

2015 State Highway Needs Assessment



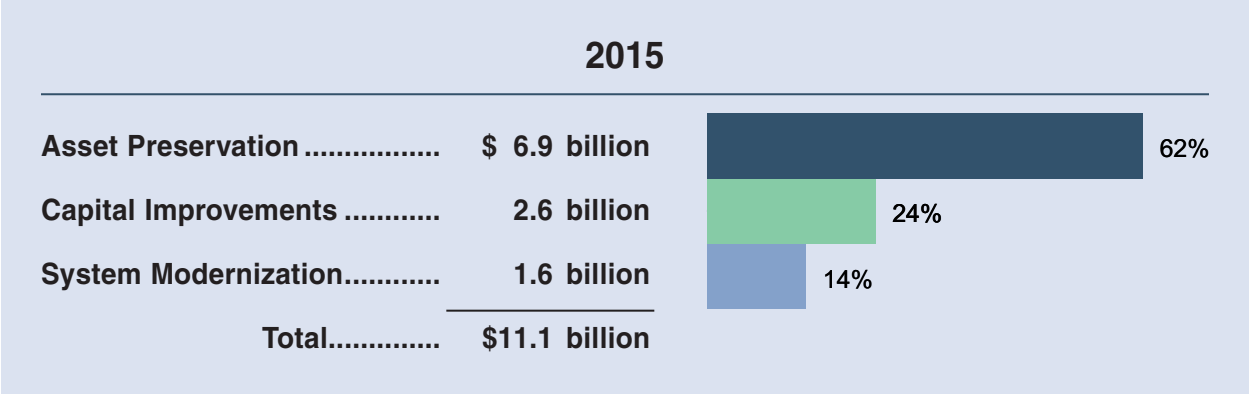
I-80 Omaha, near 20th St.



Pete Ricketts
Governor

Kyle Schneweis, P.E.
Director

Summary 20-Year Needs

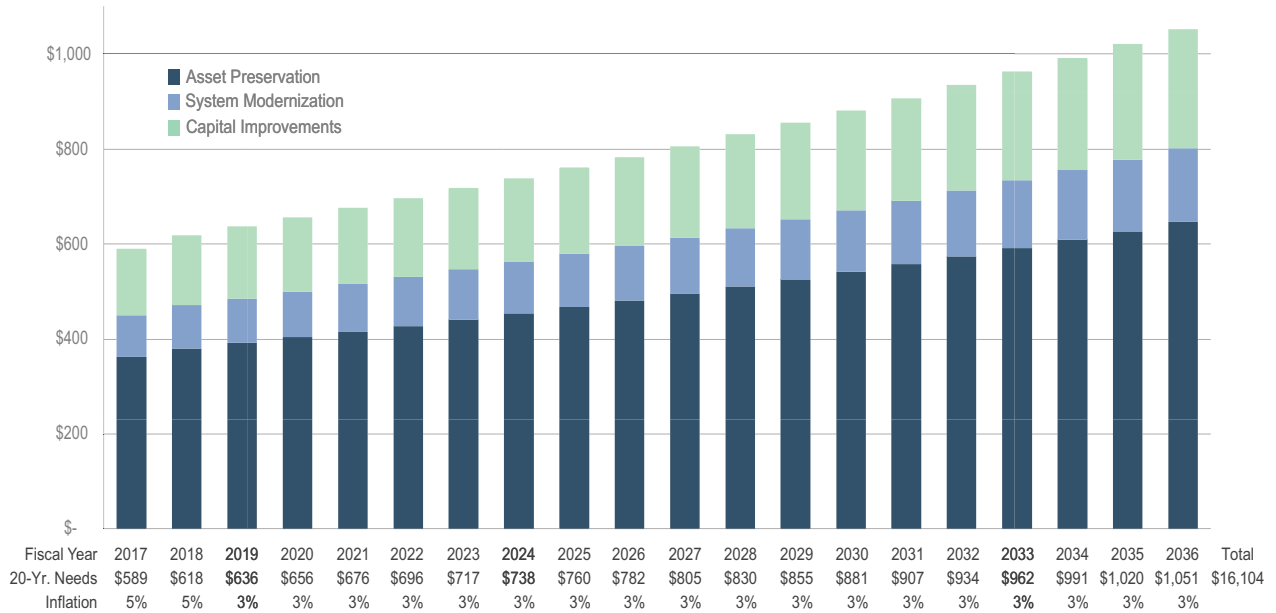


Executive Summary

The “2015 State Highway System Needs Assessment” report identifies current needs for the next 20 years at \$11.1 billion, in today’s dollars. With inflation applied at 5 percent for FY-2017 and FY-2018, and 3 percent for the remaining 18 years, over the next 20 years the total cost of the 2015 needs are estimated at \$16.1 billion. The funds available in FY-2017 are estimated to be approximately \$500 million.

