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#### TO: Municipal Engineers City Clerks

SUBJECT: Municipal Screening Board Data

Enclosed is a copy of the June 1997 Municipal Screening Board Data Booklet.

The Screening Board made a motion in 1996 not to do the annual unit price study this year because of the small fluctuation in prices during the past ten years. This allowed the State Aid Needs Unit to concentrate on other projects such as the review of the needs quantity tables and work on the life cycle concept. This concept was not completed in depth so it was not reviewed by the Allocation Subcommittee and included in this booklet.

The data included in this report will be used by the Municipal Screening Board at its June 24 and 25, 1997 meeting near Brainerd. A number of changes to the needs quantity tables are being proposed by the Needs Study Subcommittee which will have affect on the city needs and apportionment. The recommendations of the Needs Study Subcommittee are outlined in the meeting minutes and in this booklet. The minutes are found on pages 11-15.

Should you have any suggestions or recommendations regarding the data in this publication, please refer them to your District Representative along with a copy to this office, or call me at (612) 296-1662 prior to the Screening Board Meeting.

The distribution of this report is sent to all Municipal Engineers and when a consulting engineer is engaged by the municipality, a copy is also sent to the municipal clerk.

A limited number of additional copies of this report are available on request.

Sincerely,

Kenneth Straus Municipal Needs Manager

Enclosures: 1997 Municipal State Aid Screening Board Data Booklet.

# 1997 MUNICIPAL SCREENING BOARD DATA

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# 1997 MUNICIPAL SCREENING BOARD

#### )

27-May-97

#### **OFFICERS**

Chairman Vice Chairman		Brian Bachmeier John Rodeberg	Oakdale Hutchinson	(612) 739-5086 (320) 234-4208
Secretary		Ken Ashfeld	Maple Grove	(612) 494-6420
INENIDERS				
<b>District</b>	<u>Served</u>	<b>Representative</b>		
1	3	Dave Halter	Grand Rapids	(218) 326-7602
2	1	David Kildahl	Crookston	(218) 281-6545
3	1	Terry Wotzka	Waite Park Sauk Bapida	(612) 253-1000
4	3	Gary Nansen	Detroit Lakes	(218) 847-5607
Metro-West	2	Jack Bittle	Champlin	(612) 421-1955
6	3	Bill Malin	Winona	(507) 457-8269
7	2	Larry Read	Fairmont	(507) 238-9461
8	1	Daniel Sarff	Litchfield	(612) 231-3956
Metro-East	2	Dave Jessup	Woodbury	(612) 731-5784
(Three Cities		Dean Beeman	Duluth	(218) 723-3278
of the		Ramankutty Kannankutty	Minneapolis	(612) 673-2476
First Class)		Ed Warn	St. Paul	(612) 266-6142
<u>District</u>		<u>Alternates</u>		
1		David Salo	Hermantown	(218) 727-8796
2		Michael Metso	Bemidji	(218) 759-3576
3		Larry Koshak	Otsego	(612) 427-5860
4		Tim Schoonhoven	Alexandria	(320) 762-8149
Metro-West		Lee Gustafson	Minnetonka	(612) 939-8200
6		David Olson	Albert Lea	(507) 377-4325
7		Steven P. Koehler	New Ulm	(507) 359-8245
8		Keith Nelson	Marshall	(507) 537-6774
Metro-East		Mark Burch	White Bear Lake	(612) 429-8531

#### **1997 SUBCOMMITTEES**

The Screening Board Chairman appoints one city Engineer, who has served on the Screening Board, to serve a three year term on the Needs Study Subcommittee.

The past Chairman of the Screening Board is appointed to serve a three year term on the Unencumbered Construction Fund Subcommittee.

	UNENCUMBERED CONSTRUCTION
NEEDS STUDY SUBCOMMITTEE	FUNDS SUBCOMMITTEE
Herb Reimer-Chairman	Alan Gray-Chairman
Moorhead	Eden Prairie
(218) 299-5390	(612) 949-8300
Expires in 1997	Expires in 1997
•	
Ken Saffert	Dan Edwards
Mankato	Fergus Falls
(507) 387-8631	(218) 739-2251
Expires in 1998	Expires in 1998
Curt Kreklau	David Sonnenberg
Buffalo	Minneanolis
(612) 682-1181	(612) 673-2443
Expires in 1999	(012) 075-2445 Expires in 1999

#### ALLOCATION STUDY SUBCOMMITTEE

Ramankutty Kannankutty - Minneapolis (Chair)	(612) 673-2456
Gerald Butcher - Maple Grove	(612) 420-4000
Tom Drake - Red Wing	(612) 227-6220
John Flora - Fridley	(612) 571-3450
Jim Prusak - Cloquet	(218) 879-6758
Bill Ottensmann - Coon Rapids	(612) 755-2880
Herb Reimer - Moorhead	(218) 299-5390
Mike Rardin - St. Louis Park	(612) 924-2551
Ed Warn - St. Paul	(612) 266-6142

# **1996 Municipal Screening Board Fall Meeting Minutes**

October 22 and 23, 1996 • Grandview Lodge, Nisswa

## I. <u>Opening by Chairman Bachmeier</u>

Chair Bachmeier explained that Dale Swanson, who was the previous chair of the Screening Board for this year, resigned as the City Engineer of Willmar. Being the previous Vice Chair, Bachmeier will be acting Chair.

#### A. Chair Bachmeier introduced:

Bill Ottensmann	Chairman of the Needs Study Subcommittee
Alan Gray	Chairman of the Unencumbered Construction Fund Subcommittee
John Rodeberg	Secretary of the Screening Board

The Secretary conducted the roll call of the members:

District 1	Dave Halter	Grand Rapids
District 2	Gary Sanders	East Grand Forks
District 3	Curt Kreklau	Buffalo
District 4	Gary Nansen	Detroit Lakes
Metro-West	Jack Bittle	Champlin
District 6	William Malin	Winona
District 7	Larry Read	Fairmont
District 8	John Rodeberg	Hutchinson
Metro-East	Dave Jessup	Woodbury
Duluth	Ken Larson	
Minneapolis	Ramankutty Kannankutty	-
St. Paul	Paul St. Martin	

**Screening Board Alternates:** 

District 3	Terry Wotzka	Waite Park, Sauk Rapids
District 8	Daniel Sarff	Litchfield

#### **B.** The Chair recognized Department of Transportation personnel:

Patrick Murphy	State Aid Engineer
Julie Skallman	Assistant State Aid Engineer
Ken Straus	Manager, Municipal State Aid Needs
Ken Hoeschen	Manager, County State Aid Needs
Bill Croke	District 1 State Aid Engineer
Luane Tasa	District 2 State Aid Engineer
Mike Tardy	District 3 State Aid Engineer
Tallack Johnson	District 4 State Aid Engineer
Mike Pinsonneault	District 6 State Aid Engineer
Doug Haeder	District 7 State Aid Engineer
Tom Behm	District 8 State Aid Engineer
Bob Brown	Metro Division State Aid Engineer

C. The Chair recognized others in attendance.

Dave Kreager	Duluth
Dan Sabin	Minneapolis
Larry Veek	Minneapolis
Marshall Johnson	Municipal State Aid Needs
Ed Lincowski	Ass't District 1 State Aid Engineer
Greg Coughlin	Ass't. Metro District State Aid Engineer
Greg Felt	Ass't. Metro District State Aid Engineer

#### D. Consideration of 1996 Spring Municipal Screening Board Minutes

The 1996 Spring Municipal Screening Board Minutes were presented for approval with one revision. On Page 9 under Special Drainage, the dollar amount should be \$28,490. *Motion by Kreklau/second by Jessep to approve minutes* 

# II. Municipal Needs Report presented by Ken Strauss

#### A. New Cities

Ken noted that Glencoe, St. Michael and Redwood Falls would be added to the list of MSA cities.

#### **B. 1996 Screening Board and Subcommittee Members:** The membership was noted on pages 2 - 5.

<u>C. Needs, Mileage, and Apportionment:</u> Ken noted that annexations, the addition of new cities, and county and trunk highway turnbacks have had a significant effect on Needs for 1996.

#### **D.** Population Apportionment:

Ken noted that Glencoe's population should be 5,196, St. Michael should be 6,559, and Redwood Falls is expected to be just over 5,000. He also noted the fast growth of some of the suburban cities, with Woodbury being the fastest growing.

#### E. Needs Study Update:

Ken noted that with the all changes (unit prices, population, traffic counts etc.) the total needs increased by \$52,000,000 or 3.0%.

#### F. Itemized Tabulation of Needs:

The Needs to Apportionment Ratios should be 20.1874 for 1995, 19.4920 for 1996, for a difference of 0.6954.

G. Tentative Construction (Money) Needs Apportionment and Adjustments: Alexandria and Andover have adjustments for segments that were deleted in 1995. Oakdale had an additional project that reduced its balance to 0. Ken noted that the State Aid advance was extensively used in 1996.

#### H. Turnback Maintenance Allowance:

Ken noted that the "Total Mileage" should be 38.36, and "Miles Eligible for Turnback Maintenance" should be 33.41.

### I. Tentative Apportionment Data:

This entire section is devoted to the establishment of a tentative 1997 M.S.A.S. Apportionment. If the Board accepts the mileage and needs data as shown in this report, the original of the letter shown on page 49 must be signed by all members. These adjustments are generally the result of Screening Board Resolutions or Minnesota Statutes and were briefly explained in the report.

#### J. General Fund Advance:

Ken reviewed the usage of the General Fund Advances for the past year. He noted that the year-end balance was used to determine the total advance amount available. He also discussed the State Aid policy on repayment of advances and the guidelines on advances by first class cities.

#### K. Minneapolis Request

Ken noted the written request by Minneapolis (p.62 and 63) for consideration.

#### L. History of the Administrative Account:

Julie Skallman asked for feedback on the use of the administrative account. SDIC (Systematic Development of Informed Consent) classes were previously used. Recertification classes will also be covered.  $T^2$  classes have been previously funded from the account, but may not be in the future. It was suggested that the funds available remain at  $1 \frac{1}{2}\%$ .

#### **III.** <u>Discussion Items (Action to be taken on Wednesday)</u>

#### A. Unencumbered Construction Fund Balance Deduction Date

Ken discussed changing the Unencumbered Construction Fund Balance deduction date from September 1 to December 31. Alan Gray discussed issues related to the Unencumbered Construction Fund Committee. He noted their support for this request. This proposal would show a lower balance in the account at year-end, which will clarify actually how much is in the fund at the end of the year. Pat Murphy also discussed the advantages of this proposal. The effect of this change on the report was noted. In order to meet deadlines, the Needs Report would still be based on September 1, while changes to the account balances would still occur after that date.

#### **B.** Minneapolis Request for Unencumbered Construction Fund Balance Adjustment Exemption (page 62 and 63 of Needs Report)

Minneapolis is requesting the Screening Board to consider an exemption to the September 1 deadline for an adjustment to its unencumbered construction fund balance. R. Kannankutty (Minneapolis) had additional comments regarding the unusual nature of this year's projects, and its effect on construction schedules. He noted that they have been very aggressive in the past on this issue. This is Force Account work to be completed by City staff. Action will occur tomorrow.

#### C. Research Account:

In the past, a certain amount of money has been set aside by the Municipal Screening Board for research projects. The maximum amount to be set aside from the Municipal State Aid Street fund is  $\frac{1}{2}$  of 1% of the preceding year's apportionment sum. Larry Read noted the valuable work and research that is being completed with this funding. Action will occur tomorrow.

#### D. Needs Quantity Table Review: (page 68 of Needs Report)

Ken noted that reference to concrete roadways was previously deleted from the needs. The charts in the Needs Report make a G.E. comparison between the quantity tables used for the computation of construction needs and the G.E. requirement for design. Bill Ottensmann and Ken Straus discussed the charts and explained the recommendations of the Needs Study Subcommittee on this item. The G.E. calculation in the Needs Report does not accurately reflect the actual needs. The recommendation is to make the Needs calculations reflect the actual design criteria. Prior to the June 1997 Municipal Screening Board Meeting, the Needs Study Subcommittee will work with Ken Straus to develop a formal proposal.

#### E. Allocation Study Subcommittee

Ken Strauss and Chair Ramankutty Kannankutty reviewed the minutes of the last meeting.

#### F. Advance Funding Program.

Pat, Kannankutty and Al Gray discussed that Cities of the first class need to have more latitude in advance funding. It was noted that, at this point, the current rules are satisfactory. Support was noted to continue the program as it has been laid out.

#### **G.** Alternates

It was noted that alternates may come at any time, however State Aid will only pay for the year prior to their term. It was also noted that all alternates should be sent all information regarding the meeting, so that they would have the ability to prepare properly if asked to serve.

#### IV. <u>Motion to Adjourn</u>

Committee considered for adjournment until 8:30 A.M. Wednesday morning, when formal action will be taken on the items before the board.

Motion by Jessep/second by Nansen to approve. Approved unanimously. Meeting adjourned at 3:10 p.m.

#### V. Motion to Readjourn

The Committee readjourned at 8:30 a.m. Wednesday morning.

#### VI. Formal Actions by Screening Board

#### A. Needs and Apportionment Data:

Consideration of Approving Needs and Apportionment Data. Kannankutty discussed the addition of Redwood Falls. Ken Straus noted that the letter to be signed includes references to cities that will be added.

Motion by Kannankutty/second by Read to approve Needs & Apportionment Data. Approved unanimously.

#### **B.** Unencumbered Construction Fund Balance deduction date

Consideration of changing the Unencumbered Construction Fund Balance deduction date from September 1 to December 31 was discussed. Dave Jessep noted that this should be effective in 1996. Ken Larson, as Chair of the Unallocated Construction Fund Subcommittee also recommended approval. Ken Straus will send out a memorandum noting the change.

The motion included an effective date of 1996, and a modification in the Resolution wording to change the word "Project" in the 2nd paragraph of the Resolution to "Funding Request".

Motion by Kreklau/second by St. Martin to approve. Approved unanimously (Kannankutty abstained).

#### <u>C.</u> <u>Minneapolis Request</u>

Minneapolis requested that the Screening Board consider an exemption to the September 1 deadline for an adjustment to its unencumbered construction fund balance. Due to the previous action, the request by Minneapolis was withdrawn.

#### D. Research Account

The State Aid staff recommended approving the allocation for the Research Account in the amount of \$453,703 (not to exceed ½ of 1% of the 1996 M.S.A.S. Apportionment sum of \$90,740,650), which shall be set aside from the 1997 Apportionment Fund and be credited to the research account.

Motion by Read/second by Kannankutty to approve. Unanimously approved.

#### E. <u>Needs Quantity Table Review</u>

This was referred to the Needs Study Subcommittee for further review

#### F. Joint Meeting with County Engineer's Screening Board

Dave Jessep submitted a motion to have the Executive Board set up a joint meeting with the County Engineer's Screening Board Representatives at the next Screening Board Meeting. Pat Murphy noted that he would meet with the Chair of the County Engineer's Screening Board to discuss the issue.

Motion by Jessep/second by Ken Larson to approve. Unanimously approved.

#### <u>VII.</u> <u>Closing Comments</u>

Pat Murphy had no further comments on State Aid issues.

The Chair thanked Bill Ottensmann, Chairman of the Needs Study Subcommittee, Alan Gray, Chairman of the Unencumbered Construction Fund, and Ramankutty Kannankutty, Chairman of the Allocation Study Subcommittee for their excellent work.

The Chair thanked the Screening Board and especially the three Representatives who will be leaving the Board.

District 2	Gary Sanders	East Grand Forks
District 3	Curt Kreklau	Buffalo
District 8	John Rodeberg	Hutchinson

Special Appreciation to Bill Croke - District 1 State Aid Engineer who will be retiring next year and most likely will not be attending Screening Board Meetings, and to Ken Larson for his "lingering efforts" in developing and presenting the planning sessions.

Ken Larson briefly noted the activities of the Utility Coordination Subcommittee and its efforts with the League of Minnesota Cities.

VIII. Entertain motion for adjournment.

Motion by Bittle/second by Kannakutty to adjourn. Approved unanimously The meeting was adjourned at 9:10 a.m.

Submitted by,

John P. Rodeberg, P.E. MSA Screening Board Secretary (Hutchinson City Engineer)

Post Office Box 3368 Mankato, Minnesota 56002-3368



Phone: (507) 387-8600 Fax: (507) 388-7530

#### MnDOT Municipal State Aid Municipal Screening Board Subcommittee Needs Study Meeting April 30, 1997, 10:00 p.m. at Sartel City Hall

#### A Review of the Needs Process

The Screening Board last reviewed the needs quantity tables in 1982. The committee proceeded to discuss and refine the needs quantity tables. Evaluation and recommendation were as follows:

1. Granular Equivalency

Discussion:

Additional section depth for slow traffic was determined to be seldom used.

#### Recommendation:

- a. To use granular equivalent (GE) to reflect current design charts in the quantity charts.
- b. Make no change in the charts for this slow traffic condition.
- 2. Class 4 Sub-Base

Discussion:

Determination was made that primary and common use is Class 5 and that the computations could be simplified using Class 5 base in the design chart.

- Recommendation:
  - a. To use only Class 5 base in the design chart and quantity tables.
- Design Section Thickness

Discussion:

The use of various typical bituminous plus Class 4 and Class 5 base designs

Recommendation

- a. To use chart design manual using only Class 5 base for quantity chart.
- 4. Projected Traffic Categories in Rural Table Discussion:

They should be changed to reflect recommended design limits. When greater than 1500 ADT, design and chart shall be for 10 ton (9 metric) on rural design chart.

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Printed on recycled paper. 30% post-consumer with say ink Recommendation:

- a. Chart be changed to reflect design for current projected traffic categories.
- 5. Urban Quantity Based on What Width?

Discussion:

When traffic is greater than/equal to 5,000 the design chart should be 10 ton (9 ton metric).

Recommendation:

a. Chart be changed to reflect design for current projected

traffic categorics.

6. Is Second Surface a Needed Consideration? Discussion:

The 10 ton design takes its place to a certain extent. It frequently does not reflect the variability of the need to place second surfaces.

does not reflect the variability of the need to place second billion:

Eliminate the seldom used second surface need.

7. Design Determination of Grading Qualities for the Rural Quantity Table. Discussion:

A standard on rural grading should be a general standard amount as on the urban quantity charts, but additional computed if special calculations indicate excessive quantity.

Recommendation:

a. Use standard grading quantity. Allow special calculation to be computed for special conditions.

8. Subcut Compaction Needs Discussion:

The uniformity of one foot and two foot subcuts for compaction and the fairness was discussed. Even though a two foot subcut was often used, the one foot subcut for compaction represents a fair uniform average.

Recommendation:

- a. Quantity chart to use a one foot subcut for compaction.
- 9. Discussion was to implement these changes for consideration at the June 1997 screening board. This would allow input with this year's needs update and show the change results in the 1998 allocation summary.
- 10. The committee reviewed cities that had needs of more than one lane additional to the required lanes. The additional lane use should be reviewed by the Screening Board. An MSA staff review for further evaluation is recommended.

- 11. Discussion:
  - Expanding cities often build with local dollars and are "needs" penalized for this activity. Discussion centered on local efforts, credit, and availability to fairly evaluate this situation. MSA staff review with Screening Board input is recommended.
- 12. Discussion on the Evaluation of Bridges and Bridge Needs: The philosophy of dollars of needs "after the fact" should be evaluated against a "cost of replacement" method. This needs to be further evaluated.
- 13. The resulting quantity tables were prepared by Ken Straus and are on the attached pages.
- 14. After the meeting, we received a copy of a May 15 request for approval of one-way streets and half mileage needs for the city of Minncapolis. After phone call discussion between the committee members, it is the committee's recommendation to consider the Ramankutty Kannankutty, Director of Engineering Design of Minneapolis' request. The committee reviewed the concept of adding the city of Minneapolis mileage as an approved one-way pair to its needs as half mileage and recommended approval. However, the committee believes that the effective date of Minneapolis/Hennepin County turnback agreement was consummated prior to the effective date of the Legislation described in the Minneapolis and State Aid for Local Transportation Division correspondence. On that basis, the mileage and not treated as mileage over and above the 20% even though that is their request be determined by the Screening Board.

mitted. Respectfully suit etary, Needs Study Committee saffert, Recording

c: Herb Reimer Curt Kreklau Ken Straus, Municipal State Aid Needs Manager

### CHANGE TO THE NEEDS QUANTITY TABLES

The recommended changes by Needs Study Subcommittee for a Rural roadway are as follows:

# 1. Incorporate a minimum grading quantity and depth in the quantity table with a 1 foot subcut.

Presently a grading cost has to be computed manually by the city on every rural need segments. By including a quantity, a city is given the option of using the quantity within the traffic grouping and soil factor or modifing the amount by furnishing the State Aid Office with a separate calculation.

# 2. Change the design data within the different traffic groupings.

Present Traffic	Proposed	Present	Proposed	Present	Proposed
Grouping	Grouning	Koadway Width	Koadway Width	Tonage	Tonage
0 - 749	0 - 399	32'	32'	7 Ton ult 9	7 Ton ult 9
750 - 999	400 - 749	36'	32'	7 Ton ult 9	9
1000 - 1999	750 - 1499	40'	36'	9	9
2000 & Over	1500 & Over	40'	40'	9	10
5000 & Over	5000 & Over	72'	72'	9	10

#### 3. Replace Class 4 subbase with Class 5 Base.

The unit price study indicates that class 4 subbase was rarely used in the past 10 years. The Subcommittee is recommending that it be eliminated in the needs and be replaced with class 5. The cost to attain the same GE between subbase class 4 and base class 5 is approximately the same. The following spread sheets show the elimination of subbase and adjustments to the class 5 base and bituminous depths and quantities. The minimum GE required for the bituminous was taken from the flexible pavement design chart and the remaining GE amount was achieved in class 5.

# 4. Adjust the Bituminous Base and Surface to the GE required for design.

The minimum GE required for the bituminous was taken from the flexible pavement design chart.

5. Change the 1500 & over and 5,000 & over traffic grouping from 9 ton to 10 ton by adding 1" of bituminous 2341.

The recommended changes by the Needs Study Subcommittee changes for a Urban roadway are as follows:

1. Change the width from 44 foot to 42 foot in the 0 - 1999 traffic grouping

2. Replace Class 4 subbase with Class 5 Base.

3. Adjust the Bituminous Base and Surface to the GE required for design.

4. Change the grading depth and quantities to reflect the change in depth of base and bituminous with a 1 foot subcut.

5. Change the 5,000 & over, 7,000 - 10,000, and 10,000 & over traffic grouping from 9 ton to 10 ton by adding 1" of bituminous 2341.

6. Eliminate the second surface quantity.

By bringing the bituminous GE in line with the amount that is required for construction will reduce the total value of needs for some traffic groupings and will affect the needs and allocation of some cities. The cost of subbase class 4 and base class 5 is about 40% less than the cost of bituminous to attain the same GE. Number of cost comparison charts are included in this booklet showing the affect on the total needs between the present and proposed quantities.

#### **NEEDS QUANTITY TABLE REVIEW**

The Rural and Urban Quantity Tables were presented to the 1996 Fall Screening Board showing GE comparisons between the amounts required for design as outlined in the State Aid Manual and what is used in the needs. In some traffic groupings, the GE for base and bituminous varied considerably. Based on these differences, the Screening Board made a recommendation to the Needs Study Subcommittee to do a further review with the possibility of adjusting the depths and quantities so that the G.E. is brought in line with the required design amounts and be presented to the 1997 June Screening Board.

This booklet includes an analysis of both the present and proposed Rural and Urban Needs Quantity Tables by applying the Granular Equivalency (G.E.) from the State Aid Manual Fig.B 5-892.201 against the depths used in the Needs Rural and Urban Quantity Tables. The following sheets show the comparison between the total G.E. used in the needs and the amount required for street construction. The two Needs Quantity Design Tables were broken up individually into parts, one considering gravel base and the other bituminous base and surface. The present Rural table indicates that the total G.E. is low in all traffic categories and the present Urban Design Table indicates that the G.E. appears to be low for the subbase and base and high for the bituminous. The reason may exist in that when concrete was removed from the MSA Needs in 1982 additional bituminous G.E. was added to compensate for the cost of concrete. When the conversion was made, the 1982 records indicate that concrete roadway costs were 45% more than bituminous roadways. The present needs indicate that about 10.5% of the inplace streets are concrete. Should the depth of bituminous used in the needs be governed by the low percentage of concrete streets?

In the computation of needs for a roadway segment, the computer uses the soil factor and the projected traffic category quantity and applies it against the unit price. To get a better understanding of the affects of adjusting the quantities may have on the different traffic groupings, the mileage summary was included for the existing surface types and traffic. The predominant traffic grouping for the different surface types is the 1000 to 4999. Even with the growth of 500 miles, the percentage distribution within the traffic grouping has encountered very little change within the past 10 years. Also enclosed is a listing of the soil factors used by each individual city. The soil factor is assigned to the city based on the predominate soil within the city. In some instances, it is modified on some segments in areas where the soil is different. 57% of the mileage in the needs has soil factor of 100.

# 1996 MILEAGE SUMMARY

#### Mileage by Surface Type and Traffic Volume

	1-99	100-749	750-999	1000-4999	5000-9999	10,000 and	TOTAL
Surface Lype	AUI	AUI		AUI		VICI	en syndiane - en her en sjoe
Unimproved	0.78	2.11	0.88	2.00	2.71	0.00	8.48
Graded & Drained	0.38	5.70	0.39	0.57	1.71	0.25	9.00
Soil Surfaced	0.25	7.90	0.43	1.06	0.00	0.00	9.64
Gravel	2.74	73.03	9.02	20.33	4.04	1.21	110.37
Bituminous Treated	0.00	1.10	0.42	10.53	2.01	0.30	14.36
Bituminous	3.38	100.06	35.62	513.03	271.37	205.54	1,129.00
Asphaltic Concrete	1.09	62.07	28.81	369.13	253.55	243.87	958.52
Concrete	0.00	5.58	5.75	92.43	88.84	94.28	286.88
Brick	0.00	0.00	0.00	2.05	1.87	1.86	5.78
Block	0.00	0.00	0.00	1.32	0.52	0.08	1.92
Non-existent	2.39	9.55	6.99	125.22	45.11	17.25	206.51
TOTAL	11.01	267.10	88.31	1,137.67	671.73	564.64	2,740.46

#### Mileage by Certification Grouping

	MSAS	CMSAS	TOTAL
Non-existing	206.51	0.00	206.51
Unimproved	8.48	0.00	8.48
Improved	2,514.22	11.25	2,525.47
TOTAL	2,729.21	11.25	2,740.46

needsstdy/traffic			•							
	MSA MILEAGE WITHIN TRAFFIC GROUPING									
Year	Projected Traffic 0 - 999	Projected Traffic 1000 - 4999	Projected Traffic 5000 - 9999	Projected Traffic 10000 - Over	Total Mileage					
1988	307.73	970.34	467.58	459.40	2205.05					
1989	313.34	993.68	482.33	467.04	2256.39					
1990	302.28	1017.23	547.99	462.80	2330.30					
1991	294.45	1046.09	576.17	460.08	2376.79					
1992	290.02	1052.20	571.66	496.65	2410.53					
1993	300.98	1065.14	589.87	515.05	2471.04					
1994	335.95	1054.70	609.32	526.42	2526.39					
1995	353.63	1095.86	625.04	540.18	2614.71					
1996	366.42	1137.67	671.73	564.64	2740.46					

% OF TOTAL MILEAGE IN TRAFFIC GROUPING								
Year	Projected Traffic 0 - 999	Projected Traffic 1000 - 4999	Projected Traffic 5000 - 9999	Projected Traffic 10000 - Over				
1988	13.9557	44.0054	21.2050	20.8340				
1989	13.8868	44.0385	21.3762	20.6985				
1990	12.9717	43.6523	23.5159	19.8601				
1991	12.3886	44.0127	24.2415	19.3572				
1992	12.0314	43.6502	23.7151	20.6034				
1993	12.1803	43.1049	23.8713	20.8435				
1994	13.2976	41.7473	24.1182	20.8368				
1995	13.5246	41.9113	23.9048	20.6593				
1996	13.3707	41.5138	24.5116	20.6038				

The % within the traffic grouping has encountered very little change between 1988 and 1996 This may be the result of mileage added by new or growing cities that have low traffic volumes.

