



Nebraska Department of Roads

PLAN FOR THE ROADSIDE ENVIRONMENT

**This Plan was developed by the
NDOR Landscape Plan Committee**

Sponsor

Cynthia Veys

Chair

Art Thompson, RLA

Committee Members

Alison Krohn, RLA

Ronald Poe

Cynthia Veys

Carol Wienhold

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Foreword

The highway corridors across Nebraska impact the lives of all our citizens and visitors on a daily basis. The Department's mission is to provide a safe, reliable, affordable, and environmentally compatible transportation system.

This Plan will help guide the development of our highway roadsides.

The result will be a transportation system that makes the manmade and natural environments compatible and sustainable.

John L. Craig, Director
Nebraska Department of Roads

Executive Summary

The *Plan for the Roadside Environment* is designed to create a roadside that can better overcome the disturbances of construction, withstand the rigors of the Nebraska Climate and perform the landscaping objectives that contribute to safe and maintainable roadsides that complement the surrounding landscape.

This manual compiles environmental and sociological information about Nebraska, providing a foundation for better understanding Nebraska landscapes and the highway corridors within their environment. The Nebraska Natural Legacy Project, a conservation plan published by the Nebraska Game and Parks Commission, formed the foundation for this plan.

The Plan was created for use by Nebraska Department of Roads' personnel in creating roadside landscape and mitigation designs. It provides a common base of information for administrators, planners, designers, and construction and maintenance supervisors. The information is directed at understanding the integration of environmental concerns, landscape objectives and mitigation and maintenance requirements. As the plan was being developed, NDOR involved many of the natural resource agencies for their expertise. During this interagency involvement, it was realized that this documented approach to roadside development would also be of benefit to the agencies as well. The agencies can better understand and be part of NDOR's vision for an integrated landscape that maximizes benefits to the environment as well as the traveling public. The Plan provides information basic to the understanding of transportation needs and environment, in all defined landscape regions and roadway corridors of Nebraska. Information is presented in the form of regional maps and text for each of the six landscape regions in Nebraska. Five roadway corridor types are defined which can occur in all regions, with landscape objectives identified for each corridor type.

Implementation of the Plan requires roadside environment consultation at the earliest stages of a project's development, when feasibility is being considered through Engineering Review and Location Study. It is intended that the elements identified in the Plan will provide a foundation upon which NEPA analysis will draw, and preliminary through final design activities will be guided, in their various stages of development. During routing, scheduling, and project design reviews, the elements important to the project's landscape region will be discussed and incorporated for best design development. The Plan will provide a common base of information to be used in training construction and maintenance supervisors concerning landscape and context sensitive issues.

The Plan promotes increased use of native plantings and vegetative management to control noxious weeds, in an effort to provide a sustainable, noxious weed-controlled roadside environment. Section 6006 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, 2005) recognized the value of increased use of native plantings and noxious weed control by providing Federal-aid eligibility for these purposes (23 Code of Federal Regulations, Section 329). Code 23 U.S.C. Section 329 specifically encourages and lists Federal-aid eligible plant establishment and management activities, such as those identified in this Plan, for efficient planning and use of limited resources. The Nebraska Plan promotes increased use of native plantings, good stewardship and maintenance of a unique and sustainable "Nebraska Landscape", recognizing that fulfilling the landscape objective is an integral part of good roadway design.

Introduction

Landscaping of the roadside involves many operations and items such as grading, drainage and soil stabilization techniques and the selection of trees, shrubs, perennials, grass and wildflower seeding. How and where these elements are installed, coupled with the use of environmental mitigations within the right-of-way whenever possible, can result in a number of secondary benefits to the roadway corridor. A better understanding, at the beginning of a project, regarding the role landscape treatments play in improving the perception and operation of the roadway corridor, enables better decisions to be made throughout the development of a project.

This landscape plan provides a framework to direct current and future development of sustainable roadway corridors in Nebraska. The *Plan for the Roadside Environment* recognizes the need for safety, ease of maintenance and environmental stewardship. It draws from a variety of data and experience gained from 40+ years of roadside projects and presents an aesthetic based on our prairie heritage, offering a unique Nebraska Style.

Accomplishing this plan will combine our experience with new methods, technologies and the knowledge and diverse skills of landscape architects, environmental scientists and civil engineers working together.

