these rural counties. The options that increase taxes only in rural counties might cause lower spending and corresponding tax revenue decreases, and lower property sales that would also decrease tax revenue in these local rural counties if the tax differences with non-rural counties become significant. The two options that increase overall state revenue and overall state funding to all secondary roads spread the increase across all consumers and would have the broadest benefit in the state by supporting funding increases to all of the state's secondary highways. The statewide sales tax increase option - increasing funding for all secondary roads - spreads the cost evenly across the state and has a smaller sales tax rate increase than if only the rural counties pay for increased funding to only the rural secondary highways. However, the motor fuel tax increase is fairly large since this is an across-the-board increase rather than only for rural secondary highways.

The following are the conclusions based on the funding option review and survey results:

- The centralized local rural highway system in NC allows for easy access to pavement condition survey information and strategic planning on highway funding allocations. Funding by the state has allowed the local rural system to be maintained at the same high level as other state highways, which is 70 percent in "good" condition.
- The NCDOT "From Policy to Projects 2040 Plan," in 2012, calculated a \$60.08 billion, or 111 percent, gap for transportation in 2040 with 76 percent of the projected funding needs being required for highways.
- In states such as NC, where the local rural highways are owned by the state and part of the state secondary system, funding is primarily from direct sources, including motor fuel taxes.
- A model for rural secondary highways explored three options for increasing local rural highway funding that included calculating various increases to property taxes,

sales taxes, and motor fuel taxes. The options reviewed were sufficient to impact the funding needs and were based on the review of the literature. Sales tax increases at the state or local level appear to be the most viable options at the lower rates to fund 25 percent or 50 percent of the gaps. This would require a major change in the state to use indirect fees for the funding of highways. The option of a property tax increase to fund either the 25 percent or 50 percent gaps is a possible solution. The use of local taxes to fund state highways would be something the state and local municipalities would have to address. However, both options appear viable with the relatively low local sales tax and local property taxes.

- Raising motor fuel taxes is currently viewed as unlikely and any increase would need to be fairly small since NC already has a relatively high overall motor fuel tax rate. The option of higher motor fuel taxes is so unpopular politically that this would appear to be the least likely option.
- Experts stated that sales tax increases to fund highways appear to be possible and, in NC, sales tax increases appear to be very viable with a current relatively low sales tax rate and the fact that the neighboring state of Virginia recently changing their highway funding to be based on sales tax. However, NC has always funded highways directly, through road user charges, and funding through indirect taxes would be a major philosophical change that is not under discussion at this time. Property tax increases, in NC, to fund secondary highways owned by the state is also unlikely.
- The option of changing to a VMT-based MBUF charge was also reviewed because of the national discussion on changing to a MBUF. The MBUF review indicated a 1.6-cent per mile charge should be adequate to replace the state motor fuel taxes currently collected. This did not take into account the higher collection cost of MBUF fees since NC is considering a simple MBUF collected with annual vehicle registrations.

- The projected MBUF collection on low VMT local rural highways would be way under the current allocation of state funds to these local rural or secondary system highways. An MBUF would, therefore, require shifting of funds collected on other highways to the local rural highways if the current local rural highway state funding levels are to be maintained. The cross subsidy from higher VMT highways that exists under the current distribution of highway funds needs to continue and probably even increase to assure adequate funding to local rural highways.
- A campaign needs to be conducted, both long-term and consistently, to make the public and legislature aware of the need for additional funding of highways and, particularly, local rural highways. The surveyed NC experts noted how poor the public perception is regarding use of specific taxes for specific uses. This public perception makes the use of any taxes directed to highways, and a motor fuel tax increase in particular, a hard sell. Currently, any tax increase and any resulting revenue increase is too abstract for most to understand. The million or billion dollar range needed for highway funding is something difficult to explain to the local population. There is a need to translate the cost to an individual per-year cost, as in the NCDOT 2040 report, since most people have no idea what an individual pays in current motor fuel taxes per year. There also needs to be a clear set of highway projects and improvements on which these increased highway funds will be spent.

## 7.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

Funding of transportation infrastructure and highways in the United States is being discussed at the national level because of aging infrastructure, increasing cost of replacement, and the decreasing revenue from the current motor fuel tax. Some reports predict that the past rate of increasing vehicle miles traveled has stopped and is, in fact, decreasing. This would make the projected gap in funding even larger than some are anticipating. There is a perfect storm where needs are increasing and revenue is decreasing. Local rural highways are often outside the national highway funding discussion, with much lower VMT and limited congestion issues on a much larger distributed highway system than in urban areas that have higher VMT and congestion issues. However, local rural highways have the same issue of increasing needs with decreasing revenue. Where local rural highways are owned primarily by local government, as in New York State, the funding concern is primarily a local government issue. Where local rural highways are primarily owned by the state, as in North Carolina, the concern is primarily a state funding issue. Reviewing these two states, with very different ownership and funding, resulted in the following findings that should apply to many other states:

- Centralized local rural highway systems, where the state owns the local rural highway system, allow for easier access to pavement condition survey information and strategic planning on highway funding allocations. The centralized state studied, where most local rural highways are owned by North Carolina, has resulted in the local rural system being maintained at the same high level as other state highways, which is 70 percent in “good” condition.
- A decentralized local rural highway system makes the pavement condition and strategic planning for allocation of highway funding more difficult. In NYS, with a high percentage of the local rural highways under the responsibility of small rural towns, most agree that the local rural highways are in worse condition than state

roads, but limited condition data are available to confirm that suspicion. There are some local rural municipalities, primarily at the county level, performing good planning, but consistency is an issue, particularly regarding condition surveys.

