Southern US 95 and US 93
landscape and aesthetics corridor plan

Corridor Plan

INCLUDES US 95 SOUTH FROM RAILROAD PASS TO THE CALIFORNIA STATE LINE, US 93 TO HOOVER DAM AND US 95 NORTH OF I-215 TO THE CLARK COUNTY LINE WEST OF INDIAN SPRINGS

December 15, 2006

DESIGN WORKSHOP
PLACES
Sand County Studios
JW Zunino & Associates
CH2M Hill
MESSAGE FROM THE GOVERNOR OF NEVADA

On June 6, 2002, the Nevada Department of Transportation adopted as policy, “Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada State Highway System.” The second phase of planning is complete. The Landscape and Aesthetics Corridor Plan represents a significant step forward for the Landscape and Aesthetics program created by the Master Plan because it involves local public agencies and citizens in the planning process. Now, Nevada’s highways truly represent the State and its people. The Corridor Plan will be the primary management tool for use in guiding funding allocations, promoting appropriate aesthetic design, and providing for the incorporation of highway elements that uniquely express Nevada’s landscape, communities, and cities, as well as its people. The State considers this Corridor Plan to be a major accomplishment for the future of Nevada highways.

MESSAGE FROM THE DIRECTOR OF NEVADA DEPARTMENT OF TRANSPORTATION

Landscape and aesthetics are an integral part of the design in building and retrofitting our highway system. This Landscape and Aesthetics Corridor Plan for US 95 and US 93 in Southern Nevada helps realize our vision for the future appearance of our highways. The plan will provide the guidance for our own design teams, and it will help Nevada’s citizens participate in formulating context-sensitive solutions for today’s transportation needs. Together, we will ensure our highways reflect Nevada’s distinctive heritage, landscape, and culture.
ENDORSEMENTS

This Corridor Plan has been reviewed by the following groups and agencies. Endorsement means agreeing in principle with the opportunities and recommendations identified within agency jurisdiction:

City of Boulder City
City of Henderson
City of Henderson Parks and Recreation Department
Clark County Parks and Recreation
Clark County Public Works Department
Fort Mojave Tribal Council
Las Vegas Arts Commission
National Park Service
Natural Resources Conservation Service
Nevada Division of Forestry
Nevada Division of State Parks, Las Vegas Region
Nevada Resort Association
Nevada State Museum and Historical Society
Regional Transportation Commission of Southern Nevada
Searchlight Town Advisory Board
Sierra Club
Southern Nevada Home Builders
Southern Nevada Water Authority
State Arts Commission
U.S. Forest Service Spring Mountain National Recreation Area
University of Nevada, Las Vegas
ACKNOWLEDGEMENTS

State Transportation Board
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Kathy Augustine Controller
Caesar Caviglia Member
Tom Gust Member
Lorraine Hunt Lieutenant Governor
Brian Sandoval Attorney General
Jim Thornton Member

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Laurie Ann-Grimes Sig Jaunarajs
Tom Brady Mara Jones
Steve Bunnell Charlie Kajkowski (Vice-Chair)
Denis Cederburg Clara Lawson
Daryl Crawford Patrick Pittenger
Keyth Durham Marc Reynolds (Chair)
Paul Enos Jonna Samsom
Jon Ericson Bruce Turner
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Bill Bible David Hunt Deborah Murray
Eric Blumensaat Rick Keller Damon Ohlerking
Jackie Brady Teri Knight Lisa Ortega
Ann Brauer Myrna and Bob Kokesch Cathy Razor
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Kari Bergh - Landscape Architect

CH2M Hill
Cindy Potter - Civil Engineer, Principal, P.E.

Nevada Department of Transportation
Rand Pollard, P.E. - Assistant Chief of Road Design Engineer
Lucy Joyce-Mendive - Landscape Architect Supervisor
Janice Ellis - Assistant Landscape Architect
Ron Blakemore - Former Landscape Architect Supervisor
EXECUTIVE SUMMARY

This plan establishes the vision for the landscape and aesthetics of the Southern US 95 and US 93 corridor. The vision synthesizes historic, current, and future conditions into a comprehensive guide to improve the visual appearance of the highway corridors through communities, rural landscapes, and scenic environments.

The first chapter of this report provides an introduction to the NDOT Landscape and Aesthetics program. It describes the mechanism by which corridor design will be managed, a description of programs and elements that influence highway aesthetics, and a summary of background information gathered and analyzed.

Chapter Two describes the process through which sections of the highway were categorized into highway zones and divided into distinct landscape design segments: Mountain Desert Vista, Destiny of the West, and Mojave Desert Vista. A description of the theme, design objectives and examples of the appropriate design aesthetic are presented for each segment. Additionally, maps and sections of the landscape design segments provide detail regarding the location of specific projects and the desired level of aesthetic treatment.

Chapter Three begins by outlining an approach to the design process. This process highlights the necessity of integrating landscape and aesthetics at the beginning of every project. Design guidelines are included to provide the framework for improving the aesthetics of existing, new, and retrofit highway projects. They are written statements of recommended methods to meet the segment’s design objectives. The guidelines, accompanied by concept diagrams, sketches, or photographs, demonstrate ways in which to achieve the design intent.

Chapter Four summarizes the cost implications associated with the improvements proposed by this Corridor Plan. Cost estimates are included for both preliminary project budgeting as well as ongoing project maintenance. These estimates will inform NDOT in the decision-making process and help influence budget allocations for the landscape and aesthetics highway improvements.

The remaining chapters provide information that will help readers understand the technical information presented in the document.

USER’S GUIDE

• Refer to the section beginning on page 1.3 to understand Softscape and Hardscape Types and Treatments

• Refer to the Introduction and Section One of Chapter Two beginning on page 2.1 to understand how the corridor is organized into Highway Zones

• Refer to Chapter Two, Sections Two through Four beginning on page 2.12 to understand the theme and design objectives for each Landscape Design Segment

• Refer to pages 2.20, 2.21, 2.30, 2.31, 2.38, and 2.39 for Design Interpretation

• Refer to Chapter Three beginning on page 3.1 for specific Design Guidelines

• Refer to page 3.23 to view the base and accent Color Palettes

• Refer to pages 3.42, 3.44, 3.45, and 3.46 to view the Plant Palettes for each Softscape Type

• Refer to Chapter Four beginning on page 4.1 for the description of Funding and Costs

• Refer to the section beginning on page 4.17 for Project Priorities
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SECTION ONE: Introduction

THE VISION

Nevada has a renewed commitment to landscape and aesthetics for the state’s highways. In 2002, the Nevada Department of Transportation (NDOT) adopted the Landscape and Aesthetics Master Plan, raising the bar for context-sensitive design.

“We envision a system of state highways that reflect the land and people of Nevada. We believe that Nevada should have highways that are aesthetically pleasing, as well as safe and cost effective. Therefore, no state highway is complete until landscape and aesthetics are considered and addressed.”

Pattern and Palette of Place, 2002, p.10-11

Today, it is the policy of the State of Nevada to consider landscape and aesthetics in conjunction with other design factors in all transportation projects. Furthermore, NDOT recognizes that successful projects result when local communities, the public, other permitting agencies, and the private sector participate in the planning, design, construction, and maintenance of transportation projects. Partnerships are imperative to ensure Nevada’s highway system expresses the unique heritage, culture, and environment of the state and its communities.

Purpose of the Corridor Plan

The Southern US 95 and US 93 Landscape and Aesthetics Corridor Plan is based on the vision and recommendations of the Master Plan. This plan establishes the vision for landscape and aesthetic treatments for each highway, synthesizing historic, current, and future conditions to improve the visual appearance of each corridor. The plan describes the vision, not the promise, for highway landscape and aesthetic treatments and enhancements. Implementation of the vision will be achieved through the combined efforts of local governments, private citizens, civic groups, and the business community.

As shown in illustration 2, the corridor includes US 95 from the California state line near Cal Nev Ari to the US 95/US 93 intersection, US 93 from Railroad Pass east to Hoover Dam, and US 95 north of Las Vegas from Kyle Canyon to the Clark County line.

The Corridor Plan identifies major design themes and materials to be used in landscape and aesthetic treatments. It also recommends the level of treatment to be applied to highway features in the corridor, providing a broad cost estimate of treatments, and outlining strategies for funding of construction and long-term maintenance.
Chapter One — Corridor Management and Background Inventory

The Corridor Plan is a method for improving the aesthetic qualities of the state’s highways, particularly in relation to adjacent cities, communities, and neighborhoods. The Corridor Plan is intended to affect both existing highways as well as future expansion projects. Landscape and aesthetic treatments identified and prioritized in the Corridor Plan may be funded from a variety of sources. As a general rule, up to three percent of total highway construction costs on all new construction and capacity improvements may be allocated to landscape and aesthetic treatments. Funding for the retrofit of landscape and aesthetic improvements to existing highways is based on community partnerships and the opportunity for communities to match State funds with a share of local money, Federal monies, or in-kind contributions. The Corridor Plan is a public/private partnership initiative. This unique initiative is guided by the partnership policy outlined in the NDOT Landscape and Aesthetics Master Plan, which states:

“Local communities, the public, other permitting agencies, and the private sector are encouraged to be involved in planning, design, construction, and maintenance of transportation projects to express the unique heritage, culture and environment of the state and its communities.”

Pattern and Palette of Place, 2002, p. 12

Furthermore, NDOT will work with local governments, private citizens, civic groups, and the business community to develop cooperative agreements for funding the design, construction, and maintenance of landscape and aesthetic improvements identified in this Corridor Plan. In locations where recommendations exceed NDOT’s normal financial responsibility and the community desires the elevated level of aesthetic treatment, NDOT will engage the community to create partnerships to find additional funding.

CORRIDOR DESIGN MANAGEMENT

This plan is a useful management tool for designing highway projects because it provides specific recommendations, programs, and a description of the intended result.

The Corridor Plan establishes a theme or central design idea. Projects within each landscape design segment are guided by a theme, associated design objectives, examples that illustrate interpretation of the theme, and a program of facilities with common definitions. Design guidelines, estimated costs, and project priorities establish the viability of the final corridor plan. NDOT will use the Corridor Plan as one of the tools to manage the design of the highway. Prior to designing specific projects, NDOT and the design consultant should review the Corridor Plan to understand how the project level design fits within a particular landscape design segment. Implementation of the designated treatment levels may depend on partnerships and funding opportunities. Overall, the vision and intent of the themes and treatment levels should be considered as the guide throughout the design process. Figure 1 (page 1.11), outlines the steps that are necessary in order to achieve the desired outcome for this corridor.

PUBLIC PARTICIPATION

Early and continuous public involvement has been critical to the success of the Landscape and Aesthetics Corridor Plan. NDOT fostered extensive public dialogue at every stage of planning and development. This engaged communities and helped to develop local support.

The public participation process provided stakeholders with a forum for sharing knowledge of their communities, identifying opportunities for enhancing the landscape and aesthetics of the corridor, creating design objectives and guidelines for highways in their area, and prioritizing prospective projects. The public participation process ensured:

- Identification of issues and concerns to each community
- A method, strategy, and action plan to address community concerns
- Opportunities for the public to express their level of support for the Corridor Plan
- Release of full information about the Corridor Plan through public meetings, the Corridor Plan Web site, and fact sheets

The public process involved a multi-layered approach to encourage maximum participation.

- A Technical Review Committee (TRC), composed of a broad range of stakeholders, contributed significant local agency and community knowledge
- The TRC was able to identify issues, help establish priorities, ask questions, and provide input at two public meetings
- A fact sheet was widely distributed to provide general information about the corridor plan
- The public visited a corridor planning Web site to learn more about planning activities
- Individual stakeholder meetings were conducted to ensure that all those who needed to be included were involved
- A media relations strategy was developed to encourage even greater participation

Public participation and community involvement are important components of the planning process because they have helped to ensure that the recommendations outlined in this Corridor Plan reflect the ideas and suggestions of local community members.

(1) The Technical Review Committee (TRC) allowed representatives of various agencies to review intermediate reports and provide valuable information regarding the corridor.

(2) A series of public meetings were held throughout the corridor planning process to gather information from local residents and stakeholders.
The Elements of Landscape and Aesthetics provide the framework used to define the purpose and intent of highway corridor improvements. These elements, described on the following pages, include varying intensities of softscape and hardscape, statewide signage, rest area facilities, native wildflower program, approaches to address outdoor advertising, scenic byways, anti-littering campaigns, and a Main Street approach. NDOT currently incorporates some of these elements; however, many others are redefined. In some cases, new facility types are established.

**LANDSCAPE TREATMENT TYPES**

A Landscape Treatment Type includes a Softscape Type and a Structures and Hardscape Type. Every section of NDOT rights-of-way has a Landscape Treatment Type associated with it to define its design character and maintenance requirements. Softscape treatments vary from a simple ground cover treatment to more elaborate ornamental plant material. Similarly, structures and hardscape treatments range from standard category to landmark quality. Used in combination, these treatment levels establish the design character within the corridor. The matrix of possible combinations of softscape types and structures and hardscape treatments is shown in Figure 2.

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Softscape Types and Treatments

Softscape types and treatments are compositions of plant materials including trees, shrubs, perennials, grasses, and ground treatments. Although the treatments require varying levels of irrigation, an overall emphasis has been placed on water conservation. NDOT requires cooperative long-term maintenance agreements with local stakeholders for irrigated landscapes. The following descriptions and photographic examples define the specific softscape types that may be utilized in sections of the corridor. Plant palettes and guidelines are described beginning on page 3.42.

Native Plant Revegetation Softscape

A palette of native southern Mojave plant materials, including Creosote Bush/Bursage or Blackbrush, should be used to reestablish disturbed areas along the roadway. Seeding should be interspersed with mature plantings to create an established plant community character. Plantings should be sparse and infrequent, and require only temporary irrigation to ensure plant survival. Enriching the soil with mulch and other amendments is required, and preparation techniques include roughening grade for seed siting and amending the soils with mulch and topsoil.

Ground Treatment

Ground treatments along the roadway provide erosion and dust control. This treatment includes uniform applications of rock mulch or variable sizes of stone, combined with textures that match the existing environment. In rural areas, palettes are derived from natural patterns found in playas, foothills, or ephemeral drainages. In urban environments, various forms of aesthetic rock treatment are used to create patterns and textures. Irrigation is not included in this treatment.

Total Cost: $1.20 - $1.40 sf  L & A Cost: $0.00 sf

Note: These photographs show examples of softscape types and treatments.
Enhanced Native Softscape
This treatment accentuates change by introducing a greater diversity of plant materials from the southern Mojave plant palette. Organized in greater densities, trees are used to increase vertical diversity. Special ground treatments for drainage and erosion control are included. Drip irrigation is required to assure plant survival.

Total Cost: $1.50 - $1.70 sf  
L & A Cost: $0.30 - $0.50 sf

Regionally Adapted Softscape
Combinations of Mojave and related desert plants form this landscape palette. A greater density and variety of plant materials are combined to create a layering effect. Trees provide a distinct overstory, while shrubs and perennials form a thick understory. Plants are selected for color, texture, seasonal change, and form. For this landscape type to survive, drip irrigation to individual plants is required.

Total Cost: $2.40 - $2.90 sf  
L & A Cost: $1.20 - $1.70 sf

Regional Ornamental Softscape
Regional ornamental landscape includes a diversity of plant species, some of which are imported to this region. Ornamental landscape introduces taller and denser plant materials, such as species of pine and palm trees. The regional ornamental landscape includes shade, varieties of form and color. It provides a dynamic contrast to the arid landscapes of naturally-occurring plant species. In the regional ornamental landscape, vegetation patterns and compositions are designed to reflect aesthetic and cultural qualities. Zoned drip irrigation systems are required.

Total Cost: $3.70 - $6.50 sf  
L & A Cost: $2.50 - $5.30 sf

Note: These photographs show examples of softscape types and treatments.
Structures and Hardscape Types and Treatments

The following classifications define the common language of highway facility design. Bridges, retaining walls, noise walls, pedestrian crossings, pedestrian fencing, railings, barrier railings, lighting, and transportation art are included in these classifications.

Standard Structures and Hardscape

A standard treatment is simple and functional. Color and proportional adjustments improve aesthetic quality. Standard structure design is economical and satisfies vehicle movement requirements. However, it does little to establish design character or placemaking. NDOT standards for surface treatment and lighting include painted finishes, fractured fin formliners and overhead poles with cobra head illumination or high mast area lighting. Regular trash and graffiti removal maintenance programs are necessary.

Total Cost: $115 - $120 sf  L & A Cost: $0 sf

Accentuated Structures and Hardscape

Corridor pattern design is defined by a unified system of materials and textures. Adding accents and special finishes to built structures facilitates and enhances placemaking. These elements can include transportation art and the application of high quality finishes and color to highway structures. Drainage details and water harvesting techniques can be enhanced through the use of decorative rock and contour grading.

Total Cost: $132 - $142 sf  L & A Cost: $17 - $27 sf

Note: These photographs show examples of structure and hardscape types and treatments.
Focal Structures and Hardscape
Focal structures and hardscape treatments facilitate the expression of a specific design character. Structures consist of self-weathering materials, integrated color or textural finishes, and may include detailed formliners on structural surfaces. Patterns consist of a motif-based multi-surface design. Barrier rails utilize custom construction and include designs that are artistically incorporated into the structure, ultimately elevating an engineered form to a work of art. Upgraded lighting elements combine form and function to include lower height standards and decorative elements.

Total Cost: $180 - $195 sf  L & A Cost: $65 - $80 sf

Landmark Structures and Hardscape
Landmark treatments call attention to qualities that highlight something unique. Extensive design treatments are used on bridge structures, retaining walls, acoustic walls, barrier rails, and pedestrian crossings. Unique formliner treatments on structural surfaces denote the special importance of the place. Subject and composition, combined with placement, denote the importance of transportation art. Elaborate lighting provides special nighttime effects.

Total Cost: $225 - $270 sf  L & A Cost: $110 - $155 sf

Note: These photographs show examples of structure and hardscape types and treatments.
The following diagram illustrates how varying degrees of softscape treatments and structures and hardscape treatments may be appropriately applied over a section of the corridor.
Chapter One — Corridor Management and Background Inventory

SECTION TWO: Elements of Landscape and Aesthetics

- Regionally Adapted
  - Focal
- Regional Ornamental
  - Accentuated
- Regional Ornamental
  - Landmark
- Enhanced Native
  - Accentuated
STATEWIDE PLACE NAME SIGN PROGRAM
A statewide place name and point-of-interest sign program better connects people to places.

Benefits of the Program
The state of Nevada is a large geographic area with diverse and oft-hidden features. The sign program will provide clear and consistent direction from the corridors to scenic areas, points-of-interest, historical sites, and local, non-publicly-owned attractions. Signs will welcome visitors and inform residents. In addition to stimulating local economies, it will draw attention to these important assets and affirm the rich history and physical attributes of the state. The sign program will encourage visitors and residents to better understand the history, culture, and geology of the state.

How the Program Will Work
Utilizing the current Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices as a guide, a family of iconic symbols specific to Nevada will be designed for use on standardized directional and identification signs. To ensure uniformity and consistency, the state will implement a policy manual for the signs, referred to as the Nevada Place Name Sign Manual. Program promotion will occur via informational brochures available at welcome centers, specific identification on state maps, and locally-based advertisements. Recognizable icons will demarcate points of interest and directional symbols. FHWA approval for the statewide Place Name Sign Program is mandatory prior to installation. The program will work in conjunction with “Watchable Wildlife,” an organization that utilizes signage and guide books to facilitate wildlife viewing areas. Watchable Wildlife, an existing, separately run program addresses signage for wildlife viewing.

An audio and multimedia interpretative program will be developed with the sign program. This program will provide signage and audio interpretation of Nevada’s history and natural features to travelers. In order to ensure the success of the program and reduce the confusion created by multiple programs, it will coordinate with interpretive programs that groups, such as Nevada Silver Trails, are currently completing.

Eligibility
Under a state managed and controlled program, NDOT will establish and approve an initial inventory of categories common to the state, including features specific to each highway corridor. Iconic imagery will be created to represent the general categories. After the initial inventory is confirmed, state and local entities can apply for inclusion based on specific criteria.

Anticipated Categories
Categories for sign icons common to the state of Nevada could include, but are not limited to:

- Rural communities and their history
- Regional tourism themes/promotion
- Historical features such as railroads, mines, mining towns, ghost towns, explorers, and immigrant trails
- Wildlife viewing areas
- Native vegetation
- Geographic features
- Geological features
- Landmarks
- Cultural resources
- Museums

The Design Guidelines, page 3.21, lists potential features to be interpreted and guidelines for icon development.

Associated Cost
Smaller communities and local attractions are expected to benefit directly from the sign program. Increased tax revenues will give the state a tangible return on its investment. Business partnerships through sponsorships are possible, provided there are partial cost offsets.

Signs Included in the Program
Exit to Area of Interest or Town
This primary sign type is used only on interstates and is included here for informational purposes only. It will be used as an informational listing, located in advance of interstate exits. It will illustrate iconic symbols and descriptions as well as the interstate exit number.

Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of four symbols will be used on each sign – one per panel. Concise written descriptions are required to accompany iconic symbols.

Directional Sign on State or County Road
Used primarily along the highway corridors, this secondary sign type will be used as an informational listing located on state or county roads and intersections. It will illustrate symbols as well as a directional arrow (see Illus. 1 on page 1.11).

Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of four symbols will be used on each sign. Written descriptions are required to accompany iconic symbols.
Scenic Overlook or Viewpoint
This sign type will be located prior to pull-offs, illustrating symbols and descriptions as well as the distance to the pull-off (see Illus. 2).

Signs will be post-mounted and use reflective graphics/lettering on a metal panel in accordance with applicable FHWA safety standards. A maximum of two symbols will be used on each sign. Concise written descriptions are required to accompany iconic symbols.