Enhancing existing partnerships and developing new partnerships with other agencies, communities, organizations and interested parties will also help fulfill this plan. Ongoing partnerships with Nebraska Game and Parks Commission, Nebraska Forest Service, UNL-Center for Grassland Studies, State Department of Agriculture-Weed Advisory Committee, NRCS-Nebraska Plant Materials Committee, various Natural Resource Districts and others will broaden the benefits to the public. With these partners, we will be able to share knowledge and combine resources for mutual benefit.

This plan addresses opportunities in which construction elements, combined with landscaping techniques and appropriate plant materials, will achieve an environmentally compatible statewide transportation system.

The Plan

The purpose of this plan is to create roadside landscapes for Nebraska highways that can better overcome the disturbances of construction, withstand the rigors of Nebraska's climate and fulfill landscape objectives that contribute to safe and maintainable roadsides that complement the surrounding environment.

The elements used to create the roadside landscape will substantially be those that are already included in each project, but they may be accomplished in new ways. When these elements also accomplish the landscape objectives of that roadway corridor, they increase the benefits of that investment and improve both the quality and value of our investment in that roadway corridor. Core elements to be used to accomplish desired landscape objectives include the following:

- Increased use of native plants appropriate to each landscape region of the state
- Using seeding of native grasses, legumes and forbs in new ways as design elements to accomplish landscape objectives as well as provide soil stabilization for the roadway corridor
- Using required environmental mitigations in a manner that will accomplish landscape objectives within the highway corridor
- Using permanent erosion control and stormwater control constructions as design features to accomplish landscape objectives within the highway corridor as appropriate
- Development of additional ways to use plantings to reduce maintenance efforts and improve stewardship
- Enhance existing partnerships and develop new partnerships with natural resource agencies and others to broaden benefits and to share knowledge and combine resources for mutual benefit

The roadside landscape must also recognize the movement of plants and animals. These corridors provide a way for plants and animals to move between habitats that have been fragmented by agriculture, expanding communities and various other activities of man and nature. Understanding this need and using thoughtful design and appropriate long-term management of these corridors will allow for safer movement of all species whether for seasonal migration or changes over longer periods of time.

Plan Components

In order to keep each roadway corridor in context with its surroundings, six landscape regions are defined for Nebraska. This NDOR *Landscape Regions Map* takes into consideration their differences in climate, geology, hydrology, geography and native plant communities across the state, as well as our experience working in these areas.

The statewide highway system contains several functional classifications for roadways. For the purposes of this plan, we have organized the highways into corridor types based on the context of their location, usage and complexity. The corridor types are:

- Metropolitan
- Community Center
- Community edge
- Rural Interstate/Expressway
- Rural Highway
- Scenic

Based on the characteristics of these corridors, landscape objectives have been assigned to each corridor type. The purpose of the landscape objectives is to improve:

- How the motorist perceives the roadway corridor.
- NDOR's ability to maintain each corridor type.
- Appearance and environmental quality of each corridor.

Seven landscape objectives have been established as basic to all roadway corridors (these are described on Page 13). Additional landscape objectives have been determined to be beneficial to each corridor type. The landscape objectives for each roadway corridor type are the same throughout the state, but they may be implemented in different ways to remain in context with a particular landscape region.

These objectives offer improved motorist safety by enhancing the driver's perception of vehicle speed and distance along the roadway, improving environmental quality, cost savings on repetitive maintenance operations, making the roadway compatible with its surroundings and more.

Reports have been compiled for each landscape region. Each report contains maps of the roads and special interest areas in that region, as well as information concerning environmental and social components. Any special landscaping techniques, hydrology, unique biotic communities, or environmental issues of particular concern to a specific landscape region are discussed and recommendations provided, when appropriate, in each regional report. Plant material guidance is provided for grasses, wildflowers and woody plants. These guidelines are based on plants that are native to that region, our experience in the landscape regions and research of other recognized sources.

A second regional map has been developed that displays the corridor classifications of the highway segments in each region. This map can be used to determine the landscape objectives desirable in each corridor. Information on special characteristics of roadway corridors in the region is also presented in these individual landscape region reports.

The regional reports provide background for a basic awareness of the overall environment the roadway corridors pass through. The reports point out many sociological and environmental issues that have an influence on the roadside environment.