- In the states studied, the local rural highways had a similar overall funding gap of over 100 percent. The 2007 report, “A 20 Year Needs Assessment of Local Jurisdiction Highways and Bridges in New York State,” calculated there was a 103 percent gap in local highway funding compared to needs across the state. A more recent 2013 report, “An Assessment of Local Jurisdiction Highway and Bridge Infrastructure Needs in New York State,” calculated a larger 132 percent gap. Meanwhile, the NCDOT 2012 report, “From Policy to Projects 2040 Plan,” calculated a 111 percent gap for transportation statewide, including the 76 percent of this funding targeted for highways. Based on the literature review and the states studied, it is anticipated that other local rural highway systems have a gap in the 100 percent range.
- When local rural highways are owned by the state, the funding is typically based on direct funding including motor fuel taxes. Meanwhile, in states where local rural highways are primarily owned locally, highway funding is typically funded indirectly by the local general fund through local taxes, including locally-collected property and sales taxes.
- Both NC and NYS would require a 1.6 cent per mile vehicle miles traveled fee, or mileage based user fee (MBUF), to replace the current collection of state motor fuel taxes which is consistent with literature for other states. The cost to implement and collect these fees is not included in this 1.6 cent fee and would result in a much higher overall charge in all states, depending on the method of collection.
- States need to be aware that the MBUF collection on low VMT local rural highways would be way under the typical current allocation of state funds to these local rural

or secondary system highways. A MBUF would, therefore, require shifting of funds collected on other highways over to local rural highways, if the current local rural highway state funding levels are to be maintained. This was the case in the two states studied.

- The collection cost for a MBUF may be very expensive using a sophisticated GPS system, and an easier collection, based on mileage collected as part of the annual registration fee, should be investigated as is being discussed in North Carolina.
- Sales tax increases to fund local highways appear to be possible, although in states with high sales tax rates, as in NYS, this is less likely to be approved by the public or the legislature. In states like NC, with lower sales tax rates, increases appear to be more viable. The recent change to fund highways completely from sales taxes in Virginia appears to indicate that sales tax funding of highways may be a viable option in other states. However, sales tax funding of highways would require changing the highway funding philosophy to an indirect method that many states may not want to implement.
- Property tax increases in states that own secondary highways appear unlikely even if local property taxes are relatively low. The ability to share local tax revenues with the state to improve state owned local highways would be unlikely, although not impossible. The normal revenue sharing is when a higher level of government shares the taxes it collects with a lower level of government. In reversing this process, the local government would require transparency to assure the funds transferred to the state are used for the targeted local highways; the jurisdictional issue of spending local funds on state highways may still be a hurdle.
- Raising motor fuel taxes is an unpopular option with the public and legislatures and is unlikely in many states. In states such as NC and NYS, any rise in motor fuel tax

rates would need to be fairly small since these states have a relatively high overall motor fuel tax rate already in place.

- A campaign needs to be conducted, both long-term and consistently, to make the public and legislature aware of the need for additional funding of highways and, particularly, local rural highways. The survey conducted of NYS and NC experts noted how poor the public perception is regarding use of specific taxes for specific uses. This public perception makes the use of a new property or sales tax directed to highways and a motor fuel tax increase a hard sell. This campaign should be broader than one state and could include a regional or national campaign.
- There needs to be a better public awareness campaign for both the public and the legislature. Currently, the public, and even the legislature, do not understand the individual cost of any proposed tax increase. The million or billion dollar range discussed and needed for highway funding is something difficult for the local population to understand. Cost must be translated to an individual per-year cost since most have no idea what an individual even pays for the current motor fuel taxes per year. A good example is when a motor fuel tax of 40 cents a gallon would cost someone only \$160 a year if they drove 12,000 miles with a 30 mpg vehicle. The campaign needs to highlight individual costs with a set of proposed highway projects and improvements to be funded. The public will likely endorse reasonable individual costs that have high impact.
- In states where local highways are owned locally and decentralized, there needs to be better local rural highway planning and strategic planning for funding highways that requires a statewide condition analysis of all highways across the state. Development of funding plans based on pavement condition surveys and life cycle cost is needed. When local rural highways are owned by small towns with insufficient systems and staff to conduct pavement condition surveys, life cycle cost

planning is often not accomplished. It is recommended that the highway condition analysis be conducted by the state, if it is not already, since most states already inspect their state's bridges. The overall planning and strategic planning for funding local highways could be either a county-led or a state-led program with direct input from the towns. Using rural planning organizations (RPOs), as done in North Carolina, would be an option that also should be reviewed. It is recommended that local governments should maintain control of the actual allocation through this planning process if local rural highway funding continues to be through local rural government.

The following items that should be researched further to assure effective funding of local rural highways:

- The election of town highway superintendents should be studied in states with locally owned highways. In New York, 90 percent are elected and only 10 percent are appointed. The hard decisions necessary in the future, including reversion to gravel highways and lower levels of service, may be easier to consider with highway superintendents being appointed. The differences in decision making should be reviewed.
- Further research is needed on tools, such as simple spreadsheets, that could link pavement life cycle costs with funding and pavement condition surveys for local rural highway agencies. The goal should be to develop simple, but useful, systems that could be used by small rural counties and townships with limited staff.
- Implementation of VMT fees should be further studied to determine cross subsidies required to assure that lower volume local rural highways are adequately funded along with funding of local urban highways
- Surveys of the public and legislature are needed to judge the acceptance of increasing local rural highway funding using sales taxes, motor fuel taxes or VMT

fees when individuals understand the individual cost and how these increases are linked to known local rural highway maintenance and improvement projects.

- The change in Virginia to fund highways from sales tax rather than motor fuel tax should be studied over time to determine the effectiveness of the change to increase funding and public acceptance of the change from a direct to indirect method of funding.
- Diversion of state motor fuel taxes to fund projects other than highways like in New York State and in North Carolina should be further studied. The public should understand that stopping the diversion may have a significant impact on funding for the underfunded highway system.

There is much work that is needed to assure that the local rural highway system has sufficient funds in the future. Over 50 percent of the national highway system consists of local rural roads, either by ownership or by functional classification, and the local rural road system is important to rural America and the United States to access agriculture, manufacturing, and the recreation system. This important asset needs to be maintained or the quality of life will decline for all residents of the US.

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## 9.0 APPENDIX

## **Interview questions and answers**

### **Interview Number 1 from North Carolina**

1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?
2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?
3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?
4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?
5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?
6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?
7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?
8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?
9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?
10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?
11. What are other potential sources, besides motor fuels tax, property taxes, and sales taxes, that can be raised to make significant increases in available funding for local or secondary rural highways?
12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?

13. What effect would a decrease in state highway funds have on local or secondary rural highways?
14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?
15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?
16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?
17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?
18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?

**Interview Number 1 from North Carolina February 13, 2014 regarding questions 1 to 18**

NC has Powell bill to assist funding of highways for municipalities. The general assembly may restrict counties and cities on revenue generation and are trying to eliminate the privilege to tax and raise local revenues. Current Republican politicians in power in NC have led to less local power.