The Design Guidelines, page 3.21, lists potential features to be interpreted and guidelines for icon development.
ROAD SERVICES PROGRAM

Road services are an important component of any roadway corridor experience. They are even more critical in areas of Nevada where long distances separate developed areas. A complete description of road service facilities and their program components is provided in the Design Guidelines, pages 3.16-3.18. These service areas provide travelers with designated spaces to rest, interpret history and geography, and discover information about nearby activities and communities.

Two road service facilities of specific importance within the corridor include activity pull-offs and community rest areas. Activity pull-offs provide access to activities adjacent to the highway, and are located in areas where motorists commonly pull over to watch or participate in roadside activities. Providing structured parking improves the roadside safety and reduces disturbance to the fragile roadside vegetation.

Community rest areas are integrated within the town structure to serve residents and visitors. Community rest areas function like a pocket park or town square, providing a central location for visitors to learn more about local tourism opportunities, piquing their desire to further explore the community. Central locations or areas connected to community centers provide appropriate sites. Partnerships with towns, counties, or other organizations are required to site the facilities outside of the right-of-way.

(1) The road services program utilizes shaded picnic areas, interpretive signage, and viewing platforms to provide safe and comfortable rest areas and road pull-offs along the corridor.

(2) Significant road services facilities, such as welcome centers and gateway rest areas, should use desert colors, materials, and plants in an architecturally significant way to add visual interest and attract visitors.

(3) A roadside pull-off provides a safe place for motorists to stop and rest for brief periods.

(4) A complete rest area includes separate parking areas for automobiles and trucks, rest room facilities and picnic areas.

(5) Viewpoints and point of interest sites allow travelers to view unique natural or cultural features from a safe location off the highway.
### SECTION TWO: Elements of Landscape and Aesthetics

#### ROAD SERVICES PROGRAM

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<td><strong>ROADSIDE PULL-OFF</strong></td>
<td>Roadside pull-offs provide facilities for drivers to exit the highway for a brief period. Facilities and minimal parking are provided to accommodate the abbreviated stay. (Referred to as &quot;Rest Stop&quot; under former NDOT naming conventions.)</td>
<td>• Native Plant Revegetation to Enhanced Native Softscape Types</td>
<td>• Site-specific interpretive signage</td>
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<td></td>
<td>• Standard Hardscape Type</td>
<td>• No toilets or running water</td>
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<td>• Trash containers</td>
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<td>• Limited car and Recreational Vehicle parking</td>
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<td>• Scenic overlooks</td>
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<td></td>
<td>• Located according to travelers’ needs and unique site features</td>
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<td></td>
<td>• Shade canopy (vegetation or structure)</td>
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<tr>
<td><strong>VIEWPOINTS AND POINTS OF INTEREST</strong></td>
<td>Viewpoints and points of interests present opportunities to view unique vistas, geologic and historic features, or cultural landmarks. Interpretive elements are integrated into the site design, and Place Name Signage and Travel Information elements are provided to establish the relationship between highway and place. Typically, the length of stay is short and parking is limited.</td>
<td>• Native Plant Revegetation to Enhanced Native Softscape Types</td>
<td>• Located according to travelers’ needs and unique site features</td>
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<td>• Standard to Accentuated Hardscape Types</td>
<td>• Site-specific interpretive signage</td>
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<td>• Toilets with running water only where available</td>
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<td></td>
<td>• Handicap accessible</td>
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<td>• Picnic tables and shade structures</td>
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<td>• Trash containers</td>
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<td>• Paved car and Recreational Vehicle parking</td>
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<td>• Telescopes/viewfinders</td>
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<td>• Nature walks or short trails</td>
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<td></td>
<td>• Seating Areas</td>
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<td></td>
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<td>• Shade canopy (vegetation or structure)</td>
</tr>
<tr>
<td><strong>BASIC REST AREA AND COMMUNITY REST AREA</strong></td>
<td>Basic Rest Areas are located throughout the state offering site specific interpretive information. They offer limited restroom facilities and may or may not include running water, depending on availability. Typically, these rest areas are located adjacent to scenic views, unique historical, cultural or environmental features. Community rest areas provide facilities within the town’s infrastructure and function as a pocket park or town square.</td>
<td>• Enhanced Native Softscape Type</td>
<td>• Located according to traveler’s needs and unique site features</td>
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<td>• Standard to Accentuated Hardscape Types</td>
<td>• Site-specific interpretive signage</td>
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<td>• Toilets with running water only where available</td>
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<td>• Picnic tables and shade structures</td>
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<td>• Nature walks or short trails</td>
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<td>• Seating Areas</td>
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<td></td>
<td>• Shade canopy (vegetation or structure)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Local community information</td>
</tr>
<tr>
<td><strong>COMPLETE REST AREA</strong></td>
<td>Complete Rest Areas are typically located at 60 mile intervals throughout the state and are usually situated outside of developed areas. They feature fully-operable facilities in combination with interpretive information on regionally significant cultural and historical sites. Complete Rest Areas also provide travelers with picnic facilities and include children’s play areas and pet areas.</td>
<td>• Regionally Adapted Softscape Type</td>
<td>• Interpretive and overlook features</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Focal Hardscape Type</td>
<td>• Children’s play area</td>
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<td></td>
<td>• Pet rest facilities</td>
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<td></td>
<td>• Picnic tables and shade structures</td>
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<td>• Trash containers</td>
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<td></td>
<td>• Paved truck parking</td>
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<td></td>
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<td></td>
<td>• Recreational Vehicle dump station</td>
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<td></td>
<td>• Paved truck parking</td>
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<td></td>
<td>• Picnic areas and shade structures</td>
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<td></td>
<td></td>
<td>• Eating facilities (at named sites)</td>
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<td></td>
<td>• Recreational Vehicle dump station</td>
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<td>• Paved truck parking</td>
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<td>• Pet rest facilities</td>
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<td>• Shade canopy (vegetation or structure)</td>
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<tr>
<td><strong>GATEWAY REST AREA</strong></td>
<td>Gateway facilities convey first impressions and identity. Special features may be incorporated to highlight the area through design interpretation of the place. Gateways may be associated with any level of rest stop in the list- ing. The incorporation of local community information regarding amenities, events and interpretative elements, improves the interface between the highway and the communities it serves.</td>
<td>• Regionally Adapted Softscape Type</td>
<td>• Program elements are consistent with the type of Road Service Area provided.</td>
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<td>• Landmark Hardscape Type</td>
<td>Specific elements include:</td>
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<td>• Regional services information</td>
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<td></td>
<td>• Interpretation of regional sites and features</td>
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<td></td>
<td>• Information on regional recreational attractions</td>
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<td></td>
<td></td>
<td></td>
<td>• Bicycle storage units</td>
</tr>
<tr>
<td><strong>WELCOME CENTER</strong></td>
<td>Welcome centers are located along major entry routes to the state. They offer introductions to the state and travelers can find access to useful travel information. Welcome centers include a staffed information kiosk.</td>
<td>• Regionally Adapted Softscape Type</td>
<td>• Information on regional recreational attractions</td>
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<tr>
<td></td>
<td></td>
<td>• Landmark Hardscape Type</td>
<td>• Bicycle storage units</td>
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<td>• Picnic areas and shade structures</td>
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<td>• Eating facilities (at named sites)</td>
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<td>• Recreational Vehicle dump station</td>
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<td>• Paved truck parking</td>
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CHAPTER ONE — CORRIDOR MANAGEMENT AND BACKGROUND INVENTORY

NATIVE WILDFLOWER PROGRAM

Inspired by a vision of native plant species along rights-of-way to enhance the beauty of the land, the FHWA has adopted two programs to promote the use of naturally-occurring forbs and grasses in a particular region, state, or ecosystem. The Surface Transportation and Uniform Relocation Assistance Act (STURAA) of 1987 requires that at least one-quarter of 1% of funds expended for any Federal-aid highway system landscape project be utilized for native wildflower plantings. The second, voluntary program is “Operation Wildflower.” It promotes the use of native wildflowers through a cooperative relationship between the National Council of State Garden Clubs and State highway agencies.

In addition, the FHWA recognizes that native forbs and grasses can also provide:

• Reduced maintenance requirements for established native plants in comparison with non-native species
• Reduced roadside fire hazards
• Reduced use of herbicides when native plants are successfully established
• Improved erosion control through drought-tolerant species
• Improved relationship between the highway corridor and the regional character of the landscape

The University of Nevada’s revegetation report supports the use of forbs and grasses in highway rights-of-way (refer to Technical Appendix pages A.4-A.13). Forbs and grasses that are appropriate to specific regions and ecosystems require “little or no maintenance… (and) create defensible space for wildfire along the highway corridors” (Tueller, Post, Noonan, 2002). As part of the wildflower program, plants should be utilized that do not create a fire hazard or become overly attractive to wildlife.

INVASIVE AND NOXIOUS WEED CONTROL

Invasive species can have devastating effects on a landscape’s economic and environmental quality. Invasive species decrease diversity and can out-compete native species. The Nevada State Department of Agriculture maintains a list of noxious weeds that should be contained through a revegetation program along the corridor. The list can be referenced at the following site: www.agri.state.nv.us/nwacNv_noxweeds.htm.

"Nevada’s Coordinated Invasive Weed Strategy”, produced by the University of Nevada, also identifies additional species that have the potential to negatively impact Nevada’s environmental quality. NDOT’s continued coordination with the Nevada Weed Action Committee provides an organized effort for invasive and noxious weed control.

Due to the frequency of invasive weeds along the corridor, control measures are necessary for any new landscape design project. Adhering to the best procedures and management practices for successful revegetation is one suggested control method. Additional suggested procedures include:

• Tailoring revegetation procedures to specific plant community types
• Making recommendations for site and soil preparation
• Including site appropriate revegetative practices
• Providing for adequate weed maintenance to allow for revegetation establishment

OUTDOOR ADVERTISING

Outdoor advertising, specifically billboards, provides businesses, community groups and other organizations with opportunities to inform travelers about various establishments and available services. Billboards can, however, impact the highway’s visual quality by obstructing views of scenic features and the natural landscape. As a result, community groups are committed to restricting new signage, and removing existing billboards from areas adjacent to and within their communities.

The Highway Beautification Act

The intent of the Highway Beautification Act (HBA) of 1965 was to control billboard construction along Federal-aid highways and provide methods for removal of billboards that do not conform to state and local ordinances. Section C of this law limits signage visible from the road to only include informational and directional signs pertaining to distinctive natural, scenic, or historic attractions; on-site real estate signs; on-site business signs; landmark signs associated with historic, natural, or artistic purposes; and “free coffee” signs promoted by non-profit organizations.

Limitations

In the 40 years since the passage of the HBA, few non-conforming billboards have been removed and many more have been constructed due to exclusions in the law. Enforcement is difficult because Section G of the law requires cities and counties to pay just compensation to owners for billboard removal. Although the federal government is required to contribute 75% of the compensation, many communities do not have the funds to pay the 25% requirement, and their ability to use local land use controls to restrict con-
A second limitation within the HBA is the allowance for billboards to be constructed in areas zoned commercial and industrial, as well as in unzoned areas with commercial or industrial uses. The provision also acknowledges that the State has authority over the zoning laws. This entitlement allows the State to implement zoning regulations that effectively increase the difficulty of controlling billboards. Communities may specifically zone an area along the highway as commercial, or the outdoor advertising structure may be built on a parcel that has an obscure commercial use.

The third provision allows designated scenic byways to be segmented and excluded from federal control. An amendment to the HBA, passed by Congress with the 1995 National Highway System Designation Act, allows states to exclude portions of a scenic byway that conflict with the state’s standards for denoting scenic byways and utilize only local restrictions for billboard control. As a result, areas of lower scenic quality become more unattractive and reduce the overall scenic character of the byway.

Nevada Statutes

Removing billboards in Nevada became more difficult in 2001 due to the Nevada Revised Statute (NRS) 278.0215. The regulation prohibits the use of amortization—a method used by many states—for sign removal. Rather than utilizing the traditional cost approach, it defines the methodology for determining “just compensation” to include property uniqueness as well as income generation from the sign. This cost-prohibitive revision renders sign removal almost impossible.

Although control of outdoor advertising seems daunting, there are regulations that provide restrictions to billboard construction. NRS 405.050 allows counties to deny permits for billboards that may “measurably destroy the natural beauty of the scenery or obscure a view of the road ahead.” Additionally, the statutes give the NDOT Director the authority to remove any sign that is a traffic hazard.

The Role of Local Government

Cities and counties have the ability to regulate the location, and to a limited degree, the type of billboard erected within their jurisdiction. Although a state must prove their jurisdictional rights to control outdoor advertising on Indian Reservation Lands and have a written statement from the State Attorney General, local governments may coordinate with the Bureau of Indian Affairs to determine a course of action to limit the negative visual impacts of billboards. Design standards that address height, size, color, spacing/frequency, and context are a valuable method for directing outdoor advertising. For example, signs can be relocated if they block visual resources. Material choices and architectural detail can be improved to reduce the visual distinction between the sign and the surrounding environment. Communities can regulate the location of billboards to reduce the scenic impact of billboards and improve visual quality along the state’s highways. Important viewsheds and scenic corridors may be designated within the county, and land use regulations can be developed that discourage or prohibit outdoor advertising.
NEVADA SCENIC BYWAYS DESIGNATION

Nevada’s Scenic Byways Program was established in 1983. Since then, 21 Scenic Byways have been designated. Three prominent byways are directly accessed from the corridor, including Kyle Canyon Road, SR 157; Mt. Charleston/Lee Canyon Rd, SR 156; and Deer Creek Road, SR 158, see Figure 3 on page 1.17.

According to the FHWA, designating a roadway as “scenic” has several benefits. These benefits include preservation, promotion, pride, partnership, and the protection of scenic roadside vistas and historic buildings. In addition, the Highway Beautification Act of 1965 prohibits the erection of new billboards along designated Scenic Byways that are inter-state, a part of the National Highway System, or federally-aided primary roads. The National Highway Designation Act of 1995 amends the law to allow segmentation of portions of the byway, particularly if sections of the roadway fail to meet the Scenic Byway criteria. The segments in question are then controlled by local regulations only, allowing new billboards to be erected, subject to existing state or local controls. Roadway scenic quality can also be regulated with scenic or conservation easements. These easements preserve landscape character and provide the participating entity with a one-time tax deduction equal to the foregone value of the use of the land.

The Nevada Commission on Tourism and the FHWA are responsible for promoting Scenic Byways. To facilitate an integrated system, tourism-related facilities such as visitor centers, rest areas, and the Place Name Sign Program should maintain coordinated informational materials. Scenic designation increases local awareness about the roadway, attracting volunteers who want to help craft the story of the byway and share in making it a vital component of the community.

Opportunities for Partnerships

Scenic designation can promote and expand public and private partnership opportunities. As an example, America’s Byways Resource Center can provide technical assistance and, together with the FHWA, can provide seminars and workshops to further facilitate the partnering process.

The Scenic Byway plan consists of federal, state, and local programs that provide assistance in achieving scenic designation in Nevada.

- The federal BLM Back Country Byways and U.S. Forest Service Scenic Byways plans focus on infrequently traveled paved, unpaved and four-wheel drive roads that access back country or wilderness areas.
- The Nevada Scenic Byways Program focuses on year-round accessible roadways. The program identifies, promotes, and protects the state’s most exceptional roadways. These byways must provide access to recreational areas or historic sites.
- The Local Tourism Routes program allows communities to promote special roadways and other modes of travel (like boat, balloon and train rides, bicycling or rafting trips) that are not included under any other programs.

Local groups and agencies nominate and manage scenic byways and local tourism routes. The designation “Scenic Byway” is reserved for routes approved by NDOT. The State Scenic Byways Committee, comprised of representatives of NDOT, the Nevada Commission on Tourism, the Nevada Division of State Parks, and the US Bureau of Land Management reviews and suggests approval; however, it is the NDOT Director who makes the final designation. The Nevada Commission on Tourism is responsible for the Local Tourism Route program. It reviews and approves all promotional material to ensure that the “Scenic Byway” designation is not used for local tourist routes.

Levels of Designations Available

Two levels of Scenic Byway designation are available: basic and advanced. Byways of both classifications are placed on state tourism maps, in visitor information packages and in other Scenic Byway promotional materials. The state prepares and distributes a brochure about the Byway. Routes with an advanced designation are eligible for federal and state funds. Advanced designation requires a corridor management plan and a five year re-certification obligation.

Interstate highways have not been included in the state program primarily because encouraging travel on non-interstate routes increases the tourism economic base of rural communities.

Nevada Scenic Designation

The Director of NDOT may establish a “Scenic Designation” for any section of highway right-of-way. The Corridor Plan recommends this occur in areas of high scenic quality to limit the number of billboards and signage obstructing views. The three byways accessible from the corridor also create a scenic loop north of Las Vegas. Promotion and signage for the loop can be consolidated at a recreational gateway at SR 157.

ANTI-LITTERING CAMPAIGN AND SIGNAGE
Figure 3 - Existing Nevada Scenic Byways near the Southern US 95 and US 93 Corridor

LEGEND

- Existing Scenic Byway

Scenic Byway signage should include custom icons related to the place.
Fast food containers, bottles, trash bags, and rusty kitchen appliances found alongside the road are distracting and imply an attitude of general neglect and disregard for the environment. A statewide anti-littering campaign would represent a significant step towards maintaining and improving Nevada’s highways. The campaign should be advertised in such a way as to command the attention of residents and travelers. Similar to the “Don’t Mess with Texas” anti-littering campaign, this program could become a marketing showpiece for the state of Nevada. The program would be promoted through roadway signage, magazine advertisements, and bumper stickers.

Distribution of campaign materials would be focused at travel-oriented locations such as welcome centers, rest areas, and truck stops. Coupled with promotional materials, a “Sponsor-A-Highway” program would engage residents of Nevada, encouraging active participation in maintaining clean and beautiful highways. This plan recommends implementing an anti-littering campaign using highly visible signage, easily distributed collateral materials, and an active volunteer clean-up program.

SECTION TWO: Elements of Landscape and Aesthetics
Vibrant main streets are a critical component of all communities. Rural communities are especially dependent upon vital commercial districts. Bisected and altered by the interstate highway system and suburban sprawl, main streets across America have declined both economically and physically, to a point where they are no longer viable community centers. Vacant buildings and declining businesses often line the highway. In some areas, revitalized commercial districts indicate continued community growth.

Main Street Approach, developed by the National Trust for Historic Preservation, assists in revitalizing the older, traditional business districts while simultaneously preserving the history and character of downtowns. The program combines “historic preservation with economic development to restore prosperity and vitality to downtowns and neighborhood business districts.”

The Main Street Approach does not promote a “quick fix.” It is a long-term, comprehensive strategy designed to meet local needs and opportunities. The strategy is based on a four-point approach that includes organization, promotion, design, and economic restructuring. It is a volunteer-based program that relies on community support. Volunteers form the governing board and standing committees, and a paid program manager coordinates and supports the operation.

The National Main Street Center, or the local coordinating agency, provides assistance in the form of technical services, networking, training, and information. The Center can provide direct fee-for-service technical assistance to cities and towns, both independently and in conjunction with state and citywide main street programs. Revitalization programs funded largely by local sources are more likely to succeed than those relying solely on state or federal funds. The Main Street Program offers educational sessions related to facilitating local support and generating public and private partnerships. Local involvement in, and coordination with, the program helps communities find solutions that work best for them.

The accomplishments of Main Street organizations are many: improving aesthetics and safety of downtown areas, restoring historic buildings, and revitalizing economic viability. The organization identifies potential economic niches, assists with promotional and fund-raising efforts, supports joint marketing efforts among local businesses, encourages and trains new business owners, and finds grants for facade, streetscape, and landscaping improvements. Reduced vacancy rates, and renovation and restoration in the downtown are a few examples of its results.

Physical improvements are quickly evident. Long-term economic improvements may take up to three years to accomplish. However, the program’s impact on communities nationwide is indisputably positive and long-lasting. Communities have experienced net gains in new businesses and job generation, and a surge in local investment. Most importantly, community pride grows as personal involvement in the volunteer-driven program increases.

As an example of the success of this program, seven communities in rural Iowa participated in the program for ten years. On average, each town renovated 97 downtown buildings, gained 24 business starts, and saw $1.6 million in private sector reinvestment.

Anyone can start a Main Street Program in their community. The first step is to contact the state-wide coordinating program for support, technical assistance, training, networking, and encouragement. Because Nevada does not currently have a coordinating program, contact should be made with the National Main Street Center in Washington D.C. A self-initiated program may be created without a state program. The National Main Street Center provides contacts to assist in networking with other independent programs and nearby state programs. Communities are welcome to utilize principles and tools from the Main Street Approach regardless of whether they qualify for the program or wish to follow it exactly. The program incorporates historic preservation with community revitalization. Communities like Goldfield, which was recently designated as a National Historic District, now qualify for more assistance through the program. Additional information can be obtained by visiting the Main Street Program’s website at www.mainstreet.org.
SECTION THREE: Background Inventory

SOCIAL RESOURCES

Community Settlement Patterns and Growth

Urban Patterns

Settlement patterns in the Southern US 95 and US 93 corridor are characterized by small towns and unincorporated communities that offer an alternative to the large and densely populated Las Vegas Valley. These communities range in size from about 1,100 people in the town of Searchlight, to approximately 15,000 in Boulder City. Much of the settlement of Clark County is tied to Native American heritage, mining discoveries, and the gaming industry. Boulder City is unique because it was developed as a planned community during the construction of the Hoover Dam.

