

State Highway Needs Assessment

NEBRASKA

Good Life. Great Journey.

DEPARTMENT OF TRANSPORTATION

2023

JIM PILLEN
Governor

VICKI KRAMER
Director

*Fremont Southeast
Beltway Roundabout*

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MTIS

In 1988, the Nebraska State Legislature assigned the task of annually reporting the needs of the state highway system to the Nebraska Department of Transportation (NDOT). Since that time, NDOT has made yearly progress identifying and addressing the dynamic needs of an evolving state highway system.

To address Nebraska's needs, each year NDOT determines how much of the construction program will be dedicated to [Asset Preservation, System Modernization & Operation](#), and [Capital Improvement](#). These decisions are made based on the condition of the existing system, project deliverability, and revenue projections, and are reflected in the annual [Nebraska Surface Transportation Program \(STP\) book](#). The STP book holds revenue forecasts, the one-year construction program, the five-year planning program, and a summary of changes made since the last book was published. The list of projects under construction can be found in the STP book posted on the NDOT website at <https://dot.nebraska.gov/projects/publications/program-book-2023/>.

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

*Bridge Construction on
US-30 Near Fremont*





LETTER FROM DIRECTOR KRAMER

The state highway system serves as the backbone of Nebraska's transportation system, connecting our communities and carrying freight that supports local and regional economies. Each year, the Nebraska Department of Transportation (NDOT) provides an annual assessment of the state highway system's needs and its efforts to preserve, modernize and improve state managed transportation assets.

The assessment provides a look into how investments translate into meeting the projected 20-year needs of Nebraska's 10,000 miles of highways and 3,500 bridges and serves as a historical record, comparing year-by-year how costs are anticipated to evolve.

Over the next 20 years the highway system's calculated needs are \$16.7 billion in today's dollars, an increase of \$2.2 billion from the 2022 Needs Assessment. When projected inflation is factored in, the estimated cost increases to \$24 billion by 2044.

Several factors persisted over recent years and influenced this estimated 15% increase. To properly represent NDOT's buying power our project estimates have been updated to reflect the current costs of construction.

NDOT is committed to preserving and modernizing Nebraska's highway system for the safe and efficient movement of people and goods. As we continue efforts to emphasize practical design, project bundling and other tools to mitigate increasing costs, we stay dedicated to exploring solutions to get the most value for taxpayers.



Sincerely,

A handwritten signature in black ink, appearing to read "V. Kramer".

Vicki Kramer, NDOT Director

EXECUTIVE SUMMARY

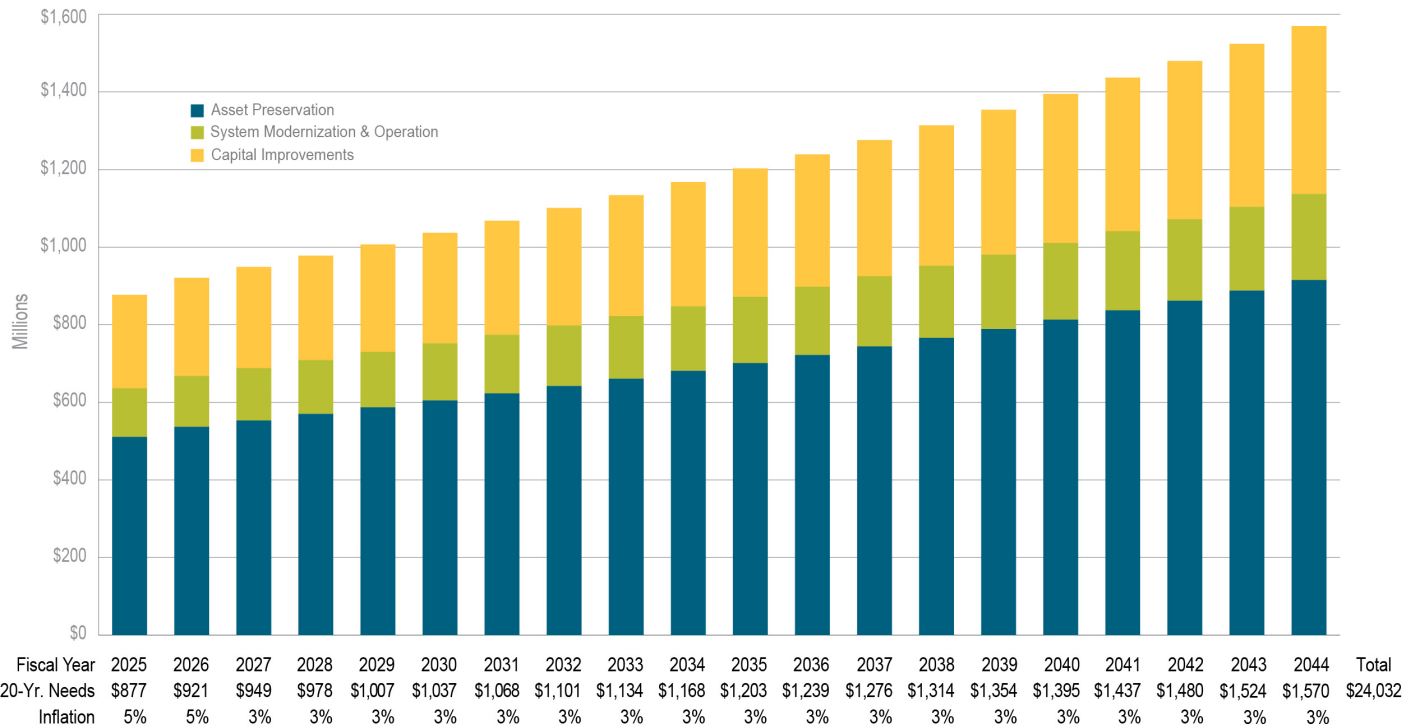
This report identifies the needs for the next 20 years at \$16.7 billion in today's dollars. With inflation applied at 5% for FY-2025, 5% for FY-2026 and 3% for the remaining 18 years, over the next 20 years the total cost of the 2023 needs is estimated at \$24 billion.