Counties have been concerned that at one time they would get the ownership back of local highways with limited funding to maintain.

NCDOT has a committee studying other states and ways to improve funding in NC. One option appears to be a VMT fee-based charge.

Highway User Tax is one that should be increased and, most people buying cars really do not appear to have issues or understand the user taxes paid when buying a car. It is just on the payment schedule. Dealers do not like the potential increase.

NCDOT committee working to find out what the public will accept. A major issue is to stop the diversion of the motor fuel tax. The last large diversion was about \$200 million for the Highway Patrol.

Another option is to have a dedicated sales tax on automotive parts which is a fairly direct user tax.

Tolls will be part of the answer on interstates to start and possibly some other high traffic roads.

Gas tax increase not politically possible at this time with the current no tax increase policy.

Other smaller items like increases in registration, plates, and licenses are being considered, but all of these will have smaller dollar impact,

Current prioritization of highways in NC has changed and this may result in a more urban. Currently changed to 40 percent statewide, 30 percent regional, and 30 percent local emphasis. Rural is getting more traction on planning and funding through the RPO with possibly more authority. Push to use RPO more.

VMT fees have concerns about the big brother effect although phones are already tracked. Eventually VMT will be implemented and an easy start would be to pay VMT with the reregistration of a car. Issue is collection annually and lump sum would appear larger to the public, although reasonable overall cost.

Still trying to determine the pain points for typical public and "soccer mom". Public awareness is the real issue. Working with stores so they can sell that congestion and delivery delays cost everyone money even at the store because of freight costs of items.

Need to stress economic drivers of rural highways so highways in the mindset with public and costs of doing nothing is quantifiable.

Virginia's sales tax answer and change from fuel tax could be an avenue. But issue is if sales tax part of the general fund highways will be competing with other needs and may lose especially if sales tax goes down in a poor economy. Better to keep highway revenue separate like in NC.

Fairest way is to have a use tax for highways based on weight and mileage which gas tax is for most. This is according to some survey results.

Still brainstorming how to fund increases, develop public awareness, and lay ground work for increasing funding. One issue is the need of \$1 billion is just too large to understand.

Need to develop a way to look at different levels with smaller amounts. Also, need to eliminate any diversions of funds since that is always an issue important for any increase.

Advocacy committee, engineering, and contractors working with the NCDOT transportation committee. Need to work with media and ask the public.

NCOT process is better now and more transparent which results in better cover for politicians. But, also less influenced by politicians. Major effort has been to make NCDOT smaller and more open.

#### **Additional questions March 24, 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** I do not think reverting our efforts in NC from paving more rural roads and moving towards converting them to gravel surface would be acceptable due to the shaping maintenance and dusting problems I believe it would create. In addition, our citizens would perceive we were taking something away from them which would create a public outcry in my opinion.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?**  
See response in No.1.

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** Our DOT has made good use of a mat and seal treatment on some rural roads and that seems to be working well. They would have to give you more information on initial and maintenance costs. They do it with their own forces in most cases.

**Any other comments on gravel highways?**

## **Interview Number 2 from North Carolina January 14, 2014**

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Secondary system close to 70 percent good on pavement condition. Now switching to high-speed data collection on pavement condition. Good on maintenance and roadside conditions as well. Culverts and cross road drainage need work. Bridges need work, as well, being so old. Some of the older timber bridges out west need work, but with low VMT it is hard to justify. Concern that funding may change to more politically based than condition based. Allocation process continues to change now in version 1 with version 2 on way. Changing from traditional allocation and using Pavement Management System and Bridge Management System.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** We need another \$60 to \$70 million a year, total. Shortfall across system, also on bridges. Inability to conduct pavement preservation without adequate chip sealing program. Concern about a potential shift of funds from pavements to bridges in need.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Need another \$60 to \$70 million a year, total, for pavement management. Currently, shifting funds from the gravel pavement program but cannot continue. Have graphs and charts showing how well past program has worked.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** With past funding for the last two years, current condition could be maintained. Need \$270 million patching and roadside maintenance. \$60 to \$70 million preservation and \$160 million resurfacing.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** Need preservation funds.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Not likely; only for emergency work.
- 7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Need to raise, but not sure on impact.

8. **What is the possibility of raising state motor fuel taxes?** How would this effect local or secondary rural highway funding? Again, needs to go up, currently capped. May not effect secondary system unless it goes to preservation. Largest need is higher traffic volume roads.
9. **What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** May be an option. New Municipality law in 2011 allows county to participate in highway improvements. If local desire, there is a way to fund local road projects; could have impact.
10. **What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Not likely with current administration that does not want to raise taxes.
11. **What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** Maybe a Utility or ROW tax, but small impact. Looking at potential for sponsors for rest stops. Again, small impact. VMT may be of interest and easy to collect through vehicle inspection system in state. Also, auto property tax and property tax recently combined so collection process could be similar.
12. **What effect would a decrease in Federal highway funds have on local or secondary rural highways?** No direct effect, but could shift funds from secondary roads indirectly.
13. **What effect would a decrease in state highway funds have on local or secondary rural highways?** Might result in shift of funds to high volume roads from secondary roads.
14. **What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Unknown. Already shifted what could be shifted from residual funds, now that they are gone, further cuts are a problem.
15. **If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** Less VMT, less revenue with gas tax, but less travel - no impact on roads themselves unless less trucks. Already have low VMT overall.
16. **Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** Little impact if a balanced VMT to gas tax.

17. **If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Would need the same way to fund roads like now based on condition. Could not be based only on VMT.
18. **What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** Depends on what public will accept on spending urban vs rural. Not practical to shift roads to county, although sometimes discussed. Already have a system called Powell with 75 percent based on population and 25 percent on miles maintained that needs to be reviewed. This results in some municipalities receiving more funds with less highways.

#### **Additional questions March 24, 2014**

**Question 1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?**

For NC, I do not see reversing any of our 1989 Trust Fund paving initiatives by reverting paved roads to unpaved. What began as ~16K of unpaved in 1989 is now ~3,000 mi. I can say our legislature passed HB 817 last session significantly reducing the secondary road paving program (among other trust fund programs) in order to place emphasis on more strategic prioritization transportation investments. The remaining ~3,000 mile of unpaved secondary roads have been reprioritized into one statewide priority paving list currently funded at \$12 million/year. Additionally, the Department is no longer obligated to pave all unpaved roads, as the 1989 Trust Fund law indicated. Unpaved roads we currently maintain that would not meet today's roads addition requirements can be excluded from the paving program.