Current and Projected Needs

2015 State Highway System
Inflated Needs in Millions



Introduction

In 1988, in accordance with State Statute 39-1365.02, the Nebraska State Legislature assigned the task of annually reporting on the needs of the State Highway System to the Nebraska Department of Roads. Since that time, the Department has made steady progress identifying and addressing the dynamic needs of the State Highway System.

The needs of the State Highway System are divided into three categories:

- Asset Preservation – Maintenance of the system
- System Modernization – Safety, geometric, or mobility improvements that do not add capacity to the roadway
- Capital Improvements – Improvements that add capacity or support economic growth

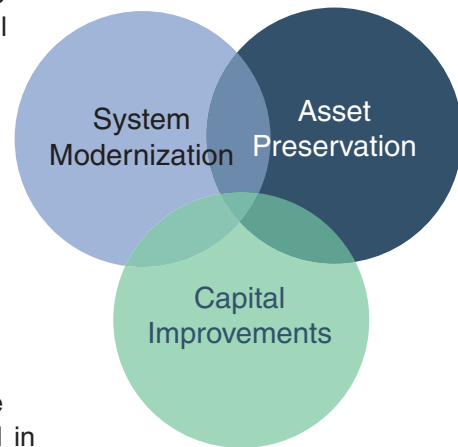
Changes since 2014

The Needs Assessment report has been reorganized since 2014 to better define the three main categories of projects that make up the needs – asset preservation, system modernization, and capital improvements. The four 2014 categories were consolidated and redistributed into the three new categories.

Approximately \$1 billion in specific capital improvement projects that were previously omitted from the report have been added. These projects have long been documented in NDOR’s annual program book and will be among those considered for selection in the Build Nebraska Act program. The addition of these projects largely accounts for the increase in needs from 2014 to 2015.

Some projects may have aspects that fall into more than one category or all three; however, no costs were double counted in this report.

The following is a brief description of how the needs are determined.



Asset Preservation

Asset preservation is the ongoing work required to maintain the highway system in a good condition. Many different factors affect the number of miles and bridges needing to be addressed, including the previous year’s work; extreme environmental conditions; traffic volumes; traffic loads; and yearly maintenance. The Department continues to explore new technology and materials that may lead to improved pavement and bridge performance and may also extend the life of pavements and bridges.

The projected 20-year asset preservation needs, in 2015 dollars, are estimated to cost \$6.9 billion and include the following:

Pavement Preservation - \$6.2 billion

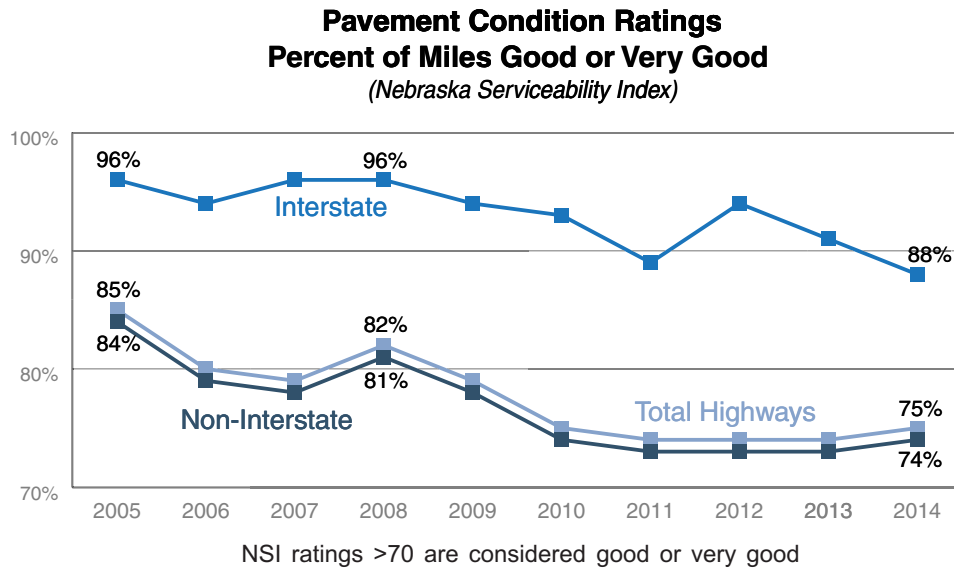
The entire State Highway System is rated each year in order to evaluate its overall pavement condition. Distress factors such as cracking, faulting, rutting, and ride quality are inserted into formulas that have been developed to calculate the overall condition of the roadway, called the Nebraska Serviceability Index (NSI). This NSI rating is then used in a pavement optimization program to identify the 20-year pavement restoration needs. This pavement optimization program includes a benefit/cost analysis, annual pavement deterioration rates, and the capability to calculate the cost to maintain the State Highway System at a specified pavement condition level. The cost to replace interstate pavements as they reach the end of their service life is included in this category.