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 		DISTRICT=1			
MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
CHISHOLM CLOQUET DULUTH GRAND RAPIDS HERMANTOWN HIBBING INTERNATIONAL FALLS VIRGINIA	$\begin{array}{c} 0.00\\ 0.00\\ 11.06\\ 2.05\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ \end{array}$	0.00 0.00 5.97 0.00 0.00 0.00 0.00	0.00 17.53 3.39 3.11 0.00 0.00 0.00 0.00	7.68 2.25 91.47 0.23 12.99 50.74 8.06 12.33	
DISTRICT	13.11	5.97	24.03	185.75	
		DISTRICT=2			
MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
BEMIDJI CROOKSTON EAST GRAND FORKS THIEF RIVER FALLS	0.00 0.25 0.00 0.00	14.35 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.08	0.00 10.87 11.82 13.48	
DISTRICT	0.25	14.35	0.08	36.17	
		DISTRICT=3			
MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
BRAINERD BUFFALO CAMBRIDGE ELK RIVER LITTLE FALLS MONTICELLO OTSEGO SARTELL SAUK RAPIDS ST CLOUD ST MICHAEL WAITE PARK	0.00 0.00 0.69 0.00 0.00 0.00 0.00 0.00	13.88 0.00 5.80 23.89 13.45 5.30 0.00 7.16 9.03 40.97 0.00 6.45	0.37 9.00 0.00 0.26 0.69 13.08 0.00 0.00 1.36 14.77 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	
DISTRICT	0.99	125.93	39.53	7.11	

SOIL FACTORS BY DISTRICT

11:19 TUESDAY, FEBRUARY 11, 1997 2

			• DISTRICT=4			
	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
	ALEXANDRIA DETROIT LAKES FERGUS FALLS MOORHEAD MORRIS	0.00 0.00 0.00 0.00 0.00	0.00 9.21 0.00 0.00 0.00	13.68 0.00 21.77 0.07 0.00	0.00 0.33 0.09 28.11 6.60	
	DISTRICT	0.06	9.21	35.52	35.13	
			DISTRICT=5			
	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
- 20 -	ANDOVER ANOKA BLAINE BLOOMINGTON BROOKLYN CENTER BROOKLYN PARK CHAMPLIN CHANHASSEN CHASKA COLUMBIA HEIGHTS COON RAPIDS CORCORAN CRYSTAL EAST BETHEL EDEN PRAIRIE EDINA FRIDLEY GOLDEN VALLEY HAM LAKE HOPKINS LINO LAKES MAPLE GROVE MINNEAPOLIS MINNETONKA MOUND NEW HOPE OAK GROVE ORONO PLYMOUTH PRIOR LAKE RAMSEY RICHFIELD ROBBINSDALE SAVAGE SHAKOPEE SHOREWOOD SPRING LAKE PARK ST ANTHONY ST LOUIS PARK	$\begin{array}{c} 33.99\\ 11.98\\ 32.78\\ 66.54\\ 21.48\\ 40.45\\ 14.69\\ 0.00\\ 0.00\\ 0.00\\ 37.67\\ 0.00\\ 0.00\\ 19.16\\ 0.20\\ 0.91\\ 25.34\\ 0.00\\ 22.85\\ 0.00\\ 0.91\\ 25.34\\ 0.00\\ 22.85\\ 0.00\\ 0.00\\ 20.06\\ 0.00\\ 0.00\\ 0.00\\ 20.06\\ 0.00\\ 0.$	0.00 0.00 0.00 0.00 4.56 0.00 0.00 0.00 0.00 0.00 0.00 11.21 3.01 37.10 34.42 0.00 0	$\begin{array}{c} 0.00\\ 0.00\\ 0.00\\ 6.98\\ 0.00\\ 0.53\\ 20.45\\ 12.53\\ 0.00\\ 14.18\\ 0.00\\ 2.22\\ 5.46\\ 2.07\\ 0.00\\ 18.64\\ 0.00\\ 9.41\\ 15.57\\ 16.23\\ 170.83\\ 49.94\\ 7.86\\ 0.00\\ 18.76\\ 12.58\\ 47.60\\ 15.17\\ 0.00\\ 18.76\\ 12.58\\ 47.60\\ 15.17\\ 0.00\\ 0.00\\ 13.02\\ 17.34\\ 9.29\\ 0.00\\ 5.18\\ \end{array}$	$\begin{array}{c} 0.00\\ 0.00\\ 0.00\\ 0.21\\ 0.19\\ 0.32\\ 0.00\\ 1.08\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 1.96\\ 0.00\\ 1.96\\ 0.00\\ 1.96\\ 0.00\\ 25.12\\ 0.00$	

			- DISTRICT=5			
	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
	DISTRICT	409.69	137.32	513.39	45.31	
			- DISTRICT=6			
	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
	ALBERT LEA AUSTIN FARIBAULT NORTHFIELD OWATONNA RED WING ROCHESTER	0.11 0.13 0.00 0.00 0.56 0.56 0.84	0.00 0.00 0.00 0.00 0.00 0.00	17.98 26.60 21.40 11.25 17.01 21.33 53.98	0.56 0.00 0.00 0.00 0.00 0.70 0.38	
	WINONA DISTRICT	21.75	0.00	169.55	0.00  1.64	
			- DISTRICT=7			
2	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
	FAIRMONT MANKATO NEW ULM NORTH MANKATO ST PETER WASECA WORTHINGTON	0.00 0.00 0.00 0.00 0.00 0.00 0.15	0.00 0.25 0.15 0.15 0.00 0.25	0.00 31.42 11.30 7.15 9.75 6.31 9.41	19.38 0.25 2.60 4.56 0.69 0.00 0.00	
	DISTRICT	0.15	0.80	75.34	27.48	
			- DISTRICT=8			
	MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	
. · · ·	GLENCOE HUTCHINSON LITCHFIELD MARSHALL MONTEVIDEO REDWOOD FALLS WILLMAR	0.00 4.13 0.24 0.20 0.00 0.00 0.68	0.00 0.00 0.00 0.00 0.00 0.00 0.00	6.94 10.27 7.61 10.54 8.08 0.00 17.47	0.00 0.33 0.21 1.99 0.00 7.87 5.76	
	DISTRICT	 5.25	0.00	60.91	16.16	

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SOIL FACTORS BY DISTRICT

	, D	ISTRICT=9		*******	
MUNICIPALITY	SOIL FACTOR OF 50	SOIL FACTOR OF 75	SOIL FACTOR OF 100	SOIL FACTOR OF 130	· •
APPLE VALLEY	4.07	0 00	27 19	0.00	
ARDEN HILLS	0.00	4 50	2 07	0.00	
BURNSVILLE	0.71	0.00	42.07	0.00	
COTTAGE GROVE	0.00	0.00	42.30	0.00	
EAGAN	0.00	0.00	LJ.JL hh 21	0.00	
FALCON HEIGHTS	0.00	0.00	44.31	0.00	
FARMINGTON	0.00	0.00	. 2.74	0.00	
FOREST LAKE	0.00	0.00	0.30	2.35	
HASTINGS	4.75	0.00	0.00	5.53	
HUGO	0.00	9.75	2,14 15,01	0.00	
INVER GROVE HEIGHTS	0.00	1 46	12.21	0.00	
LAKE ELMO	0.00	0 00	23.20	0.00	
LAKEVILLE	0.13	0.00	9.53	0.00	
LITTLE CANADA	0.00	0.00	41.55	0.00	
MAHTOMED	0.00	0.00	D.//	0.00	
MAPLEWOOD	1.55	0.00	4.22	0.00	
MENDOTA HEIGHTS	0.00	0.49	10.97	0.00	
MOUNDS VIEW	0,00	8 12	1 70	0.00	
NEW BRIGHTON	0.59	0.12	1.70	0.00	
NORTH BRANCH	0.00	0.00	13.28	0.00	•
NORTH ST PAUL	0.25	0.00	12.04	0.00	
OAKDALE	0.00	0.00	16 70	0.00	
ROSEMOUNT	3.93	0.00	10.72	0.00	
ROSEVILLE	0.12	0.00	14.40	3.01	
SHOREVIEW	0.00	13 60	20.34	0.24	
SOUTH ST PAUL	0.00	0.00	1,00	0.00	
ST PAUL	0.56	0.00	14.72	0.00	
STILLWATER	0.00	0.00	12 50	0.00	
VADNAIS HEIGHTS	0.00	0.30	12.50	0.00	
WEST ST PAUL	0.00	0.00	D.0D 10 10	0.00	
WHITE BEAR LAKE	0.71	0.00	10.20	0.00	
WOODBURY	0.00	0.00	17.32	0.00	
			37.00	0.00	
DISTRICT	17.37	38.91	652.92	11.13	
	470.82	332.49	1.571.27	====== 365 88	

STATE AID MANUAL

Fig. D 5-892.810

#### Municipal State Aid Needs Study RURAL DESIGN QUANTITY TABLE

(Quantities Based For A One Mile Section)

Design Data	Soil Type	No. 2211 Class - 4 Gravel Base (Tons)	No. 2211 Class - 4 Gravel Base Depth	No. 2211 Class - 5 Gravel Base (Tons)	No. 2331 Bit. Base (Tons)	Initial Surface	No. 2221 Gravel Shidrs, (Tons)	Additional Bit. Surface (Tons)	No. 2221 Gravel Reshoulder (Tons)
Proj. ADT 0-749 24' Surface 32' Roadbed 2 Lane 7 Ult. 9 Ton	50 75 100 130	0 4499 9339 15857	0" 4" 8" 13"	3271 (3'')	1210 (1-1/2'')	No. 2331 1-1/2" Bit. 1162 Tons	631	No. 2331 1-1/2'' Bit. 1162 Tons	394
Proj. ADT 750-999 24' Surface 36' Roadbed 2 Lane 7 Ult. 9 Ton	50 75 100 130	0 4925 10189 17240	0" 4" 8" 13"	3601 (3'')	1210 (1-1/2")	No. 2331 1-1/2'' Bit. 1162 Tons	778	No. 2331 1-1/2'' Bit. 1162 Tons	579
Proj. ADT 1000-1999 24' Surface 40' Roadbed 2 Lane 9 Ton	50 75 100 130	0 4107 11375 20791	0" 3" 8" 14"	6663 (5")	1210 (1-1/2'')	No. 2341 3'' Bit. 2323 Tons	1628	No. 2341 1-1/2" Bit. 1162 Tons	370
Proj. ADT 2,000 & Over 24' Surface 40' Roadbed 2 Lane 9 Ton	50 75 100 130	0 8531 16500 29615	0" 6" 12" 19"	8060 (6'')	1210 (1-1/2'')	No. 2341 3" Bit. 2323 Tons	1628	No. 2341 1-1/2" Bit. 1162 Tons	370
Proj. ADT 5,000 & Over 48' Surface 72' Roadbed 4 Lane 9 Ton	50 75 100 130	10776 25198 43893 71180	4'' 9'' 15'' 23''	15455 (6")	5647 (3-1/2'')	No. 2341 3-1/2" Bit. 5421 Tons	4817	No. 2341 1-1/2'' Bit. 2323 Tons	554

This table is for needs study reference only and is not to be construed as a guide for rigid or flexible design determination.

Quantities of approved street widths will be prorated.

# COUNTY STATE AID RURAL DESIGN QUANTITY TABLE (Quantities Based On A One Mile Section)

Projected ADT	Ďesign. Datal -	Söll Factor	2211. Class 4 Subbasd (Tons)	Subbase Depth Triches	N2211 () Class 5 Base () (Tons)	#2331 810, 6886 (Tons)	initial Surface (Tone)	Additional Surface (Tons)	#2221 Gravel Shidr. (Tons)	#2221 Gravel Re*Sh. (Toris)
1 - 49	24 x 24 2-Lane	50 75 100 130					#2118 GRAVEL 6.0" - 4525	W2118 GRAVEL 3" - 2112		
50 - 149 	28 x 28 2-Larve	50 75 100 130					#2118 GRAVEL 6.0" - 5280	#2118 GRAVEL 3" - 2464		·
150 - 399	24 x 32 7 Ult. 9 Ton 2-Larme	50 75 100 130	0 5624 9339 12373	0 ( 5 8 11	3271 3*	, 1210 1-1/2"	#2331 1162 1-1/2"	#2331 1548 	631	525
400 - 749	24 x 32 9 Ton 2-Lane	50 75 100 130	0 4499 10123 17996	0 4 9 16	4361 44	1549 24	#2331 1162 1-1/2*	#2331 1548 2"	631	525
750 - 11499	24 x 36 9 Ton 2-Lane	50 75 100 130	0 4925 11082 18469	0 4 9 15	4801 4"	1549 2"	#2331 1162 1-1/2#	#2331 1548 2"	778	772
1500 - 4000	24 x 40 10 Ton 2-Lane	50 75 100 130	4266 12797 21328 31280	3 9 15 22	9403 7™	2570 3-1/2"	#2341 2323 3*	#2341 1548 2"	1628	493
5000 e Over	24 x 40 10 Ton 2-Lane	50 75 100 130	3446 	8" Sub- <u>Shoulder</u> 10" Sub- Shoulder	2820 3" 4753 5"		#2301 8" 14080 sq. yds.	#2341 2323 3*	1588	739
\$000 X	48 x 72 10 Ton 4-Lane	50 75 100 130	10776 29634 48492 70044	4 11 18 26	20607 8"	5140 3-1/2"	#2341 4647 3#	#2341 3096 2"	4817	739
10,000 £ dver	48 x 72 10 Ton 4-Lan <del>e</del>	50 75 100 130	5606 7069	8" Sub- <u>Shoulder</u> 10" Sub- Shoulder	5640 <u>3"</u> 9505 5"		#2301 8" 28160 sq. yds.	#2341 4646 3"	2437	1108

This table is for needs study reference only and is not to be construed as a guide for rigid or flexible design determination.

#### Municipal State Aid Street Needs Study URBAN DESIGN QUANTITY TABLE (Quantities Based On A One Mile Section)

										Na. 2361	1
Design Data	Soil Typ <del>e</del>	Grading Cubic Yards	Grading Depth Inches	No. 2211 CL. 4 Subbase (Tons)	Subbase Depth Inches	No. 2211 CL. 5 Gravel Base (Tons)	No. 2331 Bit. Base (Tons)	No. 2341 Bit. Surf. (Tons)	Additional Surfa <del>ce</del> (Tons)	Second Surface (Tons)	
Proj. ADT 1-1999 44 Feet 2 Traffic Lane - 9 Ton 2 Parking Lanes	50 75 100 130	15990 18378 22386 23998	20.5" 23.5" 28.5" 30.5"	0 4288 11485 14379	0" 3" 8" 10"	5790 (4'')	1936 (1-1/2'')	3872 (3'')	No. 2341 2581 (2")		
Proj. ADT 2000-4999 44 Feet 2 Traffic Lane - 9 Ton 2 Parking Lanes	50 75 100 130	16388 18778 22788 24402	21" 24" 29" 31"	0 4288 11485 14379	0" 3" 8" 10"	5790 (4'')	2581 (2'')	3872 (3'')	No. 2341 2581 (2'')		
Proj. ADT 5000 & Over 48 Feet 2 Traffic Lane - 9 Ton 2 Parking Lanes	50 75 100 130	19048 21640 26860 29488	22.5" 25.5" 31.5" 34.5"	0 4644 14000 18711	0" 3" 9" 12"	6283 (4")	3550 (2-1/2")	4259 (3'')	No. 2361 1420 (1")	1420 (1")	
Proj. ADT 7,000-9,999 68 Feet 4 Traffic Lane - 9 Ton 2 Parking Lanes	50 75 100 130	28762 32340 41940 45562	24.5" 27.5" 35.5" 38.5"	0 6426 23673 30181	0" 3" 11" 14"	10935 (5'')	6196 (3'')	7228 (3-1/2'')	No. 2361 2065 (1'')	2065 (1'')	
Proj. ADT 10,000 & Over 72 Feet 4 Traffic Lane - 9 Ton 2 Parking Lanes	50 75 100 130	34133 37919 46799 53184	27.5" 30.5" 37.5" 42.5"	0 6783 22695 34136	0" 3" 10" 15"	16169 (7'')	8777 (4'')	7680 (3-1/2'')	No. 2361 2194 (1'')	2194 (1")	

This table is for needs study reference only and is not to be construed as a guide for rigid or flexible design determination.

Quantitites of approved street widths will be prorated. When the quantities from the table do not apply, use an estimated amount.

# COUNTY STATE AID URBAN DESIGN QUANTITY TABLE (Quantities Based On A One Mile Section)

Projected ADT Design Data 9 Ton	Soil Factor	#2211 Class 4 Subbase (Tons)	Subbase Depth (Inches)	#2211 Class 5 Gravel Base (Tons)	#2331 Bit. Base (Tons)	Initial Surface (Tons)	#2341 Additional Surface (Tons)
1 - 4999 44 Feet 2 Traffic Lanes 2 Parking Lanes	50 75 100 130	0 8598 17285 27533	0 6 12 19	10134 7"	2840 2"	#2341 2130 1-1/2"	2840 2"
5000 & Over 44 Feet 2 Traffic Lanes 2 Parking Lanes	50 75 100 130			4712 <u>3"</u> 9425 6"		25813 Sq. Yds. 8" #2301	4646 3"
7000 - 9999 68 Feet 4 Traffic Lanes 2 Parking Lanes	50 75 100 130	8579 23593 38759 56244	4 11 18 26	18480 8"	4389 2"	#2341 3292 1-1/2"	4389 2"
10000 & Over 68 Feet 4 Traffic Lanes 2 Parking Lanes	50 75 100 130			6930 <u>3"</u> 13860 6"		39893 Sq. Yds. 8" #2301	6970 3"

26

This table is for needs study reference only and is not to be construed as a guide for rigid or flexible design determination.

#### 7-5.03.03 Granular Equivalent (G. E.) Factors For Aggregate Base Design

Granular equivalency factors provide a means of equating the structural performance of all bituminous and aggregate courses which make up a pavement structure in terms of the structural performance of a well-known high-type aggregate base (e.g., Mn/DOT Class 6 Aggregate Base). The granular equivalency concept is a convenient way to define or rate a pavement structure for purposes of comparison, and it forms the basis for the Mn/DOT Bituminous Pavement Design Chart, Figure 7-5.03A.

The G. E. required (expressed in inches) for the pavement structure design is the product of Minnesota Investigation No. 183 (1969), which defined required G. E. in terms of Stabilometer R-value and Sigma N-18 accumulated damage effect at a point where repetitions of traffic loadings reduced pavement structure to a specific level of service defined as a Present Serviceability Index of 2.5. By definition this is a surface condition at which trunk highways will require a structural overlay to restore ridability and load support capability.

After the required G. E. is determined, it is converted to actual minimum thickness of surfacing, base and subbase by means of the appropriate granular equivalent factor found in Table 7-5.03I. These factors are a function of the type of material and its intended use. Once these minimum layer thicknesses have been established, total pavement thickness and layer composition is determined.

#### 7-5.03.04 Full-Depth Bituminous Pavement Design

Full-depth asphalt pavement is defined as a pavement structure in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. This type of structure is composed of an asphalt surface course and one or more asphalt base courses supported by the subgrade. Preparation of full-depth asphalt pavement mixtures shall be in accordance with the Mn/DOT Standard Specifications. This type of pavement structure was approved and included as a design alternate for Minnesota in 1978:

The principal factors to be evaluated for the structural design of a full-depth asphalt pavement are: Traffic conditions throughout the design period; subgrade and other available construction materials; and environmental factors which may affect pavement behavior or service.

The design of a full-depth asphalt pavement is a function of the same variables as bituminous pavement with aggregate base. These are 1-way design-lane AADT, 20-year design-lane Sigma N-18/20, and design R-Value.

As with flexible pavement with aggregate base, an es-

#### Table 7-5.031

Material	Specification	G.E. Factors
Plant-Mix Surface Plant-Mix Surface	2341, 2361 2331	2.25 2.00
Plant-Mix Binder Plant-Mix Base	2331 2331	2.00
Road-Mix Surface Road-Mix Base	2321 2321	1.50
Bituminous Treat. Base Bituminous Treat. Base	(Rich) 2204 (Lean) 2204	1.50 `1.25
Aggregate Base Aggregate Base	(Cl. 5, Cl. 6) 3138 (Cl. 3, Cl. 4) 3138	1.00 0.75
Selected Granular Material		0.50*

#### GRANULAR EQUIVALENT (G.E.) FACTORS

\*May be used in design when so approved by the Subgrade and Base Design Engineer.

NOTE: Where the subgrade consists of granular material, the District Materials and/or Soils Engineer may recommend the treatment of the upper portion of the selected granular material with 150 lbs/sq yd or more of stabilizing aggregate (Specification 3149.2C).

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	9 TON - MORE THAN 1100 HCADT Minimum Total 50 8.0 20.3 75 8.0 26.4 100 8.0 32.5 110 8.0 35.0 120 8.0 37.4 130 6.0 39.6
$7 \text{ TON} - 400-1000 \text{ ADT}$ $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	9 TON - $300-600$ HCADT Hinimum Total <u>S.F. Bit. G.E. G.E.</u> 50 7.0 16.0 75 7.0 20.5 100 7.0 25.0 110 7.0 26.8 120 7.0 28.6 130 7.0 30.4	TYPE OF MATERIALGRAVEL MATERIALPlant-Hix Surf.(PMS) 2341- -51,-612.25 -51,-61Plant-Hix Binder Plant-Hix Surf.(PMB) 2341 (PMS) 2331 2.002.00 Plant-Hix Base (PMB) 2331 2.00Plant-Hix Base Road-Hix Base Bit. Treat. Base Bit. Treat. Base (Lean) 22041.50 1.00 Aggregate Base (Cl. 3 6 4)3138 0.75
9 TON - LESS THAN 150 HCADT Hinimum Total <u>50 7.0 10.25</u> 75 7.0 13.9 100 7.0 17.5 110 7.0 19.0 120 7.0 20.5 130 7.0 22.0 NOTE: If 10-Ton design is bituminous pave Required FLEXIE	9 TON - 600-1100 HCADT <u>Hininum</u> Total <u>S.F. Bit. G.E.</u> 50 8.0 18.5 75 8.0 23.7 100 8.0 29.0 110 8.0 31.1 120 8.0 33.2 130 8.0 35.3 to be used, see Road Design Manua Gravel Equivalency (G.E.) for N.E. PAVEMENT DESIGN USING	AASHTO         SOIL FACTOR         ASSUMED           SOIL CLASS $(S.F.)$ R=VALUE           A-1         50-75         70-75           A-2         50-75         30-70           A-3         50         70           A-4         100-130         20           A-5         130+            A-6         100         12           A-7-5         120         12           A-7-6         130         10           anual 7-50 (10) & 7-50 (12). For full depth         17-50 (12).           various         Soil Factors (S.F.)