\$16.7B
2025

\$24B
2044



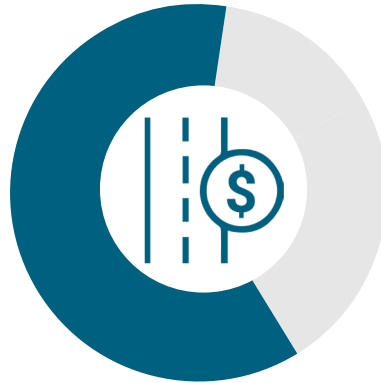
2023 State Highway System Inflated Needs in Millions



SUMMARY OF NEEDS



**ASSET
PRESERVATION**



Maintenance to improve and extend the life of existing assets.

\$9.7B



**SYSTEM
MODERNIZATION
& OPERATION**



Safety, geometric, or mobility upgrades that do not add capacity.

\$2.4B



**CAPITAL
IMPROVEMENTS**



Add capacity or support economic growth.

\$4.6B

ASSET PRESERVATION

20-YEAR PROJECTED NEEDS

\$9.7B

Many factors affect pavement and bridge preservation needs, including previous work, environmental conditions, traffic volumes and loads, and yearly maintenance. NDOT 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.



PAVEMENT PRESERVATION

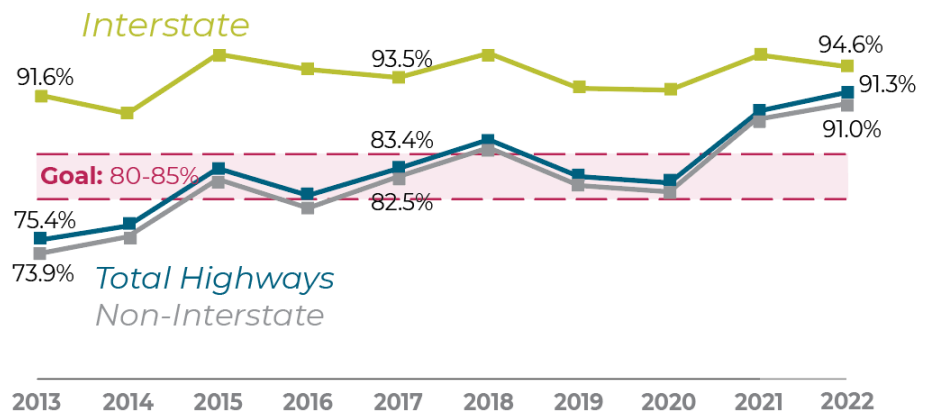
\$8.8B

The entire State Highway System's pavement condition is evaluated each year using the Nebraska Serviceability Index (NSI), which measures factors such as cracking, faulting, rutting, and ride quality.