As the Las Vegas Valley and communities such as Laughlin continue to grow rapidly, bedroom communities will grow to meet the needs of new residents and travelers. For example, Kyle Canyon, north of Las Vegas, is a dense residential development centered around community trails, open space, and outdoor recreation. Existing rural communities such as Cal Nev Ari, Searchlight, and Indian Springs will likely see an increase in retail and service industries to support the anticipated growth. Boulder City’s proximity to the Las Vegas Valley exposes it to extreme growth pressure, however, the town has taken steps to control the impacts. Residents approved a growth control ordinance limiting expansion to 3% per year. The goal of this ordinance is to preserve the sense of place and quality of life that currently exists. The growth of Clark County will translate into greater use of the existing highway corridor by both tourists and residents, creating a need for both community-level and neighborhood-level aesthetic treatments.

Land Ownership

The State of Nevada contains the highest percentage of federal lands, almost 83%, among the contiguous 48 states (BLM, 2000). The Bureau of Land Management (BLM) controls the bulk of the federal lands which include in-holdings of varying sizes owned by other public agencies and private landowners. In southern Nevada, this is true along most of the Southern US 95 and US 93 corridor except for private lands around municipalities such as Boulder City and Indian Springs, National Park Service ownership at Lake Mead National Recreation Area, and the Las Vegas Paiute Indian Reservation north of Las Vegas.

Land ownership affects both land use and the visual character of the landscape. Much of the rural areas of the Nevada landscape maintain their natural beauty by remaining under federal control. Contributing to Nevada’s open landscape aesthetic is the predominance of low occupancy uses such as grazing, farming, material production, and mining. In order to preserve rural character, existing and proposed developments must have a common vision, coordinated by all landowners. NDOT’s jurisdictional influence over the landscape only extends to the edge of the right-of-way; however, agreements with other public agencies make it possible for NDOT to develop a common vision that will shape visual character and land use decisions for areas adjacent to the roadway.

Implications to the Southern US 95 and US 93 Corridor

Over the next 20 years, many anticipated changes will likely influence the corridor. Since September 11, 2001, all truck traffic has been re-routed away from Hoover Dam for national security reasons. The completion of the Hoover Dam Bypass bridge will allow truck traffic to return to US 93 through Boulder City. To combat increased traffic and the overall growth of the region, the Boulder City Bypass route is currently under design. Continued growth and expansion in the Las Vegas Valley will place additional pressure on outlying communities and the existing highway corridor. Applying the Landscape and Aesthetics program to these projects will connect the communities of southern Nevada with a consistent aesthetic approach to the roadway.

Travel and Tourism

Travel Patterns

Southern Nevada is world-renowned for the volume and variety of tourism opportunities. The Nevada Commission on Tourism refers to the area around Las Vegas as the “Las Vegas Territory”, offering a variety of resorts and recreational amenities. The Las Vegas Territory generally includes the Las Vegas Metropolitan Area, I-15 Corridor, Boulder City, Hoover Dam, Searchlight, and Laughlin.

Overview of Existing Travel Facilities

Highways play an important role in connecting people to their surroundings. Visitor centers, view points, and community signage help travelers understand the natural and cultural features that make a place unique. The state highways could improve their role in promoting and facilitating travel to key local, state, and national tourism destinations. For example, it is not easy for travel-
Travel and tourism facilities consist of rest areas and information centers. These facilities can have the dual responsibility of providing traveler services and information regarding historical, cultural, and environmental features in the region, as well as providing important information about tourist destinations. Only a few highway services (such as formal rest areas, truck stops, and/or pull-outs) accommodate highway travelers along the corridors. The existing facilities can be improved to minimize signs in unattractive locations.

Travel and tourism generate a large part of southern Nevada’s transportation requirements and the highways serve the important role of connecting people to their surroundings and destinations. Visitor centers, view points, and community signage help travelers understand the natural and cultural features that make this place unique. Currently, the state highway’s role in promoting and facilitating travel to key local, state, and national tourism destinations is minimal.

Opportunities to Enhance Travel and Tourism
Southern Nevada’s history is rich with legends and unique spectacles that are prime interpretive opportunities for travelers. A more consistent and regional program of signage could improve the visitor’s understanding of the region. Proper placement of signs is important for travelers to find and process the information quickly.

Travel and tourism facilities, such as rest areas, viewpoints, and information centers, can have the dual responsibility of providing services for travelers while describing historical, cultural, entertainment, and environmental features in the region. Rest areas should be planned and designed in a consistent and comprehensive manner. Regional architecture that is sensitive to the desert environment should be encouraged for all structures and facilities. In addition, where landscape treatments are implemented, drought tolerant plant materials are not only sensible, but essential to their success. Adequate rest areas typically include restrooms, picnic areas, pet exercise areas, paved parking areas, fresh drinking water, interpretive exhibits, and local area information.

NATURAL RESOURCES

Topography and Surface Hydrology
The landscape character of this region is dominated by alternating mountain ranges and valleys typical of the rest of the Basin and Range physiographic province. The Southern US 95 and US 93 corridor lies within the Mojave Desert and is characterized by wide valleys, bordered by arid north-south mountain ranges. The mountain ranges typically exhibit weathered and exposed bedrock at higher elevations.

The corridor crosses two of the state’s 14 hydrographic regions: the Central Region and the Colorado River Basin. Nevada’s central hydrographic region is the largest in the state, covering most of central and eastern Nevada. It is primarily characterized by isolated basins that do not drain into major river systems. Surface waters are channeled through a network of ephemeral streams and washes into playas, where the water gradually percolates into the water table. The Colorado River Basin region, however, is unlike most of the other hydrographic regions in Nevada. Surface runoff that flows into the Colorado River eventually travels out of the Great Basin, toward the Gulf of California. The Colorado River, at the easternmost margin of the corridor forming the state boundary between Nevada and Arizona, is the primary source of water for the Las Vegas Valley and surrounding areas. Lake Mead, likely the most visible body of water along the corridor, is a direct beneficiary of the Colorado River Basin system.

Vegetation
Most of the land along the highway corridor is arid. This area falls within the boundaries of the Mojave Desert, characterized by extreme variation in daily temperature and an average annual precipitation of less than five inches. The Mojave Desert serves as the transition between the hot Sonoran Desert and the cooler, higher Great Basin. The segment of US 95 south of Las Vegas is within the Sonoran Desert section of the Basin and Range geologic province, however, the vegetation and landscape characteristics of this area are more consistent with the Mojave Desert. Elevation changes influence the occurrence of plant communities where Blackbrush/Joshua Tree sites occur at higher elevations and the Southern Desert Shrub sites occur on the valley floors. Blackbrush/Joshua Tree areas...
may also include Spanish Bayonet and an under-story of Desert Needle Grass. Southern Desert Shrub sites are the most prevalent landscape type and include plants adapted to very hot and dry conditions such as Creosote and Bursage.

Understanding these different vegetation community types is critical, particularly during revegetation activities associated with highway improvement projects. Each community has unique soil and hydrologic characteristics that must be considered to ensure successful revegetation.

Wildlife Habitat and Migration

Nevada is home to a large variety of wildlife. Because much of rural Nevada is under federal ownership, it is open and undeveloped, and provides excellent wildlife habitat for a number of species. Specially designated areas have been established to protect and preserve the ecological, natural, and cultural resources of specified areas. The South McCullough Wilderness Area, North McCullough Wilderness Area, Sloan Canyon National Conservation Area, and El Dorado Wilderness Area are within close proximity to this corridor. Another important feature is an Area of Critical Environmental Concern (ACEC) located in the Eldorado Valley. This area, designated by the BLM, was created to protect critical desert tortoise habitat.

Bighorn sheep are a species of high concern within the Southern US 95 and US 93 Corridor. In order to avoid predation, bighorn sheep inhabit rugged, steep terrain segmented by intermittent canyons and washes. The sheep also require access to open water during summer months, and in drought conditions may search for water throughout the year. Bighorn sheep movement corridors that extend across the valley and cross the highway exist north of Searchlight and east of Indian Springs. Another area with high levels of bighorn sheep movement is near Boulder City and US 93 toward Hoover Dam. A portion of the wildlife corridor runs parallel to the highway and has resulted in documented accidents involving collisions with sheep.

ENVIRONMENTAL CONSIDERATIONS

Mapping of Environmental Features

The landscape of northern Nevada has many special environmental features, including plant communities, rivers, lakes, playas, wildlife, rock outcroppings, cliffs, and mountain ranges. These resources provide opportunities to create viewpoints, preserve natural systems, and enhance wildlife movement corridors. The following features are representative of potential opportunities to preserve or enhance the traveler’s understanding of the environmental resource or feature from the highway:

- Bighorn sheep herd viewing at Hemenway Park in Boulder City
- Joshua tree forests outside of Searchlight offer visual contrast to the common Creosote-Bursage vegetation type
- The River Canyon and Black Mountains surrounding Lake Mead provide visual interest outside of Boulder City to the Hoover Dam
- Long, distant views into the Eldorado Valley and surrounding ranges from US 95 / US 93 intersection

To assess the environmental features, data was gathered from a variety of sources and analyzed according to its relationship to the corridor highways. Data included in the analysis includes wildlife habitats, lakes and playas, and riparian systems. Additional data obtained from the BLM identifies unique features of significant influence that are visible from the highway and include: Sand Dunes, Wildlife Refuges, National Conservation Areas, and ACEC. The BLM uses the ACEC designation to preserve areas with unique biological, geological, historical, or scenic features. The boundaries shown are taken from the BLM database.

Wilderness areas and ACEC are specially designated areas that should be carefully considered with all highway construction projects. Stands of Joshua trees are unique plant communities that should also be considered. Stands visible from the highway were mapped.
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Local Roads
Railroads
Streams / Rivers
Lakes
Playas
Sand Dunes
Joshua Tree Plant Communities Visible from the Highway
Desert National Wildlife Refuge
Wildlife Management Area
Nevada Wilderness Area
National Conservation Area
Area of Critical Environmental Concern

WILDLIFE CORRIDORS
Bighorn Sheep
Antelope
Elk

LEGEND

SCALE: 1 inch equals 3 miles
NORTH

ENVIRONMENTAL CONSIDERATIONS
CALIFORNIA STATE LINE TO SEARCHLIGHT

CONTINUE ON MAP EC2
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Local Roads
Railroads
Railroads (historic)
Streams / Rivers
Lakes
Playas
Sand Dunes
Joshua Tree Plant Communities Visible from the Highway
Desert National Wildlife Refuge
Wildlife Management Area
Nevada Wilderness Area
National Conservation Area
Area of Critical Environmental Concern

LEGEND

WILDLIFE CORRIDORS
Antelope
Bighorn Sheep
Elk

SCALE: 1 inch equals 3 miles
NORTH
VISUAL RESOURCES

Viewsheds and Distance Zones
Viewsheds refer to all the areas that are visible from a section of highway. Similar to the boundaries of a watershed, the boundaries of viewsheds are usually high points in the landscape, such as ridges and hills. Viewsheds are determined by analyzing digital elevation models in a Geographic Information System (GIS) program. All areas that are visible from the highway are combined to create the viewshed.

Areas within a viewshed are perceived by drivers with varying levels of detail. The detail that a driver perceives is related to the distance between the driver and the feature being observed. Distance zones, including foreground zones, middleground zones and background zones, define the traveler’s viewing distances. Distance zones are delineated through a process developed by the USFS that relates the detail and importance of distance to the driver on the highway. Identifying the portions of a viewshed that are most frequently seen helps determine what portions of the landscape are most critical to establishing the highway’s visual character and what areas are most sensitive to change.

Foreground Zones
Viewers can perceive details such as forms, lines, and colors in masses located from one-quarter mile to three miles away.

Middleground Zones
Viewers can perceive details such as forms, lines, and colors in masses located from one-quarter mile to three miles away.

Background Zones
Background is the area beyond the middleground, extending to the horizon or limit of the area that is seen. For this Corridor Plan the background extends up to 25 miles from the centerline of the highway. Viewers can perceive broad forms, lines, wide valleys, distant hills, and mountains.

Viewshed and Distance Zones Mapping
Viewsheds and Distance Zones along the corridor are shown on the maps beginning on page 1.28. This analysis sets the foundation for visual quality management along the corridor. Darker shading denotes an area that can be seen most often from points on the highway. These areas usually coincide with landforms of high visual quality and scenic values such as mountain ranges. Management of these areas through multi-jurisdictional cooperation can protect them from billboards and other land uses that obstruct views and detract from the travel experience.

Scenic Resources
The Southern US 95 and US 93 corridor offers some of the most scenic views found in the state. Depending on the sequence of travel, views range from rugged cliffs in close proximity, wide-open spans of arid land bordered by mountain backdrops, and rural small towns, to engineering marvels such as the Hoover Dam. The combination of scenic and contrasting landscapes provides visitors with a memorable impression and applies a strong sense of identity to the southern corridor.

Visual Analysis
A visual analysis was conducted along the corridor to evaluate the viewsheds and rank them relative to their scenic quality. Scenic features were identified and highly visible landforms, such as mountain ranges and exposed cliffs, were located. Verified with site visits, the areas of highest scenic value include:

- The Eldorado Valley bordered by the McCullough Range, Highland Range, and Eldorado Mountains along US 95. The contrast between the valley floor and distant mountain backdrop has a striking visual depth.
- Views to Lake Mead and the surrounding River and Black Mountains from US 93 near Boulder City
- The visual contrast between the Hoover Dam and Black Mountains
- The architecture of the Hoover Dam at the Nevada-Arizona state line
- The view of the entire Las Vegas Valley that becomes visible at approximately mile marker 57 along US 95 at Railroad Pass
- Views of the Spring Mountains along US 95 from the Clark County line to the Las Vegas Valley
- Views of Mt. Charleston near SR 157 outside of the Las Vegas Valley
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Major Roads
Railroads
Railroads (historic)
BLM Public Lands Disposal Boundary
City Boundary
Streams / Rivers
Lakes
Playas

VIEWSHEDS
FOREGROUND DISTANCE ZONE
MIDDLEGROUND DISTANCE ZONE
AREAS NOT VISIBLE FROM THE HIGHWAY
VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

SCALE: 1 inch equals 3 miles
NORTH
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Major Roads
Railroads
Railroads (historic)
BLM Public Lands Disposal Boundary
City Boundary
Streams / Rivers
Lakes
Playas

VIEWSHEDS
FOREGROUND DISTANCE ZONE
MIDDLEGROUND DISTANCE ZONE
AREAS NOT VISIBLE FROM THE HIGHWAY
VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

SCALE: 1 inch equals 3 miles

NORTH
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Major Roads
Railroads
Railroads (historic)
BLM Public Lands Disposal Boundary
City Boundary
Streams / Rivers
Lakes
Playas

LEGEND

VIEWSHEDS
FOREGROUND DISTANCE ZONE
MIDGROUND DISTANCE ZONE
AREAS NOT VISIBLE FROM THE HIGHWAY
VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

SCALE: 1 inch equals 3 miles
NORTH

Southern US 95 and US 93 landscape and aesthetics corridor plan

KYLE CANYON TO CLARK COUNTY LINE

CONTINUE ON MAP VS3

VIEWSHEDS VS4

DESIGN WORKSHOP
Sand County Studios
JW Zunino & Associates
PLACES
CH2M Hill

CONSULTANT TEAM
DESIGN WORKSHOP
Sand County Studios
JW Zunino & Associates
PLACES
CH2M Hill

LEGEND

VIEWSHEDS
FOREGROUND DISTANCE ZONE
MIDGROUND DISTANCE ZONE
AREAS NOT VISIBLE FROM THE HIGHWAY
VISIBLE FROM ONE TO SEVERAL POINTS ALONG THE HIGHWAY
VISIBLE FROM MULTIPLE POINTS ALONG THE HIGHWAY
VISIBLE FROM LARGE PORTIONS OF THE HIGHWAY

SCALE: 1 inch equals 3 miles
NORTH

Southern US 95 and US 93 landscape and aesthetics corridor plan

KYLE CANYON TO CLARK COUNTY LINE

CONTINUE ON MAP VS3

VIEWSHEDS VS4

DESIGN WORKSHOP
Sand County Studios
JW Zunino & Associates
PLACES
CH2M Hill

CONSULTANT TEAM
DESIGN WORKSHOP
Sand County Studios
JW Zunino & Associates
PLACES
CH2M Hill
VISUAL ANALYSIS
ELDORADO VALLEY TO HOOVER DAM

LEGEND
- Southern US 95 and US 93 Corridor with Mile Markers
- Interstates
- Highways / State Routes
- Major Roads
- Railroads
- Railroads (historic)
- BLM Public Lands Disposal Boundary
- City Boundary
- Streams / Rivers
- Lakes
- Playas

VIEWSHEDS
- HIGHLY VISIBLE LANDFORMS
- AREAS NOT VISIBLE FROM THE HIGHWAY
- MODERATE VISUAL QUALITY
- HIGH VISUAL QUALITY
- HIGHEST VISUAL QUALITY

SCALE: 1 inch equals 3 miles

NORTH
Southern US 95 and US 93 Corridor with Mile Markers
Interstates
Highways / State Routes
Major Roads
Railroads
Railroads (historic)
BLM Public Lands Disposal Boundary
City Boundary
Streams / Rivers
Lakes
Playas

VIEWSHEDS
HIGHLY VISIBLE LANDFORMS
AREAS NOT VISIBLE FROM THE HIGHWAY
MODERATE VISUAL QUALITY
HIGH VISUAL QUALITY
HIGHEST VISUAL QUALITY

SCALE: 1 inch equals 3 miles
NORTH
Chapter Two — Landscape Design Segments

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INTRODUCTION

This chapter establishes the design direction for highway landscape and aesthetics. The chapter is organized into four sections. The first section describes program elements that relate to the highway type under consideration and its surrounding land uses. Sections Two through Four describe the design objectives associated with each landscape design segment and its theme. These design objectives clarify how the program elements should look.

Figure 4 illustrates the two main categories used to organize highways as they relate to landscape and aesthetics. Information derived from both categories is analyzed to design both the functional aspects and physical form of highway facilities.

**General Highway Categories** consider factors such as the road type, speed and volume of travel, type of access, and the densities of adjacent land use.

- Goals associated with the general categories represent planning and design ideas that should always be considered for roads with similar functions.

**Context-Sensitive Categories** consider place specific features – environment, culture, and history.

- Goals describe how general design objectives should look.

**Section One: Highway Zones**

The Master Plan organizes road systems into different highway types: urban freeways, city streets, and rural highways. Highway types are categorized according to the type of road, the speed and volume of travel, and the type of access. Each classification may be further divided into highway zones. These categories establish program elements and goals that should always be considered when addressing projects located along roads with similar characteristics (downtowns, transition areas, etc.).

For example, a low-speed road that travels through a downtown area is considered a community interface zone. Within this zone, traffic-calming techniques are appropriate and pedestrian needs dominate. As communities develop and adjacent land uses change, the highway zone associated with the new land use and development can be updated. Figures 7, 8, and 13 illustrate the type of development and goals associated with each highway zone.

Figure 4 - Corridor Organizing Elements.

<table>
<thead>
<tr>
<th>HIGHWAY TYPES</th>
<th>HIGHWAY ZONES/ DESIGN OBJECTIVES</th>
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<td>URBAN FREeways</td>
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<td></td>
<td>SCENIC DESIGNATION</td>
</tr>
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**GENERAL***

**CONTEXT-SENSITIVE**

**LANDSCAPE DESIGN SEGMENT**

*General: Includes design goals and objectives that should always be considered during the design of a project as it relates to the types of surrounding land uses, development, and street patterns regardless of the landscape design segment in which they are located.

**Context-sensitive: Includes themes, design goals and objectives, and projects that relate specifically to the landscape design segment in which they are located. The context-sensitive design objectives should be considered in addition to the general goals and objectives.

COMPREHENSIVE DESIGN CONCEPT

The corridor design concept can be articulated for both rural and urban segments. In rural or predominately undeveloped areas, the highway should blend into the natural landscape. The presence of the road is muted by design interpretations of naturally occurring patterns of geology, vegetation, and soils. The successful emulation of these patterns results in a landscape environment that avoids the distinct separation between road and land that often characterizes rural highways.

In urban areas, the perception of community character is often shaped by a highway’s design and its features. This is especially evident when a highway also serves as a community’s main street. Creating a coherent visual environment that builds unity in the community fabric is key to the success of the highway system. The highway should consist of a range of landscape treatments that focus attention on important places, reveal community character and information, and blend the roadway with surrounding uses.
Sections Two through Four: Landscape Design Segments

The last three sections describe the design objectives, theme, and specific features associated with each landscape design segment. Landscape design segments organize the highway into areas of similar character based upon elements such as topography, plant communities, and community development. Segments set the major design theme and provide a unifying concept that is interpreted during individual project design. Figure 5 describes the way in which landscape design segments are used to develop context sensitive designs.

Because landscape design segments relate to place and community character, design objectives express special features that should be considered and describe the appearance of general program elements designated by the highway zone.

Using the Landscape Design Segments

Landscape design segments provide an organizational tool for applying design concepts along the highway. After understanding the project components that may be applied within each highway zone (community interface, managed landscape character, etc.), it is important to understand the theme and design objectives of the segment. These elements describe how the features should look. Design interpretation images provide physical examples of potential projects. Supporting maps, sections, aerial photos, and imagery illustrate the design objectives and appropriate application throughout the corridor.

The segments designated for the Southern Corridor include the Mountain Desert Vista, Destiny of the West, and Mojave Desert Vista as seen on the following page.

Theme and Design Interpretation

The theme describes the vision for the segment in terms of how the highway should appear. Images that depict how the theme may be interpreted and applied through individual project design are provided.

Specific Features

Potential projects and improvements are identified within the segment. Projects are grouped into six opportunity categories: community, travel and tourism, planting, natural resource and wildlife, views and landmark, and roadway practices and structures.

Corridor

A group of highways evaluated to address a topic such as landscape and aesthetics.

Landscape Design Segments

Sections of the highway organized according to the surrounding environmental and cultural context. Themes correlate with the segment name and location.

Design Objectives - Plan View

Design objectives and landscape and aesthetic elements are located within the segment.

