COUNTY ROAD MANAGEMENT PROBLEMS IN NORTH DAKOTA

by

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PREFACE

This report was prepared as part of the Transportation Needs Assessment (HCR 3069) in cooperation with the North Dakota State Highway Department. The author is indebted to the many county officials who provided most of the information contained within the report. For questions or information regarding this report please contact:

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INTRODUCTION

The local road system at the county and township level are an important part of North Dakota's integrated roads network. The county network provides local service to county residents and commercial operations as well as serving as a collector system for access to major arteries on the State Highway System. The county Federal Aid Secondary (FAS) road system consists of 9,394.4 miles or approximately nine percent of total system miles, while the entire county system (FAS and other county roads) has about 20,000 miles. All county, township and other rural roads constitute about 90 percent of the total system, or about 86,000 miles (Table 1). Because of this large number of miles and the wide geographic area they serve, the local road system is an important part of North Dakota's entire road network.

TABLE 1. SUMMARY OF NORTH DAKOTA ROAD MILEAGE, DECEMBER 31, 1983.

System	Miles
State	7,287.3
County (FAS)	9,394.4
Other Rural Roads and Streets	86,381.6
Incorporated City Streets	3,317.9
TOTAL	106,381.2

Source: North Dakota Highway Statistics, 1985, Planning Division, North Dakota State Highway Department.

The extent of the county and rural road system indicates the breadth of the potential management problems that may arise over the entire local system. In a state like North Dakota where geographic and economic disparities among regions are often pronounced, issues or problems facing local transportation managers can be extremely diverse. Portions of the state where the economic base is centered primarily in agriculture face different local road management problems than areas where energy development is predominant. Also, road problems and issues may be different due to terrain or some other geographic characteristics.

A survey of county officials was conducted in order to assess these problems more comprehensively. The objective of the survey was to identify specific problems and issues encountered by North Dakota counties relative to local road management. The survey was conducted in two parts. The first portion was a personal interview of thirteen county road managers in the state.

These thirteen counties were selected on the basis of several criteria in order to gain a more complete perspective of local road management problems for the state. First, a wide variation in agricultural production and marketing patterns exist across the state. County road officials were selected for personal interviews from across the state in order to assess all types of agricultural production and marketing including small grains, oilseeds, specialty crops such as sugar beets, and livestock. Also, special road management problems resulting from

energy development were considered when selecting county officials for interviews. Finally, considerations were given to individuals who may have special insights into local transportation problems because of their experience or knowledge of local programs.

With these considerations, thirteen counties were selected for personal interviews. Location of these thirteen counties is presented in Figure 1. The questionnaire administered in the interviews is presented in Appendix "A".

The remaining 40 counties in the state were also included in the survey process, but in a different manner. In order to derive a more complete assessment of local road problems, a questionnaire was mailed to officials from the remaining 40 counties who were not interviewed personally. The questionnaire mailed to county officials was designed to provide similar information as was contained in the personal interview questionnaire. However, due to the nature of mail surveys, the questionnaire was shorter and contained attitudinal or direct questions. A copy of the questionnaire mailed to the remaining 40 counties is presented in Appendix "B". The personal interviews, on the other hand, were designed more toward discussion and presentation of ideas, issues and perceptions by county road officials.

Responses were received from 37 of the 40 counties included in the mail survey for a 92.5 percent response rate. Follow-up telephone calls to county officials followed the initial mailing

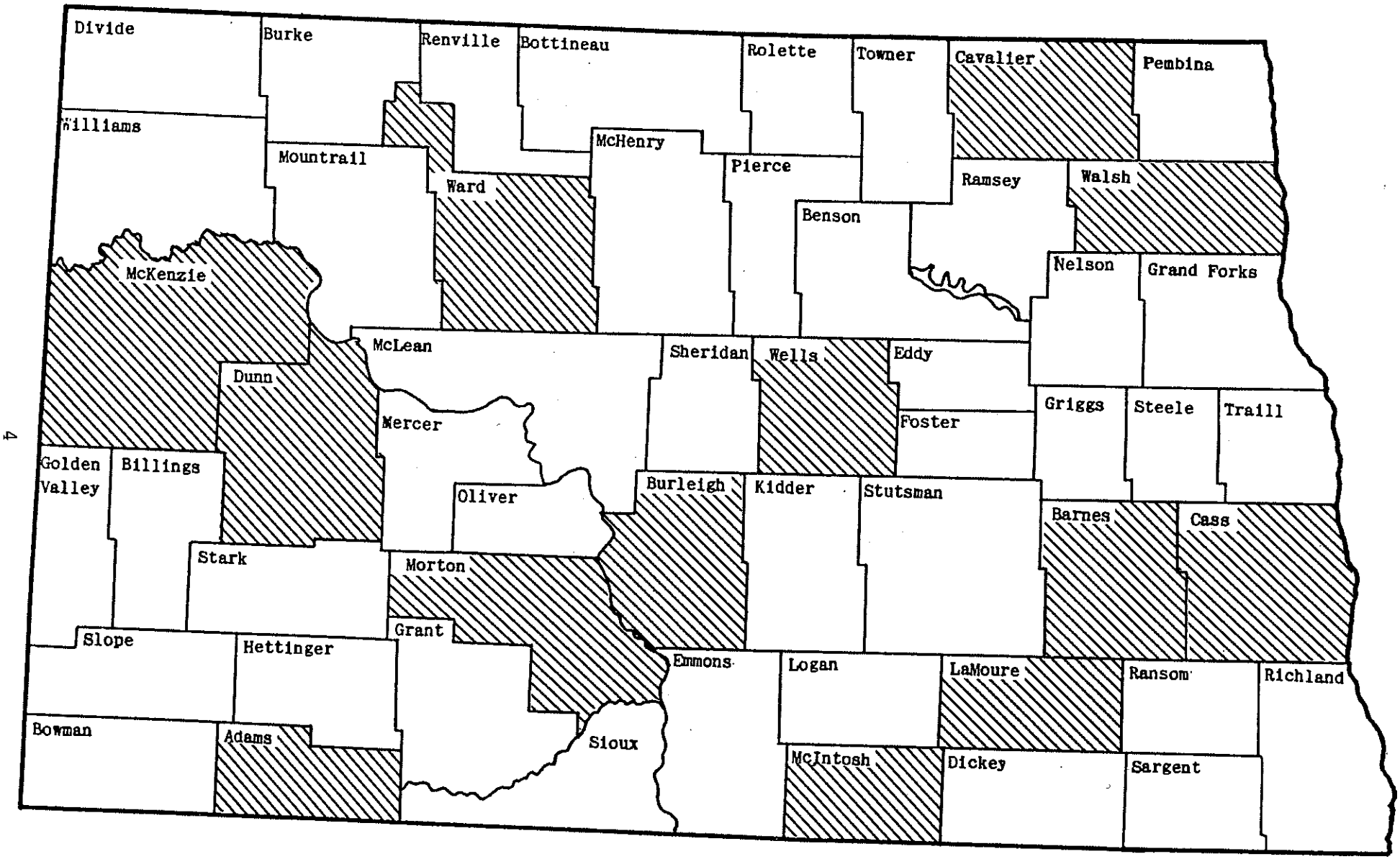

Figure 1. Personal Interviews of County Road Officials.

by approximately two weeks. Portions of four mail questionnaires were deemed unusable due to errors in completing the survey instrument. Results of both questionnaires follow in both table and narrative form.