# FOR NEW CONSTRUCTION USE PROJECTED ADT / FOR RESURFACING USE PRESENT ADT

Fig. B 5-892.201

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NOTES	
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#### (EXISTING) - RURAL COMPARISON CHART 1 **SUBBASE CLASS 4 & BASE CLASS 5 GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE**

MSAS - Rural Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

		(C) (D)				(A + C)	(B + D)				
	G.E. APPLIED PER INCH	0.75	0.75			1.00	1.00			L	
			SUBBASE		SUBBASE		BASE		TOTAL BASE		
			MSAS NEEDS	COUNTY NEEDS	MSAS NEEDS	COUNTY NEEDS	MSAS NEEDS	COUNTY NEEDS	MSAS NEEDS	COUNTY NEEDS	REQUIRED
			SUBBASE	SUBBASE	SUBBASE	SUBBASE	BASE	BASE	TOTAL	TOTAL	CONSTRUC
		SOIL	CLASS 4	CLASS 4	CLASS 4	CLASS 4	CLASS 5	CLASS 5	SUBBASE &	SUBBASE &	SUBBASE 8
HCADT	DESIGN DATA	TYPE	DEPTH	DEPTH	G.E.	<i>G.E.</i>			BASE G.E.	BASE G.E.	BASE G.E.
110/101	Proj. ADT 0-749	50	0"	0"	0	0			3.00	3.00	3.25
0-	24 Foot surface	75	4"	5"	3.00	3.75	3"	3"	6.00	6.75	6.90
150	32' Roadbed	100	8"	8"	6.00	6.00	G.E.3.00	G.E.3.00	9.00	9.00	10.50
	2 Lanes 7 ton ult 9 ton	130	13"	11"	9.75	8.25			12.75	11.25	15.00
	Proj. ADT 750 - 999	50	0"	0"	0	0			3.00	4.00	7.00
150 -	24 Foot surface	75	4"	4"	3.00	3.00	3"	4"	6.00	7.00	10.50
300	36' Roadbed	100	8"	9"	6.00	6.75	G.E.3.00	G.E.4.00	9.00	10.75	14.00
	2 Lanes 7 ton ult 9 ton	130	13"	16"	9.75	12.00			12.75	16.00	18.20
	Proi. ADT 1000 - 1999	50	0"	0"	0	0			5.00	4.00	9.00
300 -	24 Foot surface	75	3"	4"	2.25	3.00	5"	4"	7.25	7.00	13.50
600	40' Roadbed	100	8"	9"	6.00	6.75	G.E.5.00	G.E.4.00	11.00	10.75	18.00
	2 Lanes 9 ton	130	14"	15"	10.50	11.25			16.50	15.25	23.40
	Proj. ADT 2000 & over	50	0"	3"	0	2.25			6.00	9.75	10.50
600 -	24 Foot surface	75	6"	9"	4.50	6.75	6"	7"	10.50	13.25	15.70
1100	40' Roadbed	100	12"	15"	9.00	11.25	G.E.6.00	G.E.7.00	15.00	18.25	21.00
	2 Lanes 9 ton	130	19"	22"	14.25	16.50			20.25	23.50	27.30
	Proj. ADT 5000 & over	50	4"	4"	3.00	3.00			6.00	11.00	12.30
1100	& 48 Foot surface	75	9"	11"	6.75	8.25	6"	8"	12.75	16.25	18.40
OVER	72' Roadbed	100	15"	18"	11.25	13.50	G.E.6.00	G.E.8.00	17.25	21.50	24.50
	4 Lanes 9 ton	130	23"	26"	17.25	19.50			23.25	27.50	31.80

SUBBASE CLASS 4	\$4.70	TON
BASE CLASS 5	\$6.20	TON

30

#### (EXISTING) - RURAL COMPARISON CHART 2 **BITUMINOUS BASE & SURFACE** GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE , <sup>,</sup>

MSAS - Rural Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

G.E.	APPLIE	D PER INCH	UNIT PRICE IN NEEDS
BIT.	2331	2.00	\$20.50
BIT.	2341	2.25	\$23.60

			(A)	(B)	(C)	(D)	(A + C)	B + D)		]		
			BIT. BASE		BIT. S	SURF.	TOTAL BIT. G.E. COMPARISON			TOTAL AGG. BASE & BIT.		
					MSAS	COUNTY	TOTAL	TOTAL		G.E. COMPARISON		
HCADT	DESIGN DATA	SOIL	MSAS NEEDS BIT BASE	COUNTY NEEDS BIT BASE	NEEDS INITIAL SURFACE	NEEDS INITIAL SURFACE	MSAS NEEDS SURFACE	COUNTY NEEDS SURFACE	REQUIRED CONSTRUCT. BIT. SURF.	TOTAL MSA NEEDS	TOTAL COUNTY NEEDS	TOTAL DESIGN REQ.
	Proj. ADT 0-749	50					<i>G,E</i> .	<u>G.E.</u>	<i>G.E.</i>	<b>G</b> , <b>E</b> ,	G.E.	<i>G,E.</i>
0-	24 Foot surface	75	1 5"	1.5"	1 5 "	1 5 1				9.00	9.00	10.25
150	32' Roadbed	100	No 2331	No 2331	No 2221	1.5 No 2221		0.00		12.00	12.75	13.90
	2 Lanes 7 ton ult 9 ton	130	G F 3 00	G E 3 00	GE 200	GE 200	0.00	6.00	7.00	15.00	15.00	17.50
*******	Proj. ADT 750 - 999	50	0.00	0.2. 0.00	G.L. 3.00	G.E. 3.00				18.75	17.25	22.00
150 -	24 Foot surface	75	1.5"	2"	1 5"	1 5"				9.00	11.00	14.00
300	36' Roadbed	100	No. 2331	No. 2331	No 2331	No 2331	6.00	7.00	7.00	12.00	14.00	17.50
	2 Lanes 7 ton ult 9 ton	130	G.E. 3.00	G.E. 4.00	G.E. 3.00	GE 3.00	0.00	7.00	7.00	15.00	17.75	21.00
	Proj. ADT 1000 - 1999	50				0.2. 0.00				18.75	23.00	25.20
300 -	24 Foot surface	75	1.5"	2"	3"	1.5"				14.75	11.00	16.00
600	40' Roadbed	100	No. 2331	No. 2331	No. 2341	No. 2331	9 7 5	7.00	7.00	20.75	14.00	20.50
	2 Lanes 9 ton	130	G.E. 3.00	G.E. 4.00	G.E. 6.75	G.E. 3.00	0.70	7.00	7.00	20.75	17.75	25.00
	Proj. ADT 2000 & over	50								15 75	22.25	30.40
600 -	24 Foot surface	75	1.5"	3.5"	3"	3"				20.25	23.50	18.50
1100	40' Roadbed	100	No. 2331	No. 2331	No. 2341	No. 2341	9.75	13.75	8.00	20.25	27.00	23.70
	2 Lanes 9 ton	130	G.E. 3.00	G.E. 7.00	G.E. 6.75	G.E. 6.75			0.00	30.00	37.00	29.00
	Proj. ADT 5000 & over	50								20.88	24.75	35.30
1100 &	48 Foot surface	75	3.5"	3.5"	3.5"	3"				27.63	24.75	20.30
OVER	72' Roadbed	100	No. 2331	No. 2331	No. 2341	No. 2341	14.88	13.75	8.00	32 13	20.00	20.40
L	4 Lanes 9 ton	130	G.E. 7.00	G.E. 7.00	G.E. 7.88	G.E. 6.75	_			37.13	31.25	39.80

#### EXISTING - URBAN CHART 1 SUBBASE CLASS 4 & BASE CLASS 5 GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE

MSAS - Urban Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

				(A)		(B)	(A + B)		
	G.E. APPLIED PER INCH		0.75		1.00				
		0.011	NEEDS SUBBASE	NEEDS SUBBASE	NEEDS BASE	NEEDS BASE	MSAS NEEDS TOTAL	REQUIRED CONSTRUCT.	COUNTY NEEDS TOTAL
<u> </u>		SOIL	CLASS 4	CLASS 4	CLASS 5	CLASS 5	SUBBASE &	SUBBASE &	SUBBASE &
HCADT	DESIGN DATA	TYPE	DEPTH	<b>G</b> , <b>E</b> .	DEPIH	<b>G.</b> E.	BASE G.E.	BASE G.E.	BASE G.E.
	Proj. ADT 1-1999	50	0"	0	4"	4.00	4.00	3.25	7.00
0 -	44 Feet - 9 ton	75	3"	2.25	4"	4.00	6.25	6.90	11.50
150	2 Traffic Lanes	100	8"	6.00	4"	4.00	10.00	10.50	16.00
	2 Parking Lanes	130	10"	7.50	4"	4.00	11.50	15.00	21.25
	Proj. ADT 2000-4999	50	0"	0	4"	4.00	4.00	7.00	7.00
150 -	44 Feet - 9 ton	75	3"	. 2.25	4"	4.00	6.25	10.50	11.50
300	2 Traffic Lanes	100	8"	6.00	4"	4.00	10.00	14.00	16.00
	2 Parking Lanes	130	10"	7.50	4"	4.00	11.50	18.20	21.25
	Proj. ADT 5000 & over	50	0"	0	4"	4.00	4.00	9.00	3.00 *
300 -	48 Feet - 9 ton	75	3"	2.25	4"	4.00	6.25	13.50	3.00 *
600	2 Traffic Lanes	100	9"	6.75	4"	4.00	10.75	18.00	6.00 *
	2 Parking Lanes	130	12"	9.00	4"	4.00	13.00	23.40	6.00 *
	Proj. ADT 7000-9999	50	0"	0	5"	5.00	5.00	10.50	8.00
600 -	68 Feet - 9 ton	75	3"	2.25	5"	5.00	7.25	15.70	13.25
1100	4 Traffic Lanes	100	11"	8.25	5"	5.00	13.25	21.00	18.50
	2 Parking Lanes	130	14"	10.50	5"	5.00	15.50	27.30	24.50
	Proj. ADT 10000 & over	50	0"	. 0	7"	7.00	7.00	12.30	3.00 *
1100 &	72 Feet - 9 ton	75	3"	2.25	7"	7.00	9.25	18.40	3.00 *
OVER	4 Traffic Lanes	100	10"	7.50	7"	7.00	14.50	24.50	6.00 *
	2 Parking Lanes	130	15"	11.25	7"	7.00	18.25	31.80	6.00 *

UNIT PRICE IN NEEDS

SUBBASE CLASS 4	\$4.70 TON
BASE CLASS 5	\$6.20 TON

\* CONCRETE SURFACE
#### EXISTING - URBAN CHART 2 **BITUMINOUS SURFACE** GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE MSAS - Urban Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. A required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

		G.E. APPLIED PER INCH 2.00		1	0.05	1		1					
	G.E. AFFLIED FEN INCH		2.00	/	2.25		2.25			COMPARISO	NS	2.25	
			x	(A)		(B)		(C)	(A + B + C)			MS	SAS
							2361	2361	MSAS NEEDS	TOTAL	COUNTY NEEDS		
			2331	2331	2341	2341	SECOND	SECOND	ΤΟΤΑΙ	BIT SURF	ΤΟΤΔΙ	ΔΟΟΙΤΙΟΝΑΙ	ADDITIONAL
		SOIL	BIT. BASE	BIT. BASE	BIT. SURF.	BIT SURE	RIT SURF	RIT SUDE	BIT SUDE	CONST		ADDITIONAL	ADDITIONAL
HCADT	DESIGN DATA	TVPF	DEPTH	GE	ПЕРТН	G E		DI1. 30AI.		0.5.75	BIT. SUKF.	BIT. SURF.	BIT. SURF.
	Proj. ADT 1-1999	50	1.5"	3.00	2"	6.75	DEFIN	G.E.	G.E.	G.E. REQ.	<u> </u>	DEPTH	G.E.
0 -	44 Feet - 9 ton	75	1.5	3.00	3"	0.75			9.75	7.00	7.38	2" - 2341	4.50
150	2 Traffic Lanes	100	1.5	3.00	3"	0.75			9.75	7.00	7.38	2" - 2341	4.50
	2 Parking Lanes	130	1.5	3.00	3"	0.75			9.75	7.00	7.38	2" - 2341	4.50
	Proj. ADT 2000-4999	50	2"	3.00	3"	0.75			9.75	7.00	7.38	2" - 2341	4.50
150 -	44 Feet - 9 ton	75	2"	4.00	3   3"	0.75			10.75	7.00	7.38	2" - 2341	4.50
300	2 Traffic Lanes	100	2"	4.00	3"	0.75			10.75	7.00	7.38	2" - 2341	4.50
	2 Parking Lanes	120	2"	4.00	3	0.75	-		10.75	7.00	7.38	2" - 2341	4.50
	Proj ADT 5000 & over	50	2 2 5 "	<u>     4.00</u>	3	6.75			10.75	7.00	7.38	2" - 2341	4.50
300 -	48 Feet - 9 ton	75	2.0	5.00	3	6.75	1"	2.25	14.00	7.00		1" - 2361 ·	2.25
600	2 Traffic Lanos	100	2.5	5.00	3	6.75	1"	2.25	14.00	7.00	9"	1" - 2361	2.25
000	2 Parking Lanes	120	2.5	5.00	3"	6.75	1"	2.25	14.00	7.00	CONCRETE	1" - 2361	2.25
	Proi ADT 7000 0000	50	2.0	5.00	3	6.75	1"	2.25	14.00	7.00		1" - 2361	2.25
600 .	68 East 9 top	75	3	6.00	3.5	7.88	1"	2.25	16.13	8.00	7.38	1" - 2361	2.25
1100	A Traffic Lance	100	3	6.00	3.5"	7.88	1"	2.25	16.13	8.00	7.38	1" - 2361	2.25
1100	2 Parking Longe	100	3	6.00	3.5"	7.88	1"	2.25	16.13	8.00	7.38	1" - 2361	2.25
	Z Farking Lanes	130	3	6.00	3.5"	7.88	1"	2.25	16.13	8.00	7.38	1" - 2361	2.25
1100 0	Proj. ADT TOUOU & over	50	4.	8.00	3.5"	7.88	1"	2.25	18.13	8.00		1" - 2361.	2.25
	/2 Feet - 9 ton	/5	4"	8.00	3.5"	7.88	1"	2.25	18.13	8.00	9"	1" - 2361	2.25
OVER	4 Trattic Lanes	100	4"	8.00	3.5"	7.88	1"	2.25	18.13	8.00	CONCRETE	1" - 2361	2.25
L	2 Parking Lanes	130	4"	8.00	3.5"	7.88	1"	2.25	18.13	8.00		1" - 2361	2.25

#### UNIT PRICE IN NEEDS

32 .

> BITUMINOUS 2331 **BITUMINOUS 2341 BITUMINOUS 2361**

\$20.50 TON \$23.60 TON \$30.10 TON

special\design3

3

## **EXISTING - URBAN CHART 3** TOTAL COMPARISON GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE

MSAS - Urban Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

									BITUMINOUS COMPARISON				
					SUBBASE & L	BASE COMPAR	ISON				ΤΟΤΑ	L COMPAR	NSON
	[		(A)	(B)	(A + B)	(C)	(D)	(E)	(F)	(G)	(A + B + E)	(C + F)	(D + G)
					MSAS		COUNTY				TOTAL	TOTAL	TOTAL
			NEEDS	NEEDS	NEEDS	REOURED	NEEDS						
			NEEDS	PACE	TOTAL	CONSTRUCT	TOTAL	MSAS	BEOLIIBED	COUNTY	MSAS	DESIGN	COUNTY
			SUBBASE	BAJE	TUTAL	CONSTRUCT.	TOTAL	MGAG	DECION	NEEDO	MEEDE	DECIGIN	NEEDS
		SOIL	CLASS 4	CLASS 5	SUBBASE &	SUBBASE &	SUBBASE &	IVEEDS	DESIGN	IVEEDS	NEEDS	AEU.	INCEDS
HCADT	DESIGN DATA	TYPE	<i>G.E</i> .	<i>G.E.</i>	BASE G.E.	BASE G.E.	BASE G.E.	BIT. G.E.	BIT. G.E.	BIT. G.E.	G.E.	G.E.	G.E.
	Proj. ADT 1-1999	50	0	4.00	4,00	3.25	7.00	9.75	7.00	7.38	13.75	10.25	14.38
0 -	44 Feet - 9 ton	75	2.25	4.00	6.25	6.90	11.50	9.75	7.00	7.38	16.00	13.90	18,88
150	2 Traffic Lanes	100	6.00	4.00	10.00	10.50	16.00	9.75	7.00	7.38	19.75	17.50	23.38
	2 Parking Lanes	130	7.50	4.00	11,50	15.00	21.25	9.75	7.00	7.38	21.25	22.00	28.63
	Proj. ADT 2000-4999	50	0	4.00	4.00	7.00	7.00	10.75	7.00	7.38	14.75	14.00	14.38
150 -	44 Feet - 9 ton	75	2.25	4.00	6.25	10.50	11.50	10.75	7.00	7.38	17.00	17.50	18.88
300	2 Traffic Lanes	100	6.00	4.00	10.00	14.00	16.00	10.75	7.00	7.38	20.75	21.00	23,38
	2 Parking Lanes	130	7.50	4.00	11,50	18.20	21.25	10.75	7.00	7.38	22.25	25.20	28.63
	Proj. ADT 5000 & over	50	0	4.00	4.00	9.00	3.00	14.00	7.00		18.00	16.00	
300 -	48 Feet - 9 ton	75	2.25	4.00	6.25	13.50	3.00	14.00	7.00	9"	20.25	20.50	9"
600	2 Traffic Lanes	100	6.75	4.00	10.75	18.00	6.00	14.00	7.00	CONCRETE	24,75	25.00	CONCRETE
	2 Parking Lanes	130	9.00	4.00	13.00	23.40	6.00	14.00	7.00		27.00	30.40	10.00
	Proj. ADT 7000-9999	50	0	5.00	5.00	10.50	8.00	16.13	8.00	7,38	21.13	18.50	19.38
600 -	68 Feet - 9 ton	75	2.25	5.00	7.25	15.70	13.25	16.13	8.00	7.38	23.38	23.70	24.63
1100	4 Traffic Lanes	100	8.25	5.00	13.25	21.00	18.50	16.13	8.00	7.38	29.38	29.00	29.88
	2 Parking Lanes	130	10.50	5.00	15.50	27.30	24.50	16.13	8,00	7.38	31.63	35.30	35.88
	Proj. ADT 10000 & over	50	0	7.00	7.00	12.30	3.00	18.13	8.00	0.1	25.13	20.30	0"
1100 8	72 Feet - 9 ton	75	2.25	7.00	9.25	18.40	3.00	18.13	8.00	9"	27.38	26.40	9
OVER	4 Traffic Lanes	100	7.50	7.00	14.50	24.50	6.00	18.13	8.00	CONCRETE	32.63	32.50	CONCRETE
	2 Parking Lanes	130	11.25	7.00	18.25	31.80	6.00	18.13	8.00		36.38	39.80	

UNIT PRICE IN NEEDS			
SUBBASE CLASS 4	\$4.70 TON	2331 BITUMINOUS	\$20.50 TON
BASE CLASS 5	\$6.20 TON	2341 BITUMINOUS	\$23.60 TON
		2361 BITUMINOUS	\$30.10 TON

. NOTES • .



# CHANGE TO THE NEEDS QUANTITY TABLES

The recommended changes by Needs Study Subcommittee for a Rural roadway are as follows:

# 1. Incorporate a minimum grading quantity and depth in the quantity table with a 1 foot subcut.

Presently a grading cost has to be computed manually by the city on every rural need segments. By including a quantity, a city is given the option of using the quantity within the traffic grouping and soil factor or modifing the amount by furnishing the State Aid Office with a separate calculation.

## 2. Change the design data within the different traffic groupings.

Present	Proposed	Present	Proposed	Present	Proposed
Traffic	Traffic	Roadway	Roadway	Tonage	Tonage
Grouping	Grouping	Width	Width		- 011 <b>0</b> 90
0 - 749	0 - 399	32'	32'	7 Ton ult 9	7 Ton ult 9
750 - 999	400 - 749	36'	32'	7 Ton ult 9	9
1000 - 1999	750 - 1499	40'	36'	9	9
2000 & Over	1500 & Over	40'	40'	9	10
5000 & Over	5000 & Over	72'	72'	9	10

## 3. Replace Class 4 subbase with Class 5 Base.

The unit price study indicates that class 4 subbase was rarely used in the past 10 years. The Subcommittee is recommending that it be eliminated in the needs and be replaced with class 5. The cost to attain the same GE between subbase class 4 and base class 5 is approximately the same. The following spread sheets show the elimination of subbase and adjustments to the class 5 base and bituminous depths and quantities. The minimum GE required for the bituminous was taken from the flexible pavement design chart and the remaining GE amount was achieved in class 5.

# 4. Adjust the Bituminous Base and Surface to the GE required for design.

The minimum GE required for the bituminous was taken from the flexible pavement design chart.

5. Change the 1500 & over and 5,000 & over traffic grouping from 9 ton to 10 ton by adding 1" of bituminous 2341.

The recommended changes by the Needs Study Subcommittee changes for a Urban roadway are as follows:

1. Change the width from 44 foot to 42 foot in the 0 - 1999 traffic grouping

2. Replace Class 4 subbase with Class 5 Base.

3. Adjust the Bituminous Base and Surface to the GE required for design.

4. Change the grading depth and quantities to reflect the change in depth of base and bituminous with a 1 foot subcut.

5. Change the 5,000 & over, 7,000 - 10,000, and 10,000 & over traffic grouping from 9 ton to 10 ton by adding 1" of bituminous 2341.

6. Eliminate the second surface quantity.

By bringing the bituminous GE in line with the amount that is required for construction will reduce the total value of needs for some traffic groupings and will affect the needs and allocation of some cities. The cost of subbase class 4 and base class 5 is about 40% less than the cost of bituminous to attain the same GE. Number of cost comparison charts are included in this booklet showing the affect on the total needs between the present and proposed quantities.

# CLASS 4 SUBBASE #2211



NEEDS YEAR	NO.OF CITIES	QUANTITY	TOTAL COST	YEARLY AVERAGE CONTRACT PRICE	PRICE USED IN NEEDS	5-YEAR AVERAGE CONTRACT PRICE
1987	6	52,643	\$248,938	\$4.73	\$5.00	\$4.61
1988	8	60,793	239,623	3.94	4.75	4.63
1989	10	68,406	286,398	4.19	4.75	4.64
1990	5	56,590	240,949	4.26	4.75	4.55
1991	7	30,594	142,157	4.65	4.75	4.35
1992	7	69,260	284,485	4.11	4.50	4.23
1993	3	25,634	109,928	4.29	4.50	4.30
1994	2	5,140	27,970	5.44	4.50	4.55
1995	7	36,095	188,875	5.23	4.70	4.74
1996	9	66,467	269,967	4.06		4.63

SUBCOMMITTEE'S	RECOMMENDED PRICE FOR THE 1996 NEEDS STUDY IS	\$4.70
PER TON.		

# CLASS 5 AGGREGATE BASE #2211



NEEDS YEAR	NO. OF CITIES	QUANTITY	TOTAL COST	YEARLY AVERAGE CONTRACT PRICE	PRICE USED IN NEEDS	5-YEAR AVERAGE CONTRACT PRICE
1987	61	455,259	\$2,768,438	\$6.08	\$6.00	\$5.05
1988	51	381,898	2,185,112	5.72	6.00	5.27
1989	70	648,988	3,385,938	5.22	5.75	5.31
1990	68	715,922	3,696,421	5.16	5.50	5.34
1991	70	553,874	3,368,664	6.08	6.00	5.65
1992	69	650,835	3,525,629	5.42	5.75	5.52
1993	60	621,247	3,807,092	6.13	6.00	5.60
1994	70	660,174	3,921,230	5.94	6.00	5.75
1995	61	491,608	3,060,585	6.23	6.00	5.96
1996	68	593,314	3,733,431	6.29		6.00

SUBCOMMITTEE'S RECOMMENDED PRICE FOR THE 1996 NEEDS STUDY IS \_ PER TON.

\$6.20

#### EXHIBITS, FIGURES, AND TABLES

8820.9920 GEOMETRIC DESIGN STANDARDS; RURAL UNDIVIDED; NEW OR RECONSTRUCTION.

Projected ADT (b)	Lane Vidth (meters)	Shoulder Vidth (meters)	inslope (c) (rise:run)	Recovery Area (d) (meters)	Design Speed (e) (ka/h)	Surfacing	Structural Design Strength (metric tons)	Bridges to Remain (f) Width Curb-Curb (meters)	
0-49	3.3	0.3	1:3	2	50- 100	Agg.		6.6	2 2 2 2
50-149	3.3	0.9	1:4	3	60- 100 (g)	Agg.		6.6	RDADWA WIDTH (FEET)
150- 399	<b>3.6</b> 11.81	1.2 (h)	1:4	5	60- 100	Paved	<b>6.4</b> 7.05 Ton	8.4	31.51
400- 749	<mark>3.6</mark> 11.ອ11	1.2 ૩.૧૫ <sup>/</sup>	1:4	6	60- 100	Paved	8.2 9.04 Ton	8.4	31.5
750- 1499	3.6 \\.&\'	<b>1.8</b> 5.90'	1:4	8	60- 100	Paved	8.2 9.04 Тол	8.4	35.42
1500 and Over	<b>3.6</b> 11.817	2.4 ז.8ד <b>י</b>	1:4	9	60- 100	Paved	9.1 10.0 Ten	9.0	39.36

(a) For rural divided roadways, use the geometric design standards of the Mn/DOT Road Design Manual, with a minimum 9.1 metric tons structural design and minimum 60 kilometers per hour design speed.

(b) Use the existing traffic for highways not on the state-aid or federal-aid systems.

(c) Applies to slope within recovery area only.

(d) Obstacle-free area (measured from edge of traffic lane). Culverts with less than 675 millimeter vertical height allowed without protection in the recovery area.

Guardrail is required to be installed at all bridges where the design speed exceeds 60 kilometers per hour, and either the ADT exceeds 400 or the bridge width is less than the sum of the lane and shoulder widths.

Mailbox supports must be in accordance with the provisions of chapter 8818.

(e) Subject to terrain.

(f) Inventory design rating M 13.5 required. Bridges narrower than these widths may remain in place provided that the bridge does not qualify for federal-aid bridge funds.

(g) Design speed of 50 kilometers per hour allowed off of the state-aid and federal-aid systems.

## GEOMETRIC DESIGN STANDARDS; URBAN; NEW OR RECONSTRUCTION

Urban design must be a minimum of 8.2 metric ton or 9 ton structural design

Functional Classification and Projected Traffic Volume	Design Speed (Km/h)	Traffic Lane Widths (a) (Meters)	Traffic Lane Widths (a) (Feet)	Curb Reaction Distance (Meters)	Curb Reaction Distance (Feet)	Parking Lane Widths (Meters)	Parking Lane Widths (Feet)	Total Widths Required For Design (Feet)
Collectors or Locals	50-60	3.3 (b)	10.83	0.6	1.97	2.4	7.87	41.34
with ADT < 10,000*	Over 60	3.6	11.81	0.6	1.97	3.0	9.84	47.24
Collectors or Locals	50-60	3.3 (b)	10.83	1.2 (c)	3.93	3.0	9.84	49.22
with ADT > 10,000 and Arterials	Over 60	3.6	11.81	1.2 (c)	3.93	3.0 (d)	9.84	51.18

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(a) One-way turn lanes must be at least 3.0 meters wide, except 3.3 meters is required if the design speed is over 60 km/h.

(b) Whenever possible, lane widths of 3.6 meters, rather than 3.3 meters, should be used.

- (c) Maybe reduced to 0.6 meters if there are four or more lanes and on one-way streets.
- (d) No parking is allowed for six or more traffic lanes or when the posted speed exceeds 70 km/h.

When a median is included in the design of the two way roadway, a 0.3 meter reaction distance to the median is required on either side of the median. Mimimum median width is 1.2 meters.

For volumes greater than 15,000 projected ADT at least 4 through-traffic lanes are required.

# TYPICAL SECTIONS USED FOR PROPOSED GRAVEL EQUIVALENCY CHART REVISIONS



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## PROPOSED RURAL CHART 3 (9 &10 TON) BASE CLASS 5 GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE

MSAS - Rural Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201. No Class 4 Subbase proposed.

	G.E. APPLIED PER INCH	1	1.00				
				TOTAL GR	AVEL BASE		
UGADT		SOIL	BASE CLASS 5	Existing TOTAL SUBBASE and BASE C E	PROPOSED TOTAL CLASS 5 BASE C E	REQUIRED CONSTRUCT. SUBBASE & BASE G E	DIFFERENCE BETWEEN EXISTING AND PROPOSED
TCADI	Broi ADT 0 399	50	3 25"	3.00	3.25	3 25	0.25
0	24 East surface	75	7.00"	6.00	7.00	6.90	1.00
149	32' Roadbed	100	10.50"	9.00	10.50	10.50	1.50
145	2 Lanes 7 ton ult 9 ton	130	15.00"	12.75	15.00	15.00	2.25
	Proi. ADT 400 - 749	50	7.00"	3.00	7.00	7.00	4.00
150 -	24 Foot surface	75	10.50"	6.00	10.50	10.50	4.50
299	32' Roadbed	100	14.00"	9.00	14.00	14.00	5.00
	2 Lanes 9 ton	130	18.25"	12.75	18.25	18.20	5.50
	Proj. ADT 750 - 1499	50	8.75"	5.00	8.75	8.75	3.75
300 -	24 Foot surface	75	13.50"	7.25	13.50	13.50	6.25
599	36' Roadbed	100	17.75"	11.00	17.75	18.00	6.75
	2 Lanes 9 ton	130	23.00"	16.50	23.00	23.40	5.50
	Proj. ADT 1500 & over	50	10.00"	6.00	10.00	10.00	4.00
600 -	24 Foot surface	75	15.25"	10.50	15.25	15.70	4.75
1099	40' Roadbed	100	20.50"	15.00	20.50	21.00	5.50
	2 Lanes 10 ton	130	27.00"	20.25	27.00	27.30	6.75
	Proj. ADT 5000 & over	50	12.00"	6.00	12.00	12.30	6.00
1100 &	48 Foot surface	75	18.00"	12.75	18.00	18.40	5.25
OVER	72' Roadbed	100	24.00"	17.25	24.00	24.50	6.75
	4 Lanes 10 ton	130	31.50"	23.25	31.50	31.80	8.25

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## PROPOSED RURAL CHART 4 - (9 & 10 TON) BITUMINOUS BASE & SURFACE GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE

MSAS - Rural Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201.