Design Objectives - Section View

Landscape treatment types and interpretive themes provide additional direction for design objectives and the development of landscape and aesthetic elements.
MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT

SPRING MOUNTAINS SUB-SEGMENT

Note: Mojave Desert Vista Landscape Design Segment and Spring Mountain Sub-Segment are continued in the Central US 95, West US 6, and Central US 50 Landscape and Aesthetics Corridor Plan.

LEGEND

A  MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT

B  DESTINY OF THE WEST LANDSCAPE DESIGN SEGMENT

C  MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT

SCALE: 1 inch equals 12 miles
SECTION ONE: Highway Zones

Design objectives form the parameters for landscape and aesthetics along the roadway. The general categories of urban freeways, city streets, and rural highways are illustrated in Figures 7, 8, and 13. Urban freeways include high-speed, high-volume roadways. The built environment dominates the visual experience, significantly contributing to the driving experience. Only a brief description of urban freeways is provided in this document due to the fact that the majority of roads in these corridors fall into the city streets or rural highways category. The exception includes the Boulder City Bypass. Design objectives that relate specifically to this highway can be found in the description of the individual landscape design segment. Refer to the Master Plan for additional discussions regarding urban freeways. *(Pattern and Palette of Place, 2002, p. 38-47)*.

The general design objectives for city streets are reviewed in Figure 8, followed by a more detailed description of community interface, community transition, and managed landscape character. Rural highways is described beginning on page 2.10 and includes more specific information on preserve landscape character and scenic designation zones.

(1) Zones classified as managed landscape character are areas of planned development and the traveler’s first experience as they enter a community. Design objectives for these zones aim to limit the impacts of future growth on the native landscape.

(2) Community transition zones occur between downtown and the undeveloped edges of a community. These areas begin to balance the needs of pedestrians with automobile circulation and are excellent locations for community gateway features.

Figure 6 - Highway zone design objectives are tailored to varying levels of development along the roadway. As development becomes more dense, the focus of the design objectives moves from preserving views and the natural landscape to improving the interface between the highway and the community.
MANAGED LANDSCAPE CHARACTER
― Transition Zones ― in the Master Plan
• Create a transition from rural to urban character
• Establish gateways into urban areas
• No-cost to low-cost treatments are appropriate

URBAN BACKGROUND
― Urban Zones in the Master Plan
• Typical urban highway segments
• Consider pedestrian overpasses to connect regional systems
• Utilize a consistent soundwall design
• Emphasize segment design theme at interchanges through art, plants, materials, and signage
• Low to mid-cost treatments are appropriate

URBAN CONFLUENCE
― High Visibility Zones ― in the Master Plan
• High traffic volumes and special character such as casino districts
• Create a distinctive design that complements the design theme
• Utilize special retaining walls and land graphics
• Incorporate complex plantings and artwork
• Mid- to high-cost treatments are appropriate

Adjacent land uses: Vary from residential to industrial. Located in areas of current growth or planned growth at community edges along interstates or elevated highways.

Adjacent land uses: Commercial development along interstates or elevated highways. Noise walls are used in residential areas.

Adjacent land uses: Highly visible location. Major interstate or highway intersection is of great importance within the state.
**Chapter Two — Landscape Design Segments**

**CITY STREETS — HIGHWAY ZONES**

**MANAGED LANDSCAPE CHARACTER**

*Adjacent land uses:* Vary from residential to industrial. Located in areas of current growth or planned growth at community edges.

**COMMUNITY TRANSITION**

*“Suburban Zones” in the Master Plan*

- Zone between downtown and undeveloped edge
- Curb cuts and cross streets generously spaced
- Buildings set back from right of way
- Vehicular and pedestrian needs are balanced
- Pedestrian crossings at signalized intersections
- Bike lane or shared-use path easily integrated
- Buildings have parking in front
- Low to mid cost treatments are appropriate

**COMMUNITY INTERFACE**

*“Urban Zones” in the Master Plan*

- Pedestrian needs dominate with frequent intersections and crosswalks
- Slower design speeds
- Shorter block lengths
- Traffic calming features
- On-street parking
- Buildings, sidewalks and parking in close proximity to travel lanes
- Mid- to high-cost treatments are appropriate
CITY STREETS

Community Interface

Description
In many communities, highways provide the central point of access to all parts of the community. In small towns, the highway often becomes Main Street, a key component of the community’s economic and social vitality. Pedestrian amenities are of primary importance in these areas. The highway must be compatible with pedestrian activities, unifying, not dividing, the town center.

Community interface zones are characterized by lower travel speeds, frequent curb cuts, cross streets, traffic control devices, and increased pedestrian and other non-vehicular traffic. Adjacent land uses are typically commercial, but may include residential areas, schools, parks, and other civic uses. Block lengths are generally shorter, with buildings, sidewalks, and parking in close proximity to the travel lanes.

Design Objectives
The primary design objective for community interface zones is the highway’s ability to accommodate a variety of town-center activities without reducing its function as a through street. Roadway design in these areas must incorporate traffic calming features that minimize conflicts between pedestrians and vehicles. The following goals establish the approach:

- Manage speed by reducing the number of travel lanes and lane widths. Install raised or planted medians to create pedestrian refuge islands that can double as speed-reduction devices.
- Facilitate traffic flow and speed with roundabouts

Figure 9 - Traffic-calming features such as street tree planting, on-street parking, and curb extensions accentuate downtown community areas.

Figure 10 - Five-lane highways can be softened through raised, planted medians. Roadway design incorporates bike lanes to promote multi-modal transportation through downtown.
Chapter Two — Landscape Design Segments

- Reduce vehicle-pedestrian conflicts with consolidated curb cuts and planted medians
- Increase pedestrian safety and reduce crossing distances by combining angled or parallel parking with bulb-outs at crosswalks. Bollards, located at the bulb-outs, a buffer zone separating travel lanes, and angled parking offer additional levels of pedestrian safety. Parallel parking is recommended in areas of limited right-of-way.
- Install pedestrian-activated signals for heavily used mid-block crossings or where the distance between crosswalks exceeds one-quarter mile

Adding pedestrian-scale amenities within a streetscape also encourages slower travel speeds. The following goals establish the approach:

- Utilize street trees for shade and visual interest
- Provide lighting that is appropriate in height, style, and intensity
- Provide signage that is compatible with preferred architectural styles and is visible to pedestrians and vehicles
- Provide street furnishings, including seating, shelters, trash containers, and wayfinding aids, such as sidewalk inlays

Clearly marked bike lanes must be incorporated into these stretches of highway. Where on-street parking exists, parallel parking is most compatible with bike lanes, particularly when combined with crosswalk bulb-outs. Where angled parking exists, parking areas must be deep enough to ensure adequate visibility of cyclists. In all cases, it is important to coordinate efforts with local multi-modal transportation plans.
Community Transition

Description
Community transition zones include stretches of highway between the center of a community and its undeveloped edges. These zones provide access to outlying areas of a community and form a buffer between pedestrian-oriented town centers and open stretches of highway on their outskirts. Vehicle needs are balanced with pedestrian needs in these areas. Travel speeds vary, but are generally midway between those in community interface zones and those on open highways. Curb cuts and cross streets are used less frequently than in community interface zones; pedestrian crossings may be present at intersections. Adjacent land uses may be commercial, residential, industrial, or agricultural, but setbacks are typically greater than in community interface zones. Where adjacent uses are commercial, building setbacks commonly consist of large parking lots accessible from the highway.

Design Objectives
Design objectives for community transition zones emphasize pedestrian safety in areas that accommodate heavier or higher speed traffic conditions. Objectives for project design include:
- Provide gateway features to mark the edge of a community. Utilize these opportunities to showcase locally relevant artwork, signage, or plantings.
- Increase visual interest and reinforce reduced speed limits with median landscape treatments.
- Improve pedestrian safety at crosswalks with elements such as refuge islands, signals, improved lighting, and signage.
- Provide separated shared-use paths in higher speed or heavy traffic areas. Where frontage roads are present, create buffered shared-use paths between the frontage road and highway.
- Require developers to revegetate roadside disturbance to an appropriate level.
- Plant street trees to calm traffic and separate vehicular and pedestrian travel lanes.
- Integrate transit and provide shaded bus stops.
- Provide separated shared-use paths between the frontage road and highway.
- Require developers to revegetate roadside disturbance to an appropriate level.
- Plant street trees to calm traffic and separate vehicular and pedestrian travel lanes.
- Integrate transit and provide shaded bus stops.

Managed Landscape Character

Description
The managed landscape character is characterized by areas of growing or planned development at community edges. The frequency and density of residential, commercial, or industrial development indicates potential community expansion in an otherwise natural landscape setting. Built elements interrupt the natural environment in a more regular pattern, but without the intensity of urban density.

Design Objectives
Objectives for project design include:
- Provide adequate right-of-way for a separated, shared-use trail.
- Provide regional bike and pedestrian linkages.
- Use berms and vegetative materials instead of sound walls for acoustic mitigation.
- Identify locations for new wildlife crossings. Manage the corridor to maintain existing crossings and corridors.
- Provide sufficient right-of-way for landscape screening.
- Improve litter control.
- Preserve views of surrounding mountains and scenic vistas.
- Manage outdoor advertising to maximize scenic views and minimize ridgeline obstructions.

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- Identify locations for new wildlife crossings. Manage the corridor to maintain existing crossings and corridors.
- Provide sufficient right-of-way for landscape screening.
- Improve litter control.
- Preserve views of surrounding mountains and scenic vistas.
- Manage outdoor advertising to maximize scenic views and minimize ridgeline obstructions.

Manage the corridor to maintain existing crossings and corridors.
RURAL HIGHWAYS – HIGHWAY ZONES

COMMUNITY INTERFACE
- Pedestrian needs dominate with frequent intersections and crosswalks
- Slower design speeds
- Shorter block lengths
- Traffic calming features
- On-street parking
- Buildings, sidewalks and parking in close proximity to travel lanes
- Mid- to high-cost treatments are appropriate

PRESERVE LANDSCAPE CHARACTER
- “Rural Landscape Segments” in the Master Plan
- High speeds
- Maintain integrity of existing landscape – “do no harm”
- Agriculture or low density residential development
- Native vegetation and landforms dominate views
- Low-cost treatments are appropriate

SCENIC DESIGNATION
- “Rural Landscape Segments” in the Master Plan
- Existing scenic byways or potential scenic byway
- Located along rural highways, city streets, and urban freeways
- Unique scenic, cultural, historic, recreational, and or natural qualities
- High level of visual management
- Low- to mid-cost treatments are appropriate

Adjacent land uses: Commercial and local community development.

Adjacent land uses: Typically agricultural or low-density residential. Federal or state land ownership dominates.

Adjacent land uses: Varies from conservation and recreation to significant, historical commercial uses. Includes scenic byways and other portions of the highway that travel through areas of high scenic, cultural, or recreational value.
RURAL HIGHWAYS

Preserve Landscape Character

Description
Landscape character is best preserved in rural highway design. In rural areas, roadside development consists of agricultural uses or low-density residential. The potential for significant future growth appears to be low. Land ownership is dominated by Federal or State entities. Built elements and human interventions are sparsely distributed throughout the landscape. Native vegetation and geologic features dominate the view.

Design Objectives
Objectives for project design include:

- Utilize existing native vegetation to preserve the aesthetic integrity of the roadside.
- Preserve scenic views and viewsheds from the highway.
- Restrict outdoor advertising in scenic locations. Coordinate with local jurisdictions to prevent billboards from obstructing scenic views. Promote outdoor advertising requirements.
- Incorporate a separated, shared-use trail within the right-of-way.
- Incorporate the Placename Signage Program at areas with significant historical or natural features.
- Partner with federal and state agencies to coordinate the Corridor Plan with long-term planning.
- Fit the alignment of the highway into existing topography so structures blend into the surrounding landscape.
- Re-grade, stain, and revegetate rock cuts to blend with the adjacent hillside.
- Prevent degradation of surrounding landscape. Minimize vegetation removal during construction and maintenance practices.
- Prevent the practice of spreading asphalt millings on road shoulders. Use materials that blend with the natural landscape.
- Revegetate disturbed highway areas with native seed mix or salvaged plant materials where possible.
- Identify locations for new wildlife crossings and opportunities for improvements to existing wildlife crossings.
- Screen or visually blend maintenance facilities from roadway.
- Improve litter collection along the corridor.
- Provide activity pull-offs along the highway for recreation area access and pull-over traffic.
- Preserve downhill trees to screen the roadway from off-site locations.
- Align highway to blend facilities into the surrounding landscape.
- Regrade, stain, and revegetate rock cuts to blend with the adjacent hillside.
- Revegetate disturbed highway areas with native seed mix or salvaged plant materials where possible.
- Locate signage for scenic viewpoints at least 600 feet prior to entry. Provide screening for safety and enhanced visual quality.
- Reduce glare of traffic signs by painting the backsides.
- Provide barrier systems that define the travel corridor but do not dominate the setting. Barrier systems should become an integral part of the roadway and surrounding landscape.
- Identify locations for new wildlife crossings and opportunities for improvements to existing wildlife crossings.
- Screen or visually blend maintenance facilities from roadway.
- Incorporate the Placename Signage Program at locations with significant historical or natural features. Integrate interpretive elements throughout the corridor.
- Form partnerships with federal and state agencies to coordinate the long-term planning measures for the Corridor Plan.

Scenic Designation

Description
Scenic designation includes existing and proposed scenic byways where cultural, historic, recreational, and/or natural qualities dominate the highway landscape. Facilities in these areas require the highest level of management and should incorporate enhanced treatment levels and a higher level of detail. Designation is based on scenic preservation, visual management, and access to recreational opportunities.

Design Objectives
Objectives for project design include:

- Preserve existing view corridors.
- Protect scenic areas by disallowing structures that obscure views.
- Incorporate a separated, shared-use trail within the right-of-way.
- Provide rest areas that serve a diversity of purposes, including access to recreational opportunities, trailheads, and stopping points along shared-use trails.
- Limit vegetative clearing to the extent feasible. Allow for safety considerations and vehicle recovery within the clear zone. Minimize vegetation removal during construction and maintenance practices.
- Reduce the number of superfluous signs.
- Minimize the visual distraction of reflectors. Allow reflector components to blend with the background while maintaining the effectiveness of the reflector.
- Create structures that blend with the landscape by incorporating interesting textures and earth-tone colors.
- Preserve downhill trees to screen the roadway from off-site locations.
- Align highway to blend facilities into the surrounding landscape.
- Regrade, stain, and revegetate rock cuts to blend with the adjacent hillside.
- Revegetate disturbed highway areas with native seed mix or salvaged plant materials where possible.
- Locate signage for scenic viewpoints at least 600 feet prior to entry. Provide screening for safety and enhanced visual quality.
- Reduce glare of traffic signs by painting the backsides.
- Provide barrier systems that define the travel corridor but do not dominate the setting. Barrier systems should become an integral part of the roadway and surrounding landscape.
- Identify locations for new wildlife crossings and opportunities for improvements to existing wildlife crossings.
- Screen or visually blend maintenance facilities from roadway.
- Incorporate the Placename Signage Program at locations with significant historical or natural features. Integrate interpretive elements throughout the corridor.
- Form partnerships with federal and state agencies to coordinate the long-term planning measures for the Corridor Plan.
SECTION TWO: Mountain Desert Vista

THEME

The Mountain Desert Vista Landscape Design Segment is characterized by its orientation toward the Colorado River and its broad and distant views of mountain ranges including Spirit Mountain and Christmas Tree Pass. Known locally as the Snowbird Highway, it is the gateway to the state from the south. The abundant recreational amenities and close proximity to the river offer a refreshing contrast to the contemplative and solitary nature of the desert.

The northern Mojave Desert ecosystem characterizes this design segment, with its collectively understated but individually dramatic flora and fauna. Vivid colors of the mountains and sky enhance soft earth tones. Astronomy enthusiasts, visitors, and residents of the area treasure the brilliant night sky. Rugged mountains interrupt vast expanses of salt flats and dry lake beds. Strong and durable stone masonry, rough-hewn timbers, and weathered metals typify building materials along this section of the corridor.

Scenic, historic, and recreational amenities will be addressed through interpretative signage at the gateway to the state. View management and protection in this design segment will be a cooperative effort between Lake Mead National Recreation Area, BLM, and Boulder City. On approach to Boulder City, an increased level of development and sense of the abundance of water is apparent and signifies the transition into a new landscape design segment.

DESIGN SEGMENT OBJECTIVES

The Mountain Desert Vista Landscape Design Segment includes US 95 from the border of California north to Railroad Pass near Boulder City. Segment-level design objectives are primarily focused on preserving the scenic quality of broad desert valleys bordered by rugged mountain ranges that exist along this road.

Community Interface

• Incorporate traffic calming measures at Searchlight to reduce motor vehicle speed and improve conditions for pedestrian users. Provide visual cues to encourage motorists to slow down or park and utilize community facilities.
• Improve traffic/pedestrian circulation by consolidating curb cuts.
• Partner and coordinate with Searchlight to provide facilities for multi-modal transportation, including pedestrians, bicyclists, and transit users.
• Facilitate the completion of community enhancement projects along the NDOT right-of-way.
• Commit to partnerships that achieve the area’s goals and objectives. Work toward the best results; share decision-making responsibilities.

Preserve Landscape Character

• Preserve scenic views of distant mountain ranges and open desert valleys including Spirit Mountain Wilderness area, McCallough Range, Eldorado Mountains, and Eldorado Valley.
• Integrate the corridor plan with the BLM’s viewshed preservation plan.
• Control pullover traffic along the highway by providing activity pull-offs, especially at the dry lake bed at MM 49 (also see Road Services Program design objectives).
• Identify locations for new wildlife crossings and opportunities to improve existing crossings, especially near Railroad Pass.
• Partner with the National Park Service to provide access to the Colorado River and Lake Mead National Recreation Area.

Scenic Designation

• Designate SR 163 from the intersection with US 95 to Laughlin as a Scenic Byway.

Statewide Gateway

• Mark the entry into and exit out of the state at the Nevada/California border.
• Create a subtle gateway feature that conveys the spirit and identity of Nevada.
• Utilize muted, earth tone colors that relate to the surrounding landscape.

Road Services Program

• Create a gateway rest area at the SR 163/US 95 intersection.
• Incorporate travel and recreation information (Lake Mead National Recreation Area, Spirit Mountain Wilderness Area, Laughlin, etc.) at activity pull-offs and rest area facilities. Include vehicle requirements and road accessibility information.
• Utilize the Place Name Sign Program at road service facilities to highlight natural features, cultural history, and wildlife found within the corridor.
• Provide appropriate facilities for activities occurring adjacent to the roadway. Locate activity pull-offs at key locations to formalize parking areas and reduce roadside disturbance.
MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT

- Preserve Landscape Character
- Activity Pull-Off
  - 4x4 driving
  - Radio controlled aircraft
  - Historic Nelson and mining influence
  - Rocket launching
- Viewpoint / Point of Interest
  - Solar Energy Farm
- SR 165 to Nelson, Colorado River access, and Lake Mead Natl. Rec. Area
- US 95, US 93, and Boulder City Bypass

LEGEND
- MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT
- Preserve Landscape Character
- DESTINY OF THE WEST LANDSCAPE DESIGN SEGMENT
- Landscape and Aesthetics Element
- Key Highway Intersection

SCALE: 1 inch equals 3 miles

NORTH

VIEWPOINT / POINT OF INTEREST
- Solar Energy Farm
**DESIGN OBJECTIVES**

- Statewide Gateway Monument
- Gateway Rest Area - US 95/SR 163 intersection.
- Scenic Designation - SR 163 to Laughlin.
- Viewpoint/Point of Interest - Spirit Mountain Wilderness Area

**MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT**

**PRESERVE LANDSCAPE CHARACTER**
- Native Revegetation
  - Standard

**VIEWPOINT / POINT OF INTEREST**
- Native Revegetation
  - Standard

**SEARCHLIGHT**
- Native Revegetation
  - Accentuated

**STATEWIDE GATEWAY MONUMENT**
- Native Revegetation
  - Accentuated

**STATEWIDE GATEWAY REST AREA**
- Native Revegetation
  - Accentuated

**MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT**

**COMMUNITY INTERFACE**
- Native Revegetation
  - Standard

**PRESERVE LANDSCAPE CHARACTER**
- Native Revegetation
  - Accentuated

**ACTIVITY PULL-OFF**
- Native Revegetation
  - Standard

**HORIZONTAL AND VERTICAL SCALES VARY**

**Landscape Type/Treatment**
- Enhanced Native

**Structures and Hardscape Type/Treatment**
- Accentuated

**MOUNTAIN DESERT VISTA — LONGITUDINAL SECTION**

**CALIFORNIA STATE LINE TO ELDORADO VALLEY**

**DESIGN WORKSHOP**
- Sand County Studios
- JW Zunino & Associates
- PLACES
- CH2M Hill

**SECTION**
- A1
DESIGN OBJECTIVES

- Viewpoint / Point of Interest - Solar Energy Farm
- SR 165 to Nelson, Colorado River Access, and Lake Mead National Recreation Area
- Activity Pull-off
- US 95 / US 93 Intersection

MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT

PRESERVE LANDSCAPE CHARACTER

Native Revegetation
Standard

COMMUNITY GATEWAY TO LAS VEGAS VALLEY
RAILROAD PASS

Native Revegetation
Enhanced Native
Focal

Native Revegetation
Accentuated

VIEWPOINT / POINT OF INTEREST

Native Revegetation
Standard

ACTIVITY PULL-OFF

Native Revegetation
Standard

SR 165 TO NELSON,
COLORADO RIVER ACCESS,
AND LAKE MEAD NAT'L. REC. AREA

US 95, US 93, AND BOULDER CITY BYPASS INTERCHANGE

Landscape Type/Treatment
Structures and Hardscape Type/Treatment

[HORIZONTAL AND VERTICAL SCALES VARY]
MOUNTAIN DESERT VISTA LANDSCAPE DESIGN SEGMENT

- ACTIVITY PULL-OFF
- HISTORIC MINING AND RECREATIONAL TRAVEL INFORMATION
- VIEWPOINT/INTERPRETATION OF SOLAR ENERGY FARM (WEST SIDE ONLY)

Continent of the West Landscape Design Segment

Mountain Desert Vista — Specific Features

Eldorado Valley to US 95/US 93 Intersection

Legend

- Community Opportunities
  1. Statewide gateway
  2. Community gateway
  3. Pedestrian linkage and circulation
  4. Bike and multi-use trail linkage
  5. Highway archaeology, cultural, or historic awareness
  6. Highway and community compatibility improvement
  7. Partnerships and resource leveraging

- Travel and Tourism Opportunities
  1. Road Services Program
  2. Viewpoints and points of interest
  3. Travel Information Program
  4. Highway art
  5. Community Rest Area

- Natural Resource and Wildlife Opportunities
  1. Environmental resources preservation
  2. Wildlife movement enhancement
  3. Water resources enhancement
  4. Rare, unique, or special natural resource enhancement

- Views and Landmark Opportunities
  1. Highway scenic preservation
  2. Highway scenic improvement

- Roadway Practices and Structure Opportunities
  1. Sound protection or acoustic wall
  2. Bridge and structure aesthetics
  3. Information and directional signage
  4. Highway maintenance practices
     Note: Includes maintenance practices for milled asphalt by-products for entire corridor
  5. Highway facility enhancement
  6. Landform or contour grading enhancement
  7. Geometrics, alignment, and land relationship enhancement
  8. Sustainable corridor practice opportunity

Scale: 1 inch equals 3 miles

Map A4

CONTINUE ON MAP B2

DESTINY OF THE WEST LANDSCAPE DESIGN SEGMENT
Landscape and Aesthetic Treatment Aerial Simulations

The following aerial images illustrate all landscape and aesthetic treatments at certain key points along the Mountain Desert Vista Landscape Design Segment.