**Question 2. If reverting to gravel highways is an option, under what conditions is this acceptable?** Really do not see as a palatable option in NC, particularly from political perspective.

**Question 3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** For our low volume paved roads, we continue to promote the benefits of asset management strategies, use of low

cost preservation treatments to extend pavement life. For unpaved...focus on retaining positive drainage. Our pavement management folks have recently reviewed extending time between resurfacing on our subdivision roads (of which we have many), at least from an overall pavement need analysis. Others, who you provided much info to you earlier can shed more light on this data, if you see this info having value.

**Other comments:** For what it's worth, I did a study for our legislative folks in 2007 on maintenance costs of paved vs unpaved. The bottom line, I recall, with resurfacing factored in, was it cost on average 36 percent more to maintain paved vs unpaved (\$5,400/mile vs \$3,400/mile).

### Interview Number 3 from North Carolina

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Currently, secondary are similar to other state highways meeting the target of about 70 percent being good. Interstate is higher meeting target of 80 percent good. Currently, focus is on maintenance first and not building additional capacity. This is currently based on real needs and not political issues. Concerned this might change to adding capacity based on politics.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** Currently at acceptable level, but with chip seal being cut politically, this will change. Although funding for resurfacing went up with chip seal being cut long term, some roads will not have appropriate maintenance with chip seal being the most cost effective solution. Resurfacing costs a lot more per mile so less preventive maintenance will take place.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** With chip seal being cut and maintenance budget for shoulders, mowing, and potholes going down, there is need to have at least \$200 million maintenance and \$70 to \$80 million a year for chip seal. Primary roads okay with the resurfacing budget, but secondary are in trouble with chip seal cut.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** Current funding of a 10 to 15 percent cut will result in secondary system dropping to 50 to 60 percent good roads from current 70 percent over the next 10 years.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** Some chance to increase state funding; need to check with secondary system.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Not likely.
- 7. What is the possibility of raising federal motor fuel taxes?** Needs to go up. How would this effect local or secondary rural highway funding? Depends on amount of increase.

8. **What is the possibility of raising state motor fuel taxes?** Not likely with even variable portion also capped. How would this effect local or secondary rural highway funding? None
9. **What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Property taxes for secondary roads not really being discussed for state roads. There is some state transfer of state highway funds to cities and towns.
10. **What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Not likely.
11. **What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** VMT the most likely; need to ask secondary unit.
12. **What effect would a decrease in Federal highway funds have on local or secondary rural highways?** Not positive since this would shift funds in state away from secondary.
13. **What effect would a decrease in state highway funds have on local or secondary rural highways?** Already an issue with some shift like from chip seal funding.
14. **What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** No definite idea.
15. **If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** There is already slower growth and travel in rural areas and spending not adequate, so no effect. Need to probably leave some roads gravel (4,000 to 5,000 miles) due to limited use. Construction dollars being allocated more regionally and more projects in Raleigh. There are issues like changes from four- to two-lanes across different highway divisions that cause inconsistent traffic movement.
16. **Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** New fee would try and be neutral to start program. Current highway inspection system deals with this and attempts to be neutral; in past, distribution based 90 percent on lane miles and 10 percent population. Changed to 50 percent needs, 37.5 percent lane miles, and 12.5 percent population. Rural ended up getting even more money. Talking about going to primarily needs based and without population which would be even a larger shift.

17. **If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Rural already get more than their share, so any change to distribution could cause issues.

18. **What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** In house has traditionally been cheaper for maintenance, but currently there is a shift to outsourcing which costs more and will result in less work with same funds. Suggest you talk with secondary system and chief financial officer as well.

#### **Additional questions March 30, 2014**

1. **With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Yes. This is something that has been considered and has even happened in a few remote areas. Interestingly enough, however, with maintenance funds being more limited than paving funds, in some cases, it might be easier to resurface than maintain a gravel road. Not cheaper necessarily, just easier funding mechanisms. This will vary by division and year.

2. **If reverting to gravel highways is an option, under what conditions is this acceptable?** Very low AADT roads that serve a limited number of customers and also areas in which roads do not need to be machined as frequently. Frequent machining can get expensive. Some areas, such as State and National Park access, may also be conducive to having a more "natural" looking road.

3. **If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** Maintaining a robust chip seal and patching program is really the best way to deal with low volume roads over time. You can toss single layer chip seals out for very low cost and if you do it cyclically, it works very well. Otherwise, options are limited. In areas where chip seals are not as viable due to noise and/or ride, use of a chip seal/slurry seal combination can be effective.

**Any other comments on gravel highways?**

**Interview Number 4 from North Carolina**

- 1. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?**
- 2. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?**
- 3. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?**
- 4. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?**
- 5. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?**
- 6. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?**
- 7. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?**
- 8. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?**
- 9. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?**
- 10. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?**
- 11. What effect would a decrease in Federal highway funds have on local or secondary rural highways?**
- 12. What effect would a decrease in state highway funds have on local or secondary rural highways?**

- 13. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?**
- 14. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?**
- 15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway needs?**
- 16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?**
- 17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?**
- 18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?**

**Interviewer answered financial questions on February 10, 2014**

Cities in NC get 1.75 cents of the current gas tax.

Counties do not spend any funds on highways.

Currently one-half cent in some metropolitan areas that is allowed in NC – Mcklenburg, Orange and Durham voted to use this tax for transit, but also allowed for highways.

Looking at VMT tax in the future based on paying when registering a vehicle annually in the 21st century report that Larry helped author. Discussed issue with low volume rural secondary highways and he agreed direct payment on use would be an issue.

Referenced the liability insurance excise tax in the 21st century report suggestion is to charge a \$1 surcharge on the typical \$6 charge per month.

Also, possibility of going from 3 percent to 4 percent tax on car sales like other southern states. Most items in report are direct user type fees. May also tweak the fee on trucks based on weight.

Also, that I95 will be going to tolling to also tax all users, not just NC users. Tolling stalled while reviewing economic impact on eastern part of state.