The regional information will be the basis for the appraisal of roadway corridors within the various regions of the state. By reviewing the landscape needs, identifying the landscape objectives and coordinating them with the other environmental commitments, the roadway corridor will better meld with the surrounding regional landscapes.

In development of the roadside landscape, native plant materials will be emphasized. Environmental commitments such as roadside stabilization, mitigation requirements and threatened and endangered species bring requirements that must be incorporated into the project and affect the roadside environment. By reviewing the project throughout the roadway design process, the opportunity is available to incorporate the environmental requirements as design features within the roadway corridor, using them to accomplish desired landscape objectives.

The long-term maintenance needs of a roadway corridor must be considered. To be able to successfully maintain these sustainable roadside corridors, management plans will be developed with each District involved that recognize the agency capabilities, regional characteristics and any ongoing environmental commitments.

As this plan continues to develop, partnering will be expanded, and new guidelines for design, vegetation management, project implementation, incorporation into plan documents, specifications, contract administration will be developed.

Bibliography

1. Amekudzi, A. and Meyer, M.. National Cooperative Highway Research Program, *NCHRP Report 541 Consideration of Environmental Factors in Transportation Systems Planning* (Washington DC, Transportation Research Board) 2005.
2. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets 2001* (Washington DC, American Association of State Highway and Transportation Officials) 2001.
3. AASHTO Highway Subcommittees on Design Task Force for Environmental Design. *A Guide for Transportation Landscape and Environmental Design* (Washington DC, American Association of State Highway and Transportation Officials) 1991.
4. Arizona Department of Transportation, Intermodal Transportation Division, *Arizona Department of Transportation Regional Freeway System Landscape Value Analysis Report* (Phoenix AZ; ADOT Transportation Roadway Engineering Group Roadside Development Section) 1997.
5. Barton, Susan-University of Delaware, Drake, Rick and Schwetz, Gary. Delaware Center for Horticulture; *Enhancing Delaware Highways; A Roadside Vegetation Concept and Planning Manual* (Dover DE; Delaware Department of Transportation) 2005.
6. Bleed, Ann. *An Atlas of the Sand Hills* (Lincoln, NE : Nebraska University in cooperation with World-Herald) 1989.
7. Brewer, Jim. German, John; Krammes, Ray; Movassaghi, Kam; Okamoto, John; Otto, Sandra; Puff, Wendell; Sillan, Seppo; Stamatiadis, Nikiforos; Walters, Robert: *Geometric Design Practices for European Roads* (Washington DC, Office of International Programs FHWA-HPIP, US Department of Transportation) 2001.
8. Brown, Janice W. *Eco-logical: An Ecosystem Approach to Developing Infrastructure Projects* (Cambridge, MA; U S Department of Transportation Research and Innovative Technology Administration) 2006.
9. C. F. Keech and Ray Bentail. *Resource Report Number 4 – Dunes On the Plains, The Sand Hills Region of Nebraska* (Lincoln NE; University of Nebraska Conservation and Survey Division) February 1971.
10. Chapman, Shannen S.; Omernik, James M.; Freeouf, Jerry A.; Huggins, Donald G.; McCauley, James R.; Freeman, Craig C.; Steinauer, Gerry,; Angelo, Robert T.; Schlepp, Richard L.. *Ecoregions of Nebraska and Kansas – color poster with map, descriptive text, summary tables and photographs;* (Reston VA, U S Geological Survey) 2001.
11. Committee on Geometric Design. Transportation Research Board, *Context-Sensitive Design Around the Country, Some Examples: Number E-C067* (Washington DC; Transportation Research E-Circular) 2004.
12. Danis Road Directorate-translation. Abrahamsen, Martha Gaber, *Beautiful Roads – A handbook of Road Architecture* (Copenhagen K. Denmark, Danish Road Directorate) 2002.
13. Elder, John A.. *Resource Report Number 2 – Soils of Nebraska* (Lincoln NE; University of Nebraska Conservation and Survey Division) May 1969.
14. Federal Highway Administration; *Roadside Weed Management* (United States: U.S. Department of Transportation, Federal Highway Administration, publication number FHWA-HEP-07-017) 2007.