(1) Looking south toward the Eldorado Valley from the US 95/US 93/Boulder City Bypass interchange. This interchange includes portions of the Mountain Desert Vista Landscape Design Segment and the Destiny of the West Landscape Design Segment, specifically the Boulder City and Boulder City Bypass Sub-Segments. An accentuated hardscape treatment is proposed at this location to signify the importance of the interchange.

(2) Looking northwest toward the Las Vegas Valley from Railroad Pass on US 95. This location within the Mountain Desert Vista Landscape Design Segment contains a community gateway to the Las Vegas Valley. The enhanced native softscape treatment and focal hardscape treatment will allow for a prominent entrance feature for the vibrant metropolitan area.
Design Interpretation

Interpretation of a segment’s design themes occurs during individual project design. The Corridor Plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

(1) The native vegetation of this region maintains a stark beauty typical of the desert landscape. Much of the Mountain Desert Vista segment requires a native revegetation treatment to restore disturbed areas to their natural state.

(2), (3) Road service facilities that use native desert materials and colors blend well into the existing desert landscape.

(4) The natural or cultural history of a region is a story that can be interpreted on various highway design elements.

(5) The preservation and presentation of scenic desert landscapes is an important objective of the Mountain Desert Vista corridor. Road services facilities can be designed to frame views and heighten the traveler’s awareness of these fragile and beautiful landscapes.

(6) Simple structural forms, earth-toned color palettes, and visually transparent rail designs help preserve the scenic character of the corridor.
(1) Artistic, shade-providing structures are welcome amenities in a desert climate.

(2) Iconic transportation art can capture the attention of the traveler and be an interesting element of a statewide gateway.

(3) The architecture and site design of gateway rest areas and viewpoints can present the desert landscape in a powerful and provocative way.

(4) Rest areas should include simple path systems that engage the traveler with interpretive signage and native desert plants.

(5), (6) Interpretive signage at pull-offs and rest areas throughout the corridor can describe educational information on the landscape character and history of the region.
SECTION THREE: Destiny of the West

THEME

The Destiny of the West Landscape Design Segment is characterized by a unique cultural history based on the development of the Hoover Dam, Lake Mead, Boulder Highway, and Boulder City, the first planned community in the state. Significant federal funding and national attention has been given to this design segment over the years, ensuring a unique plan and exquisite details.

There are three sub-segments, united by a similar design theme, in the Destiny of the West Landscape Design Segment.

- B1 - Boulder City Sub-Segment
- B2 - Hoover Dam Sub-Segment
- B3 - Boulder City Bypass Sub-Segment

Strong historical influences identify the Boulder City Sub-Segment. Early twentieth-century Art Deco forms are recreated in formed concrete and metal structures. Abundant water, an unusual feature within the state, is manifest in the notion of the city as a reclaimed garden.

The Hoover Dam Sub-Segment consists of the Colorado River, Hoover Dam, and Lake Mead. The scale and enormity of these projects that were intended to provide water and electricity to the entire American Southwest introduced thousands of workers to the area, facilitating the settlement of the entire region. The Art Deco-style dam, walls, and buildings were designed by Gordon Kaufmann. The influence of water in a arid landscape is easily discernible, and the national significance of the dam attracts visitors from all over the world.

The Boulder City Bypass Sub-Segment focuses on the current transportation needs of the region. As a major gateway to Nevada, this sub-segment must also focus on interpretation and guest services. The bypass of historic downtown Boulder City is currently under design. The Hoover Dam Bypass is currently under construction and includes extensive grading and numerous bridge structures.

DESIGN SEGMENT OBJECTIVES

The Destiny of the West Landscape Design Segment includes US 93 from Hoover Dam to the interchange with US 95 and the new Boulder City Bypass currently under design. The corridor is further divided into three sub-segments (Boulder City, Hoover Dam, and Boulder City Bypass) each with their own distinct set of goals for landscape and aesthetics. Segment-level objectives range from scenic designation and preservation near Hoover Dam, to community enhancement within Boulder City. In addition to applicable corridor-level objectives, these design objectives have been established specifically for the Destiny of the West segment.

Community Transition

- Highlight the transition to community areas, such as the central business district, civic center, etc., with gateway features within the right-of-way.

- Because US 93 does not pass directly through downtown, provide visual cues to encourage motorists to leave the highway and enter into the city to utilize community facilities.
- Incorporate traffic calming measures in Boulder City near areas of high bicycle and pedestrian use.
- Enhance pedestrian and bicycle movement across the roadway in Boulder City, especially near access points to the River Mountain Trail. Provide safe connections and reduce the roadway’s potential to divide the community.
- Consider implementing landscaped medians as part of the traffic calming and pedestrian enhancement measures.
- Partner and coordinate with Boulder City to provide facilities for multi-modal transportation, including pedestrians, bicyclists, and transit users.
- Improve traffic circulation by consolidating curb cuts.
- Facilitate the completion of Boulder City community enhancement projects along the NDOT right-of-way.
- Commit to partnerships with the town to achieve the area’s goals and objectives. Work toward the best results and share decision-making responsibilities.

Managed Landscape Character

- Apply uniform design criteria along US 93 and the Boulder City Bypass. Blend the roadway and structures with the surrounding Mojave Desert landscape.
- Stain unnatural rock cuts to blend with the adjacent hillsides, especially in the areas of high scenic quality near Hoover Dam.
- Showcase distinct engineering features and built elements as potential works of art. For example, reinforce the concept of the modern marvel of the Hoover Dam.
• Improve litter control along the corridor.
• Provide regional bicycle and pedestrian links across US 93 and the future bypass. Ensure connectivity of neighborhoods and recreational opportunities.
• Provide community linkages from the future bypass to Boulder City.
• Preserve views of Lake Mead.
• Provide appropriate crossing facilities for bighorn sheep. Utilize natural topography, such as drainages, as part of the design.

Road Services Program
• Provide motorists with access to the Hoover Dam visitor center and museum from the Boulder City Bypass.
• Provide viewpoints to Hoover Dam.
• Consolidate existing highway pull-offs on the approach to Hoover Dam.
• Provide one central visitor center near Hoover Dam, similar to the existing Hoover Dam facility. Encourage a partnership with federal agencies in the creation of a consolidated visitor center.

Scenic Designation
• The roadways nearest Hoover Dam are not proposed to become Scenic Byways because of adjacent federal ownership; however, they are to be managed for the highest level of scenic quality and preservation.
• Restrict signage that may negatively impact viewsheds to Lake Mead and Hoover Dam.
• Partner with federal agencies to raise design standards to a level appropriate with a place of national significance.
• Use colors, textures, and materials that blend into the landscape, minimizing their visual impact.

Community Gateways
• Provide community gateways on the east (MM 5.5) and west (MM 10) side of Boulder City along US 93.
• Coordinate location of community gateways with Boulder City planning efforts.
• Ensure community identification at gateways. Use gateways to reflect the distinctive cultural, environmental, and historic background of Boulder City and Hoover Dam.
• Integrate gateway structures into the natural setting.
DESTINY OF THE WEST LANDSCAPE DESIGN SEGMENT

BOULDER CITY SUB-SEGMENT

HOOVER DAM SUB-SEGMENT

MANAGED LANDSCAPE CHARACTER

COMMUNITY TRANSITION

MANAGED LANDSCAPE CHARACTER

SCENIC DESIGNATION

BOULDER CITY LIMITS

EXISTING US 95/US 93 INTERSECTION

NEVADA / ARIZONA STATEWIDE GATEWAY

B1

B2

Enhanced Native
Accentuated

Regional Ornamental
Focal

Enhanced Native
Accentuated

Native Revegetation
Accentuated

LANDSCAPE ARCHITECTURE & PLANNING RESEARCH

(HORIZONTAL AND VERTICAL SCALES VARY)

STRUCTURES AND HARDSCAPE TYPE/TREATMENT

landscape type/treatment

Accentuated

Native Revegetation

Enhanced Native

Regional Ornamental

Native Revegetation

Accentuated

Boulder City Community Gateway

Lake Mead Visual Gateway

Nevada / Arizona Statewide Gateway

DESIGN OBJECTIVES

- Boulder City Community Gateway
- Lake Mead Visual Gateway
- Nevada / Arizona Statewide Gateway
DESIGN OBJECTIVES

- Boulder City Bypass
- US 95 / US 93 Intersection

DESTINY OF THE WEST — LONGITUDINAL SECTION
BOULDER CITY BYPASS

MANAGED LANDSCAPE CHARACTER

Native Revegetation
Accentuated

SCENIC DESIGNATION

Native Revegetation
Accentuated

BOULDER CITY LIMITS

INTERCHANGE WITH US 95/US 93 NEAR RAILROAD PASS

Enhanced Native
Accentuated

INTERCHANGE WITH US 93 NEAR HOOVER DAM

Enhanced Native
Accentuated

HUDSON VERTICAL SCALE VARY

Landscape Type/Treatment

Structures and Hardscape Type/Treatment
Landscape and Aesthetic Treatment Aerial Simulations

The following aerial images are meant to illustrate all landscape and aesthetic treatments at certain key points along the Destiny of the West Landscape Design Segment.

(1) Looking east toward Boulder City from the US 93 intersection with Veterans Memorial Drive. The community gateway is located within the Destiny of the West Landscape Design Segment/Boulder City Sub-Segment and marks the western entrance to Boulder City. As proposed, it will exhibit an enhanced native softscape with an accentuated hardscape treatment.

(2) Looking east toward Lake Mead from above US 93. The Lake Mead visual gateway lies within the Destiny of the West Landscape Design Segment/Boulder City Sub-Segment. The gateway has the opportunity to exhibit historical information about Lake Mead, Hoover Dam, and Boulder City, and provide excellent views of the lake.
2.29

Chapter Two — Landscape Design Segments

SECTION THREE: Destiny of the West

DESTINY OF THE WEST LANDSCAPE DESIGN SEGMENT

B1 BOULDER CITY SUB-SEGMENT

(1) Looking west toward Boulder City from the US 93 intersection with Temple Rock Road and Pacifica Way. This community gateway is located within the Destiny of the West Landscape Design Segment Boulder City Sub-Segment and marks the eastern entrance to Boulder City. Similar to the western gateway, it includes an enhanced native softscape treatment with an accentuated hardscape treatment.

(2) Looking down on Hoover Dam from above US 93 and the Hoover Dam Bypass. This statewide gateway is within the Destiny of the West Landscape Design Segment Hoover Dam Sub-Segment and provides an enhanced native softscape treatment with a landmark hardscape treatment. As proposed, this statewide gateway has the opportunity to exhibit historical information about Hoover Dam, provide state travel and tourism information, and provide excellent views of Hoover Dam and the Colorado River.
Design Interpretation

Interpretation of a segment’s design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

(A) Accentuated and focal structures can make a statement by utilizing bold designs and maintaining consistency with the desert environment.

(B) Multi-use trails can be incorporated adjacent to the highway to safely allow for pedestrian and bicycle circulation, providing a connection to larger regional trail systems.

(C) Viewing platforms should be included along the new Hoover Dam Bypass to provide safe areas for motorists to view the area’s unique features.

(D) A range of softscape treatment types, from native revegetation to regionally adapted, will be utilized to fulfill the wide variety of design objectives proposed for the Destiny of the West Landscape Design Segment.
Chapter Two — Landscape Design Segments

Section Three: Destiny of the West

1. Architecturally interesting shade structures and view platforms can attract more visitors and enhance their experience.

2. Rock cuts and excavation should be designed to resemble natural rock formations in shape, form, and texture.

3. Unnatural rock cuts should be stained to blend with the natural rock coloration.

4. Drainage facilities can be incorporated into the right-of-way in artistic and interactive ways.

5. Employing regionally appropriate materials and colors in a powerful and artistic manner will help draw visitors into a statewide welcome center.

6. Stormwater runoff can be harvested, stored, and reused to irrigate landscape plantings.
SECTION FOUR: Mojave Desert Vista

THEME

The Mojave Landscape Design Segment lies on the opposite side of the Las Vegas Valley from Boulder City and the Destiny of the West. It is characterized by broad and distant views to the mountains and the Mojave Desert. Rural communities steeped in histories shaped by the involvement of federal agencies such as the National Park Service, Department of Defense, and the Department of Energy, line the highway.

While the colors and textures of the Mojave Desert Vista Landscape Design Segment – muted earth tones, rugged textures, and brilliant skies – are similar to those found in the Mountain Desert Vista, it deserves classification as a separate segment with its own character. Major recreational gateways at Kyle and Lee Canyon roads, the likelihood of substantial growth and development, and the influence of adjacent federally owned lands, set this section of roadway apart from the more southern portion of US 95.

Due to the significant visual impact of the Spring Mountains along this section, the entire length of the Mojave Desert Vista segment within the Southern US 95 and US 93 Corridor is also categorized under the Spring Mountains Sub-Segment. Note that the Mojave Desert Vista Landscape Design Segment continues into the Central US 95, West US 6, and Central US 50 Corridor.

DESIGN SEGMENT OBJECTIVES

The Mojave Desert Vista Landscape Design Segment begins at the intersection of US 95 and Kyle Canyon Road and extends northwest to the Clark County line. This section of roadway is also categorized under the Spring Mountains Sub-Segment due to the significant visual impact and recreational activities in the Spring Mountains. The Mojave Desert Vista contains a subtle scenic quality that will be supported by its design objectives; however, growth pressure from the Las Vegas metropolitan area is a force that must be considered. In addition to applicable corridor-level objectives, these design objectives have been established specifically for the Mojave Desert Vista segment.

Community Interface

- Incorporate traffic calming measures within Indian Springs to reduce motor vehicle speed and improve conditions for pedestrian users. Provide visual cues to encourage motorists to slow down or to park and utilize community facilities.
- Improve traffic/pedestrian circulation by consolidating curb cuts.
- Enhance the aesthetic quality of the street environment, especially for pedestrians.
- Partner and coordinate with Indian Springs to provide facilities for multi-modal transportation, including pedestrians, bicyclists, and transit users.
- Enhance pedestrian and bicycle movement across US 95. Provide safe connections and reduce the roadway’s potential to divide the community.
- Remove impediments to change along community Indian Springs’ main street. Allow community enhancement projects to be realized along the NDOT right-of-way.
- Provide a community rest area in the form of a central gathering place. Provide basic rest area amenities such as parking, shade, and picnic tables. Coordinate the facility with other existing services such as gas stations and restaurants.
- Commit to partnerships that achieve the area’s goals and objectives. Work toward the best results; share decision-making responsibilities.

Managed Landscape Character

- Improve litter control along the corridor.
- Provide regional bicycle and pedestrian links across US 95 to ensure connectivity to recreational opportunities.
- Manage signage and advertising to prevent deterioration of scenic views.
- Require new developments to revegetate and restore any disturbed areas adjacent to the roadway.
- Use signage and extended turning lane distances to promote access to recreational opportunities in the area.

Preserve Landscape Character

- Form a partnership with the BLM to manage and preserve views of the Spring Mountains. Integrate the Corridor Plan with the BLM’s plans for viewshed preservation.
- Delineate access to Scenic Byways and scenic roadways.
- Restrict outdoor advertising in scenic locations. Coordinate with local jurisdictions to prevent billboards from blocking scenic views. Promote outdoor advertising requirements that enhance the design requirements of billboards.
- Identify locations for new wildlife crossings and opportunities to improve existing crossings.
Scenic Designation

- Apply scenic designation to US 95 between Lee Canyon and Kyle Canyon Scenic Byways to create a scenic loop.

Road Services Program

- Create a connection to recreational opportunities with recreational gateways at the entry into Mount Charleston Wilderness Area at SR 157 and SR 156.
- Provide visitors with opportunities to discover the stories and history of the region. Interpret the importance of local cultural resources such as Native American heritage and military facilities.

*(1) Managed landscape character design objectives are critical to this portion of the corridor as its scenic quality could be affected by growth and development pressures from the Las Vegas metropolitan area.*
MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT

MOJAVE DESERT VISTA — DESIGN OBJECTIVES
KYLE CANYON TO CLARK COUNTY LINE

LEGEND

MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT
Spring Mountains Sub-Segment
Preserve Landscape Character
Managed Landscape Character
Community Interface
Landscape and Aesthetics Element
Key Highway Intersection
Regional Trail

SCALE: 1 inch equals 3 miles

CONTINUE ON MAP B1
MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT

DESIGN OBJECTIVES

- Kyle Canyon Road Recreational Gateway - SR 163 to Spring Mountains
- Lee Canyon Road Recreation Gateway
- Indian Springs Community Rest Area
MOJAVE DESERT VISTA — SPECIFIC FEATURES
KYLE CANYON TO CLARK COUNTY LINE

LEGEND

COMMUNITY OPPORTUNITIES
1. Statewide gateway
2. Community gateway
3. Pedestrian linkage and circulation
4. Bike and multi-use trail linkage
5. Highway archaeology, cultural, or historic awareness
6. Highway and community compatibility improvement
7. Partnerships and resource leveraging

TRAVEL AND TOURISM OPPORTUNITIES
1. Road Services Program
2. Viewpoints and points of interest
3. Travel Information Program
4. Highway art
5. Community Rest Area

NATURAL RESOURCE AND WILDLIFE OPPORTUNITIES
1. Environmental resources preservation
2. Wildlife movement enhancement
3. Water resources enhancement
4. Rare, unique, or special natural resource enhancement

VIEWS AND LANDMARK OPPORTUNITIES
1. Highway scenic preservation
2. Highway scenic improvement

ROADWAY PRACTICES AND STRUCTURE OPPORTUNITIES
1. Sound protection or acoustic wall
2. Bridge and structure aesthetics
3. Information and directional signage
4. Highway maintenance practices
Note: Includes maintenance practices for milled asphalt by-products for entire corridor
5. Highway facility enhancement
6. Landform or contour grading enhancement
7. Geometrics, alignment, and land relationship enhancement
8. Sustainable corridor practice opportunity

MOJAVE DESERT VISTA LANDSCAPE DESIGN SEGMENT
KYLE CANYON TO CLARK COUNTY LINE
Landscape and Aesthetic Treatment Aerial Simulations

The following aerial images are meant to illustrate all landscape and aesthetic treatments at certain key points along the Mojave Desert Vista Landscape Design Segment.

(1) Looking north through the Las Vegas Valley from the US 95 intersection with SR 157 - Kyle Canyon Road. The gateway is located within the Mojave Desert Vista Landscape Design Segment/Spring Mountains Sub-Segment. It will provide a community gateway monument to the Las Vegas metro area and provide access to the recreational activities located along Kyle Canyon.
Design Interpretation
Interpretation of a segment’s design themes occurs during individual project design. The corridor plan establishes the direction for project level design. Examples illustrate forms and materials that could be used to accomplish the stated design objectives.

1. The fragile nature of the desert environment demands that minimal disturbance occur during construction projects and a native revegetation treatment be applied along the entire corridor to restore disturbed areas to their natural state.

2. Using light-colored and transparent structures helps preserve views to the scenic mountain ranges that border this segment.

3. Banners that advertise community events and amenities should be incorporated directly into lighting elements and presented with consistent color and materials.

4, 5. Transportation art that represents local ranching and agricultural activities, flora and fauna, or geographic features gives the visitor insight into the character of the place.

6. Artistic embellishments on structures and hardscape elements present a community’s cultural and historical storyline in an engaging and visually interesting way.

7. Planted and raised medians help slow traffic through town and create a welcoming environment as travelers enter a community.
Recreational gateways should be inviting facilities that provide a variety of services including restrooms, parking, and visitor information.

Historic structures along the corridor should be preserved and promoted through the Statewide Place Name Sign Program.

Picnic benches and seating should be located in shaded and comfortable areas that present the desert landscape in a scenic manner.

Historic structures along the corridor should be preserved and promoted through the Statewide Place Name Sign Program.