When asked about the Virginia movement to a sales tax, he noted the concern of relying on general fund and a tax that is subject to economy that may have wild swings. End result may be wild swings in highway funding.

No chance currently to raise property tax or sales tax with current Republican governor who is anti-tax.

Noted how Georgia has lower gas tax and relies on property tax for county highways. Always balanced, but money from somewhere.

Currently, NCDOT will be emphasizing metro areas rather than rural highways due to needs; example with current snow, some metro areas like Raleigh were really unprepared since they rely on NCDOT - some streets were not cleaned for four days. Communities, like Cary, were all set with equipment.

#### **Additional questions March 24, 2014**

- 1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered? In NC? No!**
- 2. If reverting to gravel highways is an option, under what conditions is this acceptable?**  
None.
- 3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** I do not see ripping up pavement as an option in North Carolina.

## Interview Number 1 from New York

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Varies across the state with a quick measure of cost/mile. We are typically behind the eight ball, but depends and local level may actually be okay based on lower level of service that is required.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** Really depends on level of service and, again, cost/mile. Even with double the funding it may not be the real solution. We are working to make sure that all new officials through New York Conference of Mayors (NYCOM) understand the need to match funding with roads with the required level of service. Typically falling behind with inadequate funding for local roads. Should look at Steuben County and life cycle analysis with level of services that reviews what funding should be available. They use a moderately complex analysis system that works.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Needs to be based on analysis like Steuben County.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** Will fall behind.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** Need to review the required funding for level of service and fund locally and through CHIPS. It is important that the public understand how funding is directed to roads directly. The concern was raised that with a property tax cap, there will be less investment in infrastructure. There is a need to fund and use capital reserves for large investments like highways and equipment.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Only possibility is for limited secondary roads; most have no federal funding.
- 7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Not likely to increase and little effect locally.

- 8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?** Not likely increase and little effect locally.
- 9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Tax cap issue really creates an issue with infrastructure funding being cut. It is important that reserves and plans be developed for both infrastructure and equipment. Easier to do this for equipment, but few do this now. Few local officials understand infrastructure long-term cost and replacement.
- 10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Not likely, but may be possible if truly targeted for a short term and then go away when the specific project is funded. The issue is the public does not believe the tax will go to a specific project and the increase in taxes will be permanent. This has worked in some states.
- 11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** Nothing noted except better planning to assure roads are funded at required level of service.
- 12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** Overall any decrease would be negative on other state roads and shift money away from CHIPS.
- 13. What effect would a decrease in state highway funds have on local or secondary rural highways?** Same issue - a decrease would result in less state funding and taking funds from CHIPS and local roads.
- 14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Local general funds only option.
- 15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** Fact remains that the real damage is due to larger trucks and smaller VMT little affect, since capacity not the issue.
- 16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** Funding should be

similar, as with gas tax and CHIPS. The real issue is the cost of collections may require a much higher overall collection of fees.

**17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** See no change; still a CHIPS or formula based distribution.

**18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** Need to make sure that local highway officials get the newest and latest technology. It is important since they need to be very effective with limited resources and larger networks. The recent CHIPS increase is a clear political message that it is possible to increase funding if legislators and governor want to increase. Very important to streamline processes. Discussed the issue that following state rules on local bridges for NYSDOT has a manual larger than the highway design manual. Why so many procedures with less state funding and assistance? Also discussed the bureaucratic nature of the current testing and other issues with federal bridge program through state.

#### **Additional questions March 30, 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Some agencies are looking at this, but this is not common in New York State. Traffic volumes in the counties are too great. For towns, this can be politically an issue. Since 90 percent of the town superintendents are elected (see attachment), this is not commonly done, purposely. It is happening, in some cases, just due to lack of maintenance.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?** The biggest problem with conversion back to gravel is the gravel itself. A good surface gravel has 8-15 percent fines, but a good gravel base should be less than 8 percent. If you remove the surface and the fine content is not correct, the highway tends to ravel, pothole, and get corrugations. Also, the traffic volume needs to be low. There are studies from the World Bank that show values as low as 10 vehicles per day as the cutoff for when it is cheaper to pave. Other studies show much higher values. I tend to go with the numbers generated as part of the Manual Guidelines for Rural Town and County Roads

([http://www.clrp.cornell.edu/library/publications/guidelines\\_rural\\_town-county\\_roads.pdf](http://www.clrp.cornell.edu/library/publications/guidelines_rural_town-county_roads.pdf)) developed in the 1990s. They use 150 AADT base upon research done in the 1980s.

I would look at the notes on when to pave a gravel road in the Gravel Roads: Maintenance and Design Manual developed by the South Dakota LTAP center (our equivalent in SD).

[http://water.epa.gov/polwaste/nps/upload/2003\\_07\\_24\\_NPS\\_gravelroads\\_appd.pdf](http://water.epa.gov/polwaste/nps/upload/2003_07_24_NPS_gravelroads_appd.pdf)

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** Chip seals and other wearing courses are the most economical, but drainage and good gravel are still critical. Also, the widths can be reduced some. See standards for very low volume roads.

[http://www.clrp.cornell.edu/library/publications/hwy\\_standards\\_low\\_volume\\_roads.pdf](http://www.clrp.cornell.edu/library/publications/hwy_standards_low_volume_roads.pdf)

**Any other comments on gravel highways?** Gravel roads still make up a high percentage of highways in New York State and nationally. They work well, but do require maintenance. Some of the “savings” agencies have found by de-paving have actually been transferred to the drivers in the form of rougher roads with more repairs and less gas mileage as a result.

## Interview Number 2 from New York

January 13, 2014

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Local towns in Schuyler County holding their own using patching and oil and stone. Statewide, there are issues on staying even. Culvert replacement is becoming issue, especially locally.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** Towns need to step up local programming and funding. Needs need to be set locally and vary depending on how programming has been managed.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** State and federal should be for larger capital items, including large culverts and bridges. Local roads should be funded through local funding. CHIPS helps, but should not be the only funding.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** Need to use federal and state for capital investments. Problem can be planning and carry over for some communities. Issue is that CHIPS may not always be used for capital projects. There may be a lower level of service if CHIPS not used correctly. Need to take time to plan.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** Taxes need to be allocated directly. No reason that a tax should be capped.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Not expected to see this happen. Main issue is to use federal and state for capital and local funding for highways.
- 7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Slim to none regarding any increase. Local funds, including property tax, should be used for highways.
- 8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?** First, need to fix the DHBTF and have more funds go

to local highways. Need to demonstrate the need for the increase. Best to use existing gas taxes on highways and, particularly, local highways. Also, should look at NYSDOT as a regional plan for local highways.