A high degree of variability in types and extent of county road management problems was discovered through the personal interviews and mail survey. This variation occurred in many different areas including surface condition of roads, types of vehicles involved, sufficiency in funding, sources of funding, and others. One of the first major differences to note in the county road system in North Dakota is the variability in mileages among counties (Table 2.)

Total miles of county roads varies from 34.4 in Slope County to 475.8 in Cass County. Also, the total number of paved miles varies between zero in Dunn County to 280 in Cass County. The percent of paved miles also varies widely, from 0% in Slope County to 65% in Grand Forks County.

This dramatic variation in both total and paved miles of roads gives an indication of the variety of road management problems which occur in North Dakota. Management techniques on gravel road systems are considerably different than on paved systems. Also, costs of constructing and maintaining a paved system are much higher than a gravel system. Some of these cost differences are presented later in this report.

TABLE 2. COUNTY FEDERAL AID SECONDARY ROAD MILEAGES, BY SURFACE TYPE, NORTH DAKOTA, DECEMBER 31, 1985.

COUNTY	PAVED MILES		GRAVEL MILES		OTHER MILES		TOTAL
	Actual	Percent	Actual	Percent	Actual	Percent	
Adams	14.2	9.99	123.9	87.13	4.1	2.88	142.2
Barnes	194.1	64.51	106.8	35.49	0.0	0.00	300.9
Benson	10.5	4.01	249.1	95.22	2.0	0.76	261.6
Billings	5.4	15.43	29.6	84.57	0.0	0.00	35.0
Bottineau	149.7	63.59	84.5	35.90	1.2	0.51	235.4
Bowman	32.5	43.10	42.9	56.90	0.0	0.00	75.4
Burke	23.4	22.01	82.9	77.99	0.0	0.00	106.3
Burleigh	78.1	31.65	164.2	66.53	4.5	1.82	246.8
Cass	280.0	58.85	195.8	41.15	0.0	0.00	475.8
Cavalier	70.1	28.43	170.0	68.94	6.5	2.64	246.6
Dickey	75.2	40.02	112.7	59.98	0.0	0.00	187.9
Divide	17.6	11.37	132.8	85.79	4.4	2.84	154.8
Dunn	0.0	0.00	191.5	94.80	10.5	5.20	202.0
Eddy	48.1	60.50	31.4	39.50	0.0	0.00	79.5
Emmons	10.9	5.46	186.6	93.44	2.2	1.10	199.7
Foster	55.4	53.63	47.9	46.37	0.0	0.00	103.3
Golden Valley	9.1	10.99	73.4	88.65	0.3	0.36	82.8
Grand Forks	208.9	65.44	110.3	34.56	0.0	0.00	319.2
Grant	2.8	1.88	146.0	98.12	0.0	0.00	148.8
Griggs	33.9	24.49	104.5	75.51	0.0	0.00	138.4
Hettinger	0.8	0.49	161.9	99.26	0.4	0.25	163.1
Kidder	54.0	29.59	128.5	70.41	0.0	0.00	182.5
Lamoure	152.0	65.21	81.1	34.79	0.0	0.00	233.1
Logan	7.6	6.79	96.4	86.07	8.0	7.14	112.0
McHenry	55.8	25.00	160.9	72.09	6.5	2.91	223.2
McIntosh	59.2	46.91	67.0	53.09	0.0	0.00	126.2
McKenzie	7.1	7.69	85.2	92.31	0.0	0.00	92.3
McLean	86.7	34.12	167.3	65.84	0.1	0.04	254.1
Mercer	19.7	14.79	113.5	85.21	0.0	0.00	133.2
Morton	30.1	14.95	163.0	80.97	8.2	4.07	201.3
Mountrail	32.3	17.01	157.6	82.99	0.0	0.00	189.9
Nelson	45.2	30.11	104.9	69.89	0.0	0.00	150.1
Oliver	3.8	4.20	86.6	95.80	0.0	0.00	90.4
Pembina	151.7	93.82	10.0	6.18	0.0	0.00	161.7
Pierce	11.0	9.34	106.8	90.66	0.0	0.00	117.8
Ramsey	125.4	64.01	70.5	35.99	0.0	0.00	195.9
Ransom	5.0	3.15	153.5	96.85	0.0	0.00	158.5
Renville	63.3	47.06	70.2	52.19	1.0	0.74	134.5
Richland	137.5	62.73	81.7	37.27	0.0	0.00	219.2
Rolette	23.1	24.19	72.4	75.81	0.0	0.00	95.5
Sargent	84.2	45.66	100.2	54.34	0.0	0.00	184.4
Sheridan	20.0	14.71	116.0	85.29	0.0	0.00	136.0
Sioux	33.0	49.92	22.8	34.49	10.3	15.58	66.1
Slope	0.0	0.00	34.4	100.00	0.0	0.00	34.4
Stark	54.7	27.95	137.3	70.16	1.0	0.51	195.7
Steele	57.9	47.54	63.9	52.46	0.0	0.00	121.8
Stutsman	180.7	56.22	140.8	43.81	0.0	0.00	321.4
Towner	11.0	10.50	93.8	89.50	0.0	0.00	104.8
Traill	116.7	57.29	87.0	42.71	0.0	0.00	203.7
Walsh	153.2	55.71	121.9	44.33	0.0	0.00	275.0
Ward	104.2	29.30	251.4	70.70	0.0	0.00	355.6
Wells	115.0	52.54	103.9	47.46	0.0	0.00	218.9
Williams	78.9	39.51	120.8	60.49	0.0	0.00	199.7
ALL COUNTIES	3400.7	36.20	5920.0	63.02	71.2	0.76	9394.4

COUNTY ROAD SYSTEM CHARACTERISTICS

County road officials were queried as to several operating or utilization characteristics regarding their local road system to be able to better understand how priorities are set and what type of specific traffic related problems are to be dealt with. These characteristics include the types of routes which are given priority in the maintenance schedule, the types of vehicles which are believed to cause accelerated deterioration of road surfaces, and a general rating of severity of several road management related topics.