15. Illinois Department of Transportation. *Chapter Fifty-Nine: Landscape Design and Erosion Control* (Illinois Department of Transportation) 2002.
16. Kuzelka, Robert. *Flat Water: a History of Nebraska and its Water* (Lincoln, NE : University of Nebraska) 1993.
17. Lincoln-Lancaster County Ecological Advisory Committee. *Historic and Ecological Resources Survey* (Lancaster County NE; Lincoln-Lancaster County Ecological Advisory Committee) 1985.
18. Minnesota Department of Transportation's Landscape Architecture Unit. *Inspection and Contract Administration Manual for MN/DOT Landscape Projects 2006 Edition* (St. Paul, MN; Minnesota Department of Transportation) 2006.
19. Minnesota Department of Transportation. Site Development Unit, *Architectural and Visual Quality Design Recommendations for the T.H. 212 Transportation Corridor: Aesthetic Design Guide* (MNDOT Office of Technical Support, Site Development Unit) 1997.
20. Nebraska Board of Public Roads Classifications and Standards. *Nebraska Minimum Design Standards: Counties, Municipalities, State* (Lincoln, NE; Nebraska Department of Roads, Government Affairs Division) 2002.
21. Nebraska Chapter – Associated General Contractors of America. *Nebraska Threatened and Endangered Species Identification Guide 2007* (Lincoln NE; Nebraska Chapter – American General Contractors of America) 2007.
22. Nebraska Department of Agriculture and Inspection. *Nebraska Weeds* (Lincoln, NE : Nebraska Department of Agriculture and Inspection, Division of Noxious Weeds) 1952.
23. Nebraska Department of Roads. Nebraska Department of Roads *Roadway Design Manual* (Lincoln, NE, Nebraska Department of Roads) 2006.
24. Nebraska Game and Parks Commission. *Walk in the Woods* (Lincoln, NE : Nebraska Game and Parks Commission, NEBRASKAland Magazine) 1993.
25. Nebraska Game and Parks Commission, Rick Schneider, Mark Humpert, Kristal Stoner, Gerry Steinauer. *The Nebraska Natural Legacy Project: A Comprehensive Wildlife Conservation Strategy* (Lincoln, NE; The Nebraska Game and Parks Commission) 2005.
26. Nebraska State Highway Board. *Soils of Nebraska as Road Materials and Naming, Routing, Marking of Nebraska Highways* (Nebraska State Highway Advisory Board) 1919.
27. Neuman, Timothy R. National Cooperative Highway Research Program; *Context Sensitive Design for Integrating Highway and Street Projects with Community and the Environment* (Chicago IL, Transportation Research Board National Research Council) 2001.
28. Nevada Department of Transportation, Landscape Architecture Section. Design Division, *Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada Highway System* (Carson City NV; Nevada Department of Transportation) 2002.
29. New York City Department of Design and the Construction and Design Trust for Public Space. *High Performance Infrastructure Guidelines: Best Practices for the Public Right-of-Way* (New York NY, New York City Department of Design and the Design Trust for Public Spaces) 2005.
30. Nisenson, Lisa. U S Environmental Protection Agency: *Using Smart Growth Techniques as Stormwater Best Management Practices* (EPA's National Service Center for Environmental Publications – number EPA 231-B-05-002) 2005.

31. Ohio Department of Transportation. *Design Aesthetics* (Ohio Department of Transportation) 2000.
32. Pennsylvania Department of Transportation. *Publication 461, Roadside Planting Guidebook* (Harrisburg, PA; Pennsylvania Department of Transportation, Bureau of Maintenance and Operations) 2003.
33. Texas Department of Transportation. *Landscape and Aesthetics Design Manual* (Texas Department of Transportation) 2001.
34. USDA Natural Resources Conservation Service. Technical Resources; *Nebraska Field Office Technical Guides: Section II Natural Resources Information* (Lincoln, NE, USDA Natural Resources Conservation Service) 2006, 2007.
35. U S Department of Interior. *The Platte River Ecology Study: Special Research Report* (Jamestown, ND : U.S. Department of Interior, Fish and Wildlife Service) 1981.
36. Vermont Chapter of the American Society of Landscape Architects. *Landscape Guide for Vermont Roadways and Transportation Facilities* (Montpelier, VT; Vtrans The Vermont Agency of Transportation) 2002.
37. Water and Ecosystems Team Office of Natural Environment Federal Highway Administration; *Roadside Use of Native Plants* (Washington D.C.: Federal Highway Administration) September 1999.

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