**9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Difficult with tax cap. Probable that property taxes will be used for any increase in funding.

**10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Difficult, since close to Pennsylvania border and local chambers would protest increase.

**11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** Tolls would not work locally, nothing else discussed.

**12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** This would really hurt bridges and counties. Result would be higher local taxes and no direct impact on highways. Indirectly, it may be negative with shift of funding from highways to bridges.

**13. What effect would a decrease in state highway funds have on local or secondary rural highways?** Huge negative impact with many relying heavily on CHIPS. Less impact of local government more progressive and using local funds. But loss would still be issue.

**14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Property taxes only real source. Schuyler County has picked up some items, like assessment, and kept sales tax. Net was a positive benefit to towns. Using a local targeted sales tax may be an option, but a long shot.

**15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** Need to lift gas tax cap. Need to have a better way to charge vehicles. Less travel, less wear and tear on roads, but less effect on less traveled local highways.

**16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** Need to take off the gas tax cap. Need some way to charge. If switch to VMT charge, it will be hard to collect.

**17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Too complicated. If highways have low VMT, a direct link to funding would be real issue since current state funding too low already.

**18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** Jack Ellis and others warned when CHIPS was implemented that CHIPS would be an issue in the future since local government would rely on state funding and not local funding. This is now happening with too many communities relying on CHIPS only for major portion of local highway funding.

#### **Additional questions March 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** This is a good question. I think going back to gravel roads is acceptable. They are more labor intense, annually, but the material costs are minimum and can be handled typically in an annual maintenance budget rather than a capital expense. One problem, however, is acceptance of the level of service by the property owners. With more urban individuals moving to the rural settings, they expect paved roadways with maximum dust control.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?** Selecting primarily agricultural dominated usage rather residential.

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** My town was moderately successful with a minimum roadway section where they did a good job on preparation. Replacing old cross culverts, scarifying the sub grade and doing a good job re-grading for cross slope drainage, good sub base structure, and a two-season paving job. Where we tried to pave over old insufficient oil and stone surface paving; it has been a failure.

**Any other comments on gravel highways?** Gravel is an art that is being lost. Most Highway Departments don't have staff with the experience and understanding of what the pavement

structure is doing. You have to have the structure and drainage developed up through the pavement system. Some highway crews leave a green strip between the sub base and the open side ditch. The result is ponding on the pavement structure and creating a bath tub effect. Drainage has to be day-lighted to have the pavement drained well.

The other problem is winter maintenance is a challenge. Gravel has a tendency to ice-up quicker and more difficult to thaw out. The top layers have to have large enough gravel stone to bridge that time period when the frost is below the surface, so the top doesn't turn to mush.

### Interview Number 3 from New York

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** State inspection data available on bridges for all bridges. Need to ask the county association regarding statewide estimate on highways.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** Again, ask county association. Using the countywide life cycle analysis, we are not receiving all funds needed each year, but overall condition is reasonable for funds received.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Based on life cycle, the required pavement materials and gravel is calculated. Example: last year's county have highway \$4.4 million when \$6.3 million needed based on life cycle analysis. Another \$500,000 from a wind turbine farm company was also given based on damaged highways.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** Based on life cycle, county will continue to fall behind on keeping condition at current state.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** County and statewide ChHIPS funding. Toll roads is an option in urban, but not an option in rural areas.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Both at national and state, more money for bridges is possible since the safety issues of bridges is clearly defined and understood. But, more money for highways is unlikely.
- 7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Increase at national level not going anywhere. Looking at VMT charge as a better option.

- 8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?** Not a very good option with movement to lower taxes by governor. Increase in fuel tax would help, if it happened.
- 9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Not likely. Not possible to target directly to highways.
- 10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** None, issue is both with public and legislature.
- 11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** Fuel tax should be raised and VMT tax is not as good a method to fund roads. Fuel tax also has benefit of being environmentally friendly by encouraging higher MPG.
- 12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** Catastrophic, since bridge money are main federal funds to county, there would still be a need to replace bridges so highways would really suffer with less funding.
- 13. What effect would a decrease in state highway funds have on local or secondary rural highways?** Major negative impact on condition of local highways.
- 14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** If CHIPS cut, then somehow property taxes would need to go up to pay for highway or real issue with highway condition over time.
- 15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** There would have to be a major decrease to have any impact on highways since most of the damage is truck related anyways.
- 16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** It appears that the move to VMT charge is a way to increase collection of fees without public understanding, since they do not know exactly what they pay in taxes with gas tax. Not sure any increase would in fact get back to highways.

**17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Not sure if any effect, since not direct tie with gas tax.

**18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** Currently, the county uses a life cycle analysis based on roughness of highway and traffic count that is used to allocate funds based on life cycle. This will be shared to understand process.

It does appear that some rural counties, like Ontario, have much higher highway funding since their highways appear to be in better condition. The state needs to conduct statewide condition of all highways. They already do bridges, but having condition of all highways would allow a statewide comparison of conditions and needed funding. Condition survey across state is probably the most important item to make a difference.

Suggested to talk to Ontario county and Town of Howard.

#### **Additional questions March 24, 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Yes.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?** Under 42 vehicles per day. Some say under eight vehicles per day.

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** Go to a double-surface chip seal road. However, gravel roads require about 15 percent fines to keep packed together. If you upgrade to a chip seal, it requires the added expense of upgrading the base gravel to at least less than 10 percent fines.

**Any other comments on gravel highways?** See my notes attached from a Public Works Committee presentation. Debbie: Scan and email Craig: 1) Appendix D for gravel roads. 2) Gravel roads zoning article. 3) County news article on gravel roads.