County officials were asked to rank which types of routes received priority in terms of snow removal, blading, regraveling and other maintenance within their jurisdiction. Results of that ranking are presented in Table 3. A wide variation across counties in types of routes receiving priority maintenance. In most cases, however, school bus routes and access to a higher

TABLE 3. PRIORITY MAINTENANCE ROUTES, COUNTY ROADS IN NORTH DAKOTA, 1986.

Rank	Type of Route
1	School bus route
2	Access to state primary or collector roads
3	Access to farms and home sites
4	Rural mail routes
5	Rural milk routes
6	Fire and emergency vehicle routes
7	Access to farmland
8	Access to nonfarm rural residences

traffic density collector or primary road were noted as higher priority. However, individual county needs often indicated different priorities. For example, counties with a more well developed dairy industry gave higher priority to milk routes, counties containing a highly utilized recreational area gave higher priority to recreational area access roads, etc. Other types of routes which were mentioned in addition to those listed in Table 4 include:

1. oil field access
2. high volume roads
3. county FAS roads
4. roads between communities
5. roads to livestock facilities
6. roads serving several users (milk, mail, bus, etc.)

County officials also were asked to identify which types of vehicles may be causing road deterioration in their jurisdiction. The results are presented in Table 4. In an agricultural state such as North Dakota, it is not surprising that trucks carrying agricultural products were rated as the primary causes of local road deterioration. Also, in counties where oil and coal development has taken place, energy-related vehicles were rated very highly as a cause of road deterioration. Farm machinery traffic was cited as a contributor to road damage, particularly as it related to tire size, tread type, and damage caused on road shoulders by trailing machinery. Construction traffic of all types was also noted as contributing to road surface problems. Single-plant construction or pipeline construction, for example, were occasionally mentioned. It also seems that rural road

rehabilitation/maintenance is its own worst enemy -- trucks hauling aggregate to regravel other county roads were often cited as a cause of rural road deterioration.

TABLE 4. TYPES OF VEHICLES CAUSING LOCAL ROAD DETERIORATION ACCORDING TO COUNTY ROAD OFFICIALS, 1986.

Rank	Vehicle Type
1	Farm truck traffic of agricultural products
2	Semi truck traffic of agricultural products
3	Traffic due to energy development
4	Other commercial truck traffic
5	Farm machinery traffic
6	Construction traffic
7	Passenger vehicles (automobiles, pickups, etc.)

Other types of vehicles which were mentioned in addition to those presented in Table 5 include:

1. school buses
2. milk trucks
3. four-wheel-drive and recreational vehicles

A listing of general road/bridge management problems was presented to county road officials for them to rate the seriousness of each of those topics. The topics and results of the rating are presented in Table 5. The two topics rated at

TABLE 5. RATING OF THE SERIOUSNESS OF VARIOUS LOCAL ROAD MANAGEMENT ISSUES ACCORDING TO COUNTY ROAD OFFICIALS, 1986.

Topic	Rating			
	Very Pressing	Somewhat Pressing	Not Very Pressing	Not Pressing At All
	(number of responses)			
Bridge replacement/repair	20	20	8	1
Need for additional revenue	37	8	5	0
Need for new/additional equipment	15	22	10	4
Need to upgrade heavily travelled roads	26	17	3	2
Need to salvage/maintain existing road surfaces	24	21	4	1
Need to enforce weight restrictions	26	13	6	1
Competition for funds with other county programs	8	15	14	5

least somewhat pressing most often were the need for additional revenues for road programs and the need to salvage existing road surfaces. The fact that these two topics were rated highly makes sense given some of the subjective comments of county officials. Very few expressed a need for additional miles of paved roads or additional road building. Instead many felt that the size of their system could be cut back and that additional miles should not be paved. Many officials stated that existing budgets were

not sufficient to cover maintenance costs of the already paved miles. Many of the aggressive paving programs instigated in the past are now haunting local jurisdictions because of the higher maintenance costs on their paved systems compared to their gravel roads.

Several other issues were also rated as highly critical and needing attention. Bridge maintenance/repair is a major problem for many North Dakota counties. A large proportion of rural bridges in the state are old and either structurally unsound or obsolete. (A more complete description of bridge condition on county roads is presented later in this report.) Several counties expressed a need to upgrade some heavily travelled routes. For example, some counties have experienced industrial development which has impacted specific routes leading to a plant site, such as a subterminal grain elevator, a processing plant, or concentrated energy development.

Truck overloads and enforcement of weight restrictions was also a topic of concern to road officials. Several facets of this problem were mentioned. Overloaded farm trucks were cited as a major problem as well as overloaded semi-trucks traveling on local roads to avoid restrictions on other more highly enforced routes. The problem of enforcement is especially difficult at the local level. For example, enforcing limits on farm trucks during the harvest rush is extremely difficult due to the local pressures on officials to overlook the violations.

Several other issues not included in Table 5 were noted by county road officials. Those issues included:

1. affects of higher speed limits on rural roads;
2. vulnerability to liability claims caused by substandard surface condition, inadequate signing, and other deficiencies;
3. reliability of funding sources in the future such as revenue sharing;
4. affects of subdivision development on county roads;
5. availability of personnel training.

COUNTY AND TOWNSHIP SYSTEM CONDITION

County road officials are continuously attempting to upgrade the overall quality of their roadway surface conditions. The challenge is to most effectively utilize available funds on portions of their system where the most benefit will be attained. Officials were asked to rate the condition of their county and township systems, both gravel and paved roads. Results of that rating are presented in Table 6.

TABLE 6. COUNTY AND TOWNSHIP ROAD CONDITION AS REPORTED BY COUNTY ROAD MANAGERS, 1986.

Condition Category	County		Township		All Miles
	Paved	Gravel	Paved	Gravel	
Needs major repair or reconstruction	12%	31%	-	6%	15%
Maintenance much higher than normal	48%	28%	-	28%	26%
Needs only regular maintenance	40%	41%	-	66%	59%

Condition of local roads varied by jurisdiction and by surface type. On the county system, 12 percent of paved roads and 31 percent of graveled roads were rated as needing major repair or construction. Forty-eight percent of the paved county roads and 28 percent of the gravel roads were rated as needing higher than normal maintenance. Forty percent of the county paved and 41 percent of the county gravel roads were rated as needing regular maintenance only.