Bridge Preservation - \$700 million

Similar to pavements, bridges are inspected for safety and condition. Every bridge in Nebraska is inspected at least once every two years. NDOR uses a bridge needs program that takes into consideration factors such as condition, deterioration rate, age, traffic, and cost/benefit to

determine when to apply the proper treatments at the proper times. Preservation includes preventative maintenance, repair, re-decking, rehabilitation, and replacement of bridges that meet the required width. Bridges continually deteriorate so bridge needs are not static but change yearly. NDOR is doing more systematic preservation such as asphalt overlays with waterproof membranes, expansion joint replacements, and thin epoxy/polymer overlays to keep our good bridges in good condition for longer periods of time.

The timing of bridge needs varies, but efforts are made to plan bridge construction at the same time as the adjacent pavement and road construction.



System Modernization

System modernization is associated with roadway improvements that do not increase capacity. These needs are associated with deficiencies such as pavement width, shoulder width, vertical curves, and bridge width. Interstate roadway or bridge deficiencies, as defined by Nebraska’s minimum design standards, are included in the needs assessment. The non-interstate rural system modernization needs are defined using the standards shown in the sidebar on the next page.

The projected 20-year system modernization needs, in 2015 dollars, for the interstate, rural, and municipal highways are estimated to cost \$1.6 billion, and include the following:

Roadway Modernization - \$1.1 billion

Roadway modernization describes changes made to existing roadways to correct certain deficiencies. Such changes as widening lanes and shoulders, straightening curves, and cutting down hills make roadways safer to travel.

All contract and as-built plans are reviewed to ensure that the Department’s database contains the most current geometric information. The roadway system modernization needs are compiled by calculating the construction costs, including resurfacing and right-of-way costs, required to

correct the deficiency. These costs are updated annually. The state currently operates and maintains approximately 39 miles of gravel highways. The costs to surface and bring these roadways up to current standards are based on annual construction costs.

In addition to the costs to remove deficiencies, costs for other roadway improvements, such as lighting and traffic signal needs, are determined based on an average of previous years' costs.

Bridge Modernization - \$250 million

Modernization needs for bridges are determined by the need to widen bridges and remodel bridge rails to meet current standards. The costs associated with these needs are based on the bridge's condition at the time of improvement and can include remodeling bridge railings, widening an existing bridge, or replacing a bridge with a wider bridge.

Rail and Rural Transit Modernization - \$250 million

The rail at-grade crossing needs include all passive warning device locations with an exposure factor (defined as the number of trains multiplied by the number of vehicles) of 3,000 or greater.

The Federal Transit Administration defines a rural area as one encompassing a population of less than 50,000 people that has not been designated in the most recent decennial census as an "urbanized area." The term "transit" refers to public transportation and specialized transportation for the elderly and disabled. For the purposes of this needs estimate, only the transit needs for rural areas are considered.

Estimated 20-year needs for rural transit is broken down into the following categories:

- **Operating Assistance** – Costs associated with direct operation of rural transit systems (including intercity bus).
- **Vehicles** – Cost of expanding and replacing an aging fleet of transit vehicles.
- **Capital Facility Construction** – Cost of constructing or remodeling transit-related buildings for bus storage and office space.