## Interviews Number 4 & 5 (together) from New York

January 7, 2014

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Ontario ranks near the top regarding county roads in state probably based on funding and financing. Town roads in county also middle or toward top, regarding condition. The counties to either side of Ontario (Yates and Livingston) appear much lower in condition. Main reason is limited shoulders while Ontario has good shoulders. Also, only 273 county road miles in Ontario, much less than counties like Steuben. Last year \$1.1 million from local funds plus \$1.7 million from CHIPS. Also, strong engineering staff in county for everything but federal work on bridges.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** Local bridges across the state or 60 percent deficient in state and need to be some deficient to assure we get full useful life of bridges. Probably should be about 20 to 30 percent deficient. Whole system is short and last statewide local roads report noted about \$1.2 billion a year. Real issue is local roads not structurally good, so real need is to rebuild structurally, not just surface coat. Many towns just use oil and stone and not adequate.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Maybe acceptable unless growth, then hard to keep up. Really difficult to know.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** If funding not increased, we will start to lose the system. MAP 21 is issue. We were making progress, especially in towns with Map 21 change. Towns and some counties rely mostly, if not only, on CHIPS funding so, unless CHIPS increase, a real issue. No rebuilding money will be available.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** CHIPS, federal, and local all need to increase. Local governments need to find a way to finance. Gas tax not increasing and in NYS only 50 percent used for highways, and local roads only receive about 13 percent, which is a real issue. Most funds to transit and other uses. Need to look at taxes on natural gas and other

energy taxes for highways. Property tax issue since it cannot be raised with tax cap. Old model does not work on funding. Have heard that federal tax may decrease as much as 15 cents, so state tax could be increased to generate more state funds. Also, need less regulations for MAP 21 funds.

**6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** MAP 21 needs more flexibility on bridge programs to national highway system.

**7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Let state keep all the federal money, but get more state money to locals with no strings like CHIPS. Locals could do three bridges for the cost of two with current state/federal regulations. This includes typically six times the cost for ROW that is required for state/fed compared to local cost. State administration of federal funds is a real issue.

**8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?** Dead issue raising fuel tax. The state should fund from general fund and fix DHBTF since not functioning well and already taking \$500 million to make up DHBTF shortfall.

**9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Zero chance of raising with current governor and plan to cut taxes, although good argument that property taxes should pay for highways since related to property.

**10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding? Ontario recently raised sales tax to fund community college, so why not roads?** The county already has a 0.25 percent of the sales tax dedicated for community college and sales tax for roads have a better chance if related to road condition. Sales tax dedicated for roads could also be a public issue, but with a sunset, it is possible. The main issue is there no direct relationship with use and sales tax and there is a degree of separation from transportation. Gas tax makes more sense.

**11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes that can be raised to make significant increases in available funding for local or secondary rural highways?** Bonding would work. Casino gambling funds would make sense

since highways assist access. Fracking, if it happens, should fund; both damage and long-term royalty fees could go to transportation.

**12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** Limited town effect since funds go to county only for bridges. Next issue are culverts in rural areas that need some federal assistance.

**13. What effect would a decrease in state highway funds have on local or secondary rural highways?** Huge, since CHIPS may be primary or only funding in towns.

**14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Property tax, but difficult to increase.

**15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** Less driving, like with lease vehicles, little impact on local highways with less traffic.

**16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** Like Easy Pass type charging will be less transparent and concern about making the case for funds to go to highways. Already have too many grabbing gas tax fund and VMT fee will be the same. Need more local control. Federal and state has too much control over the process. Transit getting too much of current funds and not paying in to the DHBTF. Bond act would work using VMT fee to pay. The largest issue is using any VMT collected for highways and not violating that principle, like the current DHBTF where gas taxes are used for mass transit and other uses.

**17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Somehow need local control on spending. Current following of state and federal requirements and specifications on projects is a real issue and too costly. Counties and towns can share this responsibility.

**18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?** Require locals to match the extra CHIPS funds so extra funds, in fact, have a double impact. Issue is some communities could not match and the counties and towns with the funds get better and the communities with lack of local funds get worse. There is a lack of consistency

in highway rating system across state and counties with a need to have a better rating system. Need to talk to Pam Mann- GO RAIL involved with a Local roads Cornell study to show the local highway impact of heavier trucks.

**April 5, 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Not sure about the gravel road option in NY.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?**  
None

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?**

Highway funding update is that CHIPS will get the expected second year \$75 million increase so the CHIPS base will be the same as last year, \$438.1 million. The budget includes an additional \$40 million of capital (distributed through the CHIPS formula) to help municipalities repair and rehabilitate local roads and bridges impacted by the extreme winter.

## Interview 6 in New York State

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** Some areas of state may be better, but typically state roads better than local, with some towns on par with counties. Some towns are not as good with tax base making the difference. Condition of highways not as good 10 years ago with cost of materials being way up with flat budgets and less CHIPS funds. The result is less highway work with the same dollars.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** The recent Shufon report states that local highways are short over \$1 billion annually and, if funded appropriately, the condition would be similar. Less MAP21 funds for county bridges since money is going to interstate and other capital projects.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Towns need at least twice the funds.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** Currently, only sealing every 7-10 years rather than the required 3-5 years. Cost increases will allow less work to be conducted as the material cost increases.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** Gas tax needs to be fixed so that additional funds go to DHBTF. Need better access of the gas tax by local roads. Sales tax from gas not going to DHBTF and these funds should go to DHBTF. With property tax cap, any increase in property tax is very difficult. Gambling or any fracking related funds need to also be considered for highways. Sales tax from county to town varies with some towns now required to pay for students attending community college rather than county which takes away from potential highway funds at town level.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** Not likely. Even MAP21 funding that goes to county is getting less, as well.
- 7. What is the possibility of raising federal motor fuel taxes? How would this effect local or secondary rural highway funding?** Not likely and will not get to local highways.

- 8. What is the possibility of raising state motor fuel taxes? How would this effect local or secondary rural highway funding?** Not likely and will not get to local highways. Not truthful on where these taxes currently go in state and will not change.
- 9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** Tax cap makes this very difficult.
- 10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Sales tax is a good way to spread out to others, like tourists. But hard to target to highways.
- 11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** No good answer.
- 12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** Would not be positive since other funding cuts would hurt locals.
- 13. What effect would a decrease in state highway funds have on local or secondary rural highways?** CHIPS funding cut would be a disaster since that is the primary town funding for highways.
- 14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Unsure, maybe a VMT charge or mileage charge on trucks.
- 15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** Possibly positive on low volume highways.
- 16. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** Need to find a way to charge electric and natural gas vehicles. Also need to charge trucks more.
- 17. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Not sure.