Condition rating of the township system revealed somewhat different results. Six percent of the township miles were rated as needing reconstruction, 28 percent needed higher than regular maintenance, and 66 percent needed only regular maintenance. Many county road officials felt that even though many township roads may not have been in good condition, the lower traffic density levels did not justify any significant investment. This may explain the small percent of township miles placed in the reconstruction category and the higher proportion noted in the regular maintenance only category.

In order to economize on road maintenance/construction expenditures, some county officials have chosen to reduce service levels on some low density or problem roads. Reducing service levels may include many activities including:

1) reducing or eliminating snow removal;
2) reducing the frequency of regraveling or blading;
3) reverting to paved road back to gravel;
4) replacing a bridge with a culvert or other lower cost structure.

Many of these cost-reduction activities take place regularly in county road management such as replacing bridges with culverts. Also, the frequency of snow removal or regraveling may be a function of available funds in any particular fiscal time period. Some counties, however, have actually turned some paved roads back to gravel due to the high maintenance costs of paved roads, and due to the intolerable driving characteristics of a poorly surfaced, broken-up paved road. Officials from eleven counties stated that they had actually reverted some portion of their system from pavement to gravel. The average length of road segment noted by these eleven officials was 11 miles, ranging from 0.5 to 40 miles. In addition, 10 officials stated that they planned to reduce services on more of their system in the next five years.

SYSTEM COSTS

Estimates of the costs to maintain local roads were formulated in discussions with county road officials. These estimates were made to give insights into the adequacy of local funds to support road networks at an acceptable quality level. Estimates of gravel road maintenance and construction costs are presented in Table 7.

TABLE 7. COUNTY GRAVEL ROAD MAINTENANCE AND CONSTRUCTION COSTS, 1986.

Annual Maintenance Costs	
High Volume Route	$1,812/mile
Medium Volume Route	$1,219/mile
Low Volume Route	$898/mile
Construction Costs	
FAS Standards	$41,666/mile
County Standards	$13,333/mile

Costs to maintain county gravel roads were stratified into three traffic volume categories: high volume (250 vehicles per day and over); medium volume (50-249 vehicles per day); and low volume (less than 50 vehicles per day). These maintenance costs include regraveling, blading, snow removal, weed control, signing, and miscellaneous expenses. Included in these categories are costs of labor and equipment replacement. These cost estimates do not include overhead or administrative costs associated with county road management. Average gravel road maintenance costs varied from approximately $900 per mile on low volume roads to over $1,800 per mile on high volume roads.

Road construction (or more appropriately, re-construction) costs were also estimated and are presented in Table 7. Costs varied significantly depending on the standards to which the project must be built. For roads built to federal aid standards, the average construction cost was estimated to be approximately $41,600 per mile. For roads where less stringent standards can

be applied regarding road width, etc., the cost was about $13,300 per mile.

Estimates of county paved road maintenance and construction costs also were estimated by local officials and are presented in Table 8. Annual maintenance costs include items such as patching and crack sealing, snow removal, signing and chip seals. The cost of overlays is not included. The average annual maintenance cost for county paved roads was estimated to be $1,928 per mile. The cost of a typical asphalt overlay (normally two inches thick) was estimated to be $54,500 per mile. The cost of totally rebuilding a county paved road, including the asphalt surface, was estimated to be $118,000 per mile.

TABLE 8. COUNTY PAVED ROAD MAINTENANCE AND CONSTRUCTION COSTS, 1986.

Annual Maintenance Cost	$1,928/mile
Overlay Cost	$54,500/mile
Reconstruction Cost	$118,000/mile

The most efficient utilization of available county road funds is a constant concern to local officials. County officials prioritize expenditures to gain the maximum benefit, as well as try to reduce absolute expenditures while maintaining essential services. Local road officials were asked to comment on what methods they felt would be most appropriate as a means to lower

road-related expenditures. Methods most favored to lower expenditures are presented in Table 9.

TABLE 9. METHODS TO LOWER ROAD-RELATED EXPENDITURES FAVORED BY LOCAL OFFICIALS.

Rank	Method
1	Reduce number of bridges
2	Close some roads for periods of high damage
3	Close some roads or bridges completely
4	Reduce certain roads or bridges to lower service and weight rating
5	Reduce snow plowing
6	Reduce maintenance and repair of all roads
7	Reduce weed mowing, brush cutting

The two most favored methods to lower expenditures on county roads were to reduce the number of bridges and to close some roads when susceptible to damage, such as during spring thaw. This ranking confirms earlier discussions regarding the expense involved with the high number of old and deficient bridges in many counties.

Lowering expenditures by reducing snow plowing and mowing was not ranked highly by county officials; however, closing some roads completely and reducing service ratings on roads were mentioned more often. Other methods to lower expenditures which were noted include:

1. Stricter enforcement of weight restrictions on rural roads;
2. lower speed limits;
3. redefine system to reduce mileage;
4. return some maintenance to private individuals;

5. hire superintendent to achieve benefits of professional management;
6. adhere to effective equipment replacement program to minimize down time, maintenance, etc.;
7. stop aggressive paving programs;
8. bolster construction standards to reduce long term maintenance costs.

County officials were also asked to share their perceptions regarding the most effective methods to raise additional revenues for local road maintenance and construction. These preferred revenue sources are presented in Table 10.

TABLE 10. METHODS TO RAISE REVENUE FOR ROADS MAINTENANCE AND CONSTRUCTION FAVORED BY LOCAL OFFICIALS.

Rank	Method
1	Increase state motor fuel tax revenues
2	Dedicated state sales tax revenues
3	Increase vehicle license fees revenues
4	Increase federal motor fuel tax revenues
5	Increase local property tax revenues
6	Eliminate agricultural motor fuel tax refund
7	Increase sales tax on farm inputs
8	Check-off on agricultural commodities

The most favored methods to raise revenues for local roads were to increase the existing primary sources, including state fuel taxes and state vehicle license fees. In addition to the revenue sources mentioned above, several other possible revenue generators were cited by the local road officials including:

1. eliminate gasohol tax exemption;
2. increase state income tax;
3. increase taxes on coal and oil producers;

4. implement county sales taxes;
5. issue a statewide bond for immediate construction needs;
6. impose tax on four-wheel-drive vehicles;
7. impose a tax on gravel pit owners.