			BITUN	IINOUS.	BI	Г. G.E.	TOTAL AGG. BASE & BIT				
			PROPOSED	PROPOSED	PROPOSED			G.E. CC	MPARISON	•••	
	DESIGNIDATA	SOIL		INITIAL	TOTAL SURFACE	REQUIRED CONSTRUCT BIT. SURF.	PROPOSED TOTAL NEEDS	TOTAL DESIGN REQ.	EXISTING TOTAL NEEDS	DIFFERENCE BETWEEN EXISTING	
	DESIGN DATA	ITPE	BIIBASE	SURFACE	<b>G.E.</b>	G.E.	G.E.	G.E.	G.E.	AND	
HCADT	•									PROPOSED	
	Proj. ADT 0-399	50	1613 tons	1162 tons			10.25	10.25	0.00	TOTAL G.E.	
0 -	24 Foot surface	75	2.0"	1.5"			14 00	13 00	9.00	1.25	
149	32' Roadbed	100	No. 2331	No. 2331	7.00	7.00	17.50	17.50	12.00	2.00	
	2 Lanes 7 ton ult 9 ton	130	G.E. 4.00	G.E. 3.00			22.00	22.00	18.00	2.00	
1	Proj. ADT 400 - 749	50	1613 tons	1162 tons			14.00	14.00	9.00	5.75	
150 -	24 Foot surface	75	2.0"	1.5"	1		17.50	17 50	12 00	5.00	
299	32' Roadbed	100	No. 2331	No. 2331	7.00	7.00	21.00	21.00	15.00	5.50 6.00	
	2 Lanes 9 ton	130	G.E. 4.00	G.E. 3.00			25.25	25.20	18.75	7 50	
200	Proj. ADI 750 - 1499	50	1613 tons	1162 tons			16.13	16.00	14.75	1.38	
300 -	24 FOOT SUITACE	75	2.0"	1.5"			20.88	20.50	17.00	3.88	
099		100	No. 2331	No. 2341	7.38	7.00	25.13	25.00	20.75	4.38	
	2 Lanes 9 ton Proj ADT 1500 8 ever	130	G.E. 4.00	G.E. 3.38			30.38	30.40	26.25	4.13	
600 -	24 Egot surfage	50	1613 tons	2323 tons			20.75	18.50	15.75	4.00	
1099	40' Roadbod	100		3"			26.00	23.70	20.25	5.75	
	2   anes 10 ton	120	NU. 2331	NO. 2341	10.75	8.00	31.25	29.00	24.75	6.50	
	Proi ADT 5000 & over	50	G.E. 4.00	G.E. 0.75			37.75	35.30	30.00	7.75	
1100 &	48 Foot surface	75	2 0"	4040 tons			22.75	20.30	20.88	1.87	
OVER	72' Roadbed	100	No 2331	No 2241	10.75	0.00	28.75	26.40	27.63	1.12	
	4 Lanes 10 ton	130	GF 4 00	GE 675	10.75	8.00	34.75	32.50	32.13	2.62	
L		1.00	0.2. 4.00	0.2.0.75			42.25	39.80	37.13	5.12	

### RURAL QUANTITY CHART 5 - ONLY 9 TON MSAS - Rural Design Quantity Table

		SOIL	GRADING DEPTH IN INCHES 1 FT SUBCUT	<i>GRADING</i> Cu. Yds	CLASS 5 BASE DEPTH	CLASS 5 BASE	217.0405	INITIAL	No. 2221 GRAVEL SHOULDERS	ADDITIONAL	No. 2221 GRAVEL RESHOULDERS
HCAD	DESIGN DATA	IYPE	INCLUDED	44 430	IN INCHES	10/05	BITBASE	SUKFAGE	(10/05)	SURFACE	(TONS)
	Proj. AD1 0-399	50	18.75	11,473	3.25	3,750	N. 0004	N. 0001		No. 0001	
0 -	24 Foot surface	/5	22.50	14,267	7.00	/,/86	NO. 2331	NO. 2331		NO. 2331	004
149	32' Roadbed	100	26.00	17,022	10.50	12,081	2.0"	1.5"	/11	1.5"	394
	2 Lanes 7 ton ult 9 ton	130	30.50	20,770	15.00	17,995	1613 tons	1162 tons		1162 tons	
	Proj. ADT 400 - 749	50	22.50	14,267	7.00	7,786					
150	- 24 Foot surface	75	26.00	17,022	10.50	12,081	No. 2331	No. 2331		No. 2331	
299	32' Roadbed	100	29.50	19,917	14.00	16,643	2.0"	1.5"	711	1.5"	394
	2 Lanes 9 ton	130	33.75	23,622	18.25	22,541	1613 tons	1162 tons		1162 tons	
	Proj. ADT 750 - 1499	50	24.25	16,953	8.75	10,864					
300	- 24 Foot surface	75	29.00	21,097	13.50	17,461	No. 2331	No. 2341		No. 2341	
599	36' Roadbed	100	33.00	24,789	17.75	23,782	2.0"	1.5"	931	1.5"	579
	2 Lanes 9 ton	130	38.50	30,166	23.00	32,135	1613 tons	1162 tons		1162 tons	
	Proj. ADT 1500 & over	50	26.00	19,842	10.00	13,761					
600	- 24 Foot surface	75	31.25	24,850	15.25	21,860	No. 2331	No. 2341		No. 2341	
109	40' Roadbed	100	36.50	30,175	20.50	30,562	2.0"	2"	1346	1.5"	370
	2 Lanes 9 ton	130	43.00	37,208	2 <b>7</b> .00	42,170	1613 tons	1549 tons		1162 tons	
	Proj. ADT 5000 & over	50	28.00	35,577	12.00	28,289					
1100	& 48 Foot surface	75	34.00	44,511	.18.00	43,613	No. 2331	No. 2341		No. 2341	
OVEF	72' Roadbed	100	40.00	53,858	24.00	59,723	2.0"	2"	1566	1.5"	554
	4 Lanes 9 ton	130	47.50	66,126	31.50	80,967	3162 tons	3098 tons		2323 tons	<u> </u>

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## PROPOSED RURAL QUNATITY CHART 6 (9 & 10 TON) MSAS - Rural Design Quantity Table

HCADT	DESIGN DATA	SOIL TYPE	GRADING DEPTH IN INCHES 1 FT SUBCUT INCLUDED	<i>GRADING</i> Cu. Yds	CLASS 5 BASE DEPTH IN INCHES	CLASS 5 BASE TONS	BIT BASE	INITIAL SURFACE	No. 2221 GRAVEL SHOULDERS (TONS)	ADDITIONAL	No. 2221 GRAVEL RESHOULDERS
	Proj. ADT 0-399	50	18.75	11,473	3.25	3,750					110/15/
0-	24 Foot surface	75	22.50	14,267	7.00	7,786	No. 2331	No. 2331		No. 2331	
149	32 Roadbed	100	26.00	17,022	10.50	12,081	2.0"	1.5"	711	1.5"	394
	2 Lanes 7 ton ult 9 ton	130	30.50	20,770	15.00	17,995	1613 tons	1162 tons		1162 tons	004
150	Proj. AD1 400 - 749	50	22.50	14,267	7.00	7,786					
150 -	24 Foot surface	75	26.00	17,022	10.50	12,081	No. 2331	No. 2331		No. 2331	
299	32 Roadbed	100	29.50	19,917	14.00	16,643	2.0"	1.5"	711	1.5"	394
	2 Lanes 9 ton	130	33.75	23,622	18.25	22,541	1613 tons	1162 tons		1162 tons	
000	Proj. ADT 750 - 1499	50	24.25	16,953	8.75	10,864					
300 -	24 Foot surface	75	29.00	21,097	13.50	17,461	No. 2331	No. 2341		No. 2341	
599	36 Roadbed	100	33.00	24,789	17.75	23,782	2.0"	1.5"	931	1.5"	579
	2 Lanes 9 ton	130	38.50	30,166	23.00	32,135	1613 tons	1162 tons		1162 tons	0/0
	Proj. ADT 1500 & over	50	27.00	20,772	10.00	13,980					
600 -	24 Foot surface	75	32.25	25,840	15.25	22,194	No. 2331	No. 2341		No. 2341	
1099	40 <sup>°</sup> Roadbed	100	37.50	31,225	20.50	31,010	2.0"	3"	1885	1.5"	370
	2 Lanes 10 ton	130	44.00	38,333	27.00	42,760	1613 tons	2323 tons		1162 tons	370
	Proj. ADT 5000 & over	50	29.00	37,038	12.00	28,551				1102 10113	
1100 &	48 Foot surface	75	35.00	46,040	18.00	44,006	No. 2331	No. 2341		No 23/1	
OVER	72' Roadbed	100	41.00	55,457	24.00	60,248	2.0"	3"	2326	1 5"	554
	4 Lanes 10 ton	130	48.50	67,811	31.50	81,655	3162 tons	4646 tons	2020	2323 tons	504

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#### PROPOSED - URBAN CHART 7 **TOTAL COMPARISON - 9 & 10 TON GRAVEL EQUIVALENCY APPLIED TO NEEDS QUANTITY TABLE** MSAS - Urban Design Quantity Table

This chart makes a G.E. comparison to the needs quantity table and what is required for construction. The required G.E. for construction and needs vary. The required G.E. for the different soil factors was taken from the State Aid Manual chart Fig. B 892.201. -----

							BITUMIN	OUS COMP	ARISON				
				GRAVEL BAS	SE COMPARIS	ON				T	OTAL COM	PARISON	
			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(B + E)		(C + F)	(D + G)
			NEEDS BASE	PROPOSED NEEDS	REQUIRED	COUNTY NEEDS	PROPOSED MSAS	REQUIRED	COUNTY	TOTAL PROPOSED MSAS	TOTAL PRESENT MSAS	TOTAL	TOTAL
		sou	CLASS 5	BASE	BASEGE	RASE G E	BIT G F	DESIGN	NEEDS	NEEDS	NEEDS	REQ.	NEEDS
HOADT		JUIL	WCHES	CLASS 5	DAGE G.L.	BASE G.L.	DI1. G.L.	BIT G F	RIT G F	GE	GE	G.F.	G.E.
HCADT	DESIGN DATA	50	2.00	3.00	2 87	7.00	7 38	7 00	7.38	10.38	13.75	10.25	14.38
	Proj. ADT 1-1999	50	3.00	7.00	2.07	11 50	7.38	7.00	7.38	14.38	16.00	13.90	18.88
150	42 reet - 9 ton	100	10.00	10.00	10.12	16.00	7.38	7.00	7.38	17.38	19.75	17.50	23.38
150	2 Trailic Lailes	130	15.00	15.00	14.62	21.25	7.38	7.00	7.38	22.38	21.25	22.00	28.63
	Proj ADT 2000-4999	50	7.00	7.00	6.62	7.00	7.38	7.00	7.38	14.38	14.75	14.00	14.38
150 -	44 Feet - 9 ton	75	10.00	10.00	10.12	11.50	7.38	7.00	7.38	17.38	17.00	17.50	18.88
300	2 Traffic Lanes	100	14.00	14.00	13.62	16.00	7.38	7.00	7.38	21,38	20.75	21.00	23.38
	2 Parking Lanes	130	18.00	18.00	17.82	21.25	7.38	7.00	7.38	25.38	22.25	25.20	28.63
	Proj. ADT 5000 & over	50	9.00	9.00	6.37	3.00	9.63	7.00		18.63	18,00	16.00	
300 -	48 Feet - 10 ton	75	13.00	13.00	10.87	3.00	9.63	7.00	9"	22.63	20.25	20.50	9"
600	2 Traffic Lanes	100	18.00	18.00	15.37	6.00	9.63	7.00	CONCRETE	27.63	24.75	25.00	CONCRET
	2 Parking Lanes	130	23.00	23.00	20.77	6.00	9.63	7,00		32.63	27.00	30.40	
	Proj. ADT 7000-9999	50	10.00	10.00	7.75	8.00	10.75	8.00	7.38	20.75	21.13	18.50	19.38
600 -	68 Feet - 10 ton	75	15.00	15.00	12.95	.13.25	10.75	8.00	7.38	25.75	23.38	23.70	24.63
1100	4 Traffic Lanes	100	21.00	21.00	18.25	18.50	10.75	8.00	7.38	31.75	29.38	29.00	29.88
	2 Parking Lanes	130	27.00	27.00	24.55	24.50	10.75	8.00	7.38	37.75	31.63	35.30	35.88
	Proj. ADT 10000 & over	50	12.00	12.00	9.55	3.00	10.75	8.00		22.75	20.13	20.30	0"
1100 8	a 72 Feet - 10 ton	75	18.00	18.00	15.65	3.00	10.75	8.00	9"	28.75	27.38	20.40	
OVER	4 Traffic Lanes	100	24.00	24.00	21.75	6.00	10.75	8.00	CONCRETE	34./5	32.03	32.50	CONCRET
	2 Parking Lanes	130	31.00	31.00	29.05	6.00	10.75	8.00		41.75	30.38	39.80	

UNIT PRICE IN NEEDS	•		
SUBBASE CLASS 4	\$4.70 TON	2331 BITUMINOUS	\$20.50 TON
BASE CLASS 5	\$6.20 TON	2341 BITUMINOUS	\$23.60 TON
		2361 BITUMINOUS	\$30.10 TON

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#### gestudy/quantabl.wk3

## **URBAN QUANTITY TABLE - CHART 8 - ONLY 9 TON** (Quantities Based On A One Mile Section)

8" was used for the proposed curb width instead of 6" in computing the existing quantities.

ADDITIONAL SURFACE TONS
No. 2341
9 2,452
) (2")
No. 2241
6 2 5 9 1
2,381 () (2")
No. 2361
0 1420
(1")
1
No. 2361
2,065
) (1")
No. 2361
3 2194
3(  3( 2' 8{ 2''

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## PROPOSED 9 & 10 TON - URBAN QUANTITY TABLE - CHART 9 (Quantities Based On A One Mile Section)

The difference between Chart 7 and 8 is that the 3 higher traffic grouping was changed to 10 Ton on Chart 8. This was done by adding an additional 1" of bituminous. This also increased the grading depth by 1".

8" was used for the proposed curb width instead of 6" in computing the existing quantities.

			EXIS	EXISTING					PROPOSED					
		SOIL	GRADING CUBIC YARDS	GRADING DEPTH INCHES	GRADING DEPTH INCHES	GRADING CUBIC YARDS	CLASS 5 BASE DEPTH INCHES	CLASS 5 BASE QUANTITY TONS	NO. 2331 BIT. BASE TONS	NO. 2341 BIT. SURFACE TONS	ADDITIONAL SURFACE TONS			
HCADT	DESIGN DATA	11 <b>7C</b>	15 000	20.5	M 185	13 000	3.0	4 189						
	Proj. ADT 1-1999	50	10,990	20.5	10.0	16,900	3.0	9 774			No 2341			
140	42 Feet - 9 ton	100	22 386	2.3.5	22.3	19 280	10.0	13 963	2 452	1.839	2.452			
145	2 Parking Lanes	130	23,998	30.5	30.5	23,164	15.0	20,944	(2")	(1 1/2 ")	(2")			
	Proj. ADT 2000-4999	50	16.388	21.0	22.5	17,699	7.0	10,205						
150 -	44 Feet - 9 ton	75	18,778	24.0	25.5	20,111	10.0	14,579			No. 2341			
299	2 Traffic Lanes	100	22,788	29.0	29.5	23,346	14.0	20,410	2,581	1,936	2,581			
	2 Parking Lanes	130	24,402	31.0	33.5	26,602	18.0	26,242	(2")	(1 1/2 ")	(2")			
	Proj. ADT 5000 & over	50	19,048	22.5	25.5	21,773	9.0	14,230						
300 -	48 Feet - 10 ton	75	21,640	25.5	29.5	25,269	13.0	20,554			No. 2361			
599	2 Traffic Lanes	100	26,860	31.5	34.5	29,669	18.0	28,459	2,839	3,549	1420			
	2 Parking Lanes	130	29,488	34.5	39.5	34,103	23.0	36,365	(2")	(2 1/2 ")	(1")			
	Proj. ADT 7000-9999	50	28,762	24.5	27.0	31,882	10.0	21,971			N. 0004			
600 -	68 Feet - 10 ton	75	32,340	27.5	32.0	37,894	15.0	32,956			No. 2361			
1099	4 Traffic Lanes	100	41,940	35.5	38.0	45,154	21.0	46,138	4,130	6,195	2,065			
	2 Parking Lanes	130	45,562	38.5	44.0	52,463	27.0	59,321	(2")	(3")	(1")			
	Proj. ADT 10000 & over	50	34,133	27.5	27.0	33,642	12.0	27,843			NI- 0004			
1100 &	72 Feet - 10 ton	75	37,919	30.5	33.0	41,252	18.0	41,765	1	0.500	No. 2361			
OVER	4 Traffic Lanes	100	46,799	37.5	39.0	48,911	24.0	55,686	4,388	6,582	2194			
	2 Parking Lanes	130	53,184	42.5	46.0	57,909	31.0	<u>71,928</u>	(2")	(3")	(1")			

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### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT RURAL ROADWAY AT 1996-97 UNIT PRICES from Rural Design Quantity Table figure #D 5-892.810 in State Aid Manual

Proj. AD 24' Su 32' Roa 2 Lane 7L Soil	T 0-749 rface adbed Jlt. 9Ton	PRESENT			Proj. ADT 0-399 24' Surface 32' Roadbed 2 Lane 7Ult. 9Ton		PROPOSED 9 TON		24' Surface 32' Roadbed 2 Lane 7Ult. 9Ton		DIFFERENCE	
Factor	50	75	100	130	50	75	100	130	50	75	100	120
Class 4 Class 5 2331 Base. 2331 Surf. 2341 Surf 2361 Surf. 2221 Shidr TOTAL	\$0 20,280 24,805 23,821 0 0 5,364 <b>\$74,270</b>	\$21,145 20,280 24,805 23,821 0 0 5,364 <b>\$95,415</b>	\$43,893 20,280 24,805 23,821 0 0 5,364 <b>\$118,163</b>	\$74,528 20,280 24,805 23,821 0 0 5,364 <b>\$148,798</b>	\$0 23,250 33,067 23,821 0 0 6,044 <b>\$86,181</b>	\$0 48,273 33,067 23,821 0 0 6,044 <b>\$111,204</b>	\$0 74,902 33,067 23,821 0 0 6,044 <b>\$137,833</b>	\$0 111,569 33,067 23,821 0 0 6,044 <b>\$174,500</b>	\$0 2,970 8,262 0 0 0 680 <b>\$11,911</b>	(\$21,145) 27,993 8,262 0 0 0 680 <b>\$15,789</b>	(\$43,893) 54,622 8,262 0 0 0 680 <b>\$19,670</b>	(\$74,528) 91,289 8,262 0 0 0 680 <b>\$25,702</b>
Proj. AD 24' Sur 32' Roa	Г 0-749 face dbed		PRESENT		Proj. ADT 24' Su 32' Roa	400-749 rface adbed	PROPOSI	ED 9 TON	24' Su 32' Roa	rface adbad	DIFFER	

32' Roadbed 2 Lane 7Ult. 9Ton Soil		PRESENT			32' Roadbed 2 Lane  9 Ton		PROPOSED 9 TON		32' Roadbed		DIFFERENCE	
Factor	<u>50</u>	75	100	130	50	75	100	130	50	75	100	130
Class 5 2331 Base. 2331 Surf. 2341 Surf 2361 Surf. 2221 Shidr TOTAL	\$0 20,280 24,805 23,821 0 0 5,364 <b>\$74,270</b>	\$21,145 20,280 24,805 23,821 0 0 5,364 <b>\$95,415</b>	\$43,893 20,280 24,805 23,821 0 0 5,364 <b>\$118,163</b>	\$74,528 20,280 24,805 23,821 0 0 5,364 <b>\$148,798</b>	\$0 48,273 33,067 0 23,821 0 6,044 <b>\$111,204</b>	\$0 74,902 33,067 0 23,821 0 6,044 <b>\$137,833</b>	\$0 103,187 33,067 0 23,821 0 6,044 <b>\$166,118</b>	\$0 139,754 33,067 0 23,821 0 6,044 <b>\$202,685</b>	0 27,993 8,262 (23,821) 23,821 0 680	(21,145) 54,622 8,262 (23,821) 23,821 0 680	(43,893) 82,907 8,262 (23,821) 23,821 0 680	(74,528 119,474 8,262 (23,821 23,821 0 680

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#### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT RURAL ROADWAY AT 1996-97 UNIT PRICES from Rural Design Quantity Table figure #D 5-892.810 in State Aid Manual

Proj. ADT 24' Su 36' Roa 2 Lane 7t	750-999 rface adbed Jlt. 9Ton		PRESENT		Proj. ADT 7 24' Sur 36' Roa 2 Lane	750-1499 face dbed 9Ton	PROPOSE	ED 9 TON	24' Sui 36 Roa	rface dbed	DIFFERI	ENCE
Soil Factor	50	75	100	130	50	75	100	130	50	75	100	130
Class 4	\$0	\$23,148	\$47,888	\$81.028	\$0	\$0	\$0	\$0	0	(23,148)	(47,888)	(81.028)
Class 5	22.326	22,326	22,326	22,326	67,357	108,258	147,448	199,237	45,031	85,932	125,122	176,911
2331 Base.	24.805	24,805	24,805	24,805	33,067	33,067	33,067	33,067	8,262	8,262	8,262	8,262
2331 Surf.	23,821	23,821	23,821	23,821	. 0	0	0	. 0	(23,821)	(23,821)	(23,821)	(23,821)
2341 Surf	0	0	0	. 0	27,423	27,423	27,423	27,423	27,423	27,423	27,423	27,423
2361 Surf.	0	0	0	0	· 0	0	0	0	0	0	0	0
2221 Shidr	6,613	6,613	6,613	6,613	7,914	7,914	7,914	7,914	1,301	1,301	1,301	1,301
TOTAL	\$77,565	\$100,713	\$125,453	\$158,593	\$135,760	\$176,661	\$215,852	\$267,640	\$58,195	\$75,948	\$90,399	\$109,047
Proj. ADT 24' Su	1000-1999			ſ	Proj. ADT	750-1499			[			
40' Roa 2 Lane	adbed 9Ton	· · · · · · · · · · · · · · · · · · ·	PRESENT		24' Sui 36' Roa 2 Lane	face dbed 9Ton	PROPOSI	ED 9 TON	24' Sui 40 & 36' R	rface Roadbed	DIFFER	ENCE
40' Roa 2 Lane Soil	adbed 9Ton		PRESENT	420	24' Sui 36' Roa 2 Lane	face dbed 9Ton	PROPOSI	ED 9 TON	24' Sui 40 & 36' R	rface Roadbed	DIFFER	
40' Roa 2 Lane Soil Factor	adbed 9Ton 50	75	100	130	24' Sur 36' Roa 2 Lane 50	face dbed 9Ton 75	PROPOSI	ED 9 TON	24' Sui 40 & 36' R 50	rface Roadbed	DIFFER	ENCE 130 (\$97.718)
40' Roa 2 Lane Soil Factor Class 4 Class 5	adbed 9Ton 50 \$0	<b>75</b> \$19,303	PRESENT 100 \$53,462	<b>130</b> \$97,718 41,311	24' Sui 36' Roa 2 Lane 50 \$0 67 357	face dbed 9Ton 75 \$0 108 258	PROPOSE	ED 9 TON 130 199 237	24' Sui 40 & 36' R 50 26 046	rface Roadbed 75 (\$19,303) 66 947	DIFFER 100 (\$53,462) 106 137	ENCE 130 (\$97,718) 157 926
40' Roa 2 Lane Soil Factor Class 4 Class 5 2331 Base	adbed 9Ton 50 \$0 41,311 24 805	<b>75</b> \$19,303 41,311 24,805	PRESENT 100 \$53,462 41,311 24,805	<b>130</b> \$97,718 41,311 24,805	24' Sur 36' Roa 2 Lane 50 \$0 67,357 33.067	face dbed 9Ton 75 \$0 108,258 33.067	PROPOSI 100 \$0 147,448 33.067	ED 9 TON 130 \$0 199,237 33.067	24' Sur 40 & 36' R 50 26,046 8 262	rface Roadbed 75 (\$19,303) 66,947 8 262	DIFFER 100 (\$53,462) 106,137 8 262	ENCE 130 (\$97,718) 157,926 8 262
40' Roa 2 Lane Soil Factor Class 4 Class 5 2331 Base. 2331 Surf	<b>50</b> \$0 41,311 24,805 0	<b>75</b> \$19,303 41,311 24,805	<b>100</b> \$53,462 41,311 24,805 0	<b>130</b> \$97,718 41,311 24,805 0	24' Sur 36' Roa 2 Lane 50 \$0 67,357 33,067	face dbed 9Ton 75 \$0 108,258 33,067 0	PROPOSE 100 \$0 147,448 33,067	ED 9 TON 130 \$0 199,237 33,067 0	24' Sur 40 & 36' F 50 \$0 26,046 8,262 0	rface Roadbed 75 (\$19,303) 66,947 8,262 0	DIFFER 100 (\$53,462) 106,137 8,262 0	ENCE 130 (\$97,718) 157,926 8,262 0
40' Roa 2 Lane Soil Factor Class 4 Class 5 2331 Base. 2331 Surf. 2341 Surf	adbed 9Ton 50 41,311 24,805 0 54,823	<b>75</b> \$19,303 41,311 24,805 0 54,823	<b>100</b> \$53,462 41,311 24,805 0 54,823	<b>130</b> \$97,718 41,311 24,805 0 54,823	24' Sur 36' Roa 2 Lane 50 \$0 67,357 33,067 0 27,423	face dbed 9Ton 75 \$0 108,258 33,067 0 27,423	PROPOSE 100 147,448 33,067 0 27,423	ED 9 TON 130 \$0 199,237 33,067 0 27,423	24' Sur 40 & 36' F 50 26,046 8,262 0 (27,400)	rface Roadbed (\$19,303) 66,947 8,262 0 (27,400)	DIFFER 100 (\$53,462) 106,137 8,262 0 (27,400)	ENCE 130 (\$97,718) 157,926 8,262 0 (27,400)
40' Roa 2 Lane Soil Factor Class 4 Class 5 2331 Base. 2331 Surf. 2341 Surf 2361 Surf.	<b>50</b> <b>50</b> <b>50</b> <b>50</b> <b>50</b> <b>50</b> <b>50</b> <b>54,823</b> <b>0</b> <b>54,823</b> <b>0</b>	<b>75</b> \$19,303 41,311 24,805 0 54,823 0	<b>100</b> \$53,462 41,311 24,805 0 54,823 0	<b>130</b> \$97,718 41,311 24,805 0 54,823 0	24' Sur 36' Roa 2 Lane 50 \$0 67,357 33,067 0 27,423 0	rface dbed 9Ton 75 \$0 108,258 33,067 0 27,423 0	PROPOSE 100 \$0 147,448 33,067 0 27,423 0	ED 9 TON 130 \$0 199,237 33,067 0 27,423 0	24' Sur 40 & 36' F 50 26,046 8,262 0 (27,400) 0	<b>75</b> (\$19,303) 66,947 8,262 0 (27,400) 0	DIFFER (\$53,462) 106,137 8,262 0 (27,400) 0	ENCE <u>130</u> (\$97,718) 157,926 8,262 0 (27,400) 0
40' Roa 2 Lane Soil Factor Class 4 Class 5 2331 Base. 2331 Surf. 2341 Surf 2361 Surf. 2221 Shidr	adbed 9Ton 50 \$0 41,311 24,805 0 54,823 0 13,828	<b>75</b> \$19,303 41,311 24,805 0 54,823 0 13,828	<b>100</b> \$53,462 41,311 24,805 0 54,823 0 13,828	<b>130</b> \$97,718 41,311 24,805 0 54,823 0 13,828	24' Sur 36' Roa 2 Lane 50 \$0 67,357 33,067 0 27,423 0 7,914	face dbed 9Ton 75 \$0 108,258 33,067 0 27,423 0 7,914	PROPOSE 100 \$0 147,448 33,067 0 27,423 0 7,914	<b>130</b> <b>130</b> <b>1</b> 99,237 33,067 0 27,423 0 7,914	24' Sur 40 & 36' F 50 26,046 8,262 0 (27,400) 0 (5,915)	rface Roadbed (\$19,303) 66,947 8,262 0 (27,400) 0 (5,915)	DIFFER 100 (\$53,462) 106,137 8,262 0 (27,400) 0 (5,915)	ENCE 130 (\$97,718) 157,926 8,262 0 (27,400) 0 (5,915)

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### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT RURAL ROADWAY AT 1996-97 UNIT PRICES from Rural Design Quantity Table figure #D 5-892.810 in State Aid Manual

Proj. ADT 2000 & Over 24' Surface 40' Roadbed 2 Lane 9Ton Soil		PRESENT			Proj. ADT 1500 & Over 24' Surface 40' Roadbed 2 Lane 9Ton		SUGGESTED 9 TON		24' Surface 40' Roadbed 2 Lane 9Ton		DIFFERENCE	
Factor	50	75	100	130	50	75	400	400		L		
Class 4	\$0	\$40.096	\$77 750	\$130 100	00	15	100	130	50	75	100	130
Class 5	49,972	49,972	49,972	49,972	85,318	ە <del>ب</del> ە 135.532	ېن 189.484	\$0 261 454	\$0 35 346	(\$40,096)	(\$77,750)	(\$139,190)
2331 Base.	24,805	24,805	24,805	24,805	33,067	33,067	33,067	33,067	8,262	8.262	8 262	211,482
2331 Surf. 2341 Surf	U 54 823	0 54 823	0 54 823	0 54 822	0	0	0	0	0	0	0	0,202
2361 Surf.	01,020	04,020	04,023	54,023 0	30,550 ()	36,556	36,556	36,556	(18,267)	(18,267)	(18,267)	(18,267)
2221 Shidr	13,828	13,828	13,828	13,828	11,441	11,441	11,441	11,441	(2.387)	(2.387)	0 (2.387)	0 (2 387)
IUIAL	\$143,428	\$183,524	\$221,178	\$282,618	\$166,382	\$216,596	\$270,548	\$342,518	\$22.954	\$33.072	\$49.370	\$50 000

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# THE DIFFERENCE BETWEEN SUGGESTED 9 TON AND PROPOSED 10 TON IS ABOUT \$25,000 PER MILE.