Self-weathering materials that share similar qualities of color and texture with the desert landscape help integrate shade structures and picnic areas into their surroundings.
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Purpose

Design Guidelines provide the framework for improving the aesthetics of existing, new, and retrofit highway projects. They are written statements of recommended methods to meet the segment design objectives. These guidelines are not standards; however, they represent a vision for landscape and aesthetics across Nevada’s highways.

Guidelines approach corridor aesthetics as a comprehensive effort, intentionally avoiding a project-to-project approach. Guidelines assist in the development of design. Adherence to the guidelines in planning, design, and operations accomplishes the following goals:

- Interpret the design themes of each landscape design segment
- Create visual unity among all highway structures and facilities
- Select finishes, color palettes, and surface patterns that are compatible with the surrounding landscape
- Incorporate transportation art motifs and media that represent the landscape design segment themes

The guidelines, accompanied by concept diagrams, sketches, or photographs, demonstrate ways in which to achieve the design intent.

NDOT will review each project design for consistency with these guidelines and the overall Landscape and Aesthetics Corridor Plan. The full design team – NDOT staff, communities, engineers, project managers, landscape architects, consultants, contractors, and maintenance crews – is strongly encouraged to:

- Become familiar with design guidelines for the design segment in which a project is located. The guidelines direct the design toward creating aesthetic unity within the design segment.
- Understand the site context. The landscape surrounding the proposed project – including predominant materials, colors, and structures, as well as natural and cultural resources and social elements – provide direction for enhancement.
- Seek early review of the project. Changes are much easier to make at the beginning of the project than at the end. Involving others early in the planning/design process helps ensure that the project is both economically and aesthetically feasible.

How to Use the Design Guidelines

The Design Guidelines are divided into four sections as described below. The full design team as well as potential partnering entities, such as communities and other organizations, should be familiar with each section.

1) Design Process Guidelines
   Describe the necessity of integrating landscape and aesthetics at the beginning of every project.

2) Destiny of the West Guidelines
   Describe the vision, components, and management plan for the Destiny of the West design segment associated with Lake Mead, Hoover Dam, and Boulder City.

3) Community and Urban Context Guidelines
   Describe guidelines for facilities and amenities that are primarily influenced by local communities, depending on right-of-way extents.

4) Highway Facilities Guidelines
   Describe guidelines that are primarily influenced by NDOT’s standards including structures, grading, roadside services, and construction practices.
SECTION ONE: Design Process Guidelines

These guidelines describe the necessity of integrating landscape and aesthetics at the beginning of every project.

1.0 PROJECT DESIGN PROCESS
1.1 Integrate landscape and aesthetics at the onset of the planning, design, and engineering phases of all highway projects. Landscape and aesthetics should not be an afterthought to a highway project.

- Landscape and aesthetics are an integral part of the planning, design, and engineering of all highway projects.
- NDOT’s structure inventory report regarding type, size, and location of highway structures should include information on landscape and aesthetics. It should also provide justification for proposed structures that do not meet the design guidelines.
- Engineering design should incorporate landscape and aesthetics to create highway structures and facilities that are effective, safe, and aesthetically appealing.

1.2 Understand the design segment theme and select design concepts that interpret the theme.

- Review the vision and objective for the landscape design segment as described in the Corridor Plan and ensure that the theme guides the project design.
- Understand the site context, including the viewshed analysis and landscape design segment objectives described within the Plan.
- Ensure project design successfully interprets the landscape design segment theme.

1.3 Understand the site context, including the surrounding landscape, and conduct a comprehensive analysis.

- Conduct a comprehensive site analysis for each project. The site inventory for each project should extend beyond project boundaries to analyze the site and surrounding landscape. Ensure the planning and design of the highway project respond to this comprehensive analysis.
- Consider characteristics such as precipitation, topography, ground cover, size and location of plant material, visual conditions, soils, site drainage, rock outcrops, and other natural features that are located on, and surrounding, the site. Additionally, archaeological and cultural resources and categories, such as historical settlement, are important.

LANDSCAPE AND AESTHETICS IS NOT AN AFTERTHOUGHT TO ENGINEERING, BUT THE STARTING POINT FOR INTEGRATED, CONTEXT-SENSITIVE SOLUTIONS.
1.4 Use a variety of sketches, three-dimensional modeling, and other tools to visualize and detail the highway.
As the level of design progresses from general to specific, highway layout and facilities should be visualized through a variety of methods to create a high quality system.

1.5 Visualize design concepts in three dimensions.
Plan view design does not accurately represent the experience of the traveler along the highway or illustrate issues of visual design. Therefore, it is important to understand design concepts in their three-dimensional framework.

- Utilize sketches, models, and digital visualization tools. “Roadway Explorer” is an excellent tool to utilize for this purpose.

1.6 Consider landscape and aesthetics costs in conjunction with baseline costs.
Landscape and aesthetics should be considered simultaneously with a project’s capital budget and estimates. In addition to determining a project’s baseline construction cost, allocation of budgets and resources for landscape and aesthetics should be clearly outlined at the start of a project.

1.7 Estimate maintenance costs during design to calculate the total life cycle cost for landscape and aesthetic treatments.
Maintenance is a key component to the success of landscape and aesthetic treatments.

- Design new projects that are low maintenance.
- Consider maintenance routines required for the design program, and identify areas that may need additional attention.
- Create maintenance agreements with local agencies as necessary to establish appropriate practices and levels of maintenance over the life of the project.

(a) Utilizing several different methods of design study and visualization results in an integrated and context sensitive solution.
SECTION TWO: Destiny of the West Design Guidelines

Guidelines described under the Destiny of the West Design Principles set the vision of highway aesthetics for roadways within and entering into the Boulder City/Hoover Dam area. These guidelines are in addition to the community and urban context and highway facilities guidelines described in sections three and four.

1.0 DESTINY OF THE WEST DESIGN PRINCIPLES

1.1 Create an environmentally sensitive highway that preserves the scenic quality of the Hoover Dam area.

The vision is organized around the idea that the road is an integral part of the landscape. As such, it should respond to and be respectful of the land and the spirit of place. The experience and importance of the highway should include the surrounding Eldorado and River Mountains, Lake Mead, Colorado River, Mojave Desert plants, wildlife, and residents of Boulder City. The road should serve as a model for highways, providing access to highly utilized recreation destinations while maintaining an elevated level of environmental sensitivity. An opportunity exists for the alignment, design, and construction of the Hoover Dam and Boulder City Bypass to follow these guidelines and serve as an example of context-sensitive highway design.

1.2 Utilize enhanced guidelines for nationally significant areas.

An elevated standard is applied to areas of national significance. Hoover Dam and its surrounding landscape represent an important piece of United States history and displays a very high level of scenic quality. Therefore, a foundational landscape type of accentuated hardscape with native revegetation softscape should exist for the Hoover Dam sub-segment, located within the Destiny of the West Landscape Design Segment. Features such as concrete barriers, retaining walls, and drainage elements enhance this type of treatment.

Enhanced guidelines and treatment levels should be used to reinforce the cultural and natural significance of the Destiny of the West design segment.

Much of the land adjacent to this corridor is owned by federal agencies. Partnerships are necessary to manage long-term scenic quality.

The Hoover Dam’s historic and national importance demands an accentuated level of treatment for all design.
should feature aesthetic treatments that respond to the landscape setting. Additional specific guidelines describing elevated treatments for this section of roadway are included within the individual guideline sections.

1.3 Design components of the Destiny of the West.
Due to the high level of tourism and recreation at the Hoover Dam, a coordinated system of rest areas and viewpoints should be established and linked by shared-use trails. The rest area should include a state welcome center that works in concert with the Hoover Dam interpretive facility and provides additional travel information for the state of Nevada. This system will establish specific areas for travelers to park and experience the scenic beauty of the area and help ease congestion resulting from roadside parking and sight-seeing.

A system of specific signage and interpretive elements can promote awareness of the historical importance and environmental aspects of this area. Welcome centers, rest areas, and scenic viewpoints provide an excellent venue for signage and information that enhances the visitor experience and understanding of the area.

Wildlife habitat corridors should be incorporated throughout the highway’s design and retrofits should occur to increase connectivity.

1.4 Partner with existing federal agencies to create a consistent vision and manage the highway for long-term scenic quality.
US 93, near Hoover Dam, is not recommended for scenic byway designation because the majority of land adjacent to the roadway is under federal ownership. However, coordination with the federal agencies involved is critical to developing a comprehensive vision for the corridor. Individual management plans should be consulted to identify and address any conflicting ideas. Eventually, an overall management plan should be created through a team-based approach that clearly defines methods to protect and enhance the roadway’s defining scenic and environmental qualities.

The scenic quality of the Destiny of the West segment is especially valuable and should be presented to visitors through a coordinated system of rest areas and viewpoints.
SECTION THREE: Community and Urban Context Guidelines

These guidelines include facilities that are primarily influenced by local community desires but may benefit from NDOT’s support. A community’s highway is important and serves as a primary component of the public realm. Even though NDOT is not responsible for facilities outside of the right-of-way, it recognizes the need to work with local jurisdictions to create context sensitive solutions.

NDOT understands the need for flexibility, and it functions as a facilitator in supporting a community’s vision and goals for the highway. The guidelines found in this section are meant to enhance established traffic engineering and road design practice. No single solution will transform a community’s highway through downtown. Rather, communities should carefully evaluate and consider several options, thoroughly understanding the issues at hand in order to create a highway that fulfills the collective goals of the partnership established between the community and NDOT. Neither NDOT nor the community can accomplish the goals on their own.

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SECTION THREE: Community and Urban Context Guidelines

1.0 COMMUNITY GATEWAYS

1.1 Establish gateways that clearly express community identity.
Gateways are highly visible areas specially designed and maintained to convey the first impression and identity of neighborhoods, communities, towns, cities, and regions.

- Provide an impressive visual aesthetic
- Utilize appropriate landscape and/or structural techniques to screen unsightly land uses

1.2 Integrate the gateway into the highway facilities.
Gateways should be part of a larger design intent, coordinate with community facilities, and use materials that are found throughout the town. Refer to Softscape and Hardscape Types and Treatments (pages 1.3-1.9) and Softscape Type Guidelines (pages 3.40-3.46), for more details about the types of features and plants to consider for community gateways.

- Community gateways need to be integrated with highway structures and landscape.
- Architectural elements may include transportation art, rock walls, accent lighting, and signage.
- Utilize bridges to establish community identity.
- Ensure that community gateways are distinctive, memorable, and functional.

1.3 Ensure community gateways contribute to community identity and clearly define community identity points.

Highlight community entrances with clear and attractive signage, using landscape materials that reflect the community character. Execute the design in a clear, consistent, and bold manner. Repetition of the design is the basis for the unique identity of the corridor.

- Signage should be appropriately sized and incorporated into an architectural or sculptural element consistent with the community’s character, the environmental context, and the corridor’s theme.
- Landscape plantings should include layers of low water-use plant material arranged to enhance the architectural elements and reinforce the transition into the community.

1.4 Locate gateways at likely future growth boundaries.
Community gateways mark the entrances/exits and designate the transition to increased development. Gateways marking downtowns may be used to improve community identity and draw motorists into the heart of town.

- Downtown gateways should complement the community gateway while reflecting the special character of the city center.

1.5 Engage agencies and organizations in the planning and design process.
Engage applicable state and local agencies, as well as local stakeholders and organizations in the planning, design, and implementation of community gateways.
2.0 COMMUNITY-BASED STREET SYSTEMS ISSUES

2.1 Consider improvements to the surrounding street system before widening the highway through communities.

Wide streets discourage pedestrian activity and have a negative economic impact. Secondary streets that are not performing well influence the way in which a highway operates as a community main street. Improvements to other major and minor streets impact the functionality of a main street.

- Traffic improvements should be considered in context with surrounding transportation patterns. Improvements to other streets allow potential lane width reductions along the highway and provide additional space for landscape and aesthetics.
- Improvements to surrounding city streets may include utilizing parallel streets, implementing a truck bypass, improving the local street network, and using parallel, one-way streets.

2.2 Shorter blocks encourage pedestrian activity and provide more corner lots, essential for local businesses.

Short blocks with connecting streets characterize traditional main streets.

- Where possible, utilize short blocks of up to 400 feet to encourage pedestrian activity in downtowns.

2.3 Consider routing trucks onto a parallel street and encourage automobile traffic through main street.

Truck traffic requires more space for turning movements and increases noise levels and fumes within the community. Wide streets discourage pedestrian activity and can harm the town’s economic potential.

- Diverting truck traffic away from the local main street may distribute traffic loads more evenly and improve the function of the main street.
- Vehicular traffic should continue through main street where feasible in order to support community businesses and facilities.
- Parallel streets should have few interruptions and maintain a fairly direct connection that may be improved to accommodate truck traffic.

2.4 Avoid bypasses and only use them in limited applications.

Bypasses are utilized to divert traffic around communities, particularly when heavy traffic conditions obstruct the functionality of main street. However, bypasses reduce the interaction between travelers and communities.

- A bypass may work in certain cases where the highway is designated as part of the freight system or heavy traffic volumes overload a well-designed street system.
- If a bypass is used, maintain connectivity for bicyclists and pedestrians and provide direct connections back to community business districts.

(1) As highways travel through communities, the function of the road changes from high speed automobile travel to pedestrian-oriented main streets.

(2) Parallel one-way street systems may be used to improve traffic patterns and provide additional space for landscape and pedestrian improvements.
3.0 SIDEWALKS

3.1 Provide a 10 to 15 foot sidewalk width for downtown areas where possible.
A wider sidewalk allows for more pedestrian activities along the street.
- Additional width may be required to accommodate transit shelters, outdoor dining, and retail.
- A sidewalk may be eight feet wide in constrained circumstances. Minimum sidewalk width is six feet.

3.2 Provide continuous sidewalks throughout downtown areas.
The ability of pedestrians to access and move through downtown areas depends on the connectivity of sidewalks and paths, as well as appropriate design and placement of crosswalks.
- Establish connections to other sidewalks or path systems where town centers transition into suburban or rural areas.

3.3 In town centers, provide pedestrian amenities (benches, drinking fountains, transit shelters, kiosks, trash receptacles, newspaper racks, banners, and decorations).
Streetscapes that appear lively and inviting attract travelers and support local businesses.
- Street furnishings should be consistent with surrounding architectural styles and the overall landscape segment theme.
- Maintain a minimum five feet of clear space around street furniture to accommodate pedestrian movement.
- Provide wide sidewalks and curb extensions as locations for benches.

3.4 Use distinctive paving to highlight sidewalk areas immediately adjacent to the inside face of curb.
Sidewalk areas can be organized into two zones – the amenity zone and the pedestrian zone. The amenity zone is adjacent to the curb and should be a minimum of two feet, but preferably four feet or greater, depending on the sidewalk width.
- Distinctive paving treatments may be used in this area to distinguish it from pedestrian movement areas.
- Treatments should be consistent over a block length, but may vary from block to block.
- Street trees, planters, benches, transit shelters, signs, utility poles, and other elements are located in the amenity zone.
- Elements should be grouped together or placed in a way that leaves a minimum open area of eight feet between them, allowing passage from the sidewalk to the street.

3.5 Provide pleasant seating opportunities along every block in the downtown area.
Seating is essential in a comfortable pedestrian environment.
- Arrange seating to accommodate a variety of views.
- Locate benches and gathering spaces to absorb sun on cold days and provide shade on hot days.
- Ensure that communities commit to maintain and clean street furniture as part of maintenance agreements that are negotiated prior to construction.

1. Eight foot sidewalks allow two-way pedestrian traffic and minimal street furnishings.
2. Ten foot sidewalks provide enhanced user comfort and space.
3. Wider sidewalks allow for a broad range of pedestrian amenities such as benches, lighting, and outdoor dining.
4. Important road intersections and pedestrian crossings can be identified with stamped concrete or changes in paving material.
5. Wider sidewalks allow room for outdoor dining and sidewalk displays.
6. Continuous sidewalks, street trees, and pedestrian amenities are part of a complete main street system that enhances community character and pedestrian safety.
3.6 Consider under-grounding utilities to provide additional space for sidewalk enhancements. Utilities should be consolidated to minimize poles and other sidewalk obstructions.

- Coordinate signage with utility poles where feasible.
- Avoid placing signs and utilities in pedestrian areas.

3.7 Incorporate transit shelters to promote pedestrian and non-motorized transportation (NMT) opportunities. Coordinate transit stops with local transportation agencies or Metropolitan Planning Organizations (MPO).

3.8 Consider using artistic paving and historical marker insets to accentuate downtown areas.

- Celebrate distinctive areas with accentuated paving materials.
- Consult artists for ideas to improve the community downtown.
- Paving patterns should coordinate with intersection designs and overall community character (see illus. 2).

4.0 STREET TREES AND PLANTING STRIPS

4.1 Carefully select plant species.

- Select trees that thrive in the local climate and consider species whose roots, seasonal flowers or fruit will not disrupt sidewalks.
- Evaluate trees based on site-specific characteristics as well as design intent.
- Considerations for physical characteristics include form, height, spread, height to canopy bottom, canopy density, trunk size, root habit, rate of growth, and longevity.
- Consider habitat requirements affecting plant growth, including soil type, soil oxygen deficiency resistance, salt resistance, irrigation need, shade tolerance, heat tolerance, air pollution resistance, and wind resistance.
- Minimize maintenance costs by avoiding trees with excessive maintenance requirements including flowers, foliage, fruit, and twigs.
- Consider common insect and disease problems that consistently require maintenance, or are life threatening.
- Maintain storefront visibility and reduce pedestrian conflicts by selecting trees whose form remains intact when limbed up seven to eight feet.
- Consider tree height over traffic lanes. Canopies should appear natural when trimmed to 13 feet.
- Select plants that will provide a variety of ornamental characteristics, such as seasonal color, texture, bark, and foliage.
- Plant species according to the softscape type and treatment designated by the design objectives.
- Avoid planting a single species in suburban areas due to the risk of a single pest or disease that could destroy an entire street tree planting.
SECTION THREE: Community and Urban Context Guidelines

4.2 **Properly place trees in sidewalk conditions.**
Maximize the lifespan of trees to reduce the cost of tree replacement.

- Protect trees from damage by car doors. Where on-street parking is provided, allow adequate room between trees and cars (two feet minimum, three feet to four feet ideal). Trees may be placed between parking spaces to minimize damage.
- Allow for root aeration and potential water harvesting through the use of tree wells (four foot by four foot minimum, five foot by five foot ideal). Dry-set pavers may also be used, ensuring adequate root aeration.
- Consider light placement as part of tree spacing and placement (typically 25 feet to 40 feet).
- Place trees so they do not block vehicular site lines or building accessways. Maintain visibility of traffic signals, directional signage and access to entry drives.

4.3 **Street tree plantings may be varied to distinguish downtown areas from transition zones and accentuate wayfinding.**
Small trees in combination with medium and large trees can reinforce wayfinding in towns.

- Distinctive trees may be used within downtown areas to distinguish them from other commercial areas.
- Key intersections and gateways may be designated by clustering smaller trees or other distinctive groupings.

4.4 **Utilize hanging baskets, containers, and other vertical elements where feasible.**
In areas of limited rights-of-way, hanging baskets, moveable planters, and other vertical elements may be used to provide structure or to accent street tree plantings.

- Hanging baskets may be incorporated into the street design and attached to light fixtures or buildings to provide visual relief and enhance the aesthetics.
- Baskets may be replaced with wreaths or other seasonal accents during dormant seasons.
- Moveable planters add flexibility to the streetscape design.
- Avoid placing containers within clear zones and immediately adjacent to curbs where high levels of heat and vehicle exhaust are more prevalent.
- No container should be used if planter widths exceed 25% of the entire sidewalk width.
- Select neutral container colors that harmonize with brick pavers, concrete sidewalks, most building facades, and the countless color combinations produced by annual plantings.
- Container design should be simple and understated.
- Use a consistent planter type within communities and provide groupings where possible. Containers should be sited near street corners (as long as clear visibility is maintained for drivers), to flank entrances to landmark buildings, or to physically and visually define outdoor café spaces.
- Combined height of containers and plantings should not obstruct the view of either motorists or pedestrians at street intersections and access drives.

![This mixed line of street trees aids in wayfinding and provides much needed shade in the desert climate.](image1)

![Strategically-located bike racks make alternative means of transportation more convenient.](image2)

![The use of a continuous line of street trees in a downtown environment improves visual connectivity and place making.](image3)

![Tree grates protect trees from unwanted root compaction along street environments.](image4)
4.5 Buffer sidewalk from the roadway through the use of planting strips or raised planters where possible.
Planting strips provide opportunities to absorb runoff water and decrease overall drainage requirements.
- Where space is not required for widened sidewalks or on-street parking, provide planting strips (ideal five feet minimum width) or raised planters (see illus. 1).
- Planting strip design should consider the placement of benches, signs, bicycle racks, and other street furniture.
- Raised planters should incorporate seat walls to provide additional pedestrian seating.
- Consider providing three feet of hard surface between planting strips and parallel on-street parking to accommodate motorists upon exit from their vehicles.

4.6 Ensure that communities commit to maintain and provide irrigation for streetscape plantings.
The success of a streetscape program within communities requires dedication to maintenance and irrigation of planted areas.
- Streetscape plantings should not be provided without community endorsement and support.
- Avoid spray irrigation systems where possible, and do not overspray onto walkways and into gutters.
- Irrigation and maintenance may be funded through community beautification committees and other community organizations.