COOPERATIVE PROJECTS AMONG JURISDICTIONS

One potential method to achieve cost savings in local road management is by participating in cooperative or joint operations with neighboring or other jurisdictions. Through cooperative efforts several objectives may be accomplished. Better utilization of equipment and personnel may be achieved through sharing of these resources in each jurisdiction's projects. A county or rural community may not be able to use its equipment or staff most efficiently because of the size and scale of its operation. Combining resources with a neighboring county may not only more effectively utilize resources, but may also make more types of equipment and other items available for each jurisdiction's use. Also, savings may be achieved through joint purchasing of materials to achieve volume discounts. Some of the particular cooperative projects that were mentioned by county road officials include:

1. occasional joint construction projects between larger jurisdictions;
2. joint equipment rental for testing;
3. joint county line maintenance and construction;
4. equipment loans to neighboring counties or cities;
5. consideration of consolidating shops and communication facilities;
6. joint materials purchasing and shared stock piling;
7. emergency equipment sharing during floods, snow storms, etc.;
8. purchase supplies under state bid;

9. gravel crushing for cities;
10. Adams County/City of Hettinger road department consolidation.

Although the many cooperative projects noted above were mentioned by county road officials, few had actually aggressively pursued these activities or actively been involved in many cooperative projects. When asked what inhibited participation in these projects, several factors were cited. In general, these factors involved difficulties in coordinating the supervisory personnel and the necessary equipment involved. Specific problems with cooperative project participation mentioned by local road officials included:

1. obtaining agreement among jurisdictional boards and managers;
2. equipment needs are simultaneous;
3. equipment types needed are different for cities and counties;
4. timing and prioritizing of when and where work should be done;
5. geography, distances involved;
6. under sharing agreements, specific details on maintenance and other responsibilities often difficult to reach;
7. some auditing, accounting restrictions;
8. equipment often specialized;
9. centralized management on cooperative projects lacking, supervisory role questionable.

OTHER COUNTY ROAD MANAGEMENT PROBLEMS

Several other specific problems in managing county road systems were cited by local road management officials. These included gravel availability, liability claims potential, and the effectiveness of the current county farm-to-market roads program.

Counties utilize large amounts of gravel in maintaining their local road systems. Availability of adequate gravel supplies has become a problem for some counties. When local gravel supplies are diminished, it requires longer hauls from pits when adequate supplies are available. In addition, many counties are forced to use whatever aggregate is available and may not have access to good quality gravel. The price of available gravel supplies has also changed due to several factors, primarily in counties experiencing extensive energy development. The additional demand for gravel supplies in these counties has driven the price up for all gravel consumers including county road programs.

One major problem for local jurisdictions is the rising cost of liability insurance and their vulnerability to suits caused by inadequate road and bridge conditions. In particular, the condition of the road surface itself, bridge condition, and the adequacy of signs are areas of particular concern to local officials regarding liability.

Another major management problem regarding county roads programs is the current law governing county farm-to-market roads program. Under this law, counties are bound to their priority listing of road construction projects as voted on an many as 27 years ago. These priority listings may have reflected needs within the counties several years ago, but many factors have rendered these programs obsolete. These factors include:

1. demographic shifts;
2. inflation in road construction/maintenance costs;
3. shifts in major arterial routes.

All of these factors have led to substantial dissatisfaction with the remaining projects on many counties' priority lists. However, due to the inflexibility in current law, counties cannot change or reprioritize their programs to make them fit their needs of today.

One very isolated yet very real problem for some counties is the issue of larger city subdivision development. For example, the rapid expansion of the city of Lincoln, North Dakota (four miles southeast of Bismarck) has created problems for Burleigh county road officials due to the high density of commuter traffic between Lincoln and Bismarck. Rapid expansion of these types of subdivisions combined with the fact that long-term road system planning cannot predict such development can lead to may problems including:

1. traffic volumes on formerly low density roads increase dramatically leading to accelerated surface deterioration
2. increased demand for maintenance such as snow removal
3. questions regarding jurisdictional responsibility for roads between subdivisions and nearby larger cities
4. traffic congestion on routes not designed for higher traffic volumes.

Often these problems fall on county road officials because roads between subdivisions and larger cities are often the responsibility of the county. Although the problems of rapid subdivision development is isolated to only a few areas of the

entire state, those few incidents cause a very real problem for officials in those jurisdictions.

The number and condition of structures (bridges, culverts, etc.) has also become a major management problems for many counties in North Dakota. A large number of structures are either too old and dilapidated for safe travel or are obsolete for today's commercial and personal transportation needs.

A total of over 4,200 structures over 20 feet long exist on the county FAS and remaining county road system (Table 25). More than 2,700 or 65 percent of these are considered deficient, either by safety or obsolescence. In addition, another 3567 structures under 20 feet exist on the county and township road network which are not eligible for federal aid.

The total number of structures in each county is highly variable, ranging from zero in Kidder County to 388 in Cass County. This is an indication of the significantly different county road systems in existence in North Dakota. Also, due to high maintenance and replacement cost of bridges and other structures, it indicates the variance in problems associated with road/bridge management in North Dakota. In addition to the absolute number of deficient structures in the state, the proportion of each county's structures which are deficient also varies, and ranges from 88 percent in Bowman county to 8 percent in McIntosh county.

TABLE 11. COUNTY ROAD BRIDGES, BY COUNTY, NORTH DAKOTA, 1986.

County	Deficient Bridges		Total Number of Bridges
	(#)	(%)	
Adams	27	63	43
Barnes	17	49	35
Benson	21	64	33
Billings	16	47	34
Bottineau	119	78	152
Bowman	44	88	50
Burke	17	61	28
Burleigh	27	42	65
Cass	266	69	388
Cavalier	72	82	88
Dickey	19	49	39
Divide	5	42	12
Dunn	79	83	95
Eddy	8	44	18
Emmons	28	64	44
Foster	12	63	19
Golden Valley	13	48	27
Grand Forks	101	33	306
Grant	53	73	73
Griggs	12	52	23
Hettinger	44	61	72
Kidder	0	-	0
LaMoure	25	43	58
Logan	8	62	13
McHenry	83	59	141
McIntosh	1	8	12
McKenzie	98	75	131
McLean	13	43	30
Mercer	35	51	68
Morton	222	67	332
Mountrail	12	50	24
Nelson	9	43	21
Oliver	6	35	17
Pembina	88	44	198
Pierce	6	86	7
Ramsey	60	80	75
Ransom	15	56	27
Renville	5	24	21
Richland	137	71	194
Rolette	13	62	21
Sargent	37	86	43
Sheridan	3	43	7
Sioux	8	50	16
Slope	24	62	39
Stark	119	76	156
Steele	58	53	109
Stutsman	13	38	34
Towner	68	83	82
Traill	153	78	195
Walsh	199	73	271
Ward	44	54	81
Wells	19	54	35
Williams	80	75	107
TOTAL	2,721	65	4,209

SUMMARY AND RECOMMENDATIONS

North Dakota's county and township road system is vital to the economic health of the state. These roads serve as a "feeder" system to our primary and interstate system and provide access to rural communities and farms. This local road system constitutes over 90 percent of the entire road network in the state, but carries a much smaller proportion of the total traffic. In spite of the low traffic density, this core local road system must be in place to serve local interests whether ten residents or one resident require access via a particular route. In order to elicit specific road management problems encountered by local officials, a series of personal interviews and mail surveys was conducted.