Proj. ADT 2 24' Su 40' Ro 2 Lane	000 & Over Irface adbed 9 9Ton	PRESENT			Proj. ADT 1500 & Over 24' Surface 40' Roadbed 2 Lane 10 Ton		PROPOSED 10 TON		24' Surface 40' Roadbed		DIFFERENCE	
Soll Factor	50	75	100	130	50	75	100	130	50	75	400	
Class 4	\$0	\$40,096	\$77,750	\$139,190	\$0	\$0	901	100	50		100	130
Class 5	49,972	49,972	49,972	49.972	86 676	137 603	102 262	ΨU 265 112	<b>36 704</b>	(\$40,095)	(\$77,750)	(\$139,190)
2331 Base.	24,805	24,805	24,805	24,805	33,067	33,067	33.067	200,112	30,704	87,631	142,290	215,140
2331 Surf.	0	0	,	,000	00,007	00,007	33,007	33,007	8,262	8,262	8,262	8,262
2341 Surf	54.823	54 823	54 823	54 823	54 922	54 000	U 54.000	0	0	0	0	0
2361 Surf.	0,010	0,020	07,020	54,025	54,023	54,023	54,823	54,823	0	0	0	0
2221 Shidr	13 828	13 828	12 020	12 020	10,000	0	U	0	0	0	0	0
TOTAL	\$143 428	\$183 524	13,020 \$221 178	\$292 649	16,023	16,023	16,023	16,023	2,195	2,195	2,195	2,195
	V140,420	<u>Ψ103,524</u>	\$221,170	\$202,010	\$190,588	\$241,515	<u>\$296,174</u>	\$369,024	\$47,160	\$57,991	\$74.996	\$86.406

#### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT RURAL ROADWAY AT 1996-97 UNIT PRICES from Rural Design Quantity Table figure #D 5-892.810 in State Aid Manual

Proj. ADT 5000 & Ove 48' Surface 72' Roadbed 4 Lane 9Ton			PRESENT			Proj. ADT 5000 & Over 48' Surface 72' Roadbed 4 Lane 9Ton		SUGGESTED 9 TON		48' Surface 72' Roadbed 4 Lane 9Ton		DIFFERENCE	
Soil	50	76	400	420	50	76	400	420	50	76	400	420	
ractor	50	/ 5	100	130	50	/5	100	130	50	75	100	130	
Class 4	\$50,647	\$118,431	\$206,297	\$334,546	\$0	\$0	\$0	\$0	(\$50,647)	(\$118,431)	(\$206,297)	(\$334,546)	
Class 5	95,821	95,821	95,821	95,821	175,392	270,401	370,283	501,995	79,571	174,580	274,462	406,174	
2331 Base.	115,764	115,764	115,764	115,764	64,821	64,821	64,821	64,821	(50,943)	(50,943)	(50,943)	(50,943)	
2331 Surf.	0	0	0	0	0	0	0	0	0	· 0	0	0	
2341 Surf	127,936	127,936	127,936	127,936	73,113	73,113	73,113	73,113	(54,823)	(54,823)	(54,823)	(54,823)	
2361 Surf.	0	0	0	0	0	0	0	0	0	0	0	0	
2221 Shidr	40,944	40,944	40,944	40,944	13,311	13,311	13,311	13,311	(27,633)	(27,633)	(27,633)	(27,633)	
TOTAL	\$431,112	\$498,896	\$586,762	\$715,011	\$326,637	\$421,645	\$521,527	\$653,240	(\$104,475)	(\$77,251)	(\$65,235)	(\$61,771)	

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THE DIFFERENCE BETWEEN SUGGESTED 9 TON AND PROPOSED 10 TON IS ABOUT \$45,000 PER MILE.

Proj. ADT 5 48' Si 72' Ros 4 Lane	5000 & Over urface adbed 9 9Ton		PRESENT		Proj. ADT 5 48' Su 72' Ro 4 Lane 1	000 & Over Irface adbed I0 Ton	PROPOSE	D 10 TON	48' Su 72' Roa	rface Idbed	DIFFER	ENCE
Soil	50	75	100	130	50	75	100	130	50	75	100	130
Class 4	\$50.647	\$118,431	\$206,297	\$334,546	\$0	\$0	\$0	\$0	(50,647)	(118,431)	(206,297)	(334,546)
Class 5	95,821	95,821	95,821	95,821	177,016	272,837	373,538	506,261	81,195	177,016	277,717	410,440
2331 Base.	115,764	115,764	115,764	115,764	64,821	64,821	64,821	64,821	(50,943)	(50,943)	(50,943)	(50,943)
2331 Surf.	0	0	0	0	0	0	0	0	0	0	0	0
2341 Surf	127,936	127,936	127,936	127,936	109,646	109,646	109,646	109,646	(18,290)	(18,290)	(18,290)	(18,290)
2361 Surf.	0	0	0	0	0	0	0	0	0	0	0	0
2221 Shidr	40,944	40,944	40,944	40,944	19,771	19,771	19,771	19,771	(21,173)	(21,173)	(21,173)	(21,173)
TOTAL	\$431,112	\$498,896	\$586,762	\$715,011	\$371,254	\$467,075	\$567,775	\$700,499	(\$59,858)	(\$31,821)	(\$18,987)	(\$14,512

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### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT URBAN ROADWAY AT 1996-97 UNIT PRICES from Urban Design Quantity Table figure #F 5-892.810 in State Aid Manual

Proj. AD 44 ft. 2 traffic	T 1-1999 wide c lanes		PRESENT	[	Proj. AD 42 ft. 2 traffic	T 1-1999 wide : lanes	PROPOS	ED 9 TON	Proj. AD 2 traffic	Г 1-1999 : Ianes	DIFFER	ENCE
∠ parkin Soil	g lanes				2 parkin	g lanes			2 parkin	g lanes		
Factor	50	75	100	130	50	75	100	130	50	76	400	400
Grading	\$47,970	\$55,134	\$67,158	\$71,994	\$41,700	\$50,898	\$57 840	\$69.492	(\$6.270)	(\$4,000)	100	130
Subbase	0	20,154	53,980	67.581	0	000,000	φ07,040 Ω	ψυ9, <del>4</del> 92 ΄ Ω	(\$0,270)	(\$4,235)	(\$9,318)	(\$2,502)
Grav. Base	35,898	35,898	35,898	35,898	25,972	60,599	86,571	129,853	(9,926)	(20,154) 24,701	(53,980) 50,673	(67,581) 93,955
2331 BIL	39,688	39,688	39,688	39,688	50,266	50,266	50,266	50,266	10,578	10.578	10.578	10,578
2341 DIL.	91,379	91,379	91,379	91,379	43,400	43,400	43,400	43,400	(47,979)	(47,979)	(47.979)	(47,979)
TOTAL	\$214.935	0 \$242.253	0 \$288.103	0 \$306 540	0 \$161 338	0 \$205 462	0 \$229.077	0	0	0	0	0
				4000,0401	Ψ101,330			\$293,011	(\$53,597)	(\$37,090)	(\$50,026)	(\$13.529)

Proj. ADT 2 44 ft. v 2 traffic 2 parkinj	.000-4999 wide lanes g lanes		PRESENT		Proj. ADT 2 44 ft. v 2 traffic 2 parkin	:000-4999 wide lanes g lanes	PROPOSI	ED 9 TON	Proj. ADT 2 44 ft. v 2 traffic 2 parking	000-4999 vide lanes g lanes	DIFFER	ENCE
Factor	50	75	100	130	50	75	100	130	50	75	400	400
Grading	\$49,164	\$56,334	\$68,364	\$73,206	\$53.097	\$60.333	\$70.038	\$79.806	\$3.033	<u> </u>	<u></u>	130
Subbase	0	20,154	53,980	67,581	0	0	0	φ/0,000 γ	ψ0,000	40,999 (20,154)	Φ1,0/4 (52,090)	\$0,000 (07,504
Gravel Base	35,898	35,898	35,898	35,898	63.271	90.390	126 542	162 700	27 272	(20,104)	(53,980)	100,000
2331 Bit.	52,910	52,910	52,910	52,910	52.910	52,910	52 910	52 910	21,313	54,492	90,644	126,802
2341 Bit.	91,379	91,379	91,379	91.379	45.690	45 690	45 690	45 600	(45 690)	(45,690)	U (45.000)	U
2361 Bit.	0	0	. 0	0		,0,000	-0,030 N	40,050 j	(40,009)	(45,689)	(45,689)	(45,689)
TOTAL	\$229,351	\$256,675	\$302,531	\$320,974	\$214,968	\$249,322	\$295,180	\$341.106	(\$14.383)	0 (\$7,353)	0 (\$7 351)	0 \$20 132

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### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT URBAN ROADWAY AT 1996-97 UNIT PRICES from Urban Design Quantity Table figure #F 5-892.810 in State Aid Manual

Proj. ADT 50 48 ft. 2 traffic 2 parking	000 & Over wide lanes Janes	PRESENT		Proj. ADT 5000 & Over 48 ft. wide 2 traffic lanes 2 parking lanes		SUGGESTI	ED 9 TON	Proj. ADT 50 48 ft. w 2 traffic 2 parking	000 & Over vide lanes g lanes	DIFFERENCE		
Soil			400	400	50		400	400	50	 	400	400
Factor	50	/5	100	130	50	/5	100	130	50		100	130
Grading	\$57,144	\$64,920	\$80,580	\$88,464	\$62,709	\$73,179	\$86,358	\$99,639	\$5,565	\$8,259	\$5,778	\$11,175
Subbase	0	21,827	65,800	87,942	0	0	0	ʻ 0	0	(21,827)	(65,800)	(87,942)
Gravel Base	38,955	38,955	38,955	38,955	88,226	127,435	176,446	225,463	49,271	88,480	137,491	186,508
2331 Bit.	72,775	72,775	72,775	72,775	58,200	58,200	58,200	58,200	(14,576)	(14,576)	(14,576)	(14,576)
2341 Bit.	100,512	100,512	100,512	100,512	50,268	50,268	50,268	50,268	(50,244)	(50,244)	(50,244)	(50,244)
2361 Bit.	42,742	42,742	42,742	42,742	0	0	0	0	(42,742)	(42,742)	(42,742)	(42,742)
TOTAL	\$312,128	\$341,731	\$401,364	\$431,390	\$259,403	\$309,081	\$371,271	\$433,570	(\$52,726)	(\$32,650)	(\$30,093)	\$2,180

THE DIFFERENCE BETWEEN SUGGESTED 9 TON AND PROPOSED 10 TON IS ABOUT \$36,000 PER MILE.

Proj. ADT 50 48 ft. 2 traffic 2 parking	000 & Over wide lanes g lanes	1	PRESENT		Proj. ADT 5000 & Over 48 ft. wide 2 traffic lanes 2 parking lanes		PROPOSEI	D 10 TON	Proj. ADT 50 48 ft. w 2 traffic 2 parking	00 & Over ide lanes lanes	DIFFERENCE	
Soil	50	76	400	420	50	76	400	420	50	75	400	420
Factor	50	/5	100	130	50	(5	100	130	50	/5	100	130
Grading	\$57,144	\$64,920	\$80,580	\$88,464	\$65,199	\$75,807	\$89,007	\$102,309	\$8,055	\$10,887	\$8,427	\$13,845
Subbase	0	21,827	65,800	87,942	0	0	0	0	· 0	(21,827)	(65,800)	(87,942)
Gravel Base	38,955	38,955	38,955	38,955	88,226	127,435	<sup>•</sup> 176,446	225,463	49,271	88,480	137,491	186,508
2331 Bit.	72,775	72,775	72,775	72,775	58,200	58,200	58,200	58,200	(14,576)	(14,576)	(14,576)	(14,576)
2341 Bit.	100,512	100,512	100,512	100,512	83,756	83,756	83,756	83,756	(16,756)	(16,756)	(16,756)	(16,756)
2361 Bit.	42,742	42,742	42,742	42,742	0	0	0	0	(42,742)	(42,742)	(42,742)	(42,742)
TOTAL	\$312,128	\$341,731	\$401,364	\$431,390	\$295,381	\$345,198	\$407,409	\$469,728	(\$16,747)	\$3,467	\$6,045	\$38,338

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### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT URBAN ROADWAY AT 1996-97 UNIT PRICES from Urban Design Quantity Table figure #F 5-892.810 in State Aid Manual

Proj. ADT 7 68 ft. v 4 traffic 2 parking	000-9999 wide lanes glanes	PRESENT		Proj. ADT 7 68 ft. 4 traffic 2 parking	Proj. ADT 7000-9999 68 ft. wide 4 traffic lanes 2 parking lanes		SUGGESTED 9 TON		Proj. ADT 7000-9999 68 ft. wide 4 traffic lanes 2 parking lanes		DIFFERENCE	
Soli Factor	50	75	100	130	50	76	400			<b>3</b> · · · · · · ·	L	
Grading	\$86,286	\$97.020	\$125,920	\$126,696	50	/5	100	130	50	75	100	130
Subbase	Ψ00,200 Λ	20,020	φ125,620	\$130,000	\$92,049	\$110,067	\$131,823	\$153,726	\$5,763	\$13,047	\$6,003	\$17.040
Crowel Base	07 707	30,202	111,263	141,851	0	0	0	0	0	(30,202)	(111.263)	(141 851)
Gravel Base	67,797	67,797	67,797	67,797	136,220	204,327	286,056	367.790	68,423	136 530	218 250	200,002
2331 Bit.	127,018	127,018	127,018	127,018	84,665	84,665	84 665	84 665	(12 353)	(42 252)	210,209	299,993
2341 Bit.	170,581	170,581	170.581	170.581	97 468	97 468	97 /69	07 469	(72,440)	(42,353)	(42,353)	(42,353)
2361 Bit.	62,156	62 156	62 156	62 156	0,,100	00+,10	57,10	97,400	(73,113)	(73,113)	(73,113)	(73,113)
ΤΟΤΑΙ	\$513,838	\$554 774	\$664 625	\$706,000	0 *440,400	U U	U	0	(62,156)	(62,156)	(62,156)	(62,156)
	4010,000	\$004,774	\$004,035	\$100,089	\$410,402	\$496,527	<u>\$600,012</u>	<b>\$703,649</b>	(\$103,436)	(\$58.247)	(\$64.623)	(\$2.440)

# THE DIFFERENCE BETWEEN SUGGESTED 9 TON AND PROPOSED 10 TON IS ABOUT \$52,000 PER MILE.

Proj. ADT 7 68 ft. v 4 traffic 2 parkine	000-9999 wide lanes glanes		PRESENT		Proj. ADT 7 68 ft. 4 traffic 2 parkin	/000-9999 wide : lanes g lanes	PROPOSE	D 10 TON	Proj. ADT 7 68 ft. w 4 traffic 2 parking	'000-9999 vide lanes lanes	DIFFER	
Factor	50	75	100	130	50	75	400	420				-
Grading	\$86,286	\$97.020	\$125,820	\$136 686	\$95.646	\$113.682	\$125 462	<u>130</u>	50	75		130
Subbase	0	30,202	111,263	141.851	φυσ,ο-το 0	ψ113,002 Λ	φ135,46∠ Λ	\$157,309	\$9,360	\$16,662	\$9,642	\$20,703
Gravel Base	67,797	67,797	67,797	67,797	136.220	204.327	286.056	367 790	68 423	(30,202)	(111,263)	(141,851)
2331 Bit.	127,018	127,018	127,018	127,018	84,665	84.665	84 665	84 665	(42 353)	(42 252)	218,239	299,993
2341 Bit.	170,581	170,581	170,581	170,581	146,202	146.202	146.202	146 202	(72,000)	(42,333)	(42,333)	(42,303)
2361 Bit.	62,156	62,156	62,156	62,156	0	0	0	0	(62 156)	(62 156)	(24,3/3)	(24,319)
TOTAL	\$513,838	\$554,774	\$664,635	\$706,089	\$462,733	\$548,876	\$652,385	\$756.046	(\$51,105)	(\$5,898)	(\$12,150)	(02,100) \$49 957

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#### COMPARISONS OF COST PER MILE OF A DEFICIENT SEGMENT URBAN ROADWAY AT 1996-97 UNIT PRICES from Urban Design Quantity Table figure #F 5-892.810 in State Aid Manual

Proj. ADT 100 72 ft. v 4 traffic 2 parking	000 & Over wide lanes g lanes		PRESENT		Proj. ADT 10000 & Over 72 ft. wide 4 traffic lanes 2 parking lanes		SUGGEST	ED 9 TON	Proj. ADT 10 72 ft. v 4 traffic 2 parkin	000 & Over wide : lanes g lanes	DIFFERENCE	
Soil Factor	50	75	100	130	50	75	100	130	50	75	100	130
Grading	\$102,399	\$113.757	\$140,397	\$159,552	\$97,134	\$119,940	\$142,893	\$169,857	(\$5,265)	\$6,183	\$2,496	\$10,305
Subbase	0	31,880	106,666	160,439	0	0	0	. 0	0	(31,880)	(106,666)	(160,439)
Gravel Base	100,248	100,248	100,248	100,248	172,627	258,943	345,253	445,954	72,379	158,695	245,005	345,706
2331 Bit.	179,928	179,928	179,928	179,928	89,954	89,954	89,954	89,954	(89,974)	(89,974)	(89,974)	(89,974)
2341 Bit.	181,248	181,248	181,248	181,248	103,557	103,557	103,557	103,557	(77,691)	(77,691)	(77,691)	(77,691)
2361 Bit.	66,039	66,039	66,039	66,039	0	.0	0	0	(66,039)	(66,039)	(66,039)	(66,039)
TOTAL	\$629,862	\$673,100	\$774,526	\$847,454	\$463,271	\$572,394	\$681,657	\$809,321	(\$166,591)	(\$100,706)	(\$92,869)	(\$38,133)

THE DIFFERENCE BETWEEN SUGGESTED 9 TON AND PROPOSED 10 TON IS ABOUT \$55,000 PER MILE.

Proj. ADT 100 72 ft. v 4 traffic 2 parking	0000 & Over wide c lanes PRESENT g lanes			Proj. ADT 10 72 ft. v 4 traffic 2 parking	000 & Over wide lanes g lanes	PROPOSED	10 TON	Proj. ADT 10 72 ft. w 4 traffic 2 parking	000 & Over /ide lanes g lanes	DIFFERENCE		
Soil Factor	50	75	100	130	50	75	100	130	50	75	100	130
Grading	\$102.399	\$113,757	\$140,397	\$159,552	\$100,926	\$123,756	\$146,733	\$173,727	(\$1,473)	\$9,999	\$6,336	\$14,175
Subbase	0	31,880	106,666	160,439	0	0	0	0	0	(31,880)	(106,666)	(160,439)
Gravel Base	100,248	100,248	100,248	100,248	172,627	258,943	• 345,253	445,954	72,379	158,695	245,005	345,706
2331 Bit.	179,928	179,928	179,928	179,928	89,954	89,954	89,954	89,954	(89,974)	(89,974)	(89,974)	(89,974)
2341 Bit.	181,248	181,248	181,248	181,248	155,335	155,335	155,335	155,335	(25,913)	(25,913)	(25,913)	(25,913)
2361 Bit.	66,039	66,039	66,039	66,039	0	0	0	0	(66,039)	(66,039)	(66,039)	(66,039)
TOTAL	\$629,862	\$673,100	\$774,526	\$847,454	\$518,842	\$627,988	\$737,275	\$864,970	(\$111,020)	(\$45,112)	(\$37,251)	\$17,516

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# Item by Item Needs Comparison Affect of Needs Study Subcommittee Recommendations

	Construction	Current	
ltem	Needs From	Construction	Difference
	GE Study	Needs	
Complete Grading	\$119,737,699	\$115,208,375	\$4,529,324
Grade Widening	2,000,486	1,922,906	77,580
Total Grading Needs	\$428,582,557	\$423,975,653	\$4,606,904
		•	
Complete Subbase	0	77,722,888	(77,722,888)
Subbase Widening	0	1,081,647	(1,081,647)
Complete Base	217,097,347	65,589,891	151,507,456
Base Widening	3,131,096	944,498	2,186,598
Complete Bit. Base	84,745,079	100,024,101	(15,279,022)
Bit. Base Widening	1,182,330	1,448,931	(266,601)
Total Base Needs	\$306,168,866	\$246,824,970	\$59,343,896
Initial Dit. Curfage			
	103,898,669	212,623,300	(108,724,631)
Bit. Surface Widening	1,511,486	2,687,875	(1,176,389)
Bit. Additional Surface	51,202,631	51,212,721	(10,090)
I otal Surface Needs	\$156,612,786	\$266,523,896	(\$109,911,110)
Complete Shoulder	954 592	803.540	61.052
Reshoulder	240 385	220 042	20,102
Total Shoulder Needs	\$1 194 977	¢1 112 592	20,342
	¥1,104,077	Ψ1,113,303	<b>ФО1,3</b> 54
Total Roadway Needs	\$1,280,709,451	\$1,326,588,367	(\$45,878,916)
Engineering	\$263,840,797	\$272,308,389	(\$8,467,592)
Total Apportionment Need	\$1,663,836,135	\$1,722,973,258	(\$59,137,123)

## Current (1997) and GE Study Allotment Comparison 9 & 10 Ton Design used for GE Study Apportionmnet

	GE Study		1997		Difference	
	Construction	%	Construction	%	Between	Percent of
	Needs	Of	Needs	Of	Current and	Increase
	Apportion-	Total	Apportion-	Total	GE Study	or
Municipality	ment	Dist.	ment	Dist.	Allotments	(Decrease)
Albert Lea	\$249,850	0.5525	\$251,240	0.5546	(\$1,390)	(0.5533)
Alexandria	214,730	0.4753	214,610	0.4737	120	0.0559
Andover	413,918	0.9255	413,440	0.9126	478	0.1156
Anoka	142,519	0.3204	147,155	0.3248	(4,636)	(3.1504)
Apple Valley	433,784	0.9603	432.872	0.9555	<b>912</b>	0.2107 <sup>´</sup>
, the second	,		· · <b>, ·</b> ·			
Arden Hills	83,461	0.1877	81,644	0.1802	1,817	2.2255
Austin	419,963	0.9358	416,476	0.9193	3,487	0.8373
Bemidii	215,495	0.4735	216,404	0.4777	(909)	(0.4200)
Blaine	458 710	1.0100	473,751	1.0457	(15.041)	(3.1749)
Bloomington	1 588 905	3 4270	1 708 853	3 7720	(119,948)	(7.0192)
Bioonington	1,000,000	0.1270	1,700,000		(,,	(,
Brainerd	140.681	0.3103	143.496	0.3167	(2.815)	(1.9617)
Brooklyn Center	460 644	1 0066	479,164	1.0577	(18,520)	(3.8651)
Brooklyn Park	518 900	1 1342	537 340	1.1861	(18,440)	(3.4317)
Buffalo	170 147	0.3782	171 018	0 3775	. (871)	(0.5093)
Burnsville	611.061	1 3477	612 035	1 3510	(974)	(0.1591)
Barnsvinc	011,001	1.0177	012,000		()	(01.000.)
Cambridge	111.200	0.2493	110.202	0.2432	998	0.9056
Champlin	123,618	0.2767	123,552	0.2727	66	0.0534
Chanhassen	345,818	0.7617	346,881	0.7657	(1.063)	(0.3064)
Chaska	271,220	0.6012	269,762	0.5954	1.458	0.5405
Chisholm	95,996	0.2158	92,472	0.2041	3.524	3.8109
	,		,		<b>,</b> –	
Cloquet	326,869	0.7324	325,278	0.7180	1,591	0.4891
Columbia Heights	169,756	0.3724	174,437	0.3850	(4,681)	(2.6835)
Coon Rapids	425,915	0.9385	441,801	0.9752	(15,886)	(3.5957)
Corcoran	146,760	0.3282	131,367	0.2900	15,393	11.7176
Cottage Grove	441,236	0.9790	442,127	0.9759	(891)	(0.2015)
5						
Crookston	335,347	0.7534	323,612	0.7143	11,735	3.6263
Crystal	406,321	0.9108	\$399,059	0.8808	7,262	1.8198
Detroit Lakes	95,904	0.2137	95,407	0.2106	497	0.5209
Duluth	1,919,049	4.2474	1,844,472	4.0713	74,577	4.0433
Eagan	540,872	1.1897	542,978	1.1985	(2,106)	(0.3879)
-						
East Bethel	199,963	0.4502	198,333	0.4378	1,630	0.8219
East Grand Forks	131,155	0.2933	126,882	0.2801	4,273	3.3677
Eden Prairie	624,304	1.3701	629,452	1.3894	(5,148)	(0.8179)
Edina	527,482	1.1436	541,623	1.1955	(14,141)	(2.6109)
Elk River	355,100	0.7944	348,178	0.7685	6,922	1.9881
Fairmont	476,150	1.0548	459,924	1.0152	16,226	3.5280
Falcon Heights	6,886	0.0155	6,708	0.0148	178	2.6535
Faribault	389,340	0.8593	391,007	0.8631	(1,667)	(0.4263)
Farmington	230,091	0.5140	228,191	0.5037	1,900	0.8326
Fergus Falls	342,573	0.7612	339,736	0.7499	2,837	0.8351

