

Roadway & Bridge Investment Needs in North Dakota

Upper Great Plains
Transportation Institute
North Dakota State University

Study Overview

- Estimates funding needs to maintain existing roadway and bridge condition
- Does not include snow removal, signing, mowing or other maintenance activities indirectly relating to roadway surface condition

State Highways

- Needs (HERS-ST/HPMS)
 - **Pavement resurfacing/reconstruction**
 - Reconstruction due to insufficient roadway width
 - **Resurfacing with shoulder improvements**
 - **Widening (capacity-related improvements)**
 - Wider lanes; Wider shoulders; Additional lanes
 - **Cost to maintain system with limited expansion; does not necessarily increase structural capacity**
- Bridges

Pavement Preservation and Maintenance: Asphalt Surfaces

- Crack sealing @ \$369 per mile per year = \$2.78 million/year = \$55.7 million over 20 years
- Seal coats applied every 6 years @ \$25,000 per mile for two-lane roadway = \$682.5 million over 20 years
- Each mile patched costs \$85,000

Annual State Roadway and Bridge Investment Needs (\$000)

HPCS	\$2008/ Year	Low/Moderate Inflation Trend*	Current Inflation Trend*
Interstate	\$43,490	\$54,517	\$72,790
Interregional	\$49,636	\$63,149	\$84,458
State Corridor	\$41,212	\$52,639	\$70,430
District Corridor	\$55,613	\$71,030	\$95,038
District Collector	\$26,630	\$34,013	\$45,509
Total	\$216,583	\$275,349	\$368,227

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

State Highway Bridges

- \$526 million needed for bridge replacement, rehabilitation, preventive maintenance, and deck overlays during next 20 years.
Annual needs: \$26.3 million
- 44 percent needed for replacement of existing bridges
- 46 percent needed for bridge rehabilitation

Paved County Road Construction and Maintenance

- Based on survey; estimated expenditures for next 10 years
- 42 counties responded; survey findings expanded to state using miles of road
- Estimated 10-year construction cost = \$306.1 million
- Estimated 10-year maintenance cost = \$398 million
- Extrapolation = \$1.408 billion for 20 years

Gravel Road Maintenance

- Computed from survey: cost per mile x miles of gravel road
- Counties spend \$1,212/mile/year (weighted average) to blade and gravel unpaved roads
- Total cost = \$69.68 million per year
- Over 20 years = \$1.394 billion

County Bridges

- 2,753 bridges (exclusive of culverts)
 - 22% > than 60 years old
 - 85% more than 20 years old
- 10-year bridge needs forecast from survey
 - \$72.1 million of bridge construction
 - \$21.6 million of bridge maintenance
- Extrapolate to 20 years = \$187.4 million.

County Bridge Needs (current)

- Analysis based on Bridge Inventory
- Deficiency: superstructure or substructure rating ≤ 4 (poor)
- Currently 451 deficient bridges
- Replacement cost = \$150 per sq ft = \$137.4 million
- Cost based on replacement length

Future & Total County Bridge Needs

- Additional bridges will deteriorate to “poor” in next 20 years
- Typical rate: 1 point loss every 10 years
- 808 bridges projected to deteriorate to poor or worse in next 20 years
- Replacement cost = \$165.7 million
- Total replacement cost including currently deficient bridges = \$303.1 million
- Does not include culvert or maintenance cost
- Bridge improvements are not prioritized based upon traffic levels

Total County Bridge Needs

- Maintenance cost from the survey (when extrapolated to 20 years) is \$43.2 million
- With maintenance costs, county bridge needs (replacement and maintenance= \$346.3 million)
- May not include all maintenance needs; doesn't include rehabilitation cost of decks on bridges otherwise structurally sound
- Does not necessarily include replacement of all obsolete bridges: outmoded because of load limits or deck/roadway geometry or conditions

County Roadway & Bridge Needs

	\$ 2008/Year	Low/Moderate Inflation Trend*	Current Inflation Trend*
Paved Roads	\$30,610,000	\$39,096,410	\$52,311,120
Gravel Roads	\$69,680,000	\$86,000,120	\$100,058,570
Maintenance	\$39,800,000	\$50,834,000	\$68,016,420
Bridges	\$19,815,000	\$24,222,120	\$27,013,420
Total	\$159,905,000	\$200,152,650	\$247,399,530

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

Estimated Funding Needs of Townships and Small Cities

- Update of 2002 study
- Three scenarios: current, reasonable, and ideal.
- *Current* is defined as “improvements that you average per year”

	\$ 2008/Year	Low/Moderate Inflation Trend*	Current Inflation Trend*
Townships	\$36,250,000	\$44,740,250	\$52,054,000
Small Cities	\$29,725,000	\$36,687,000	\$42,684,280

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

Highway Funding Needs of 13 Urban Centers

- Estimated from long range plans and past survey responses from “Urban Street and County Road Funding Needs Assessment for 13 North Dakota Cities and 53 North Dakota Counties”
- Amount of detail varies from city to city
- Each plan includes lists of expected improvements for next 15 to 20 years
- Some plans include expected maintenance costs
- When maintenance costs could not be determined, the survey results from the 2000 study were used and indexed
- Estimated funding need in 2008 dollars for all 13 cities is \$70.7 million = \$1.414 billion for 20 years (moderate inflation trend = \$87.3 million, current inflation trend = \$101.5 million)

**Estimates of Roadway and Bridge Funding Needs per year
(Millions of Dollars)**

Jurisdiction/Agency	Highways	Bridges
State	\$216.6	\$26.3
County	\$140.0	\$19.8
Small Cities	\$29.7	*
Townships	\$36.3	*
Urban Centers	\$70.7	*
Total	\$493.4	\$46.1
		\$539.5
*Not estimated		