**18. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways? MTA gets funds and pays nothing in and, if MTA not affordable, why should it be subsidized?** Not sure how the Tappan Zee Bridge will ever pay for itself and will be another funding issue in state.

### **Additional Gravel Questions**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Once roads have been hard surfaced, it's impossible to permanently return them to gravel. It is a struggle to talk the stakeholders into leaving these roads unsurfaced, even for the winter freeze/thaw cycle, after full-depth reclamation and mag/chloride stabilization.

**2. If reverting to gravel highways is an option, under what conditions is this acceptable?** I'm not sure how the residents would be satisfied with gravel in any capacity after they have been hard surfaced regardless of the road condition. When I took over the superintendent's position in 2000, it was my hope that I would be able to convert our last 15 miles of gravel roads to be hard surfaced by the end of my career - a mile a year, until it was completed. With the increase in base materials, oil, and aggregates, that has not happened; I still have nine miles of gravel and I'm struggling to maintain what we have now.

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** The thought of reverting back to gravel, at least in our area, with scarcity of good gravel and the public's opposition to new open surface mines, I can see gravel getting more costly in a relatively short time. Modified gravel is 600 percent more costly than just 10 years ago and, once trucking is figured in, it could be just as expensive as adding the additional cost of going the extra mile of at least seal coating to avoid the base loss through plow and element erosion. I hope this helps answer your questions.

## Interview 7 from New York State

- 1. What is the current condition of the local or secondary rural highways in the state? How does this compare to other types of highways in the state?** While the local road system is more than six times larger than the state system, unlike the state roads, the local road conditions are not annually evaluated – that being said, we believe local pavements are in worse condition than state.
- 2. If the local or secondary rural highways in the state are below acceptable condition, how much of an increase in funding is needed annually to achieve an acceptable condition?** According to reports from both the State Comptroller and the New York State Association of Town Superintendents of Highways (NYSAOTSOH), the needs of the local highway system are approximately \$1.3 billion annually, excluding New York City.
- 3. What funding level is needed to maintain the local or secondary rural highways in the state at an acceptable condition?** Again, excluding NYC, the local system should have about \$2.3 billion spent maintaining the local system annually.
- 4. What will be the impact on the local or secondary rural highway condition if current funding levels are maintained and not increased in the future?** If current funding levels are maintained and condition levels decrease, drivers will inevitably pay more for auto maintenance and there will be a potential decrease in safety for drivers.
- 5. What funding source or sources need to be increased to maintain local or secondary rural highways at an acceptable condition?** NYS does not need to increase taxes, instead, there needs to be a redistribution of driver fees and taxes that are already being collected. It is projected that, if the local system simply received their “fair” share of these fees, there would be \$1.4 billion available annually to maintain local roads.
- 6. What is the possibility for increasing federal funds targeted to local or secondary rural highway funding?** We don’t believe New York will receive additional federal funding but there is a slim possibility of a redistribution of current funding levels between the state and locals.
- 7. What is the possibility of raising federal motor fuel taxes? Very Low. How would this effect local or secondary rural highway funding?** If it happened, more bridge maintenance money would be available.

- 8. What is the possibility of raising state motor fuel taxes? Also, very low. How would this effect local or secondary rural highway funding?** If New York's continues to take the vast majority of these revenues and not distribute it more fairly towards transportation, the impact would be negligible.
- 9. What is the possibility of increasing property taxes targeted for local or secondary rural highway funding?** The property tax cap is already stretching the local's ability to properly fund services, not just roads, so they possibility is very low.
- 10. What is the possibility of increasing sales taxes targeted for local or secondary rural highway funding?** Politically, the option of increasing sales tax is more acceptable than a gas tax increase, but most municipalities have already increased their local sales taxes – NYS's is nearly 9 percent already.
- 11. What other potential sources, besides motor fuels tax, property taxes, and sales taxes can be raised to make significant increases in available funding for local or secondary rural highways?** The sales tax on auto sales and auto parts should be dedicated to road repair and the \$2 cap on the state portion of the sales tax on gas should be lifted.
- 12. What effect would a decrease in Federal highway funds have on local or secondary rural highways?** If federal funding decreased, bridge conditions would get worse.
- 13. What effect would a decrease in state highway funds have on local or secondary rural highways?** The NYS Consolidated Highway Improvement Program is a critical funding component of local road maintenance. A cut in this aid would negatively impact conditions.
- 14. What funding source would most likely be increased if state highway funds decreased, if any, to balance this decrease?** Tough to answer, because we haven't seen a cut in CHIPS levels in over a decade.
- 15. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway funding?** As toll roads (NYS Thruway) increase their rates, commercial traffic driven to the local system increases. Every large truck (18-wheeler) causes significantly more damage to the local system than a regular passenger vehicle.
- 16. If we assume a smaller increase or decrease in VMT for vehicles in the future, what, if any, impact will that have on local or secondary rural highway needs?** Assuming more

than 50 percent of the local pavements are currently in fair or poor condition, it may take slightly longer before we hit 75 percent fair and poor conditions.

**17. Assuming we switch from motor fuel taxes to a VMT based fee for vehicles, what effect will that have on local or secondary rural highway funding?** It would be beneficial, but probably more of long-term tool, not something that would have a significant impact in the next 10 years.

**18. If we switch to a VMT based fee for vehicles, should the charges collected be tied directly to spending on the local or secondary rural highways where it is collected?** Interesting thought, but the MTA draws revenues from gas taxes collected statewide. If you consider that approach, transit should also be included.

**19. What else would you like to share regarding local or secondary rural highways and ways to assure adequate funding to maintain an acceptable condition of these highways?**

**March 30, 2014**

**1. With the recent move to have some paved rural local highways in the Midwest and West torn up and reverting to gravel, is this something to be considered?** Not sure about the gravel road option in NY.

**2. If reverting to gravel highways is an option under what conditions is this acceptable?** None.

**3. If reverting to gravel is not an option, are there other reasonable options for low VMT local rural highways when limited funds are available?** We received an extra \$40M that will be distributed through CHIPs – I sent these questions to our association President to work with you on our response – not an area I have much depth (along with many other areas.)