	GE Study		1997		Difference	
	Construction	%	Construction	%	Between	Percent of
	Needs	Of	Needs	∕∿ Of	Current and	
	Annortion-	Total	Apportion	Total		increase
Municipality	ment	Diet	Apportion-	Diet	GE Study	Or (David )
Forest Lake	\$100 761	0.2460			Allotments	(Decrease)
Fridlov	φ109,701 202.054	0.2460	\$105,917	0.2338	\$3,844	3.6293
Clanada	203,051	0.4506	212,018	0.4680	(8,967)	(4.2294)
	134,634	0.2995	135,832	0.2998	(1,198)	(0.8820)
Golden valley	366,743	0.8129	362,126	0.7993	4,617	1.2750
Grand Rapids	160,467	0.3543	164,271	0.3626	(3,804)	(2.3157)
	040.005			_		
	216,035	0.4868	221,027	0.4879	(4,992)	(2.2585)
Hastings	154,433	0.3416	155,883	0.3441	(1,450)	(0.9302)
Hermantown	121,470	0.2675	118,165	0.2608	3,305	2.7969
Hibbing	622,090	1.3881	581,584	1.2837	40,506	6.9648
Hopkins	171,539	0.3722	175,488	0.3874	(3,949)	(2.2503)
						· · · ·
Hugo	214,340	0.4809	203,719	0.4497	10,621	5.2136
Hutchinson	238,150	0.5306	236,897	0.5229	1.253	0.5289
International Falls	115,953	0.2600	112,585	0.2485	3.368	2,9915
Inver Grove Heights	394,559	0.8792	393,477	0.8685	1.082	0 2750
Lake Elmo	70,961	0.1575	67.941	0.1500	3.020	4 4450
	•			0.1000	0,020	4.4400
Lakeville	764,161	1.6914	761.214	1 6802	2 947	0 3871
Lino Lakes	242,941	0.5456	238 625	0.5267	4 316	1 8087
Litchfield	127,358	0.2865	128 544	0.0207	(1 186)	(0.9226)
Little Canada	124 449	0.2788	123,883	0.2007	(1,100)	(0.9220)
Little Falls	191 315	0.2768	101 612	0.2734	(207)	0.4509
		0.1200	101,012	0.4229	(297)	(0.1550)
Mahtomedi	49,747	0.1108	\$48.034	0.1060	1,713	3 5662
Mankato	621.325	1.3613	625,325	1 3803	(4 000)	(0.6307)
Maple Grove	672,570	1 4759	647 001	1 4281	25 569	(0.0597)
Maplewood	293 261	0.6425	200 406	0,6600	25,505 (C 14E)	(2.0524)
Marshall	148 370	0.0420	146 852	0.0009	(0,145)	(2.0524)
	140,010	0.3270	140,032	0.3241	1,510	1.0337
Mendota Heights	152,346	0 3417	152 078	0 3357	268	0 1762
Minneapolis	5.371.454	11 8202	5 399 641	11 0187	(28 187)	(0.5220)
Minnetonka	653 949	1 4539	655 717	1 4474	(20,107)	(0.3220)
Montevideo	93 171	0 2083	03 121	0.2062	(1,700)	(0.2090)
Monticello	83 593	0.2000	84 222	0.2002	(253)	(0.2708)
	00,000	0.1000	04,200	0.1059	(040)	(0.7596)
Moorhead	534,478	1,1743	520 450	1 1488	14 028	2 6054
Morris	65,841	0 1480	63 505	0 1402	2 3 3 6	2.0304
Mound	85,859	0 1915	86,603	0.1402	(744)	(0.9501)
Mounds View	133,380	0.2967	133 365	0.1912	(144)	(0.0591)
New Brighton	190,560	0.2307	190 115	0.2944	15	0.0112
	100,001	0.4227	109,115	0.4174	1,440	0.7646
New Hope	252.610	0 5475	256 784	0 5668	(4 174)	(1 6255)
New Ulm	193.677	0 4320	191 778	0.0000	1 800	(1.0200)
North Branch	207 522	0 4667	200 086	0.4200	1,033 7 Age	0.9902
North Mankato	175 610	0.7007	172 040	0.441/	1,430	3./164
North St. Paul	162 414	0.0002	164 042	0.3040	1,062	0.9555
	102,414	0.0070	104,943	0.3641	(2,529)	(1.5333)
Northfield	168 320	0 3754	167 874	0 3705	AAC	0 9657
Oak Grove	186 755	0.0704	157 624	0.3703	440 24 4 04	0.2007
Oakdale	258 128	0.7172	254 020	0.3309	34,124	22.3072
Orono	200,120	0.0721	204,020	0.0007	4,108	1.61/2
Olono Oteano	201,201	0.5188	221,813	0.5030	3,378	1.4824
- wego	202,403	0.4542	201,043	0.4438	1,360	0.6765

			1007		Difference	
	GE Study Constantion	6	1997 Constantion	/0	Dotuce	Dorocat of
	Construction	° (		° (	Detweell	
	Needs	5	Needs	5		Increase
Municipality	Apportion-	l otal Dict	Apportion-		GE Study Allotmonte	Or (Decreted)
Owatonna	\$316 802	0 7079	\$313.312	0.6916	\$3.490	1.1139
Plymouth	673.548	1.4787	677.733	1.4960	(4,185)	(0.6175)
Prior Lake	240,129	0.5392	241,481	0.5330	(1,352)	(0.5599)
Ramsey	300,769	0.6712	294,001	0.6490	6,768	2.3020
Red Wing	434,922	0.9609	436,157	0.9627	(1,235)	(0.2832)
Redwood Falls	129.103	0.2903	124.342	0.2745	4.761	3.8290
Richfield	410.259	0.9031	424.906	0.9379	(14.647)	(3.4471)
Robbinsdale	134.583	0.2924	135,353	0.2988	(170)	(0.5689)
Rochester	1.046.215	2.2861	1.058.345	2.3361	(12.130)	(1.1461)
Rosemount	337,267	0.7496	\$341,192	0.7531	(3,925)	(1.1504)
Docovillo	712 111		130 711	0 0706	A ENE	1 0475
		0.33253	1001	0.0100	1000	(0120)
St. Antnony	19,319	CC/1.0	19,459	0.1/04	(140)	(0.1/02)
St. Cloud	845,463	1.8484	847,342	1.8/03	(1,8/9)	(0.2218)
St. Louis Park	409,531	0.8998	413,182	0.9120	(3,651)	(0.8836)
St. Michael	219,233	0.4866	201,143	0.4440	18,090	8.9936
St. Paul	3.869.200	8.4771	3.892.118	8.5911	(22.918)	(0.5888)
St. Peter	164,081	0.3628	164,694	0.3635	(613)	(0.3722)
Sartell	120.341	0.2670	121,953	0.2692	(1.612)	(1.3218)
Sauk Ranids	115.096	0.2523	116.323	0.2568	(1.227)	(1.0548)
Savage	316,002	0.6910	320,829	0.7082	(4,827)	(1.5045)
)						
Shakopee	276,759	0.6085	272,181	0.6008	4,578	1.6820
Shoreview	110,832	0.2494	109,580	0.2419	1,252	1.1425
Shorewood	126,207	0.2806	127,388	0.2812	(1,181)	(0.9271)
South St. Paul	151,807	0.3333	155,505	0.3432	(3,698)	(2.3781)
Spring Lake Park	39,037	0.0860	39,212	0.0866	(175)	(0.4463)
Stillwater	154 280	0 3412	154 130	0 3402	150	0.0973
Thief River Falls	200 015	0.6652	288.418	0.6366	10 597	3 6742
Vadnais Heinhts	48 949	0 1097	48.321	0.1067	628	1.2996
Virginia	182.379	0.4004	175,629	0.3877	6.750	3.8433
Waite Park	112,173	0.2445	113,562	0.2507	(1,389)	(1.2231)
Waseca	84,369	0.1895	83,730	0.1848	639	0.7632
West St. Paul	146,490	0.3212	146,977	0.3244	(487)	(0.3313)
White Bear Lake	293,935	0.6525	294,201	0.6494	(266)	(0.0904)
Willmar	307,166	0.6830	305,412	0.6741	1,754	0.5743
Winona	295,395	0.6426	309,934	0.6841	(14,539)	(4.6910)
Woodburg	010 016	1 0501	015 006	1 OCE 1		(0 2462)
Woubury Worthington	043,013	1.0304	131 705	1.0004 7007 0	(258)	(0.2402) (0.2718)
STATE TOTAL	\$45,304,033	100.0000	\$45.304.033	100.0000	0	0.5887

- 59 -

	NOTES	
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## BRIDGES

# IS THERE A DISPARITY BETWEEN EXISTING AND NON-EXISTING BRIDGES?

## Existing bridges

1. Receive complete needs for 35 years. Funding source not considered. Frequently funded with other than State Aid funds.

2. Prices adjusted annually with the unit price study.

3. Receive an additional 18% engineering for total needs cost. In 35 years, engineering can add 6.3 times more needs or allocation (not considering price adjustments).

4. Receives allocation before construction.

## Non - Existing bridges

- 1. Receive "after the fact needs" for State Aid costs for 15 years.
- 2. Receives additional allocation for the needs after construction.
- 3. No annual price adjustment. Value is lost in future allocations.
- 4. No engineering applied against needs.
DEPARTMENT OF PUBLIC WORKS 203 City Hall 350 South 5th Street Minneapolis MN 55415-1390

(612) 673-2352 Fax (612) 673-3565

DAVID J. SONNENBERG CITY ENGINEER - DIRECTOR OF PUBLIC WORKS

BRIAN J. LOKKESMOE ASSISTANT DIRECTOR OF PUBLIC WORKS/DIRECTOR ENGINEERING OPERATIONS 203 CITY HALL 673-3316 FAX 673-3565

MICHAEL J. MONAHAN ASSISTANT DIRECTOR OF PUBLIC WORKS/DIRECTOR TRANSPORATION 233 CITY HALL 673-2411 FAX 673-2149

J.E. EDMUNDS, DIRECTOR EQUIPMENT SERVICES 1300 CURRIE AVE, MINNEAPOLIS, MN 55403 673-5737 FAX 348-9380

J.M. GARBER, DIRECTOR ADMINISTRATION 203 CITY HALL 673-2410 FAX 673-3565

J.F. HAYEK, DIRECTOR WATER WORKS 250 S. 4TH ST. #206 MINNEAPOLIS. MN 55415 673-2418 FAX 673-2555

R. KANNANKUTTY, DIRECTOR ENGINEERING DESIGN 309 2ND AVE. S. #300 MINNEAPOLIS, MN 55401 673-2455 FAX 673-2048

A.E. MADISON, MANAGER FINANCE 219 CITY HALL 673-2437 FAX 673-3565

R.L. PLETAN, DIRECTOR GENERAL SERVICES 223 CITY HALL 673-2706 FAX 673-3565

R.M. SMITH. DIRECTOR MANAGEMENT SUPPORT 203 CITY HALL 673-2241 FAX 673-3565

S.A. YOUNG. DIRECTOR SOLID WASTE & RECYCLING 309 2ND AVE. S. #210 MINNEAPOLIS. MN 55401 673-2433 FAX 673-2250 Mr. Brian Bachmeier, P.E. Chair - Municipal Screening Board City of Oakdale Engineer 1584 Hadley Ave. N. Oakdale, MN 55128

Mr. Ken Straus Manager, Municipal State Aid Needs 420 Transportation Bldg. 395 John Ireland Blvd. St. Paul, MN 55155-1899

Re: County Highways reverted or turned back to the jurisdiction of a urban municipality

Dear Mr. Bachmeier: Mr. Straus:

A difference of opinion exists between the City of Minneapolis and the State Aid Division whether the date of Commissioner's Order or the date the City of Minneapolis entering into agreement with Hennepin County determines if the City should be eligible for additional MSA mileage, in excess of 20% of its total length of city streets, due to County State Aid Highway Turnback.

State Aid Operations Rule Section 8820.0600, subpart b, states:

"B. a municipal state-aid street system not exceeding 20 percent of the total length of city streets and county roads within the jurisdiction of an urban municipality plus the length of all trunk highways reverted or turned back to the



minneapolis

May 16, 1997

city of lakes

County Highway Turnback May 16, 1997 Page 2

jurisdiction of the urban municipality pursuant to law on and after July 1, 1965, plus the length of county highways reverted or turned back to the jurisdiction of the urban municipality pursuant to law on or <u>after May 11, 1994</u>."

The City of Minneapolis and the County of Hennepin entered into an "Agreement for Transfer of Roads" on December 12, 1993, with Section V stating:

"Transfer of the roadways herinbefore identified in Section I shall occur and become affective on the first day of the month immediately following the approval of CSAH designation changes by the Commissioner of the Minnesota Department of Transportation as herinbefore set forth in Section II."

The Commissioner of Transportation Order, No. 80347, designating Hennepin County's changes was signed on September 19th 1994.

The date of the Commissioner's Order, in the opinion of the City of Minneapolis, would make the route transfer "official" after the May 11, 1994 date in the rules therefore making any excess CSAH miles eligible for County State Aid Highway Turnback.

In a letter from Patrick Murphy addressing this issue he suggests that if Minneapolis wants to pursue this issue further that we ask to have it place on the agenda of the Screening Board, therefore;

The City of Minneapolis therefore requests that this item be placed on the agenda of the spring Municipal State Aid Screening Board.

Sincerely

Ramankutty Kannankuty Director, Engineering Design City of Minneapolis, Department of Public Works



**State Aid for Local Transportation Division** Mail Stop 500 395 John Ireland Boulevard St. Paul, MN 55155

Office tel: 612/296-3011 Fax: 612/282-2727

April 14, 1997

Rammankutty Kannankutty Minneapolis City Engineer 309 2nd Ave. South Minneapolis, MN 55415

Dear Mr. Kannankutty:

Re: Hennepin County and Minneapolis Road Transfer

Apparently a difference of opinion exists between the City of Minneapolis and the State Aid Division whether the Commisioner's Order or the approval of the jurisdictional exchange with Hennepin County determines if the City should receive additional mileage. The State Aid Division is not considering the additional mileage that the city received from Hennepin County as CSAH Turnback mileage and above the 20% allowable on the basis that all stipulations of the Agreement between the County and City transpired prior to the State Statute effective date of May 11, 1994. This includes a signed Agreement, State Aid Approvals, County and City Resolutions. Article XII of the agreement states that before the agreement shall become binding and effective, it shall be approved by resolution of the County Board and City Council and <u>approved</u> by the Commissioner of Transportation. The State Aid Division gave approval for the transfer of roadways prior to May 11, 1994 and both the County and City passed resolutions based on that approval prior to May 11, 1994.

\* The agreement between both parties was signed December 12, 1993.

\* The State Aid Division staff met with Minneapolis staff on several occasions regarding designation requirements prior to passing resolutions. Verbal approval were given from the State Aid Division prior to Hennepin County and the City of Minneapolis passing Resolutions. Past practice was to give verbal approval.

\* The City of Minneapolis passed a resolution designating and revoking the MSA routes received from Hennepin County on March 17, 1994.

\* The Hennepin County Resolution was passed December 15, 1993 designating the mileage received from Minneapolis and a concurrance resolution of the designation and revocation by the City of Minneapolis on March 17, 1994.

\* The Commissioner's Order which makes the designations and revocations official was signed on September 13, 1994 after the effective date of the Statute and after all items were in order.

The following items prevented the order from being written in a timely manner.

\* A request from Minneapolis to the June Screening Board for one-way mileage to be considered as one-half so that additional routes could be designated.

\* Allow the City of Minneapolis additional time to remeasured their street system from the GIS aerial topography.

\* The problem with designating parkways.

\* An additional resolution was passed on August 11, 1994 for the additional mileage to be added to the MSA system. Some were suggested by the State Aid Office with the initial request in order for the city to have an integrated system.

\* A resolution was necessary from the City of St. Anthony to concur with the designation of Stinson Blvd. (CSAH 27) which was not passed until September 13, 1994.

State Aid can not approve the additional mileage as CSAH Turnback mileage when we believe that all facets of the agreement were met prior to May 11, 1994. The agreement did state <u>approved by the Commissioner</u> which necessarily does not mean that the Commissioner's Order had to be written for the transfer to take place. When the transfer was in progress, none of this mileage was mentioned to be considered as CSAH Turnback mileage and additional mileage to the City. If you would like to pursue this further, feel free to ask Ken Straus to put this on the agenda of the Screening Board.

Sincerely,

7. Genzing

Patrick B. Murphy State Aid Engineer

DEPARTMENT OF PUBLIC WORKS 203 City Hall 350 South 5th Street Minneapolis MN 55415-1390

(612) 673-2352 Fax (612) 673-3565

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BL PLETAN, DIRECTOR GENERAL SERVICES 220 CITY HALL 873-2706 FAX 873-3565

F M. SMITH, DIRECTOR MANAGEMENT SUPPORT 203 CITY HALL 673-2241 FAX 673-3565

2 A YOUNG DIRECTOR SOLID WASTE & RECYCLING 3.9 2ND AVE, S. #210 MINNEAPOLIS, MN 55401 673/2433 FAX 673-2250 Mr. Herbert Reimer, P.E. Chair - MSA Needs Study Subcommittee City of Moorhead Box 779 Moorhead, MN 56560

Mr. Ken Saffert, P.E. MSA Needs Study Subcommittee City of Mankato 202 East Jackson St. P. O. Box 3368 Mankato, MN 56002-3368

Mr Curt Kreklau, P.E. MSA Needs Study Subcommittee Buffalo City Hall 212 Central Avenue Buffalo, MN 55313

Re: Request for approval of One Way Streets as half mileage in Needs Study

Dear Subcommittee Members:

Municipal State Aid Screening Resolution - June 1983 (Revised Oct. 1984, Oct. 1993, June 1994) states: "That any one-way street added to the Municipal State Street system must be reviewed by the Needs Study Sub-Committee, and approved by the Screening Board before any one-way street can be treated as one-half mileage in the Needs Study."



minneapolis

May 15, 1997

city of lakes

MSA Needs Study Subcommittee May 15, 1997 Page 2

The City of Minneapolis submits to your Committee the attached map and list of existing MSA Route Segments within the City of Minneapolis to be treated as one-half mileage in the Needs Study.

Therefore; The City of Minneapolis requests review and favorable recommendation from your committee and the approval of the Municipal State Aid Screening Committee for the route segments shown on the attached map and described on the attached list.

If your committee has any questions, or if we can provide any further information, please contact me at (612) 673-2456

Thank you for your consideration.

Sincerely

Ramankutty Kannankuty Director, Engineering Design City of Minneapolis, Department of Public Works

RK:DS

cc: Greg Coughlin, Metro Division Assistant State Aid Engineer Ken Straus, Manager, Municipal State Aid Needs



# City of Minneapolis Department of Public Works Proposed One-Way Pairs on MSA Routes 5/23/97

	MSA								
	Route				Stree	et Width		Length	Lane
No.	Number	Street	From	То	Feet Meters		ADT's	(Miles)	Configuration
						·			
1	340	3rd Street South/North	11th Avenue South	3rd Avenue South	50 to 56	15.25 to 17.08	10,725	0.66	P-T-T-T-P
2	341	4th Street South/North	11th Avenue South	3rd Avenue South	52 to 62	15.06 to 18.91	10,350	0.66	P-T-T-T-P
3	218	5th Street South/North	11th Avenue South	2nd Avenue North	50 to 56 ft.	15.25 to 17.08	9,980	1.17	P-T-T-T-P
4	219	6th Street South/North	11th Avenue South	2nd Avenue North	46 to 56 ft.	14.03 to 17.08	11,650	1.17	P-T-T-T-P
5	434	8th Street South/North	5th Avenue South	1st Avenue North	34 to 56 ft.	10.37 to 17.08	12,000	0.64	`P-T-T-T-P
6	222	9th Street South/North	5th Avenue South	1st Avenue North	56 ft.	17.08	10,070	0.64	P-T-T-T-P
							· · · · ·		
7	224	11th Street South	4th Avenue South	Hennepin Avenue South	46 to 56 ft.	14.03 to 17.08	11,692	0.55	P-T-T-T-P
8	225	12th Street South	4th Avenue South	Hennepin Avenue South	48 to 56 ft.	14.64 to 17.08	8,536	0.55	P-T-T-T-P
	1								
9	189	Marquette Avenue	12th Street South	Washington Avenue South	50 to 56 ft.	15.25 to 17.08	8,342	0.78	P-T-T-T-B
10	210	2nd Avenue South	12th Street South	Washington Avenue South	56 ft.	17.08	7,932	0.78	P-T-T-T-B
						·			
11	222	9th Street South	Chicago Avenue South	5th Avenue South	56 ft.	17.08	5,015	0.23	P-T-T-T-P
12	223	10th Street South	Chicago Avenue South	5th Avenue South	50 to 56 ft.	15.25 to 17.08	3,740	0.23	P-T-T-T-P
		· ·							
				Total Mileage				8.06	

Note: Lane Configuration P = Parking Lane, T = Traffic Lane, and B = Bus Lane

#### **RESOLUTION:**

One Way Street Mileage - June 1983 (Revised Oct. 1984, Oct. 1993, June 1994)

That any one-way streets added to the Municipal State Aid Street system must be reviewed by the Needs Study Sub-Committee, and approved by the Screening Board before any one-way street can be treated as one-half mileage in the Needs Study.

Treat all one-way streets between 26 feet and 49 feet wide as one-half of the mileage as outlined in Rule 8820.9940 and allow complete needs, except that no more than one parking lane will be eligible to accrue needs. When Trunk Highway or County Highway Turnback is used as part of a one way pair, mileage for certification shall only be included as trunk Highway or County Turnback mileage and not as provided for in the preceding paragraph.

# STATE AID RULE - CHAPTER 8820.0600:

For an undivided, one-way street with a minimum width of 7.8 meters and with no parking lane or with a maximum width of 14.7 meters with parking available on one side of the street, the chargeable length allowed for municipal state-aid street length purposes is one-half of the length of the one-way street.

7.8 meters = 25.59 feet14.7 meters = 48.23 feet

# AVERAGE ROADWAY WIDTH ON PROPOSED SEGMENTS INCLUDES NON-EXISTING MILEAGE

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URBAN	1	2		NON-U	JRBAN	
		Length of	Proposed		Length of	Proposed
	Proposed	Urban	Average	Proposed	Non-Urban	Average
	Urban	Segments	Urban	Non-Urban	Segments	Non-Urban
MUNICIPALITY	Width Miles	includes	Roadway	Width Miles	includes	Roadway
· .		non-existing	Width		non-existing	Width
ALBERT LEA	741.32	17.11	43.33	55.44	1.54	36.00
ALEXANDRIA	570.80	13.03	43.81	42.25	0.65	65.00
ANDOVER	950.60	28.02	33.93	244.24	5.97	40.91
ΑΝΟΚΑ	533.60	11.98	44.54			
APPLE VALLEY	1,571.86	31.25	50.30			
ARDEN HILLS	268.76	6.57	40.91			
AUSTIN	1,180.48	26.73	44.16			
BEMIDJI	658.59	14.35	45.89			
BLAINE	1,368.20	29.81	45.90	109.02	2.97	36.71
BLOOMINGTON	4 <u>,</u> 526.58	73.73	61.39			
BRAINERD	665.04	14.25	46.67			11 A.
BROOKLYN CENTER	1,003.66	21.67	46.32			
BROOKLYN PARK	1,999.76	44.96	44.48	1,4.80	0.37	40.00
BUFFALO	390.50	9.00	43.39			
BURNSVILLE	2,183.42	43.69	49.98			
CAMBRIDGE	247.96	5.80	42.75			-
CHAMPLIN	624.40	15.22	41.02			
CHANHASSEN	968.68	21.53	44.99			
CHASKA	600.22	13.26	45.27	30.42	0.39	78.00
CHISHOLM	286.73	7.35	39.01	9.90	0.33	30.00
CLOQUET	723.42	17.21	42.03	99.48	2.57	38.71
COLUMBIA HEIGHTS	582.00	12.53	46.45	-		
COON RAPIDS	1,791.68	37.50	47.78	7.48	0.17	44.00
CORCORAN	42.80	1.07	40.00	422.16	13.11	32.20
COTTAGE GROVE	<b>1,272.42</b>	26.16	48.64	126.40	3.16	40.00
CROOKSTON	484.75	11.12	43.59			
CRYSTAL	789.32	17.88	44.15			
DETROIT LAKES	411.84	9.48	43.44	2.16	0.06	36.00
DULUTH	3,916.99	90.16	43.44	592.68	15.76	37.61
EAGAN	2,253.98	44.31	50.87			
EAST BETHEL	391.04	11.40	34.30	468.38	13.24	35.38
EAST GRAND FORKS	521.18	11.82	44.09			
EDEN PRAIRIE	1,962.38	42.76	45.89			
EDINA	1,682.05	39.36	42.74			
ELK RIVER	859.72	20.16	42.64	170.86	4.42	38.66
FAIRMONT	896.90	19.38	46.28			
FALCON HEIGHTS	92.06	2.54	36.24			
FARIBAULT	980.02	21.40	45.80			
FARMINGTON	434.83	10.04	43.31	26.84	0.61	44.00
FERGUS FALLS	910.95	19.51	46.69	135.14	2.35	57.51