4.7 Use engineered planting soil for street tree plantings.
Trees planted in urban conditions and as part of street tree programs face unique challenges. The soil under adjacent sidewalks and roadways is typically compacted to support the paving. This compaction inhibits root growth and spread, causing shallow root growth and tree stress. Engineered planting soils include mixtures of soil, loam, stone, water, and a moisture-retaining polymer or sand that transfers weight-bearing loads from stone to stone in the gravel, leaving the soil between the stones unaffected by compaction. This type of engineered soil creates a larger rooting volume with increased porosity, nutrient-holding capacity, and drainage for a healthier environment for tree root growth.
- Engineered planting soils should be used around root balls of street trees.
- Continuous trenches of engineered planting soil are recommended between street trees.
- Locate trenches parallel to curbs and under non-mortared brick pavers. Trenches provide greater volumes of soil for root growth and permit air and water to reach tree zones.
5.0 GRAPHICS AND SIGNAGE

5.1 Create a standard system of signage that aids wayfinding within communities while also providing information about local facilities and organizations.

- Provide a coordinated signage system that reflects the distinctive character of special districts.
- Graphics can take the form of signs, banners, information kiosks, or pavement inscriptions or inlays.
- Materials and designs should be clear and simple, so as to be easily read and quickly understood by pedestrians or motorists, as appropriate.

5.2 Locate and size signage and graphics so that they are easily read and understood by both cars and pedestrians.

- Pedestrian-scaled signage should be placed at heights that can be easily seen from the sidewalk (see illus. 3).
- Signage designed for motorists can be larger, and placed at heights and intervals that can be easily seen and understood at higher traveling speeds.

5.3 Provide community graphics such as banners to promote special events and define special districts and neighborhoods.

- Create a coordinated system of signage that describes community events and reinforces community character.
- Banners that span the roadway should be used sparingly and in more commercial locations. Banners can be installed permanently, or as seasonal and temporary forms of signage.

5.4 Use distinctive signage to direct motorists through the heart of the community.

Truck traffic is often not desirable within downtown areas and separate truck routes may be established. Vehicular and tourist traffic, however, is sought after.

- Ensure that signage appropriately directs vehicular traffic to promote tourism and support local businesses.

5.5 Coordinate light fixture design with graphics and signage.

- Banners may be incorporated into light fixtures and should be considered as part of the design. Graphics should be consistently displayed.
- Customized light fixtures reinforce context-sensitive solutions.

5.6 Utilize a consistent color palette within local communities.

Local jurisdictions may choose a color palette for fixtures and amenities that corresponds with the community’s vision.

- Colors should respond to the natural setting and subtly enhance the community without overpowering the streetscape design.
- Color should complement the NDOT color palette for structures within the right-of-way.

5.7 A wayfinding map placed at a highly visible downtown location can be an important device to guide tourists to local businesses.
SECTION FOUR: Highway Facilities Guidelines

These guidelines pertain to highway facilities that are primarily influenced by NDOT’s standards, including structures, grading, roadside services, and construction practices. The guidelines found in this section are meant to enhance established traffic engineering and road design practice. No single solution will transform the highway. Partnerships may be created with communities and other agencies and organizations to accomplish landscape and aesthetic treatments in addition to supporting landscape and aesthetic elements that impact areas outside of the right-of-way. Established partnerships and design teams should carefully evaluate and consider several options and thoroughly understand the issues at hand in order to create a highway that fulfills their collective goals. Neither NDOT, communities, nor other agencies or organizations can accomplish the goals on their own.

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1.0 WELCOME CENTERS AND NON-INTERSTATE STATEWIDE GATEWAYS

1.1 Provide a vibrant, visually rich welcome center at Boulder City.
Promote and provide information about statewide travel opportunities and services. Promote the welcome center as an important civic facility, and ensure that it maintains a strong visual presence. The gateway welcome center should convey the identity of Nevada, ensuring that the entry experience is notable and memorable. Welcome centers should also signify departure from Nevada, leaving the traveler with a positive memory. Program components offered at centers include interpretation of time, history and the Mojave Desert landscape. Conduct a feasibility study to determine the appropriate location for the welcome center and potential partnerships for construction, operation, and maintenance.

1.2 Provide non-interstate statewide gateway features crafted from the land and place where US 95 enters Nevada from California. Use local materials and vernacular forms in combinations that subtly reinforce the character of the local landscape. Non-interstate gateway features should be understated and relate to the scale of the road. Each statewide gateway feature shall include the Nevada name and state seal, feature stone material from local sources, and use planting types identified in the landscape design segment.
2.0 REST AREAS, VIEWPOINTS, AND PULL-OFFS

2.1 Provide a comprehensive roadside service program.

Roadside services are key components of the highway corridor, particularly where long distances separate developed areas. Provide a comprehensive roadside service program throughout the corridor. The road services matrix on the opposite page describes varying levels of service stops and associated program elements. Refer to the Specific Corridor Features maps (pages 2.17, 2.18, 2.27, 2.36) for potential road service facility locations.

- Locate rest areas to provide safe stopping points.
- Connect rest areas located in highly utilized recreation areas with a shared use trail.
- Incorporate facilities for transit stops where necessary.
- Buffer roadside services from the highway, or provide an access road when located off the highway.
- Consider major site resources and features such as topography, views and vistas, unique vegetation, geological features, wetlands, and other qualities native to the site and its surroundings.
- Consider siting activity pull-offs where they provide access to activities located adjacent the highway.
- Locate truck parking so as to not disrupt views and other features.

2.2 Ensure rest area design reflects the local setting.

All rest areas, viewpoints, and pull-offs should readily accommodate travel needs and reflect the corridor’s design theme.

- Utilize vernacular forms and local materials to create rest areas that blend seamlessly with the surrounding landscape.
- Avoid using makeshift, adapted site facilities with no distinctive architectural style.
- Concrete barriers and brightly painted pole bollards should not be used for parking delineation or site boundaries at rest areas and pull-offs.
- Sustainable architecture may be appropriate for many highway service areas where water, energy, and landscape resources are difficult to secure and maintain.
- Provide lighting in scale with the site development.
- Articulate space, frame views, and provide shade with landscape plantings and/or architectural features.

2.3 Retrofit existing rest areas.

Analyze existing rest area structures, buildings, amenities, and layout for their visual interest. Renovate to improve the aesthetics and user comfort of existing road service facilities.

2.4 Locate viewpoints and points of interest to take advantage of visual access to the features of interest.

Give special attention to existing or potential views, vistas, and cultural or historical attractions that are unique to the site or have outstanding resource value, such as Native American heritage and emigrant history. Locate viewpoints at the following locations:

- Eldorado Valley (US 95)
- Hoover Dam (US 93)
- Railroad Pass (US 95)
- Kyle Canyon (US 95)
- Lee Canyon (US 95)
- Indian Springs (US 95)

(1) Using architecture to frame scenic views helps connect visitors to the larger landscape.

(2) Viewpoints should be placed at key viewing areas, and built with materials and forms reflective of their surroundings.

(3) Road service facilities that use local materials and color palettes blend into the landscape and maintain the unique character of the place.
### Section Four: Highway Facilities Guidelines

#### Chapter Three — Design Guidelines

<table>
<thead>
<tr>
<th>ROAD SERVICES MATRIX</th>
<th>Description</th>
<th>Landscape Treatment</th>
<th>Program Elements</th>
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</table>
| **ROADSIDE PULL-OFF** | Roadside pull-offs provide facilities for drivers to exit the highway for a brief period. Facilities and minimal parking are provided to accommodate the abbreviated stay. (Referred to as "Rest Stop" under former NDOT naming conventions.) | • Native plant revegetation to enhanced native landscape types  
• Standard hardscape type | • Site-specific interpretive signage  
• No toilets or running water  
• Trash containers  
• Limited car and Recreational Vehicle parking  
• Scenic overlooks  
• Located according to unique or outstanding features  
• Shade canopy (vegetation or structure) |
| **VIEWPOINTS AND POINTS OF INTEREST** | Viewpoints and points of interest present opportunities to view unique vistas, geologic and historic features, or cultural landmarks. Interpretive elements are integrated into the site design, and Place Name Signage and Travel Information elements are provided to establish the relationship between highway and place. Typically, the length of stay is short and parking is limited. | • Native plant revegetation to enhanced native landscape types  
• Standard to accentuated hardscape types | • Located according to travelers' needs and unique site features  
• Site-specific interpretive signage  
• Toilets/no running water  
• Handicap accessible  
• Picnic tables and shade structures  
• Trash containers  
• Painted car and Recreational Vehicle parking  
• Telescopes/viewfinders  
• Nature walks or short trails  
• Seating Areas  
• Shade canopy (vegetation or structure) |
| **BASIC REST AREA AND COMMUNITY REST AREA** | Basic rest areas are located throughout the state offering site specific interpretive information. They offer limited restroom facilities and may or may not include running water, depending on availability. Typically, these rest areas are located adjacent to scenic views, unique historical, cultural or environmental features. Community rest areas provide facilities within the town’s infrastructure and function as a pocket park or town square. | • Enhanced native landscape type  
• Standard to accentuated hardscape types | • Located according to traveler’s needs and unique site features  
• Site-specific interpretive signage  
• Toilets/no running water  
• Emergency call box  
• Handicap accessible  
• Picnic tables and shade structures  
• Trash containers  
• Rest area dump station  
• Nature walks or short trails  
• Seating Areas  
• Shade canopy (vegetation or structure)  
• Local community information |
| **COMPLETE REST AREA** | Complete rest areas are typically located at 60-mile intervals throughout the state and are usually situated outside of developed areas. They feature fully-operable facilities in combination with interpretive information on regionally significant cultural and historical sites. Complete Rest Areas also provide travelers with picnic facilities and include children’s play areas and pet areas. | • Regionally adapted landscape type  
• Focal hardscape type | • Regional interpretive signage  
• Running water and flushing toilets  
• Emergency call box and telephones  
• Drinking fountains  
• Vending machine services (at manned sites)  
• Handicap accessible  
• Picnic tables and shade structures  
• Trash containers  
• Bicycle storage units  
• Recreational vehicle dump station  
• Painted car and Recreational Vehicle parking  
• Telescopes/viewfinders  
• Interpretive and overlook features  
• Children's play area  
• Pet rest facilities  
• Shade canopy (vegetation or structure)  
• Local community information |
| **GATEWAY REST AREA** | Gateway facilities convey first impressions and identity. Special features may be incorporated to highlight the area through design interpretation of the place. Gateways may be associated with any level of rest stop in the listing. The incorporation of local community information regarding amenities, events and interpretative elements, improves the interface between the highway and the communities it serves. | • Regionally adapted landscape type  
• Landmark hardscape type | Program elements are consistent with the type of Road Service Area provided. Specific elements include:  
• Regional services information  
• Interpretation of regional sites and features  
• Information on regional recreational attractions |
| **WELCOME CENTER** | Welcome centers are located along major entry routes to the state. They offer introductions to the state and travelers can find access to useful travel information. Welcome centers include a staffed information kiosk. | • Regionally adapted landscape type  
• Landmark hardscape type | • Located at major entry routes to state  
• Informational Services  
• Staffed visitor center  
• State-wide interpretive signage  
• Running water/flushing toilets  
• Emergency call box and telephones  
• Drinking fountains  
• Vending machine services  
• Handicap accessible  
• Picnic areas and shade structures  
• Trash containers  
• Bicycle storage units  
• Painted car and Recreational Vehicle parking  
• Painted truck parking  
• Improved trails  
• Children's play area  
• Pet rest facilities  
• Shade canopy (vegetation or structure)  
• Telescopes/viewfinders |
• Design the viewpoint to reflect the surrounding setting and unique features.
• Coordinate the preservation and management of scenic vistas and unique features with the appropriate organizations and groups.
• Evaluate viewpoints periodically to ensure the integrity of the view.
• Consider the use of scenic easements to protect views and vistas.
• Limit the construction of outdoor advertising and other elements and structures that detract from the quality of the landscape.

2.5 Coordinate locations of rest areas with recreational access points.

Coordinate locations of rest areas with regional trail systems.

• Coordinate with appropriate agencies to provide informational signage for recreational activities.
• Coordinate the location of park-and-ride lots, rest areas, and activity pull-offs with transit stops to encourage use of public transportation, particularly in areas of heavy tourist traffic.

2.6 Provide community rest areas within designated towns.

Community rest areas have the dual benefit of serving as town parks and engaging travelers with local businesses.

• Develop community rest areas through cooperative agreements with local municipalities.
• Provide information about local and regional activities, businesses, and points of interest.

1. Prototypical viewpoint / point of interest.
2. Connections to regional trail systems can be incorporated at recreational gateways, viewpoints, and rest areas.
3. Self-weathering materials should be used for architectural elements at rest areas and viewpoints.
4. Local materials and colors can be used to integrate parking areas into the natural setting.
5. Shade structures should be designed to disappear in their surroundings.
6. Interpretive signage included along trails inform travelers about their surroundings.
7. Viewpoints that are elevated from the ground can be used to attract visitors.


3.0 TRANSPORTATION ART

3.1 Engage artists early in the design and development stages of highway projects to ensure an integrated and comprehensive art program. Transportation art should not be an afterthought or decoration.

- Incorporate art in the design process as a means of interpreting the corridor’s theme
- Integrate art as part of the functional aspect of highway facilities
- Artists should coordinate with community members, landscape architects, and architects throughout the design process
- Scale artwork based on travel speed, slope and sight distance

3.2 Create regionally appropriate and meaningful art. Art enhances the travel experience and can create the first impression of a place. Transportation art should clearly express a meaning and purpose that relates to the surrounding locale, the unique culture and environment of the area, and the travel experience. Patterns and objects used thoughtfully, and even abstractly, can and should evoke a response that connects travelers to the uniqueness of the site and/or the surrounding landscape.

- Patterns imprinted on a highway structure should be designed as an artistic composition of objects, imprints, or patterns.
- Patterns should offer a level of complexity and interest appropriate to the place and highway travel speed.
- Avoid the use of repetitive, overused symbols and patterns.
- Consider artwork that utilizes light and shadow to create pattern and images.
- Avoid monotony in the duplication of repetitive literal pictorial application.

3.3 Ensure artwork expresses an excellence of craftsmanship, quality, truthfulness, and originality. Transportation art should complement the overall design of highway facilities. Materials and forms should be carefully considered to ensure the long-term suitability of the project.

- Select a composition of materials that are durable for the projected life span of the project.
- Avoid the use of ready-made, randomly placed, stand-alone objects, or imprints that portray little meaning.
- Use evocative artistic expressions that engage observers and complement highway structures and the surrounding landscape.
- Elements of highway art should not be obvious or forced. Rather, transportation art should depict an excellence of craftsmanship, quality, truthfulness, and originality.

3.4 Consider each art piece as part of a larger whole. Highway art can be carefully crafted, giving the simplest of all elements a very powerful effect. When planning transportation art, the entire design segment and overall corridor should be considered.

- Consider views to the surrounding landscape.
- Art should be sized at a size relative to the surrounding landscape and highway speed.
- Avoid distracting art pieces. Consider glance recognition and the intensity of surrounding features in order to prevent safety issues.
3.5 **Ensure transportation art supports the Landscape Design Segment themes.**

Transportation art is not a typical project, and the choice of appropriate subject matter and media is essential to obtaining the desired expression for each landscape design segment theme. Choose art subjects that support the landscape design segments’ themes, such as:

- **Mountain Desert Vista**
  - Subtle gateway marking the arrival to Nevada
  - Travel
  - Mojave Desert landscape and wildlife features
  - Outdoor recreation
  - Native American heritage
  - Mining
  - Mountain views
  - Geology

- **Destiny of the West**
  - Subtle gateway marking the arrival to Nevada
  - Travel / tourism
  - Hoover Dam
  - Outdoor recreation
  - Lake Mead National Recreation Area
  - Colorado River
  - Hydroelectric power

- **Mojave Desert Vista**
  - Threshold/gateway, arrival to Las Vegas
  - Travel / tourism
  - Outdoor recreation
  - Mojave Desert landscape and wildlife features
  - Native American heritage
  - Mining
  - Death Valley Historic Trail
  - Mountain views
  - Geology
  - Nevada Test Site
  - Yucca Mountain
  - Desert National Wildlife Refuge
  - Humboldt-Toiyabe National Forest

Enhance bridges, pedestrian structures, noise walls, and retaining walls with appropriate motifs and consider sculptural ornamentation, decoration, and landmark features.

3.6 **Engage local agencies and organizations in the planning process.**

Relationships with local agencies as well as the Nevada Arts Council should be developed to assist in the review and implementation of proposed transportation art projects.

- Consider transportation art at the onset of project development
- For Community Matching Fund and Transportation Art programs, refer to the guidelines outlined in the current Landscape and Aesthetics Community Match Procedures Manual: Guidelines, Applications, Instructions and Forms for the Community Matching Funds and Transportation Art Program, NDOT.

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(1) Murals can be used in downtown environments to tell the cultural and natural history of a community.

(2) Decorative imprint motifs can be created with a custom form liner and used to decorate walls.

(3) Cultural symbols sandblasted into stone describe aspects of the historic emigrant traveler.
4.0 SIGNAGE

4.1 Provide a standard, cohesive system of service signage.
NDOT manages the Tourist Oriented Directional Signage System (TODS). TODS are preferred over numerous private individual business signs and billboards. Work with local community agencies and businesses to develop and locate TODS. Refer to the Outdoor Advertising discussion (pages 1.14-1.15) for more information about billboards along the corridor.

4.2 Implement a statewide Place Name Sign Program.
A comprehensive place name signage program should be implemented through partnership initiatives with local communities and agencies. The program and sign types are described on page 1.10-1.11. Areas of interest within the design segments that could be highlighted include:

- Historic features: Searchlight mining shaft, Boulder City historic district, Clark County Heritage Museum, Boulder Dam Hotel, Floyd Lamb State Park
- Wildlife and natural areas: Lake Mead National Recreation Area, Desert National Wildlife Refuge, Mojave Desert, Cottonwood Cove, Colorado River, Corn Creek, Red Rock Canyon National Conservation Area
- Geographic features: Christmas Tree Pass, Spirit Mountain, McCullough Mountain, Black Mountain, Black Canyon
- Cultural/recreational resources: Fort Mojave Indian Reservation, Las Vegas Paiute Indian Reservation, Lake Mead National Recreation Area

4.3 Create a family of iconic symbols to represent features.
Encourage the recognition of cultural and environmental features through iconic imagery.

- Signage should depict the general physical shape of the point of interest.
- Establish icons to represent general categories of interest within the Nevada landscape. Illustration 1 shows examples of symbols to represent the categories. Additional symbols should be developed to represent Nevada landmarks/historic points, emigrant trails, and Native American features. Engage Nevada tribes to develop a universal symbol that is both appropriate and simple to represent the state’s Native American resources.
- Features and points of interest to be recognized in this program will be coordinated with NDOT, State Parks, Native American tribes, and the State Historic Preservation Office.
- Name and labels included shall be consistent with State archives and map naming conventions. Consider travel speed when names and labels are used. Lettering less than 6 inches in height can be difficult to read at high speeds.
- Final icon and name approval will rest with NDOT.

4.4 Implement an Audio Interpretation Program.
Develop and coordinate an audio/multimedia interpretative program with the statewide Place Name Sign Program. This program could be implemented via broadcast radio, CD or DVD programs, wireless Internet hotspots, satellite transmission, or other media that allows travelers to access additional information from their car.

- Information may include cultural and natural resources, tourist opportunities, and services along the corridor.
- Link the Audio Interpretation Program to the statewide Place Name Sign Program and state welcome centers so that travelers can access specific information on selected sites.
- Utilize synchronous technologies that allow users to control how and when they access this additional information.
- Incorporate the program into the Intelligent Transportation System regional information architecture to allow messages to be updated in real time and be coordinated with AMBER alert and 511 traveler information messages.

Examples and categories of iconic symbols for place name signs:
- Mountains
- Rivers
- Sand Dunes
- Mining
- Historic Railroads
- Watchable Wildlife
- Historic Downtown
- Ghost Towns
- Hoover Dam

(1) Universal symbols represent Nevada’s cultural and environmental features as part of the Place Name Sign Program. Additional categories such as Nevada landmarks/historic points and Native American features should be developed to provide straightforward icons that symbolize the resources.
• Coordinate with programs, organizations, agencies, and municipalities along the corridor, and explore ways in which to expand the Audio Interpretation Program.

4.5 Coordinate the statewide Place Name Sign Program with the national Watchable Wildlife program and with other community driven programs.
Work with other agencies, civic groups and municipalities to provide interpretive signage, where applicable.

4.6 Highlight scenic byway entrances with signage that is coordinated with the statewide Place Name Sign Program.
Reflect the place and character of the area with iconographic images incorporated on scenic byway signs.

4.7 Incorporate the anti-littering campaign.
Anti-littering messages located at highway stops that include food and beverage services will provide an immediate reminder to travelers.

• Work with local vendors to place the anti-littering messages on disposable cups, plates, and other items likely to be tossed out the vehicle window.
• Along non-interstate roadways, utilize pole signage anti-littering signs.
• Develop signage that engages Nevada residents and encourages active participation in maintaining clean and beautiful highways.

4.8 Simplify signage supports used on bypasses and elevated bypasses.

• Use single arm monotube systems for freeway signage support where possible.
• Minimize the number of trusses used in order to reduce visual clutter.

(g) As part of the anti-litter campaign, highway graphics and signage will be posted along the highway where trash accumulation is the most significant.

(8) Sign bridge with numerous trusses is visually cluttered.

(9) Scenic Byways should include a specific pictorial graphic that is related to the place.

(9) Single arm monotube with one signage board clarifies appearance of information.

(7) Scenic Byways should include a specific pictorial graphic that is related to the place.

(3), (4), (5) Examples of proposed anti-littering signage.

(3), (4), (5) Examples of proposed anti-littering signage.
5.0 COLOR PALETTE APPLICATION

5.1 Use a uniform, consistent color palette for all highway structures.

Standard NDOT practice should utilize a uniform and consistent color palette for all new and existing highway structures that complements the surrounding landscape. Base and accent stain or paint colors for all highway structures along the Southern US 95 and US 93 Corridor have been selected. To ensure accurate color reference, the colors are matched to the Dunn Edwards system, and are shown on the right.