Several characteristics of the state's local road system were identified by local road officials including condition of the system, priority routes within counties, types of vehicles predominant on local routes, and others. Local officials were also asked to rate the severity of several common problems such as bridge condition, adequacy of funds, surface condition needs, and others. Other significant problems identified by local officials included availability of good quality gravel, vulnerability to lawsuits due to road and bridge conditions, and the inappropriateness of the county farm-to-market program for today's needs. Also, costs to maintain the local system were estimated, as well as costs of construction/reconstruction of gravel and paved roads. Methods to lower expenditures for road

upkeep were also suggested. Road officials were asked to identify what types of cooperative projects they were involved in with neighboring cities or counties. Also, factors which inhibit participation in these projects were identified.

Several recommendations regarding local road management problems were made to the Interim Legislative Committee on Transportation to allow the 1987 Legislature Assembly to deal with these problems. Each of these recommendations and action taken by the Committee is presented below:

1. County Farm to Market Roads Program

   To allow counties to reprioritize their programs to meet today's needs, a bill draft was prepared by the Legislative Council to allow more flexibility and more discretion by the Board of County commissioners in the program.

2. Low Volume Rural Roads

   To reduce exposure to lawsuits and reduce maintenance costs on low volume roads, a bill draft was prepared by the Legislative Council which would establish a "minimum maintenance road" law whereby a road could be designated as a minimum maintenance road, informing the public of its condition and "travel at your own risk" status.

3. Bid Requirements for County Purchases

   To allow greater flexibility in purchasing equipment and materials by county officials, a bill

draft was prepared by the Legislative Council which would increase the dollar limit over which officials must call for bids when purchasing equipment or materials.

4. Joint Stockpiling/Sharing Facilities

To reduce inventory costs and storage facility needs, a recommendation was made to promote sharing of similar facilities where practical. No legislative action was necessary; however, discussions with auditors and state officials to allow sharing activities are underway.

5. Facility Siting on Local Roads

To promote adequate transportation planning when considering location of a commercial/industrial facility in rural areas, a bill draft was prepared by the Legislative Council which would require County Commission consultation with the State Highway Commissioner before issuing a building permit for heavy traffic generating facilities. Final approval would remain with the Board of County Commissioners.

6. Recreational Roads

To enhance utilization of North Dakota recreational facilities by residents and promote use by tourists, a recommendation was made to develop a program to rehabilitate recreational roads which are determined to have a regional or statewide impact, especially those contributing to the state's tourist industry. It was also

recommended that the State Parks and Recreation Department be responsible for developing the program, including a funding source.

7. Enforcement of Overloads on Rural Roads

To alleviate damage caused by overloaded vehicles on rural roads, a recommendation was made to ensure that funds collected through fines be channeled to the jurisdiction where the violation occurred.

8. Highway Distribution Fund Level

To ensure adequate funds are available to local jurisdictions for road programs, the recommendation was made that the Highway Distribution Fund be bolstered to at least 1984-85 levels. The 1987 Legislature will be dealing with the issue of methods to maintain highway funds.

9. Local Transportation Planning

To assist county officials in establishing a systematic transportation planning effort to more effectively utilize resources and manage road systems, the recommendation was made to establish such a program at the state level through a federal matching program already in place. A letter in support of the State Highway Department's request for such positions has been sent to the Office of Management and Budget.

10. County FAS Highway Mill Levy

To allow counties to assess up to a level sufficient to adequately care for their county road system, a

bill draft was prepared by the Legislative Council which would raise the maximum levy from 15 mills to a higher level (not yet determined).

APPENDIX "A"

County Personal Interview Questionnaire

TRANSPORTATION NEEDS ASSESSMENT STUDY

(Personal Interview Survey to Selected Counties)

Name of County _____

Name of Person Completing this Survey _____

Title of Person Completing this Survey _____

Telephone Number _____

Road and Bridge System

County Road System

Mileages		Percent of These Miles Maintained Year-Round
County Paved Miles	____miles	____%
County Gravel Miles	____miles	____%
County Other Miles	____miles	____%
Total Miles	____miles	

Township Road System
(if information available)

Mileages		Percent of These Miles Maintained Year-Round
Township Paved Miles	____ miles	____%
Township Gravel Miles	____ miles	____%
Township Other Miles	____ miles	____%
Total Miles	____ miles	

ROAD CONDITION

PLEASE RATE THE CONDITION OF YOUR COUNTY SYSTEM. GIVE THE TOTAL MILEAGE THAT FALLS INTO EACH CATEGORY.

County Paved	County Gravel		
_____	_____	miles	Need major repair or reconstruction
_____	_____	miles	Maintenance will be considerably higher than normal to prevent continued deterioration.
_____	_____	miles	Needs only regular maintenance
_____	_____	TOTAL	

PLEASE RATE THE CONDITION OF YOUR TOWNSHIP SYSTEM. GIVE THE TOTAL MILEAGE THAT FALLS INTO EACH CATEGORY.

Township Paved	Township Gravel		
_____	_____	miles	Needs major repair or reconstruction
_____	_____	miles	Maintenance will be considerably higher than normal to prevent continued deterioration
_____	_____	miles	Needs only regular maintenance
_____	_____	miles	TOTAL

HAVE YOU REDUCED STANDARDS OR SERVICE LEVELS ON ANY ROADS IN THE PAST 5 YEARS? (FOR EXAMPLE, REVERTING A PAVED ROAD BACK TO GRAVEL, NO MORE SNOW REMOVAL, ETC.

Yes _____ No _____

If yes, how many miles? _____ miles

DO YOU PLAN TO REDUCE SERVICE LEVELS ON MORE ROADS IN THE NEXT 5 YEARS?

Yes _____ No _____

If yes, how many miles? _____miles

WHICH OF THE FOLLOWING ARE THE HIGHEST PRIORITY ROUTES IN YOUR COUNTY? PLEASE RANK THE TOP 4 WHERE 1 = HIGHEST PRIORITY, ETC.