URBAN				NON-		
		Length of	Proposed		Length of	Proposed
	Proposed	Urban	Average	Proposed	Non-Urban	Ауегаде
1	Urban	Seaments	Urban	Non-Urban	Segments	Non-Urban
MUNICIPALITY	Width Miles	includes	Roadway	Width Miles	includes	Roadway
		non-existing	Width		non-evisting	Width
FOREST LAKE	220.22	5.53	39.82		non-existing	width
FRIDLEY	1.089.52	25.26	43 13	4 00	0.08	50.00
GLENCOE	312.06	6 94	40.10	7.00	0.06	50.00
GOLDEN VALLEY	1 000 06	23 55	42.57	·		
GRAND RAPIDS	498 14	11 03	42.47	22.44	0.22	
	400.14	11.00	45.10	22.44	0.33	08.00
	675.63	20.56	32.86	85.12	2 20	27 47
HASTINGS	650.40	16.07	20.00	22.00	2.29	37.17
HERMANTOWN	433.24	11 51	27 64	E2.00	0.55	40.00
HIBBING	1 175 06	11.01	37.04	52.24	1.48	35.30
HOPKINS	1,175.90	27.42	42.09	/84.48	23.32	33.64
	441.09	9.41	46.96			
Нидо	226.29	F 27	44.00	214.00		
HUTCHINSON	£30.20 642.20	0.37 14 70	44.00	314.88	9.84	32.00
INTERNATIONAL FALLS	252.02	14.73	43.07			
INVER GROVE HEICHTE	353.28	8.06	43.83			
LAKE ELMO	1,099.88	24.66	44.60			
LARE ELIVIO	102.78	2.73	37.65	245.12	6.80	36.05
	1 004 10					
	1,804.10	40.44	46.10	49.60	1.24	40.00
	570.68	12.93	44.14	90.88	2.64	34.42
	338.40	8.06	41.99			
	256.36	6.77	37.87			
LITTLE FALLS	624.42	13.71	45.54			
MAHTOMEDI	103 10	2 00	24 60		4 5 7	
MANKATO	1 539 74	2.30	34.60	50.52	1.57	36.00
MAPLE GROVE	1,330.74	31.07	46.59	007.00		
MAPLEWOOD	1,775.20	30.24	48.98	237.80	5.11	46.54
MARSHALL	912.35	19.01	47.99			
	002.54	12.73	47.33			
MENDOTA HEIGHTS	567 97	13 51	42 04			
MINNEAPOLIS	9 035 50	104 76	42.04			
MINNETONKA	1 024 70	194.70	40.39			
MONTEVIDEO	221 22	49.94	38.74			
MONTICEUO	331.22	8.08	40.99			
	272.94	5.99	45.57			
MOORHEAD	1 369 48	20 10	49.00			1
MORRIS	275 14	20.10	40.00			
MOUND	270.14	0.00	41.31			
MOLINDS VIEW	313.52	8.05	38.95			-
	594.53	9.82	40.18			
	544.70	12.98	41.97	47.60	1.19	40.00
NEW HOPE	576.08	12 70	45.20			
	654 94	12.70	45.30			
NORTH BRANCH	265 04	14.15	40.29	004.00		
NORTH MANKATO	203.84	0.29	42.26	301.92	9.35	32.29
NORTH ST DALL	5/1.81	11.86	48.21			
SOUL SI FAUL	408.36	10.68	43.85			
	182 02	11 05				
OAK GROVE	403.UZ	11.25	42.94	<b></b>		
		0.50	32.00	641.16	18.51	34.64
	059.04	16.31	40.41	21.32	0.41	52.00
	415.91	10.95	37.98	65.40	1.63	40.12
UISEGU	390.48	8.92	43.78	161.08	4.16	38.72

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URBAN				NON-U	JRBAN	
	······································	Length of	Proposed		Length of	Proposed
	Proposed	Urban	Average	Proposed	Non-Urban	Average
	Urban	Segments	Urban	Non-Urban	Segments	Non-Urban
MUNICIPALITY	Width Miles	includes	Roadway	Width Miles	includes	Roadway
		non-existing	Width		non-existing	Width
OWATONNA	755.76	17.57	43.01			
PLYMOUTH	2,261.46	48.04	47.07	35.20	0.80	44.00
PRIOR LAKE	575.32	15.17	37.92			
RAMSEY	747.92	18.38	40.69	403.76	10.35	39.01
RED WING	916.81	21.36	42.92	46.64	1.23	-37.92
REDWOOD FALLS	316.04	7.87	40.16			
RICHFIELD	1,190.42	25.96	45.86	10.00	0.25	40.00
ROBBINSDALE	442.04	10.33	42.79	· ·		
ROCHESTER	2,523.71	53.33	47.32	71.24	1.87	38.10
ROSEMOUNT	888.46	19.93	44.58	57 <b>.8</b> 4	1.41	41.02
ROSEVILLE	1,159.96	28.70	40.42	· ·		
SARTELL	301.48	7.16	42.11			
SAUK RAPIDS	429.52	9.03	47.57			
SAVAGE	704.46	14.69	47.96			
SHAKOPEE	672.54	13.72	49.02	224.40	5.61	40.00
SHOREVIEW	550.74	14.75	37.34			
SHOREWOOD	288.84	9.29	31.09			
SOUTH ST PAUL	638.10	14.72	43.35			
SPRING LAKE PARK	196.48	5.23	37.57			
ST ANTHONY	213.45	5.18	41.21			
	2.400.97	49.68	48.33	2.88	0.06	48.00
ST LOUIS PARK	1 308 38	28 70	45 59	2.00	0.00	10100
ST MICHAEL	261.88	5 51	47 53	296.32	9.26	32.00
ST PAUL	7 299 01	159 58	45.74		0.20	01.00
ST PETER	505.15	10.59	47.70			
STILLWATER	493 02	11 50	· 42 87	47 52	1.30	36.55
	ROF 76	12 52	AA 77	1 20	0 U U U U U	40.00
	251 //	6 96	36 65	1.20	0.05	
	201.44 460.04	10.00	<u> 25.05</u> 25.05	88.40	2 21	40 00
WAITE PARK	* 336.04	6.45	52.10	00.40	2.21	40.00
WASECA	770 O7	E 91	12 03			
WAJELA	270.87	0.31	42.33			
WEDI DI PAUL	4/8.40	12.12	39.48			
	034.30	20.03	41.00	16 50	0.46	26 00
	1,127.45	23.45	48.08	16.56	0.46	30.00
WINUNA	949.08	19.62	48.37	87.92	2.13	41.28
WOODBURY	1,612.68	31.94	50.49	210.76	5.06	41.65
WORTHINGTON	419.72	9.81	42.78			
TOTAL	114,789.34	2,540.26	45.19	7,361.85	200.20	<u>36.77</u>

#### gestudy'avgwidth wk3

1 23 1

21-May-97

4

Comparison of Existing and Proposed Roadway Widths from the total mileage of the city before it was divided into the existing width miles column.

1	Proposed	Evicting	Length of	Length of	Proposed	Existing				Length of	Length of	Proposed	Existing	
	Urban	Lirban	Sogmente	Orban	Average	Average		Proposed	Existing	Non-Urban	Non-Urban	Average	Average	
MUNICIPALITY	Width miles	Width miles	includes	Segments	Urban	Urban	Difference	Non-Urban	Non-Urban	Segments	Segments	Non-Urban	Non-Urban	Difference
		Width Innes	non-existing	excludes	Midth	Roadway		Width miles	Width miles	Includes	Excludes	Roadway	Roadway	
ALBERT LEA	741.32	703 15	17 11	17 11	43.22		2 22			non-existing	non-existing	Width	Width	
ALEXANDRIA	570.80	528.04	13.03	12 77	43.33	41.10	2.23	55.44	55.44	1.54	1.54	36.00	36.00	0.00
ANDOVER	950.60	622.65	28.02	19.85	33.01	41.00	2.40	42.25	42.25	0.85	. 0.65	65.00	65.00	0.00
ANOKA	533,60	421.72	11 98	11.61	44 54	36 32	2.30	244.24	179.18	5.97	4.82	40.91	37.17	3.74
APPLE VALLEY	1,571.86	1236.64	31.25	25.46	50.30	49 57	1 73							
ARDEN HILLS	268.76	210.62	6.57	5 57	40.91	37.81	3.00							
AUSTIN	1,180.48	1117.6	26.73	26.73	44 16	41 81	2 35							
BEMIDJI	658.59	659.82	14.35	14.35	45.89	45 08	(0.00)							
BLAINE	1,368.20	721.2	29.81	18.07	45.90	39.91	5 99	100 02	100.02	0.07	0.07			
BLOOMINGTON	4,526.56	3383.92	73.73	72.64	61.39	46 58	14 81	105.02	109.02	2.97	2.97	36.71	36.71	0.00
BRAINERD	665.04	627.52	14.25	14.09	46.67	44 54	2 13			. •				
BROOKLYN CENTER	1,003.66	883.54	21.67	21.67	46.32	40.77	5.54							
BROOKLYN PARK	1,999.76	1454.38	44.96	34.9	44.48	41 67	2.81	14.80	14 80	0.27	0.07			
BUFFALO	390.50	317.04	9.00	8.2	43.39	38.66	4 73	14.00	14.00	0.57	0.37	40.00	40.00	0.00
BURNSVILLE	2,183.42	2038.8	43.69	43.23	49.98	47.16	2.81							
CAMBRIDGE	247.96	205.92	5.80	5.56	42.75	37.04	5.72							
CHAMPLIN	624.40	537.49	15.22	13.82	41.02	38.89	2.13							
CHANHASSEN	968.68	551.91	21.53	15.33	44.99	36.00	8.99			•			•	
CHASKA	600.22	479.08	13.26	12.24	45.27	39.14	6.12	30.42	30 42	0.39	0 30	79.00	79.00	0.00
CHISHOLM	286.73	279.99	7.35	7.35	39.01	38.09	0.92	9.90	9.90	0.33	0.38	78.00	78.00	0.00
CLOQUET	723.42	644.03	17.21	17.21	42.03	37.42	4.61	99,48	65.26	2.57	2.45	30.00	30.00	42.07
COLUMBIA HEIGHTS	582.00	509.49	12.53	12.53	46.45	40.66	5.79		00.20	2.07	2.45	30.71	. ∡0.04	12.07
COON RAPIDS	1,791.68	1684.6	37.50	35.72	47.78	47.16	0.62	7.48	7.48	0 17	0 17	44.00	44.00	0.00
CORCORAN	42.80	25.68	1.07	1.07	40.00	24.00	16.00	422.16	352.30	13 11	13 11	32.20	74.00	0.00
COTTAGE GROVE	1,272.42	992.92	26.16	23.6	48.64	42.07	6.57	126.40	139.04	3.16	3 16	40.00	20.07	0.33
CROOKSTON	484.75	473.47	11.12	11.12	43.59	42.58	1.01			0.10	0.10	40.00	. 44.00	(4.00)
CRISIAL	789.32	591.76	17.88	17.78	44.15	33.28	10.86							
DEIROITLAKES	411.84	403.6	9.48	9.48	43.44	42.57	0.87	2.16	2.16	0.06	0.06	38.00	38.00	0.00
EAGAN	3,916.99	3688.76	90.16	89.99	43.44	40.99	2.45	592.68	524.04	15.76	15	37.61	34.94	2.67
EAGAN EAGT BETHEI	2,253.98	1870.08	44.31	39.82	50.87	46.96	3.91					07.01	04.04	A.U/
FAST GRAND FORKS	591.04	230.28	11.40	8.15	34.30	28.26	6.05	468.38	434.52	13.24	13.24	35.38	32.82	2.56
EDEN DRAIDIE	021.10	503.48	11.82	11.57	44.09	43.52	0.58						•=••=	2.00
EDINA	1,902.30	1429.31	42.76	40.44	45.89	35.34	10.55							
	1,002.03	500.14	39.36	39.36	42.74	37.63	5.11	•						
FAIRMONT	808.00	705 00	20.10	16.02	42.64	37.40	5.25	170.86	80.36	4.42	2.24	38.66	26.95	11.71
FALCON HEIGHTS	92.08	01.59	19.30	18.55	46.28	42.37	3.91							
FARIBAULT	980.02	80/ 01	2.54	2.54	30.24	36.08	0.19							
FARMINGTON	434.83	210 45	21.40	21.08	45.80	42.49	3.30							
FERGUS FALLS	910 95	823.07	10.04	0.01	43.31	31.84	11.47	26.84	28.84	0.61	0.61	44.00	44.00	0.00
FOREST LAKE	220.22	184.18	18.01	10.00	40.69	45.60	1.09	135.14	137.50	2.35	2.35	<b>5</b> 7.51	<b>58</b> .51	(1.00)
FRIDLEY	1 089 52	1024 83	25.30	0.12	39.02	35.97	3.85							. 1
GLENCOE	312.06	289 18	23.20	20.24	43.13	40.60	2.53	4.00	4.00	0.08	0.08	50.00	50.00	0.00
GOLDEN VALLEY	1 000 06	887.85	23.65	0.17	44.97	43.63	1.34							
GRAND RAPIDS	498 14	473.67	23.33	10 77	42.47	38.59	3.88							
HAMLAKE	675 63	544 42	20.58	10.77	40.10	43,98	1.18	22.44	22.44	0.33	0.33	68.00	66.00	0.00
HASTINGS	650 40	627 5A	18.07	18.00	32.00	20.08	4.28	85.12	85.12	2.29	2.29	37.17	37.17	0.00
HERMANTOWN	433.24	374 58	11.57	11.08	40.47	38.00	0.98	22.00	22.00	0.55	0.55	40.00	40.00	0.00
HIBBING	1.175.96	1019.26	27 42	25 70	J7.04 42.90	32.34	5.10	52.24	52.24	1.46	1.48	35.30	35.30	0.00
HOPKINS	441.89	376.8	Q A1	23.78	42.08	J8.52	3.3/	/84.48	809.72	23.32	23.13	33.64	<b>35</b> .01	(1.37)
HUGO	236,28	74.9	5.37	0.04 2 QA	40.80	40.34	10.02	244.00	000.00					. 1
HUTCHINSON	643.32	579.97	14 73	14 39	44.00 ⊿3.87	20.40 An 22	10.02	314.88	263.60	9.84	9.84	32.00	26.79	5.21
INTERNATIONAL FALLS	353.28	311.35	8.06	8.06	43.83	38 63	5.34							

URBAN								NON-L	IRBAN					
			Length of	Length of	Proposed	Existing				Length of	Length of	Proposed	Existing	
	Proposed	Existing	Urban	Urban	Average	Average		Proposed	Existing	Non-Urban	Non-Urban	Average	Average	
	Urban	Urban	Segments	Segments	Urban	Urban	Difference	Non-Urban	Non-Urban	Segments	Segments	Non-Urban	Non-Urban	Difference
MUNICIPALITY	Width miles	Width miles	includes	excludes	Roadway	Roadway		Width miles	Width miles	Includes	Excludes	Roadway	Roadway	
		0.40.00	non-existing	non-existing	Width	Width	0.40			non-existing	non-existing	Width	wiath	
INVER GROVE HEIGHTS	1,099.88	946.96	24.66	22.32	44.60	42.43	2.18	245.12		9 90		28.05	24.20	4 60
	102.78	79.92	2.73	2.73	37.00	29.27	0.37	245.12	233.00	0.00	0.0	30.03	34.30	1.00
	1,604.10	1301.34	40.44	37.12	40.10	37.21	0.00	49.00	34.72	1.24	1.24	40.00	20.00	44.00
	370.00	213.1	12.93	7.31	44.14	29.13	14.50	90.00	41.40	2.04	1.04	34.42	22.04	1.00
	330.40	201.0	9.00	6.00	37 87	32.04	4.00							
	200.00	222.90 504.85	12 71	13.58	45.54	13 87	4.55							
	102 4.42	584.05	2.08	13.30	34.60	99.75	7.85	56.52	42.22	1 57	1 57	36.00	26.89	9 11
	1 628 74	1390 71	2.30	2.00	48 50	48.88	1 91	00.02	76.66	1.07	1.07	00.00	20.00	
MARIAIU	1,536.74	1300.71	36.24	20.00	40.55	30 84	9 14	237.80	0.00	5 11	0	48 54		46 54
	012 35	712 23	10.24	17 34	40.00	41 07	6 92	207.00	0.00	0.11		40.04		
	602.54	538 18	12 73	11.57	47.33	46 51	0.82							
MENDOTA HEIGHTS	567.97	501 17	13.51	12.87	42.04	38.94	3.10							
MINNEAPOLIS	9.035.59	8331.81	194.76	193.45	46.39	43.07	3.32	1						
MINNETONKA	1,934,79	1528.48	49.94	46.56	38.74	32.83	5.91	1						
MONTEVIDEO	331.22	324.64	8.08	8.08	40.99	40.18	0.81							
MONTICELLO	272.94	176.2	5.99	4.33	45.57	40.69	4.87							
MOORHEAD	1,369.48	1307.3	28.18	27.67	48.60	. 47.25	1.35							· ·
MORRIS	275.14	264.24	6.66	6.66	41.31	39.68	1.64							
MOUND	313.52	241.58	8.05	7.82	38.95	30.89	8.05							
MOUNDS VIEW	394.53	381.01	9.82	9.82	40.18	38.80	1.38							
NEW BRIGHTON	544.76	476.18	12.98	1 <b>1.78</b>	41.97	40.42	1.55	47.60	0.00	1.19	0	40.00	)	40.00
NEW HOPE	576.08	524.83	12.70	12.64	45.36	41.52	3.84							
NEW ULM	654.94	655.05	14.15	14.15	46.29	46.29	(0.01							
NORTH BRANCH	265.84	149.16	6.29	5.56	42.26	26.83	15.44	301.92	221.24	9.35	9.35	32.29	23.66	8.63
NORTH MANKATO	571.81	550.59	11.86	11.86	48.21	46.42	1.79						•	[
NORTH ST PAUL	488.36	408.5	10.68	10	43.85	40.85	3.00							1
NORTHFIELD	483.02	433.88	11.25	10.57	42.94	41.05	1.89							
OAK GROVE	16.00	12	0.50	0.5	32.00	24.00	8.00	841.18	398.26	18.51	14.8	34.64	20.73	/.91
OAKDALE	. 659.04	539.62	16.31	15.66	40.41	34.46	5.95	21.32	16.04	0.41	0.41	02.00	0 44.UL	0.00
ORONO	415.91	330.37	10.95	10,95	37.90	30.17	15.01	181.09	03,40	1.03	1.03	40.12	30.12	9.50
ONATONNA	390.40	190.01	0.92	17.04	43.70	27.50	13.02	101.00	82.02	4.10	5.00	50.72		
	2 281 48	1695 86	48.04	40.41	47.07	40.00	5 11	35 20	35 20	0.80	0.8	44.00	<b>44</b> 00	0.00
	575 32	311 14	15 17	90.41 9 A	37.92	31 75	6.18	00.20	00.20	0.00	•.•			
PAMSEY	747 92	435.48	18.38	11 94	40.69	36 47	4.22	403.76	209.42	10.35	5.37	39.01	39.00	0.01
RED WING	916.81	709.79	21.36	19.3	42.92	36.78	6.15	46.64	31.32	1.23	1.23	37.92	2 25.46	3 12.46
REDWOOD FALLS	316.04	240.78	7.87	6.61	40.16	36,43	3.73							
RICHFIELD	1,190,42	1069.47	25.96	25,39	45.88	42.12	3.73	10.00	0.00	0.25	C	40.00	)	40.00
ROBBINSDALE	442.04	441.04	10.33	10.29	42.79	42.86	(0.07	1						
ROCHESTER	2,523.71	2220.27	53.33	49.44	47.32	44.91	2.41	71.24	58.74	1.87	1.66	38.10	) 35.39	9 2.71
ROSEMOUNT	888.46	611.76	19.93	17.19	44.58	35.59	8.99	57.84	59.92	1. <b>41</b>	1.41	41.02	2 42.50	) (1.48)
ROSEVILLE	1,159.96	952.08	28.70	26.91	40.42	35.38	5.04							
SARTELL	301.48	163.68	7.16	5.97	42.11	27.42	14.69							
SAUK RAPIDS	429.52	410.55	9.03	9.03	47.57	45.47	2.10							
SAVAGE	704.46	. 303.03	14.69	8.76	47.96	34.59	13. <b>36</b>							
SHAKOPEE	672.54	519.42	13.72	12.89	49.02	40.30	8.72	224.40	138.76	5.61	4.61	40.00	<b>)</b> 30.10	D 9.90
SHOREVIEW	550.74	416.8	14.75	11.83	37.34	35.23	2.11							
SHOREWOOD	288.84	198.2	9.29	9.29	31.09	21.33	9.76							
SOUTH ST PAUL	638,10	. 565.07	14.72	13.97	43.35	40.45	2.90							-
SPRING LAKE PARK	196.48	188.96	5.23	5.23	37.57	36.13	1.44							
ST ANTHONY	213.45	197.73	5.18	5.18	41.21	38.17	3.03		<b>-</b>	<b>-</b>				
ST CLOUD	2,400.97	1954.86	49.68	46.63	48.33	41.92	6.41	2.88	2.88	0.06	0.06	48.00	48.0	U 0.00
ST LOUIS PARK	1,308.38	1136.33	28.70	26.56	45.59	42.78	2.80							
ST MICHAEL	281.88	17.01	5.51	0.81	47.53	21.00	26.53	296.32	191.67	9.26	8.74	• 32.0	J 21.9	JU.07
STPAUL	7,299.01	6914.53	159.58	158.53	45.74	43.62	2.12		,					
STPETER	505.15	466.88	10.59	10.59	47.70	44.09	3.61		17.00	4				
STILLWATER	493.02	473.03	11.50	11.27	42.87	41.97	0.90	4/.52	47.60	1.30	1.3	30.5	<b>J</b> 36.6	<u>د (۲.06</u>

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URBAN							•	NON-I	JRBAN	1				
MUNICIPALITY	Proposed Urban Width miles	Existing Urban Width miles	Length of Urban Segments Includes non-existing	Length of Urban Segments excludes non-existing	Proposed Average Urban Roadway Width	Existing Average Urban Roadway Width	Difference	Proposed Non-Urban Width miles	Existing Non-Urban Width miles	Length of Non-Urban Segments includes non-existing	Length of Non-Urban Segments Excludes	Proposed Average Non-Urban Roadway Width	Existing Average Non-Urban Roatiway	Difference
THIEF RIVER FALLS	605.76	577.32	13.53	13.16	44.77	43.87	0.90	1.20	1.20	0.03	0.03	40.00	40.00	0.00
VADNAIS HEIGHTS	251.44	208	6.86	5.92	36.65	35.14	1.52			0.00	0.00	40.00	40.00	0.00
VIRGINIA	460.04	420.76	10.12	9.84	45.46	42.76	2.70	88.40	97 24	2 21	2 21	40.00	44.00	(4.00)
WAITE PARK	336.04	257.64	6.45	8.3	52.10	40.90	11.20		01.21	2.21	2.21	40.00	44.00	(4.00)
WASECA	270.87	274.27	6.31	6.31	42.93	43.47	(0.54)							
WEST ST PAUL	478.46	482.5	12.12	12.12	39.48	39.81	(0.33)							· · ·
WHITE BEAR LAKE	834.36	706.28	20.03	19.53	41.66	38 16	5 49							
WILLMAR	1,127.45	1114.93	23.45	23.45	48.08	47.54	0.53	16.56	14 72	0.46	. 0.48	26.00	20.00	
WINONA	949.08	892.13	19.62	19.25	48.37	46.34	2.03	87.92	80.02	2 13	0.40	30.00	32.00	4.00
WOODBURY	1,612.68	942.32	31.94	22.35	50.49	42.16	8.33	210 76	210 76	5.08	2.13	41.20	42.22	(0.94)
WORTHINGTON	419.72	400.8	9.81	9.81	42.78	40.86	1.93	210.70	210.70	5.00	5.00	41.05	41.65	
TOTAL	114,789.34	96320.28	2,540.26	2,356.90	45.19	37.92	7.27	7,361.85	5,786.84	200.20		36.77	28.91	7.87

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# **GENERAL FUND ADVANCE**

1996 year end construction balance available	\$56,578,107
Less amount required in account	(50,000,000)
Maximum amount for advance	6,578,107
Amount advanced to date in 1997	6,323,883
Balance available to advance	254,224

	Resolution		Advance	Repaid	
Municipality	Amount	Year	Amount	Amount	Balance
Alexandria	\$345,000	1996	\$345,000	\$253,782	\$91,218
Arden Hills	332,485	1996	332,485	168,486	163,999
Buffalo	500,000	1996	500,000	278,297	221,703
Cloquet	315,000	1996	315,000	226,797	88,203
Corcoran	495,717	1996	495,717	139,342	356,375
Eagan	1,312,053	1996	1,067,000	990,395	76,605
Eagan	1,012,790	1997	0	Ò	0
Elk River	500,000	1996	455,482	332,639	122,843
Golden Valley	884,000	1996	693,664	506,866	186,798
Hastings	500,000	1997	500,000	0	500,000
Lakeville	1,319,952	1996	1,495,714	1,216,633	279,081
Mahtomedi	382,380	1995	373,134	279,411	93,723
Minnetonka	1,400,000	1997	1,400,000	0	1,400,000
St. Cloud	1,000,000	1997	1,000,000	0	1,000,000
St. Louis Park	675,000	1997	675,000	0	675,000
Sartell	300,000	1997	0	0	0
Spring Lake Park	200,109	1996	126,147	20,484	105,663
Woodbury	1,300,000	1997	962,672	0	962,672
	\$12,774,486		\$10,737,015	\$4,413,132	\$6,323,883

# STATUS OF MUNICIPAL TRAFFIC COUNTING

(Most out-state traffic counts are done by state forces)

# <u>1. Seven County Metropolitan Traffic Area</u>

Cities in the seven county metropolitan area count cooperatively with Mn/Dot on a two year cycle and are scheduled to be counted in 1997. Minneapolis and St. Paul count one half each year.

# 2. Out-State Municipalities

The out-state cities will be counted on a four-year cycle.

# 3. Municipalities that have a count annually

Duluth counts 1/4 of the city each year.

TRAFFIC TO BE COUNTED IN 1997									
Albert Lea	Faribault	Moorhead							
Brainerd	Grand Rapids	Morris							
Crookston	Little Falls	New Ulm							
East Grand Forks	Mankato	Northfield							
Fairmont	Marshall								

	TRAFFIC TO BE COUNT	ED IN 1998
Alexandria	Rochester	Worthington
Cloquet	Willmar	<b>.</b>

TRAFFIC TO BE COUNTED IN 1999										
Bemidji	Hutchinson	Sartell								
Cambridge	Litchfield	Sauk Rapids								
Chisholm	North Mankato	Thief River Falls								
Elk River	Owatonna	Virginia								
Fergus Falls	Red Wing	Waite Park								
Hermantown	St. Cloud	Waseca								
Hibbing	St. Peter	Winona								

	TRAFFIC TO BE COUNTED I	N 2000
Austin	International Falls	Otsego
Buffalo	Montevideo	5
Detroit Lakes	Monticello	

# METRO MUNICIPALITIES PRESENT ADT COMPARISON

28 out of 72 had a increase of 200 or more between the last 8 traffic counts. 26 out of 72 had a increase of 200 or more between the last 4 traffic counts.

Is it necessary to count every two years in all the metro cities?