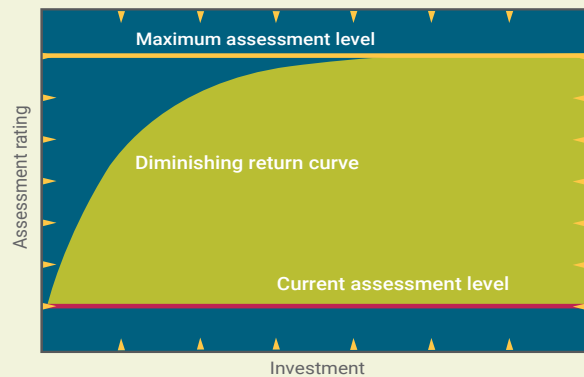
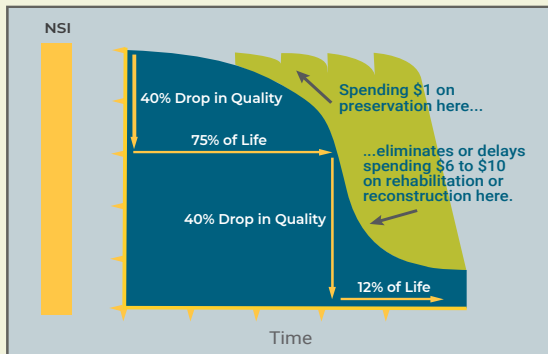
These factors are then used in a formula that calculates the overall condition of the roadways for an NSI rating, which is then used in a benefit/cost analysis tool to identify the right preservation treatment at the right time.

Percent of Miles at Least "Good" (NSI ≥ 70)

NSI Ratings	
0-30	Very Poor
30-50	Poor
50-70	Fair
70-90	Good
90-100	Very Good



Investing in pavements and bridges in the early stages of their life allow's NDOT to use less costly treatments while providing a high level of service/condition. Additionally, NDOT realizes that there is a "sweet-spot" maintaining our pavements and bridges to maximize the benefit.



BRIDGE PRESERVATION \$958M

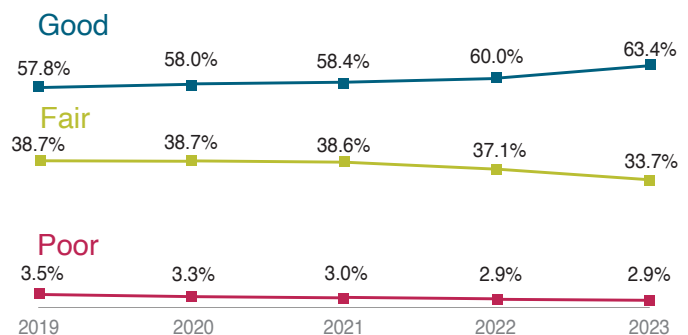
Bridge preservation is focused on maximizing the long-term value of operations of Nebraska's bridge assets. Every bridge in the state is inspected at regular and frequent intervals to gather substantial data on the current bridge condition. This data is utilized to guide our Bridge Management Program on potential actions to take on each state-owned bridge, and when the optimal time to take such action should occur.

Some actions are cyclical in nature and can be expected to be needed regularly, such as replacement of a bridge deck joint. Other actions are in response to an observed deterioration which can be traced through historical inspection records and anticipated damage, or damage resulting from an impact or incident. Rehabilitation is applied to older bridges which includes major construction work required to ensure continuing structural integrity of the bridge. These actions can include, but are not limited to, concrete repair, painting, deck replacement, or substructure repairs.

Each action is guided by the goal of ensuring safety of the structure for the traveling public and extending bridge service-life, therefore optimizing bridge-related expenses. Additional efforts are made to plan bridge preservation construction at the same time as adjacent roadway construction.

A significant effort of bridge preservation expenses in recent years have been associated with bridge decks. Beyond the expense of construction of a new bridge, the second greatest cost with management of bridge assets is replacement of bridge decks. NDOT has been frequently employing asphalt overlays with bridge deck membranes, concrete overlays, and epoxy polymer overlays in order to significantly extend the life of bridge decks and to provide a smooth driving surface. Effective use of preventative preservation techniques extends the service-life of a bridge and serve to optimize long-term economy.

Percent of State-Owned Bridges in Good, Fair or Poor Condition



Bridge Inspection Considerations

Condition • Deterioration rate • Age • Traffic • Cost/benefit



[Scan for additional bridge information](#)

SYSTEM MODERNIZATION & OPERATION

20-YEAR
PROJECTED NEEDS

\$2.4B

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.