_____ Access to farm buildings and home sites

_____ School bus routes

_____ Access to state primary or collector roads

_____ Rural mail routes

_____ Rural milk routes

_____ Fire and emergency vehicle routes

_____ Access to farmland

_____ Other (please specify)

WHICH OF THE FOLLOWING METHODS TO LOWER ROAD EXPENDITURES WOULD YOU BE MOST IN FAVOR OF?
(PLEASE RANK 1 THROUGH 5 WHERE 1 IS YOUR FIRST CHOICE)

_____ Close some roads or bridges completely to public

_____ Close some roads for periods of high damage (spring thaw)

_____ Reduce maintenance and repair of all roads

_____ Reduce number of bridges

_____ Reduce snow plowing

_____ Reduce weed mowing, brush cutting

_____ Reduce certain roads and bridges to a lower service level and weight rating (for example, return hard surfaced roads to gravel)

_____ Other (please specify) _____

_____

HOW PRESSING DO YOU FIND THE PROBLEMS LISTED BELOW?
(CHECK THE MOST APPROPRIATE RESPONSE)

	Very Pressing	Somewhat Pressing	Not Very Pressing	Not Pressing
a. Bridge replacement and repair	_____	_____	_____	_____
b. Need for additional revenue	_____	_____	_____	_____
c. Need for new or additional equipment	_____	_____	_____	_____
d. Need to upgrade heavily travelled roads or crossings	_____	_____	_____	_____
e. Need to salvage and maintain existing roads and surfaces	_____	_____	_____	_____
f. Need to enforce weight restrictions	_____	_____	_____	_____
g. Competition for funds with other county programs	_____	_____	_____	_____
h. Other (please specify)	_____	_____	_____	_____

OF THE ABOVE CONCERNS WHICH DO YOU CONSIDER YOUR MOST IMPORTANT TODAY?

ARE THERE OTHER COUNTY PROBLEMS WHICH YOU CONSIDER OF IMMEDIATE CONCERN (WITHIN THE NEXT 6 TO 12 MONTHS)?

WHAT TYPES OF VEHICLES DO YOU FEEL ARE THE PRIMARY CAUSE OF ROAD AND BRIDGE DETERIORATION IN YOUR COUNTY?
(please rank 1 through 3, where 1 is the primary cause.

_____ Passenger vehicles (automobiles, pick-ups, etc.)

_____ Construction traffic

_____ Farm truck traffic of agricultural products

_____ Farm machinery traffic

_____ Semi-trailer traffic of agricultural products

_____ Other commercial truck traffic

_____ Traffic due to energy development

_____ Other traffic (please specify) _____

_____

SOURCES OF REVENUE

WHAT WERE YOUR TOTAL FUNDS AVAILABLE THROUGH REVENUE SHARING IN 1985?

$_____

WHAT PERCENT OF THIS TOTAL WAS SPENT ON ROAD RELATED ACTIVITIES?
(PURCHASE ROAD MAINTENANCE EQUIPMENT, ETC.)

_____%

IF ADDITIONAL FUNDS WERE RAISED FOR LOCAL ROADS AND BRIDGES, WHAT REVENUE SOURCES WOULD YOU PREFER TO BE ADDED OR INCREASED? (please rank 1 through 4)

_____ Increase local property tax if dedicated to road services

_____ Increase state motor fuel tax with funds dedicated to counties

_____ Elimination of off-road motor fuel tax revate for agriculture

_____ Increase sales tax on farm inputs such as machinery, fertilizer, etc.

_____ Per bushel charge on crops sold by farmers

_____ Increase vehicle license fees with revenues dedicated to road construction and repair

_____ More state aid through dedicated sales tax

_____ More federal aid through increased federal user fee taxes such as gas or diesel tax

_____ Other (please specify) _____

MAINTENANCE OF GRAVEL ROADS

How often are roads regraveled?	County	Township
High volume (more than 250 vehicles/day)	_____	_____
Medium volume (50 - 249 vehicles/day)	_____	_____
Low volume (less than 50 vehicles/day)	_____	_____

IS THIS SCHEDULE ADEQUATE FOR THESE TYPES OF ROADS? WHY OR WHY NOT?

HOW OFTEN DO YOU BLADE ROADS IN SUMMER?

High volume (more than 250 vehicles/day)	_____	_____
Medium volume (50 - 240 vehicles/day)	_____	_____
Low volume (less than 50 vehicles/day)	_____	_____

IS THIS SCHEDULE ADEQUATE FOR THESE TYPES OF ROADS? WHY OR WHY NOT?

HOW MANY MILES OF GRAVEL ROAD NEED RECONSTRUCTION?

County _____ Township _____

WHAT IS YOUR ESTIMATED COST PER MILE OF GRAVEL ROAD RECONSTRUCTION?

$_____/mile

WHAT TYPES OF SERVICES DO YOU PROVIDE FOR TOWNSHIPS?

ON WHAT BASIS DO YOU CHARGE FOR THESE SERVICES (FIXED RATE, PER MACHINE-HOUR, ETC.)?

WHAT IS YOUR AVERAGE ANNUAL GRAVEL ROAD (COUNTY AND TOWNSHIP) MAINTENANCE COST PER MILE INCLUDING BLADING, SNOW REMOVAL, REGRAVELING, SIGN MAINTENANCE ETC.

High volume (more than 250 vehicles/day) _____$ mile

Medium volume (50 - 249 vehicles/day) _____$ mile

Low volume (less than 50 vehicles/day) _____$ mile

WHAT IS YOUR AVERAGE COST PER CUBIC YARD OF GRAVEL IN PLACE TODAY?

$_____/cu. yd.

WHAT WAS THE PRICE IN PLACE 5 YEARS AGO?

$_____/cu. yd.

IS AVAILABILITY OF GOOD QUALITY GRAVEL A PROBLEM?

PAVED ROAD MAINTENANCE

How often do you reseal paved roads? _____

What is your average annual cost per mile to maintain paved roads? (including snow, weed control, not overlay) $_____/mile

What is your average cost per mile for a two inch overlay (or your typical overlay)? $_____/mile

How many additional miles of road should be paved in your county? (consider construction costs, maintenance costs and traffic volume) _____ miles

Has your current maintenance program been able
to prevent accelerated road deterioration?

How many miles of your paved roads need reconstruction? _____miles

HAVE YOU HAD ANY LIABLILITY LAWSUITS RELATED TO ROAD OR BRIDGE CONDITION, ETC. OR DO YOU HAVE ANY SUITS PENDING?

DO YOU FEEL YOUR COUNTY IS VULNERABLE TO SUITS BECAUSE OF YOUR ROAD OR BRIDGE CONDITIONS?