		- <u></u>												Average
													Average	Increase/
													Increase/	Decrease
										.			Decrease	Bet. Last
MUNICIPALITY	1977	1979	1981	1983	1985	1987	1989	1991	1993		Total	Average	Bet. Count	4 Counts
Andover	294	388	469	386	453	420	622	531	995		4558	506	88	136
Anoka	1849	1930	1943	1841	2213	2263	2009	2147	2259		18454	2050	51	12
Apple Valley	808	1263	1806	1977	3175	3162	4572	4146	5521		26430	2937	589	587
Arden Hills	1434	2122	2078	• 2571	2389	2626	3383	4180	4737		25520	2836	413	587
Blaine	929	1268	1736	1764	1953	1987	2308	2537	3434		17916	1991	313	370
Bloomington	3743	4459	4507	5002	5747	6158	6357	6366	6461		48800	5422	340	179
Brooklyn Center	3582	3695	4008	4651	4984	5298	5516	5327	5223		42284	4698	205	60
Brooklyn Park	2531	3213	3579	3276	3621	3739	4157	4335	4747		33198	3689	277	282
Burnsville	1211	2351	1435	2959	3416	3600	5170	4653	5813		30608	3401	575	599
Champlin	733	961	1435	1110	893	839	1367	1509	2065		10912	1212	167	293
Chanhassen	163	428	622	508	638	695	949	1294	1891		7188	799	216	313
Chaska	456	1195	993	1168	1217	1368	1504	1958	1883		11742	1305	178	167
Columbia Heights	2387	2792	2646	3527	3598	3785	4143	3107	3230		29215	3246	105	(92)
Coon Rapids	781	1809	1885	1847	2340	2474	3358	3356	4215		22065	2452	429	469
Corcoran		559	517	512	561	550	534	536	385		4154	462	(25)	(44)
Cottage Grove	1764	1612	2013	2477	2611	2774	2845	2849	3293		22238	2471	191	171
Crystal	1707	2138	2024	2007	2131	2259	2318	2023	2191		18798	2089	61	15
Eagan	1515	1674	1639	1709	2774	2903	4001	4709	5810		26734	2970	537	759
East Bethel		281	355	361	337	369	464	502	545		3214	357	38	52
Eden Prairie	361	803	1170	1441	2132	2281	3829	4003	4816		20836	2315	557	671
Edina	1385	3995	4362	4364	5179	5508	5492	5219	5356		40860	4540	496	44
Falcon Heights	814	2218	1947	2053	2241	2392	1710	1811	1865		17051	1895	131	(94)
Farmington		366	259	· 382	275	437	309	462	266		2756	306	(14)	(2
Forest Lake		712	697	706	779	681	571	572	575		5293	588	(20)	(51
Fridley	1312	1500	1662	1623	2111	2243	2598	2433	2584		18066	2007	159	118
Golden Valley	2221	2473	2541	2516	2905	3088	3768	3598	3328		26438	2938	138	106
Ham Lake	140	374	400	412	403	437	438	506	488		3598	400	44	21
Hastings	1205	1044	1087	1240	1549	1590	1686	2328	4041		15770	1752	355	623
Hopkins	5755	6734	6422	6268	5766	6146	5726	5795	4924		53536	5948	(104)	(211
Hugo		589	545	539	591	610	565	566	568		4573	508	(3)	16
Inver Grove Heights		876	1021	1076	1591	1757	2326	1715	1647		12009	1334	110	14
Lake Elmo		401	419	438	706	753	716	695	1134		5262	585	105	107

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												A	Average
												Average	Increase/
												Increase/	Decrease Bet Lost
MUNICIPALITY	1977	1979	1981	1983	1985	1987	1989	1991	1993	Total	Δνετασο	Bet Counts	A Counto
Lakeville	475	633	786	771	1043	1120	1669	1637	2894	11028	1225		4 Counts
Lino Lakes		483	503	539	376	438	449	529	644	3961	1225	302	+03
Little Canada	1682	1751	1835	2034	2319	2495	2328	2332	2787	19563	2174	129	117
Mahtomedi		267	381	371	425	458	422	424	792	3540	202	75	11/
Maple Grove	846	1543	1729	1651	1629	1651	1970	2328	2553	15900	1767	212	92
Maplewood	1312	1317	1633	1667	2367	2556	1903	1754	3223	17732	1970	213	231
Mendota Heights	536	1789	1929	2339	2568	2729	1858	1846	2049	17643	1970	190	(120)
Minneapolis	4010	5262	4266	4743	4497	5670	4910	5625	4787	43770	1900	105	(130)
Minnetonka	918	1638	1708	• 1937	2478	2681	2827	3477	3393	21057	2340	200	220
Mound	1831	2090	1775	1666	1672	1776	1879	2182	2155	17026	1892	303	229
Mounds View	1068	1249	1295	1311	1475	1570	1901	1519	1559	12947	1/20	41 61	121
New Brighton	1673	1863	1937	1934	2193	2361	2417	2498	2263	19139	2127	74	21
New Hope	4418	4553	4360	4219	4999	5313	6103	6111	5053	45129	5014	74	10
North Branch								••••	0000	40120	5014	/5	14
North St. Paul	1095	1390	1309	1798	1680	1945	1815	2332	2692	16056	1794	200	252
Oak Grove		87	83	96	91	117	104	118	108	804	99	200	203
Oakdale	312	1000	933	1089	1167	1209	1882	1884	2911	12387	1376	225	4
Orono	486	865	1064	1078	1023	1078	1136	1138	1597	9465	1052	120	430
Plymouth	1474	1431	1441	1752	2358	2475	3071	3333	3743	21078	23/2	294	246
Prior Lake	367	536	532	641	723	785	920	1122	1270	6896	766	. 204	127
Ramsey	187	321	400	424	582	638	614	737	656	4559	507	F0	137
Richfield	3063	3246	3106	3040	3310	3524	3617	3646	3960	30512	3300	112	19
Robbinsdale	4415	4010	4157	4010	3997	4248	4100	4275	4054	37266	3390		103
Rosemount				1100	993	1328	1489	1494	1541	7945	4141	(45)	14
Roseville	1376	1544	1551	1643	1786	1819	1763	1828	1956	15266	1696	00 72	137
Savage		407	494	488	536	566	879	880	1470	5720	636	152	43
Shakopee	1035	1167	1294	1333	1521	1591	1330	1451	2459	13191	1465	152	234
Shoreview	609	651	844	1068	1350	1735	1920	2122	2387	12686	1405	170	230
Shorewood		589	545	539	591	610	565	566	568	4573	509	222	259
South St. Paul	1915	2193	2029	1906	2043	2121	2293	2330	2009	18839	2093	12	(0)
Spring Lake Park	1134	1755	1606	1670	2029	2154	3087	3224	3237	19896	2000	263	303
Stillwater	1488	1636	1851	2040	2391	2861	2942	2946	3776	21931	2437	203	302
St. Anthony	2174	3466	3108	3080	3268	3472	3676	3785	3822	29851	2407	200	120
St. Louis Park	4678	4733	4910	5164	5572	5807	5905	5940	5963	48672	5408	161	139
St. Paul	5276	5630	5385	5645	6118	6461	6823	6759	6781	54878	6098	101	90 166
Vadnais Heights	177	442	462	1017	1264	1689	1596	1691	1935	10272	11/1	100	100
West St. Paul	2902	2460	2747	2656	2670	2627	2762	2684	2989	24497	2722	220	108
White Bear Lake	1370	1339	1356	1396	1795	2356	2379	2535	3157	17682	1065	222	241
Woodbury	256	808	1102	1286	1292	1636	2091	2546	2706	13722	1505	223	341
				• 1			~~~!	2040	2100	10/23	1020	300	304

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# CURRENT RESOLUTIONS OF THE MUNICIPAL SCREENING BOARD

# June 1997

BE IT RESOLVED:

## ADMINISTRATION

#### Appointments to Screening Board - Oct. 1961 (Revised June 1981)

That annually the Commissioner of Mn/DOT will be requested to appoint three (3) new members, upon recommendation of the City Engineers Association of Minnesota, to serve three (3) year terms as voting members of the Municipal Screening Board. These appointees are selected from the Nine Construction Districts together with one representative from each of the three (3) major cities of the first class.

#### Screening Board Chairman and Vice Chairman - June 1987

That the Chairman and Vice Chairman, nominated annually at the annual meeting of the City Engineers association of Minnesota and subsequently appointed by the Commissioner of the Minnesota Department of Transportation shall not have a vote in matters before the Screening Board unless they are also the duly appointed Screening Board Representative of a construction District or of a City of the first class.

# Screening Board Secretary - Oct. 1961

That annually, the Commissioner of the Minnesota Department of Transportation (Mn/DOT) may be requested to appoint a secretary, upon recommendation of the City Engineers' Association of Minnesota, as a non-voting member of the Municipal Screening Board for the purpose of recording all Screening Board actions.

## Appointment to the Needs Study Subcommittee - June 1987 (Revised June 1993)

The Screening Board Chairman shall annually appoint one city engineer, who has served on the Screening Board, to serve a three year term on the Needs Study Subcommittee. The appointment shall be made at the annual winter meeting of the City's Engineers Association. The appointed subcommittee person shall serve as chairman of the subcommittee in the third year of the appointment.

## Appointment to Unencumbered Construction Funds Subcommittee - Revised June 1979

The Screening Board past Chairman be appointed to serve a three-year term on the Unencumbered Construction Fund Subcommittee. This will continue to maintain an experienced group to follow a program of accomplishments.

<u>Appearance Screening Board</u> - Oct. 1962 (Revised Oct. 1982)

That any individual or delegation having items of concern regarding the study of State Aid Needs or State Aid Apportionment amounts, and wishing to have consideration given to these items, shall, in a written report, communicate with the State Aid Engineer. The State Aid Engineer with concurrence of the Chairman of the Screening Board shall determine which requests are to be referred to the Screening Board for their consideration. This resolution does not abrogate the right of the Screening Board to call any person or persons before the Board for discussion purposes.

#### Screening Board Meeting Dates and Locations - June 1996

That the Screening Board Chairman, with the assistance of State Aid personnel, determine the dates and locations for that year's Screening Board meetings.

#### Research Account - Oct. 1961

That an annual resolution be considered for setting aside a reasonable amount of money for the Research Account to continue municipal street research activity.

Be it resolved that an amount of \$453,703 (not to exceed 1/2 of 1% of the 1996 MSAS Apportionment sum of \$90,740,650) shall be set aside from the 1997 Apportionment fund and be credited to the research account.

#### <u>Soil Type</u> - Oct. 1961

That the soil type classification as approved by the 1961 Municipal Screening Board, for all municipalities under Municipal State Aid be adopted for the 1962 Needs Study and 1963 apportionment on all streets in the respective municipalities. Said classifications are to be continued in use until subsequently amended or revised by Municipal Screening Board action.

# Improper Needs Report - Oct. 1961

That the Office of State Aid and the District State Aid Engineer is requested to recommend an adjustment of the Needs Reporting whenever there is a reason to believe that said reports have deviated from accepted standards and to submit their recommendations to the Screening Board, with a copy to the municipality involved, or its engineer.

## New Cities Needs - Oct. 1983

Any new city which has determined their eligible mileage, but does not have an approved State Aid System, their money needs will be determined at the cost per mile of the lowest other city.

# Construction Cut Off Date - Oct. 1962 (Revised 1967)

That for the purpose of measuring the Needs of the Municipal State Aid Highway System, the annual cut off date for recording construction accomplishments based upon the project award date shall be December 31st of the preceding year.

# Construction Accomplishments - Oct. 1988 (Revised June 1993)

When a Municipal State Aid Street is constructed to State Aid Standards, said street shall be considered adequate for a period of 20 years from the date of project letting or encumbrance of force account funds.

In the event sidewalk or curb and gutter is constructed for the total length of the segment, then those items shall be removed from the needs for a period of 20 years.

If the construction of the Municipal State Aid Street is accomplished with local funds, only the construction needs necessary to bring the roadway up to State Aid Standards will be permitted in subsequent needs for 20 years from the date of the letting or encumbrance of force account funds. At the end of the 20 year period, reinstatement for complete construction needs shall be initiated by the Municipality.

Needs for resurfacing, lighting, and traffic signals shall be allowed on all Municipal State Aid Streets at all times.

That any bridge construction project shall cause the needs of the affected bridge to be removed for a period of 35 years from the project letting date or date of force account agreement. At the end of the 35 year period, needs for complete reconstruction of the bridge will be reinstated in the needs study at the initiative of the Municipal Engineer. If, during the period that complete bridge needs are being received the bridge is improved with a bituminous overlay, the municipality will continue to receive complete needs but shall have the non-local cost of the overlay deducted from its total needs for a period of ten (10) years.

The adjustments above will apply regardless of the source of funding for the road or bridge project. Needs may be granted as an exception to this resolution upon request by the Municipal Engineer and justification to the satisfaction of the State Aid Engineer (e.g., a deficiency due to changing standards, projected traffic, or other verifiable causes).

In the event that a M.S.A.S route earning "After the Fact" needs is removed from the M.S.A. system, then, the "After the Fact" needs shall be removed from the needs study, except if transferred to another state system. No adjustment will be required on needs earned prior to the revocation.

# Population Apportionment - October 1994

Be it resolved that beginning with calendar year 1996, the MSA population apportionment shall be determined using the latest available federal census or population estimates of the State Demographer and/or the Metropolitan Council. However, no population shall be decreased below that of the latest available federal census, and no city will be added to, except by consolidation, or dropped from the MSA eligible list based on population estimates.

#### <u>DESIGN</u>

# Design Limitation on Non-Existing Streets - Oct. 1965

That non-existing streets shall not have their needs computed on the basis of urban design unless justified to the satisfaction of the Commissioner.

# Less Than Minimum Width - Oct. 1961 (Revised 1986)

That in the event that a Municipal State Aid Street is constructed with State Aid Funds to a width less than the standard design width as reported in the Needs Study, the total needs shall be taken off such constructed street other than the surface replacement need. Surface replacement and other future needs shall be limited to the constructed width unless exception is justified to the satisfaction of the Commissioner.

# Greater Than Minimum Width (Revised June 1993)

If a Municipal State Aid Street is constructed to a width wider than required, resurfacing needs will be allowed on the constructed width.

# Miscellaneous Limitations - Oct. 1961

That miscellaneous items such as fence removal, bituminous surface removal, manhole adjustment, and relocation of street lights are not permitted in the Municipal State Aid Street Needs Study. The item of retaining walls, however, shall be included in the Needs Study.

#### MILEAGE

Feb. 1959 (Revised Oct. 1994)

The maximum mileage for Municipal State Aid Street designation shall be 20 percent of the municipality's basic mileage - which is comprised of the total improved streets less Trunk Highway, County State Aid Highways, and any Trunk Highway and/or County Road Turnback designated as excess Municipal State Aid mileage.

# Nov. 1965 (Revised 1972, Oct. 1993, 1995)

The maximum mileage for Municipal State Aid Street designation shall be based on the Annual Certification of Mileage current as of December 31st of the preceding year. Submittal of a supplementary certification during the year shall not be permitted except the Division of State Aid will recompute available mileage, as necessary, to accomplish turnbacks. Frontage roads which are not designated trunk highway, trunk highway turnback or County State Aid Highway system shall be considered in the computation of the basic street mileage. The total mileage of county roads and local streets on corporate limits shall be included in the municipality's basic street mileage. Mileage which is on the boundary of two adjoining urban municipalities shall be considered as one-half mileage.

(Nov. 1965 - Revised 1969, October 1993, October 1994, June 1996)

However, the maximum mileage for State Aid designation may be exceeded to designate trunk highway turnbacks after July 1, 1965 subject to State Aid Operations Rules.

A Municipality which accepts a county road turnback after May 11,1994 and designates it as an MSA Street will no longer have that mileage considered as basic mileage for purposes of determining allowable mileage. This will result in a reduction in allowable mileage of 20% of that county road turnback which partially offsets the affect of adding the county road turnback to the MSA system.

Excess mileage on the MSA system shall accrue needs in accordance with current rules and resolutions.

Oct. 1961 (Revised May 1980, Oct. 1982, Oct. 1983, and June 1993)

All requests for additional mileage or revisions to the Municipal State Aid System must be received by the District State Aid Engineer by March first and a City Council resolution of approved mileage and the Needs Study reporting data must be received by May first, to be included in the current year's Needs Study. Any requests for additional mileage or revisions to the Municipal State Aid Systems received by the District State Aid Engineer after March first will be included in the following year's Needs Study.

One Way Street Mileage - June 1983 (Revised Oct. 1984, Oct. 1993, June 1994)

That any one-way streets added to the Municipal State Aid Street system must be reviewed by the Needs Study Sub-Committee, and approved by the Screening Board before any one-way street can be treated as one-half mileage in the Needs Study.

Treat all one-way streets between 26 feet and 49 feet wide as one-half of the mileage as outlined in Rule 8820.9940 and allow complete needs, except that no more than one parking lane will be eligible to accrue needs. When Trunk Highway or County Highway Turnback is used as part of a one way pair, mileage for certification shall only be included as trunk Highway or County Turnback mileage and not as provided for in the preceding paragraph.

# NEEDS COST

Right of Way (Needs only) \$ 60,000.00 Acre   Grading (Excavation) \$ 3.00 Cu. Yd.   Base: Class 4 Spec. #2211 \$ 4.70 Ton   Class 5 Spec. #2211 \$ 6.20 Ton   Bituminous Spec. #2331 20.50 Ton	<u>Constructi</u>	on Item Unit Prices	- (Revised Annually)	)	
Grading (Excavation) \$ 3.00 Cu. Yd.   Base: Class 4 Spec. #2211 \$ 4.70 Ton   Class 5 Spec. #2211 6.20 Ton   Bituminous Spec. #2331 20.50 Ton	Right o	f Way (Needs only)	) \$ 60,000.00 Acre		
Base: Class 4 Spec. #2211 \$ 4.70 Ton   Class 5 Spec. #2211 6.20 Ton   Bituminous Spec. #2331 20.50 Ton	Grading	g (Excavation)		\$	3.00 Cu. Yd.
Class 4Spec. #2211\$ 4.70 TonClass 5Spec. #22116.20 TonBituminousSpec. #233120.50 Ton	Base:				
Class 5   Spec. #2211   6.20 Ton     Bituminous   Spec. #2331   20.50 Ton		Class 4	Spec. #2211	\$	4.70 Ton
Bituminous Spec. #2331 20.50 Ton		Class 5	Spec. #2211		6.20 Ton
		Bituminous	Spec. #2331		20.50 Ton
Surface:	Surface	:			
Bituminous Spec. #2331 \$ 20.50 Ton		Bituminous	Spec. #2331	\$	20.50 Ton
Bituminous Spec. #2341 23.60 Ton		Bituminous	Spec. #2341		23.60 Ton
Bituminous Spec. #2361 30.10 Ton		Bituminous	Spec. #2361		30.10 Ton
Shoulders:	Shoulde	ers:			
Gravel   Spec. #2221   \$ 8.50 Ton		Gravel	Spec. #2221	\$	8.50 Ton
Miscellaneous:	Miscell	meous:			
Storm Sewer Construction \$229,700.00 Mile		Storm Sewer Cons	truction	\$229.	700.00 Mile
Storm Sewer Adjustment 71.200.00 Mile		Storm Sewer Adju	stment	, 71,	200.00 Mile
Special Drainage-Rural 28,490,00 Mile		Special Drainage-R	Rural	28.	490.00 Mile
Traffic Signals 20,000 to 80,000.00 Mile		Traffic Signals		20,000 to 80,	000.00 Mile
Signal Needs Based On Projected Traffic	Signal Needs E	ased On Projected	Traffic		
Projected Traffic Percentage X Unit Price = Needs Per Mile	Projected Traff	ic Percentage	X Unit Price =	Need	s Per Mile
0 - 4,999 .25 $$80,000 = $20,000.00$ Mile	0 - 4,999	.25	\$80,000 =	\$ 20,	000.00 Mile
5,000 - 9,999 .50 $$80,000 =$ 40,000.00 Mile	5,000 - 9,999	.50	\$80,000 =	40,	000.00 Mile
10,000 & Over  1.00 $$80,000 = $0,000.00  Mile$	10,000 & Over	1.00 \$80,000	= 80,000.00 Mile	e	
Street Lighting 20,000.00 Mile		Street Lighting		20.	000.00 Mile
Curb & Gutter Construction 6.00 Lin. Ft.		Curb & Gutter Cor	struction	,	6.00 Lin. Ft.
Sidewalk Construction 16.50 Sq. Yd.		Sidewalk Construct	tion		16.50 Sg. Yd.
Engineering 18%		Engineering	· · ·		18%
Removal Items:	Remova	l Items:			
Curb & Gutter \$ 1.80 Lin. Ft.		Curb & Gutter		\$	1.80 Lin. Ft.
Sidewalk 4.75 Sq. Yd.		Sidewalk			4.75 Sq. Yd.
Concrete Pavement 4.20 Sq. Yd.		Concrete Pavement			4.20 Sq. Yd.
Tree Removal 175.00 Unit		Tree Removal			175.00 Unit

#### **STRUCTURES**

## Bridge Costs - Oct. 1961 (Revised Annually)

That for the study of needs on the Municipal State Aid Street System, bridge costs shall be computed as follows:

Bridges 0 to 149 Ft.	\$ 55.00 Sq. Ft.
Bridges 150 to 499 Ft.	55.00 Sq. Ft.
Bridges 500 & Over	55.00 Sq. Ft.

"The money needs for all "non-existing" bridges and grade separations be removed from the Needs Study until such time that a construction project is awarded. At that time a money needs adjustment shall be made by annually adding the total amount of the structure cost that is eligible for State Aid reimbursement for a 15-year period." This directive to exclude all Federal or State grants.

## Bridge Width & Costs - (Revised Annually)

That after conferring with the Bridge Section of Mn/DOT and using the criteria as set forth by this Department as to the standard design for railroad structures, that the following costs based on number of tracks be used for the Needs Study:

Railroad Over Highway

Number of Tracks - 1 Each Additional Track \$5,000 Lin. Ft. \$4,000 Lin. Ft.

#### RAILROAD CROSSINGS

Railroad Crossing Costs - (Revised Annually)

That for the study of needs on the Municipal State Aid Street System, the following costs shall be used in computing the needs of the proposed Railroad Protection Devices:

**Railroad Grade Crossings** 

Signals - (Single track - low speed) Signals and Gates(Multiple Track - high Signs Only & (low speed) Rubberized Railroad Crossings (Per Track) Pavement Marking

\$	80,000	Unit	
\$1	10,000	Unit	
\$	800	Unit	
\$	750	Lin.	Ft
\$	750	Unit	

That for the study of needs on the Municipal State Aid Street System, the following costs shall be used in determining the maintenance apportionment needs cost for existing facilities only.

	Cost For Under 1000 Vehicles Per Day	Cost For Over 1000 Vehicles Per Day
Traffic Lanes: Segment length times number of traffic lanes times cost per mile.	\$1,320 (Per Mile)	\$2,200 (Per Mile)
Parking Lanes: Segment length times number of parking lanes times cost per mile.	\$1,320 (Per Mile)	\$1,320 (Per Mile)
Median Strip: Segment length times cost per mile.	\$ 440 (Per Mile)	\$ 880 (Per Mile)
Storm Sewer: Segment length times cost per mile.	\$ 440 (Per Mile)	\$ 440 (Per Mile)
Traffic Signals: Number of traffic signals times cost for each signal.	\$ 440 (Per Each)	\$ 440 (Per Each)
Unlimited Segments: Normal M.S.A.S. Streets.		
Minimum allowance for mile is determined by segment length times cost per mile.	\$4,400 (Per Mile)	\$4,400 (Per Mile)
Limited Segments: Combination Routes.		
Minimum allowance for mile is determined by segment length times cost per mile.	\$2,200 (Per Mile)	\$2,200 (Per Mile)

## NEEDS ADJUSTMENTS

# Bond Adjustment - Oct. 1961 (Revised 1976, 1979, 1995)

That a separate annual adjustment shall be made in total money Needs of a municipality that has sold and issued bonds pursuant to Minnesota Statutes, Section 162.18, for use on State Aid projects.

That this adjustment, which covers the amortization (payment) period, and which annually reflects the net unamortized bonded debt (remaining principal payments due) shall be accomplished by adding said net unamortized (principal) amount to the computed money needs of the municipality.

For the purpose of this adjustment, the net unamortized bonded debt (remaining principal) shall be the total unamortized bonded indebtedness (deducted from the amount of projects applied against the bond) less the unexpended bond amount (less the amount of projects not encumbered) as of December 31st of the preceding year. The charges for selling the bond issue shall be deducted from the amount that projects are applied against.

"Bond account money spent off State Aid System would not be eligible for Bond Account Adjustment. This action would not be retroactive, but would be in effect for the remaining term of the Bond issue."

## Effective January 1, 1996

The money needs shall be annually reduced by 10% of the total bond issue amount. The computation of needs shall be started in the year that bond principal payments are made to the city.

Unencumbered Construction Fund Balance Adjustment - Oct. 1961 (Revised October 1991)

That for the determination of Apportionment Needs, the amount of the unencumbered construction fund balance as of December 31st of the current year shall be deducted from the 25-year total Needs of each individual municipality.

Funding Requests that have been received before December 31st by the District State Aid Engineer for payment shall be considered as being encumbered and the construction balances shall be so adjusted.

## Right of Way - Oct. 1965 (Revised June 1986)

The Right of Way needs shall be included in the apportionment needs based on the unit price per mile, until such time that the right of way is acquired and the actual cost established. At that time a money needs adjustment shall be made by annually adding the local cost (which is the total cost less county or trunk highway participation) for a 15-year period. Only right of way acquisition costs that are eligible for State-Aid reimbursement shall be included in the right-of-way money needs adjustment. This Directive to exclude all Federal or State grants. Right-of-way projects that are funded with State Aid Funds will be compiled by the State Aid Office. When "After the Fact" needs are requested for right-of-way projects that have been funded with local funds, but qualify for State Aid reimbursement, documentation (copies of warrants and description of acquisition) must be submitted to the State Aid Office.

# Trunk Highway Turnback - Oct. 1967 (Revised June 1989)

That any trunk highway turnback which reverts directly to the municipality and becomes part of the State Aid Street system shall not have its construction needs considered in the money needs apportionment determination as long as the former trunk highway is fully eligible for 100 percent construction payment from the Municipal Turnback Account. During this time of eligibility, financial aid for the additional maintenance obligation, of the municipality imposed by the turnback shall be computed on the basis of the current year's apportionment data and shall be accomplished in the following manner.

Initial Turnback Maintenance Adjustment - Fractional Year Reimbursement:

The initial turnback adjustment when for less than 12 full months shall provide partial maintenance cost reimbursement by adding said initial adjustment to the money needs which will produce approximately 1/12 of \$7,200 per mile in apportionment funds for each month or part of a month that the municipality had maintenance responsibility during the initial year.

To provide an advance payment for the coming year's additional maintenance obligation, a needs adjustment per mile shall be added to the annual money needs. This needs adjustment per mile shall produce sufficient apportionment funds so that at least \$7,200 in apportionment shall be earned for each mile of trunk highway turnback on Municipal State Aid Street System.

Turnback adjustments shall terminate at the end of the calendar year during which a construction contract has been awarded that fulfills the Municipal Turnback Account Payment provisions; and the resurfacing needs for the awarded project shall be included in the Needs Study for the next apportionment.

## TRAFFIC - June 1971

# Traffic Limitation on Non-Existing Streets - Oct. 1965

That non-existing street shall not have their needs computed on a traffic count of more than 4,999 vehicles per day unless justified to the satisfaction of the Commissioner.

# Traffic Manual - Oct. 1962

That for the 1965 and all future Municipal State Aid Street Needs Studies, the Needs Study procedure shall utilize traffic data developed according to the Traffic Estimating Manual - M.S.A.S. #5-892.700. This manual shall be prepared and kept current under the direction of the Screening Board regarding methods of counting traffic and computing average daily traffic. The manner and scope of reporting is detailed in the above mentioned manual.

Traffic Counting - Sept. 1973 (Revised June 1987)

That future traffic data for State Aid Needs Studies be developed as follows:

- 1. The municipalities in the metropolitan area cooperate with the State by agreeing to participate in counting traffic every two years.
- 2. The cities in the outstate area may have their traffic counted for a nominal fee and maps prepared by State forces every four years, or may elect to continue the present procedure of taking their own counts and preparing their own traffic maps at four year intervals.
- 3. Some deviations from the present four-year counting cycle shall be permitted during the interim period of conversion to counting by State forces in the outstate area.

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Municipal Screening Board data

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