**ROADWAY
MODERNIZATION
\$1.5B**

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

Roadway modernization needs are compiled and updated annually by calculating the construction costs, including resurfacing and right-of-way costs.

Modernization needs for rural intersections are determined by the need to improve intersections due to high-traffic volumes and documented crash histories.

The costs to bring these roadways up to current standards are based on annual construction costs, in addition to the costs to remove deficiencies and modernize systems such as cameras, message boards, and fiber optics, as well as lighting and traffic signal needs.

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

<p>36,000 & greater (six or more lanes warranted)</p> <p>10,000 - 35,999 (four lanes warranted)</p> <ul style="list-style-type: none"> • 12' surfaced lane width • Outside shoulder 8' of the 10' shoulder paved • Inside shoulder 3' of the 5' shoulder paved 	<p>4,000 - 9,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 8' shoulder width w/6' paved <p>2,000 - 3,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 6' shoulder width w/2' paved <p>Stopping sight distance</p> <ul style="list-style-type: none"> - No vertical crest curve >20 mph below posted speed limit - No vertical sag curve >25 mph below posted speed limit 	<p>750 - 1,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 3' shoulder width <p>Under 750</p> <ul style="list-style-type: none"> • 11' surfaced lane width • 2' shoulder width <p>Stopping sight distance</p> <ul style="list-style-type: none"> - No vertical crest curve >20 mph below posted speed limit - Existing vertical sag curve condition allowed
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RAIL CROSSING AND RURAL TRANSIT MODERNIZATION

\$689M

The at-grade rail crossing needs include all passive-warning device locations with an exposure factor of 3,000 or greater.

The Federal Transit Administration (FTA) defines a rural area as one with 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 with the exception of proposed, scheduled Lincoln-Omaha intercity bus services and metro area vanpool subsidies.



BRIDGE MODERNIZATION

\$235M

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.

RURAL TRANSIT MODERNIZATION NEEDS



OPERATING ASSISTANCE – Costs associated with direct operation of rural transit systems (including intercity bus) and projected costs of operating scheduled intercity bus routes in the Panhandle Region and Kearney-Hastings-Grand Island.



VEHICLES – Cost of expanding and replacing an aging fleet of transit vehicles. Priority for replacement will be vehicles that have met or exceeded their useful life benchmark as defined in NDOT’s Transit Assessment Management Plan.



CAPITAL FACILITY CONSTRUCTION – Cost of constructing or remodeling transit-related buildings for bus storage and office space. Assumes two capital construction projects per year, at an average cost of \$800,000 each.



CONSULTANT SERVICES – Costs associated with procuring the services of content area experts to provide technical assistance and professional development opportunities to NDOT and subrecipients. Includes an ongoing partnership with the University of Nebraska,

drug and alcohol testing content area expert, and continued consultant involvement in the Statewide Mobility Management project.



TECHNOLOGY – Costs associated with securing hardware and software for scheduling, dispatching, ridesharing, and data collection. Also includes the purchase and implementation of one-call/one-click software for a statewide trip planner.



RIDESHARE PROGRAMS – Includes subsidized vanpool projects in the metro and rural areas. Cost projection assumes the program will grow to approximately 100 vans. As of September 2022, NDOT supported 48 vanpools across the state.



INTERCITY BUS PROGRAM – Cost of subsidizing existing intercity bus service. NDOT is required to spend at least 15% of our rural apportionment on intercity bus service. Cost projection assumes NDOT will meet this requirement through increased intercity service connecting Hastings, Kearney and Grand Island and expanding service in the Panhandle Region.

CAPITAL IMPROVEMENTS

20-YEAR PROJECTED NEEDS

\$4.6B

Capital improvement needs are associated with those projects that add highway capacity and provide infrastructure for economic development.



ROADWAY EXPANSION

\$4.4B

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.

Needs are determined as follows:

- Costs for projects selected for design and construction under Build Nebraska Act (BNA) and Transportation Innovation Act (TIA) between 2020 and 2033 are determined using historical material and project costs, planned length, and scope.
- Costs for expanding the interstate to six lanes between Lincoln and Grand Island includes all pavement, interchanges, and bridge work. 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 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 capacity needs for cities with a population greater than 5,000, are determined by identifying roads with a fair-to-poor pavement condition and average daily traffic (ADT) that requires additional lanes.

- The urban-bridge needs are extracted from the bridge needs program output and are included in this category.
- The costs for planning and research to investigate new strategies and to develop the projects mentioned above also are included.
- Costs of implementing the Metro Area Travel Improvement Study (MTIS) which was completed in 2019.