WILL IT BE POSSIBLE TO COMPLETE YOUR FARM TO MARKET PROGRAM (10 MILL PROGRAM) GIVEN CURRENT TAXABLE VALUATIONS AND ROAD CONSTRUCTION COSTS?

WHAT PROBLEMS DO YOU SEE ASSOCIATED WITH THIS PROGRAM?

HOW WOULD YOU LIKE TO SEE THIS PROGRAM (FARM TO MARKET) CHANGED TO BETTER ACCOMMODATE YOUR ROAD PROGRAM NEEDS?

WHERE IN YOUR MANAGEMENT PROGRAM DO PROBLEMS EXIST REGARDING:

Obtaining funds for projects (other than amount of funds).
- timing, source, etc.

Local or state regulations.
-project authorization, road standards, etc.

Availability of information for management.
- engineering, inventory, etc.

Prioritizing projects.
- choosing areas of expenditure, etc.

Other

ARE YOU PARTICIPATING IN ANY COOPERATIVE PROJECTS WITH OTHER COUNTIES OR CITIES SUCH AS:

Equipment sharing
Joint purchasing
Purchasing of surplus materials
"Piggyback" purchasing
Work sharing
Testing
Technology sharing

WHAT FACTORS PROHIBIT YOU FROM PARTICIPATING IN THE ABOVE PROJECTS?

ARE YOU AWARE OF ANY LAWS (LOCAL OR STATE) THAT RESTRICT YOUR ROAD MANAGEMENT PROGRAM?

APPENDIX "B"

County Mail Survey Questionnaire

TRANSPORTATION NEEDS STUDY
(Mail Survey to All Counties)

Conducted By

North Dakota State Highway Department, Bismarck and Upper Great Plains Transportation Institute, Fargo

Name of County _____

Name of Person Completing Survey _____

Title _____

Telephone Number _____

COUNTY ROAD SYSTEM

MILEAGES		Percent of These Miles Maintained Year-Round
County Paved Miles	_____ miles	_____ %
County Gravel Miles	_____ miles	_____ %
County Other Miles	_____ miles	_____ %
TOTAL	_____ miles	

TOWNSHIP ROAD SYSTEM
(if information available)

MILEAGES		Percent of These Miles Maintained Year-Round
Township Paved Miles	_____ miles	_____ %
Township Gravel Miles	_____ miles	_____ %
Township Other Miles	_____ miles	_____ %
TOTAL	_____ miles	

HOW PRESSING DO YOU FIND THE PROBLEMS LISTED BELOW? (check the most appropriate response)

	Very Pressing	Somewhat Pressing	Not Very Pressing	Not Pressing At All
a. Bridge replacement and repair				
b. Need for additional revenue				
c. Need for new or additional equipment				
d. Need to upgrade heavily travelled roads or crossings				
e. Need to salvage and maintain existing roads and surfaces				
f. Need to enforce weight restrictions				
g. Competition for funds with other county programs (law enforcement, etc.)				
h. Other (please specify) _____				

OF THE ABOVE CONCERNS WHICH DO YOU CONSIDER YOUR MOST IMPORTANT PROBLEM? _____

WHAT TYPES OF VEHICLES DO YOU FEEL ARE THE PRIMARY CAUSE OF ROAD AND BRIDGE DETERIORATION IN YOUR COUNTY? (please rank 1 through 3, where 1 is the primary cause)

_____ Passenger vehicles (automobiles, pick-ups, etc.)
_____ Construction traffic
_____ Farm truck traffic of agricultural products
_____ Farm machinery traffic
_____ Semi-truck traffic of agricultural products
_____ Other commercial truck traffic
_____ Traffic due to energy development
_____ Other traffic (please specify) _____

WHICH OF THE FOLLOWING ARE THE HIGHEST PRIORITY MAINTENANCE ROUTES IN YOUR COUNTY? (please rank the top 4 where 1 = highest priority, etc.)

_____ Access to farms and home sites
_____ School bus routes
_____ Access to state primary or collector roads
_____ Access to nonfarm rural residences
_____ Rural mail routes
_____ Rural milk routes
_____ Fire and emergency vehicle routes
_____ Access to farmland
_____ Other (please specify) _____

_____

HAVE YOU REDUCED SERVICE LEVELS ON ANY ROADS IN THE PAST 5 YEARS? (For example, reverting a paved road back to gravel, no more snow removal, etc.)

Yes _____ No _____

If yes, how many miles? _____ miles

Do you plan to reduce service levels on more roads?

Yes _____ No _____

WHICH OF THE FOLLOWING METHODS TO LOWER ROAD EXPENDITURES WOULD YOU BE MOST IN FAVOR OF? (please rank 1 through 5 where 1 is your first choice)

_____ Close some roads or bridges completely to public
_____ Close some roads for periods of high damage (spring thaw, etc.)
_____ Reduce maintenance and repair of all roads
_____ Reduce number of bridges
_____ Reduce snow plowing
_____ Reduce weed mowing, brush cutting
_____ Reduced certain roads and bridges to a lower service level and weight rating (for example, return hard surfaced roads to gravel)
_____ Other (please specify) _____

_____

WHAT WERE YOUR TOTAL FUNDS AVAILABLE THROUGH FEDERAL REVENUE SHARING IN 1985? (if unknown, please ignore)

$_____

HOW MUCH OF THIS FEDERAL REVENUE SHARING WAS SPENT ON ROAD RELATED ACTIVITIES (purchase road maintenance equipment, etc.)

_____%

IF ADDITIONAL FUNDS WERE RAISED FOR LOCAL ROADS AND BRIDGES, WHAT REVENUE SOURCES WOULD YOU PREFER TO BE ADDED OR INCREASED? (rank 1 through 4)

_____ Increase local property tax
_____ Increase state motor fuel tax
_____ Elimination of off-road motor fuel tax rebate for agriculture
_____ Increase sales tax on farm inputs such as machinery, fertilizer, etc.
_____ Per bushel charge on crops sold by farmers
_____ Increase vehicle license fees with revenues dedicated to road construction and repair
_____ More state aid through dedicated sales tax
_____ More federal aid through increased federal user taxes such as gas or diesel tax
_____ Other (please specify) _____

HAVE YOU HAD ANY LIABILITY LAWSUITS RELATED TO ROAD OR BRIDGE CONDITION, OR DO YOU HAVE ANY SUITS PENDING? Yes_____ No_____

If yes, please explain.

ARE THERE ANY OTHER ROAD/BRIDGE MANAGEMENT PROBLEMS THAT ARE A MAJOR CONCERN TODAY?

Please return to the Upper Great Plains Transportation Institute in the enclosed stamped envelope.

Thank you!