Criteria to identify non-interstate roadway geometric deficiencies are grouped into six Average Daily Traffic (ADT) categories.

Future ADT

36,000 & greater (six lanes warranted)

10,000 - 35,999 (four lanes warranted)

- 12' surfaced lane width
- Outside shoulder
8' of the 10' shoulder will be paved
- Inside shoulder
3' of the 5' shoulder will be paved

4,000 - 9,999

- 12' surfaced lane width
- 8' shoulder width w/6' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 50 mph

2,000 - 3,999

- 12' surfaced lane width
- 6' shoulder width w/2' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 50 mph

750 - 1,999

- 12' surfaced lane width
- 3' shoulder width
When segment is in the Sandhills, 4' shoulder width w/2' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 40 mph

Under 750

- 11' surfaced lane width
- 2' shoulder width
When segment is in the Sandhills, a 4' shoulder width w/2' paved shoulder will be used.
- Stopping sight distance
No vertical crest curve equal to or less than 40 mph

- **Consultant Services** – Costs associated with procuring the services of content area experts to provide technical assistance and professional development opportunities to NDOR and subrecipients.

Capital Improvements

Capital improvement needs are associated with those projects that add vehicle capacity or provide infrastructure for economic development. The projected 20-year capital improvements needs, in 2015 dollars, are \$2.6 billion, and include the following:

Roadway Expansion - \$2.4 billion

Roadway expansion is a broad category which includes costs for future bypasses, new roads, interchanges, additional lanes, upgrading freeways, and the completion of the expressway system. The needs associated with roadway expansion were determined as follows:

Project costs for Build Nebraska Act projects programmed from FY-2017 to FY-2022 and costs for projects under consideration are included. These projects were selected using a scoring system which included travel time, crash reduction, operating costs, environmental and economic benefits. Other factors influence the selection, such as project type, deliverability, geographic distribution and fiscal constraint. The costs for these projects are determined using historical project costs which are then assigned based on project length and scope.

The six-lane interstate needs are determined by projecting when the traffic density will reach level-of-service (LOS) D, as defined in the Highway Capacity Manual. Costs for interstate expansion include all pavement, interchanges, and bridge work for six-lanes between Lincoln and Grand Island.

The urban capacity needs, for cities with a population greater than 5,000, are determined by identifying those roads with a NSI below 60 (fair to poor) and average daily traffic (ADT) that requires additional lanes. Costs for the widening or reconstruction of urban state highways are based on historical cost per mile values which are then used to calculate the needs. The urban bridge needs are extracted from the bridge needs program output and are included in this category.

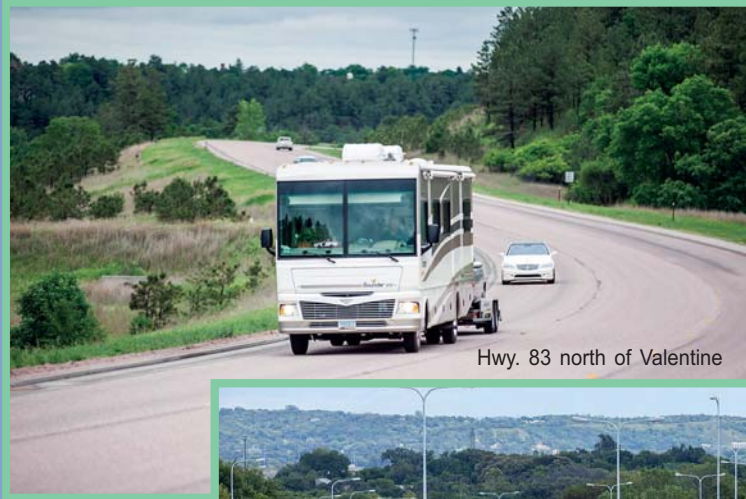
Costs for planning and research to investigate new strategies and to develop the projects mentioned above are also included.

Grade Separations - \$200 million

These needs include all on-system, at-grade crossings that are expected to warrant a grade separation due to a projected exposure factor of 75,000 or greater within the next 20 years.

NDOR's Mission Statement

We provide the best possible statewide transportation system for the movement of people and goods.



Hwy. 83 north of Valentine



I-80 Omaha, near 24th St.



Hwy. 12 near Newcastle