GRADE SEPARATIONS

\$158M

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

METRO AREA TRAVEL IMPROVEMENT STUDY

The MTIS is a collaborative effort between NDOT and the Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA). MTIS is a comprehensive study that recognizes future interstate and freeway system needs are intrinsically linked with arterial, local roads and transit system needs and investment decisions within the MAPA region.

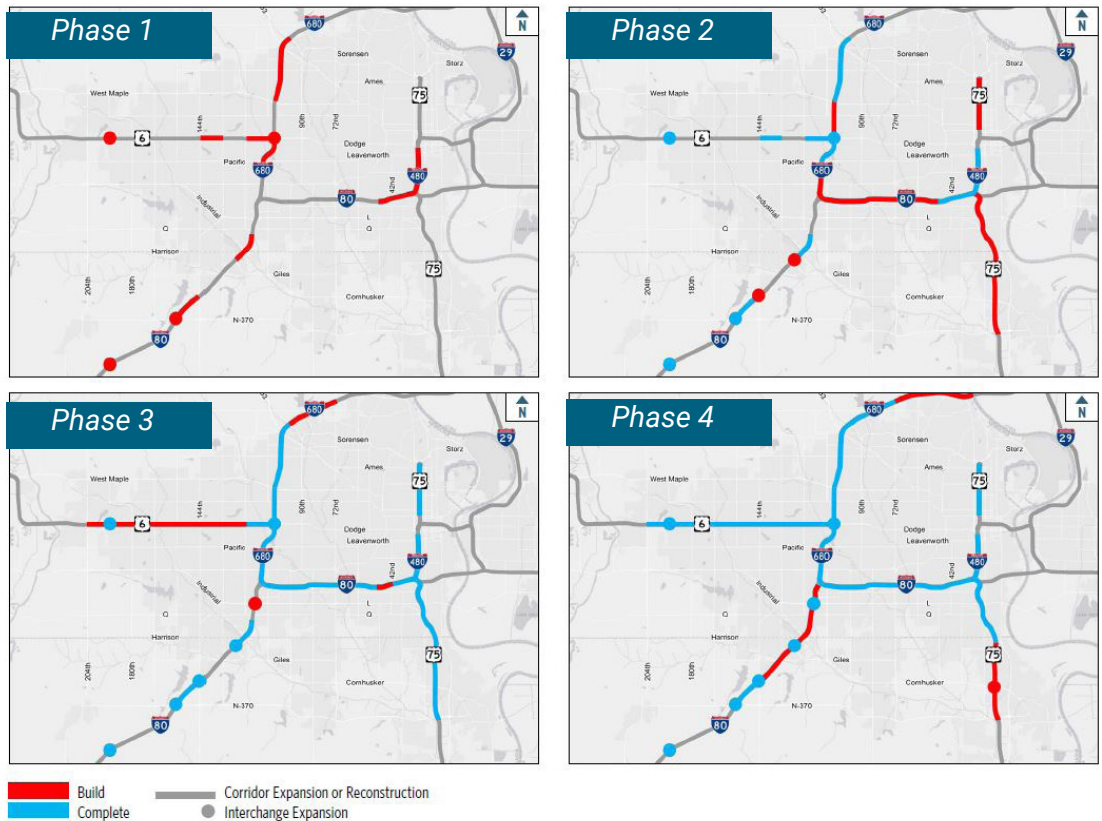
This study has helped identify the transportation network that will best meet the long term needs of the community. Study area roadways included National Highway System (NHS) routes, and non-NHS routes considered priority corridors by NDOT and MAPA. The study area included 83 miles of Interstate freeway, 39 miles of other freeways/expressways, 180 miles of state highway and 176 miles of local roads.

Study Goals and Performance Measures

- **System Preservation**
 - Achieve state-of-good-repair by effectively maximizing the life span of existing infrastructure
- **Mobility & Accessibility**
 - Reduce the growth of peak-period travel times for all modes and increase transit access and ridership
- **Safety**
 - Reduce fatalities and serious injuries
- **Congestion Reduction**
 - Reduce the growth of peak-period delays on freeways and improve system reliability and overall performance
- **Stewardship & Environment**
 - Address air quality concerns, consider land use in all improvements and incorporate economic, social and environmental criteria in project selection and programming decisions



For more information about MTIS, scan the QR code or visit dot.nebraska.gov/projects/publications/mtis/





NDOT
Teammates at the
Kearney MOU Signing