• Each highway structure should use a selection of one base color and up to two accent colors, chosen from the palette. No more than two different accent colors should be used per site.
• Ensure roadway structures within a single landscape design segment use the same base color and accent color(s).
• When existing structures require refinishing, they should be stained or repainted to be consistent with the selected color palette.
• Specific town logos and transportation art are exempt (refer to Transportation Art guideline, page 3.19).

5.2 Ensure accent colors highlight structural aspects.

Accent colors should highlight structural aspects and/or details of highway structures, such as the beam of a bridge or a bridge railing.

• Ensure accent color application logically responds to and reinforces structural features or change in materials.

5.3 Use color composition on bridges to visually reinforce structural elements.

Use the base and accent colors to reinforce the structural elements and integrity of a bridge.

• Concrete bridge spans, superstructure support, and slope paving should be selected from the landscape segment base color.
• Railing and other features incorporating a material change should utilize accent colors. In addition, steel bridge spans should use an accent color.

5.4 Blend new rock cuts and/or soil with the surrounding landscape.

Match new rock and soil treatments with existing rock and soil color to blend disturbed areas with the surrounding environment.

• Use this process for any corridor project in which rock cuts are included.
• Blend newly excavated soil and rock with existing weathered rock.
• Where possible, the application should occur in a central location and away from sensitive receiving waters.

(4) The proposed color palette refers to the Dunn Edwards paint system. For reference purposes only.
CHAPTER THREE — DESIGN GUIDELINES

SECTION FOUR: HIGHWAY FACILITIES GUIDELINES

6.0 ROADWAY DESIGN

6.1 Reduce the appearance of a wide right-of-way through communities.

Every effort should be made to keep the roadway as narrow as possible. Wide roads allow for faster vehicular travel speeds, negatively impacting the safety of pedestrians.

- Consider reducing the number of lanes. Four lane highways may be retrofitted to two travel lanes or two travel lanes and a turn lane when other street systems are improved and overall traffic patterns move effectively.
- The appearance of a wide roadway may be reduced through the use of vertical elements, curb extensions, and a narrow shy distance (side clearance from fog line to edge of structure). Utilize a one to two foot shy distance from curbs and medians in downtown areas to reduce speed.
- Provide passing lanes outside of rural communities rather than only within town to reduce the number of lanes within town and slow travel speeds. Highways that only provide passing lanes within communities encourage higher travel speeds through town because it is the only opportunity to pass slower traffic.

6.2 Consider the use of rumble strips in transition zones to signal a speed reduction.

Changes in paving material and roughened paving provide a visual and audible cue to drivers to slow down.

- Rumble strips may be combined with enhanced roadside treatments such as plantings and gateways to reinforce the entry into pedestrian areas.
- Avoid placing rumble strips in bike lanes, and do not use in situations where bikes share travel lanes.

6.3 Provide curbs no greater than six inches in height in downtown areas.

Curbs define the edge of the highway and delineate the pedestrian zones within communities. Curbs greater than six inches in height may restrict pedestrian movement and create difficult transitions at pedestrian crossings.

6.4 Utilize on-street parking in community interface zones to buffer the sidewalk from traffic.

On-street parking accommodates access to local businesses and slows traffic.

- Use curb extensions to enhance the visibility of pedestrians crossing the street.
- Angled parking should only be used in areas of very low travel speeds.
- Provide a bike lane between parking and travel lanes to create a buffer.
- When bike lanes are not incorporated, consider using a wider outside travel lane or parking area to minimize conflicts with opening doors.
- For all forms of on-street parking, maintain adequate visibility and buffer zones between travel lanes and parking to prevent conflicts with through traffic.

6.5 Integrate art, softscape, and hardscape as part of a simple landscape treatment for roundabouts.

- Landscape treatments within a roundabout should express the segment theme and community vision.
- Sensitively site transportation art and plantings.
- Treatments should complement and coordinate with the surrounding environment and landscape features and be part of an integrated design approach.

(1) Street elements such as on-street parking, bollards, landscaping, and bulb-outs delineate distinct zones for automobiles and pedestrians and provide visual cues to slow down.

(2) Parallel parking can be incorporated in relatively narrow right-of-way areas and helps delineate traffic and pedestrian zones.

(3) Angled parking can generate more parking spaces than parallel parking but requires more right-of-way distance and very low travel speeds.
SECTION FOUR: Highway Facilities Guidelines

Chapter Three — Design Guidelines

7.0 MEDIANS

7.1 Revegetate medians along rural highways to integrate the highway with the landscape. Utilize native plant material to revegetate medians along rural highways to create a more natural and consistent visual experience.

7.2 Utilize median plantings and treatments to enhance a community’s image. Landscaped medians beautify wide streets by breaking up large expanses of pavement and making the street feel narrower. Medians can include a combination of rock mulch, signage, plantings, and boulders that help to identify the character of the place.

- Avoid using asphalt paving in medians. Stamped, colored concrete or pavers should be used in narrow medians (less than five feet wide). Paving score patterns should be simple and coordinate with surrounding architecture and pedestrian areas. Colored concrete should be the segment’s base color (see Color Palette guidelines, page 3.23), or coordinate with adjacent pedestrian walkways.
- The placement of plantings and treatments should direct pedestrians and facilitate the vehicle operator’s view. Selected plant species should also be suitable for the harsh roadway environment.
- Planted medians are generally the width of the center turn lane but can be as narrow as five feet. Regardless of width, medians need to be designed to allow for safe maintenance as well as for anticipated plant growth.

- Design medians to allow for adequate percolation of water to avoid irrigation water infiltrating into the road base/sub-base and causing pavement failure.

7.3 Utilize medians to reduce potential vehicle-pedestrian conflicts and to enhance pedestrian walkability. Medians function to improve pedestrian visibility by minimizing turning conflicts and directing and separating traffic. They provide an effective way of reducing conflicts between pedestrians and vehicles because they allow pedestrians to incrementally cross the traffic lanes.

- Medians may be constructed with curbs and combined with pedestrian refuge islands.
- Future development, access management, usage patterns, and changing transportation demands should be examined when determining if raised medians are the appropriate solution for the roadway.

7.4 Direct stormwater to planted medians and landscaped planting strips where feasible. Utilize drainage swales within medians to handle excess stormwater runoff.

- Carefully design curbs, gutters, catch basins, and drain grates for ease of maintenance.
- Ensure pedestrian movement is not unduly impacted by ponding water.
- In areas where run-off may contain high levels of salt, select salt-tolerant plants.

(t1, t2) Medians should be designed to accommodate stormwater runoff where possible and be planted with low maintenance, drought-resistant plant materials.
8.0 PEDESTRIAN CROSSINGS

8.1 Improve pedestrian safety at crossings. Motorists can see striped crosswalks from a greater distance.

- Utilize a zebra striping pattern for painted crosswalks (see illus. 1).
- Crosswalk striping should correspond to the width and location of sidewalks.

8.2 Use alternative paving type, coloring, or other means to visually highlight pavement in pedestrian crossings.

Crosswalks may be marked with distinctive paving material, colors, and texture.

- Concrete is preferred over brick for its durability. Concrete may be stained, embossed with patterns, or constructed with unit pavers to give crossings a distinctive feel in particular areas.
- Textures and materials should provide a visual contrast with the adjacent road surface, however, they must also provide a smooth travel surface and good traction.

8.3 Reduce curb-to-curb distances at crosswalks. Incorporate curb extensions as part of the highway system when on-street parking is provided. Provide refuge islands to break up long crosswalks.

Curb extensions reduce the crossing distance for pedestrians, increase visibility for motorists and pedestrians, prevent illegal parking at corners, and provide additional room for people waiting to cross the street.

- Curb extensions should extend into the street no further than the edge of the travel or bike lane. They can be used at mid-block crossings and are beneficial when combined with pedestrian refuges.
- Refuge islands are located at crosswalks in the middle of streets to provide a safe waiting area for pedestrians.
- The waiting area in refuge islands should be in line with the crosswalk and as wide as the crosswalk to allow persons with disabilities to cross without obstruction.
- Refuge islands may include additional pedestrian safety features, such as bollards and flashing signs, to enhance their visibility.

8.4 Alert motorists to pedestrian crossings through the use of signage and flashers.

Pedestrian signals work in conjunction with traffic signals to assign right-of-way at intersections.

- Active signals are preferred over passive signals.
- Pedestrian signals are appropriate at all intersections with traffic signals where crossing is permitted.

8.5 Provide appropriate lighting to enhance visibility of pedestrians by motorists.

Pedestrian-scale lighting and motor vehicle-scale lighting should complement each other in an effort to ensure that both pedestrian crossing areas and travel lanes are effectively illuminated.

- Accentuated lighting may be used at crossing points to further distinguish crossing locations.
8.6 Consider pedestrian facilities as part of roundabout design.
Pedestrian crossings at roundabouts should balance pedestrian convenience, pedestrian safety, and roundabout operations.

- Crossings at roundabouts implement the same design strategies identified for typical crosswalks but also need to consider the unique geometry of the roundabout design.

8.7 Balance the need for adequate vehicular turning radii with pedestrian needs.
A tighter turn or shorter radius forces drivers to slow down, allowing them to see pedestrians and make quick stops. Additionally, they create more sidewalk space for pedestrian amenities.

- Reduce corner radii where feasible to shorten and align pedestrian crossings while reducing vehicle turning speed.
- Reduce the use of slip lanes (channelization) where possible to minimize pedestrian/vehicular conflicts.

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(1) Consider the use of curb extensions in highly utilized pedestrian areas in order to provide pedestrian amenities and reduced crossing distances.

(2) Streetscape elements help define pedestrian gathering places and safe crossing zones.

(3) Pedestrian crossings at roundabouts require additional identification through striping and paving changes due to the unique geometry of these intersections.

(4) Pedestrian movement is directly affected by turning radii. Larger radii increase traffic speed and crossing distance for pedestrians, thereby reducing pedestrian comfort.

(5) Tighter, shorter turning radii reduce traffic speed and shorten pedestrian crossing distances. Motorists are better able to see pedestrians and make quick stops.

(6) Breaks in the median provide a safe haven and allow pedestrians to cross lanes incrementally. Pedestrian refuge islands provide an additional level of security while crossing.
9.0 NON-MOTORIZED TRANSPORTATION SYSTEMS (NMT)

9.1 Consider aesthetics as part of bicycle facility design.
Users of non-motorized transportation systems are more likely to use facilities that include aesthetic treatments and that link to critical destinations.

- Minimize underpass length to allow for natural lighting.
- Utilize transportation art consistent with the segment theme.

9.2 Engage agencies and organizations in the planning and design process.
Ensure proper planning conveniently accommodates NMT while minimizing adverse safety and environmental impacts.

- Engage Federal, State and local agencies as well as local user groups and organizations in the planning, design, and implementation of non-motorized transportation facilities.
- Ensure the maintenance of connections to regional trails and pedestrian systems.
- Consult the statewide bicycle and pedestrian plans prepared by NDOT.
- Provide signage to trail heads and regional trails to encourage NMT use.

9.3 Integrate NMT into the right-of-way.
Where topography, site conditions, and land use warrant, separate bicycle paths may be built in the right-of-way.

- Ensure that direct connections are made to existing and future trail systems and shared-use pathways.

9.4 Incorporate designated bike lanes within the roadway to link regional bike trail systems.
Within developed community areas, bike lanes provide access to regional bike trail systems and to local community facilities.

- Stripe, sign, and provide a painted bike lane symbol for designated bike lanes to promote driver awareness, better define travel lanes, and enhance user comfort.
- Enhanced paving or pavement markings may be used in downtown areas.
- In areas of limited right-of-way and low speeds, bicyclists may share travel lanes in order to accommodate street improvements such as widened sidewalks and on-street parking. However, bike lanes should be included as part of the roadway whenever possible.

9.5 Consider bicycle facilities as part of roundabout design.

(1) Regional multi-modal trail systems should be integrated into the highway right-of-way wherever possible.

(2) Native materials should be used for all trail system hardscape and softscape treatments.
10.0 BRIDGES

10.1 Use a consistent bridge design.
Bridges are prominent features in the landscape and can significantly affect the visual quality of the environment. NDOT standard bridge design incorporates a concrete and steel I-girder, or concrete and steel box girder bridge structure of similar proportion, finish, and barrier rail design. The major structural elements – piers, girders, and abutments – also serve as major architectural features.

- Aesthetic qualities must consider proportion, rhythm, balance, and unity. Refer to the Aesthetic Guidelines for Bridge Design (Minnesota Department of Transportation) for a complete discussion.
- Bridge form should be simple and uncomplicated.
- Large amounts of slope paving should be avoided.
- Street names should be embossed on the bridge span, providing place identification for the motorist.
- Where special conditions arise and larger or different bridge spans or types are required, ensure landscape and aesthetic aspects are incorporated into the standard design type.

10.2 Use simple sub-structure and support features.
Use simple sub-structure and support features with strong proportional relationships in all standard bridge design.

- Avoid “V”, “Y” or flared support shapes in sub-structure and support features.
- Use simple geometric shapes to minimize the support profile as well as the number of supports required.

10.3 Use visually transparent bridge rail structures.
Consider open rail design of steel rail or concrete barrier and steel, both to create a more refined bridge with a lighter appearing span, and to maintain scenic views and views to the surrounding landscape.

- Use shadow lines and patterns to avoid blank surfaces where safety mandates a solid concrete barrier.

10.4 Consider fill embankments and approach rails as part of the bridge design.
All NDOT bridge design should consider fill embankments and approach rails in concert with the abutment, bridge barrier rail, and superstructure.

- Materials, height, and attachment details should be carefully considered when connecting guardrails to the bridge to avoid joining incompatible materials and creating abrupt vertical changes at connection points.
- Avoid slope paving at bridge embankments. Grade to a slope of 3H:1V to allow for slope revegetation.

10.5 Use landscape or rock mulch to stabilize embankments.
Contour grade embankments and use landscape planting to maintain embankment. Use rock retaining walls to establish suitable flat landscape areas where right-of-way is narrow.

- Ensure mulch materials match bridge structure color and the surrounding landscape (see Color Palette guideline for appropriate color selection, page 3.23).
- Use rock mulches, stone rip-rap, or decorative slope paving (minimally) to stabilize abutments below the bridge.
- When slope pavement is used, include integral color or stain to match base color palette.
10.6 Select vandalism-resistant finishes.
Finish type, color, and surface patterns are important design elements in coordinating the structure with the surrounding landscape. Select bridge finishes of appropriate color (see Color Palette guideline, page 3.23) and vandal-resistance.

- Where appropriate, structures with detailed treatments located in urban areas should be treated with non-sacrificial anti-graffiti finish.
- Color and finish selections will assist in reinforcing the design intent of the bridge structure.

10.7 Create a visual design unity among all existing and new structures.
Ensure bridges coordinate with noise walls, retaining walls, and other highway structures.

- Establish a visual design relationship that coordinates materials, patterns, color, and other design elements of structures.
- Establish a visual design continuity between existing bridges and other structures by implementing a paint/stain retrofit program to unify color schemes where they vary within a corridor.

10.8 Design bridges to accommodate additional elements and structures that are required.
Accommodate pedestrian corridors and other additional structures with extra width. In areas where noise walls are required on bridges, the bridge should be widened to allow for noise walls that are completely separated from concrete barriers (refer to Noise Reduction and Walls guideline 11.5, page 3.33, illus. 7). Street name identification should be placed on the concrete barrier rail.

10.9 Accentuate locations where bridges cross major water bodies, drainage courses, or canyons.
Utilize landscape treatments in order to highlight crossings and connect motorists to the landscape.

- Consider the integration of a grade-separated pedestrian crossing into structure when possible.
- Coordinate with local jurisdictions to determine the need for these features.

10.10 Retrofit existing bridges.
Bridges are gateway features to cities and communities.

- Aesthetic treatments, such as staining, should be the basic treatment for updating existing structures.
- Where possible, include segment-appropriate artistic motifs with sculptural ornamentation and decorations.

10.11 Provide direct connections from bypasses back to the community core.
Heightened levels of landscape and aesthetic treatments, including effective signage, should mark exits to downtown areas.

- Increasing density of landscape and architectural elements heightens the sense of arrival into community centers.
(1) Avoid bridge structure design that creates walls parallel to the travel lane. Utilize graded slope and abutments.

(2) Bridge design can integrate retaining walls and terraces to minimize steep slopes and create areas for landscape planting.

(3) Symmetry and correct proportions significantly enhance the visual appeal of structures. The bridge color selection emulates the natural colors of the landscape so as not to distract from the view of the horizon.

(4) Special bridge design elements such as native stone, color treatments, and cable systems can be used to create a focal feature.
11.0 NOISE REDUCTION AND WALLS

11.1 Consider grading to minimize wall height.
Where possible, use an embankment slope with landscape planting to buffer sound, or use a combination of earth forms and noise walls to achieve structural integrity and buffer sound while limiting actual wall height.

• This guideline does not change or supersede federal noise wall requirements, which specify the location of noise walls according to adjacent land uses and a sound level threshold approaching 67 decibels.
• Noise walls should not be greater than 14 feet in height without a step in the wall plane.
• Walls used only for visual screening may not be taller than ten feet.
• Use natural barriers and earth forming when possible.

11.2 Provide landscape planting and setback space between the vehicle recovery zone and the noise wall.
When necessary, work with developers to ensure adequate right-of-way is provided for sound abatement.

• Consider grading to minimize wall height. Landscape plantings in front of walls will soften the appearance of large wall facades.
• Ensure planting and maintenance is provided.

11.3 Select a simple design palette.
Choose a simple design palette of material, pattern, color, and texture that coordinates with the corridor’s landscape design segment theme for retaining walls and noise walls.

• Maintain consistent use of the selected material, pattern, color, and texture. The required prototypical surface pattern is shown in illustration 5.
• Avoid using multiple materials, such as steel and concrete or CMU, on continuous spans of wall.
• Post and panel systems are not encouraged for noise wall construction, and should be used only for temporary applications. If a post and panel system is used, it should be constructed with a single material, preferably pre-cast concrete for all components.
• Use visual design themes and/or pictorial motifs comprised of simple patterns and surface texture, and carefully design the motifs composition (height and position) on the wall.
• Noise walls over 12 feet in height require special graphic or pattern treatment (refer to Transportation Art guideline, page 3.19, for more information about appropriate subject matter).

11.4 Create visual breaks and interruptions to avoid monotony along noise walls.
Use staggered and/or curved walls of varying lengths to provide visual interest along extended stretches of noise wall.

• Avoid abruptly ending noise walls. Use a wall return of three feet for noise walls located outside of the clear zone.
• Battered walls, also known as inclined walls, can provide additional interest.
• Shadow patterns can be introduced to create visual interest that shift and change throughout the day.
• Use appropriate ornamentation to break up the surface of long, uninterrupted spans.

(1) Rusticated variable vertical patterning adds visual interest.
(2) Retaining and noise walls should be separated from concrete barriers and other structures to allow space for landscape planting.
(3) Form-lined concrete and decorative railings can be used to create a desert visual design theme.
(4) Landform and plant materials can be used to buffer road noise from adjacent land uses.
11.5 Separate noise walls from other highway structures and set back from travel lanes.
Ensure noise walls are carefully planned for and integrated with the design of the highway and/or bridge.

- Avoid attaching noise walls to concrete barriers, bridges, and/or retaining structures. When noise walls are attached to such structures, use compatible materials, colors and forms.
- Recess noise walls a minimum of 30 feet from edge of travel lane where possible. Noise walls may be placed on top of concrete barriers only when no other practical solution exists.
- Consider drainage impacts when locating or placing walls as areas flanked by walls will need to freely drain.

11.6 Encourage noise-compatible land uses adjacent to highway corridors.
At the planning level, encourage land uses that are compatible with highway noise, such as commercial and light industrial areas.

- Noise sensitive facilities (schools, churches, etc.) require sound abatement strategies.
- Coordination at the planning stages is critical to avoid conflicts.

11.7 Retrofit noise walls that do not meet recommended requirements.

- Painting should be the basic treatment to improve existing structures.
- Enhancements could include the application of artistic motifs with sculptural ornamentation and decorations, or visual relief by modulating the top edge of walls.
12.0 CONCRETE BARRIERS AND GUARDRAILS

12.1 Stain concrete barriers to blend the roadway into the surrounding environment.

- Concrete barriers should be stained to match the segment’s base color. Refer to Color Palette guideline, page 3.23, for more information on color selection.

12.2 Avoid bright and shiny guardrails.

Use acid-washed steel guardrails where appropriate.
13.0 LIGHTING

13.1 Avoid over-lighting.
Excessive high mast lighting can create light pollution along a corridor and impact views to the surrounding landscape.

- Study current lighting level standards to determine levels needed for safety only. Adjust current standards, if necessary, and apply the minimum height, illumination, and number of light masts required.
- Focus attention on luminance versus illumination (i.e. brightness of pavement versus brightness of light).
- Along all sections of the corridor, use lighting fixtures that minimize light pollution and provide even light dispersion.
- Eliminate lighting where possible.
- Use cobra head or shoebox-type pole and fixtures instead of high mast lighting where appropriate.

13.2 Use a consistent lighting fixture and pole.
In central commercial districts and town centers, use light fixtures and lamps that are consistent with surrounding architectural styles.

- Use a durable, powder-coated finish for light poles of a color that matches other structures and the surrounding landscape. Typically use colors that blend with the background and do not visually overwhelm.
- Use poles and fixtures with consistent maintenance requirements and procedures for lighting types used within the same maintenance district.
- Use accent color palette for poles (refer to Color Palette guideline, page 3.23, for more information).
- Select a sleek and simple pole configuration.
- Allow for context-sensitive design in fixtures and poles where appropriate, particularly in areas such as historic sites.
- Consider color properties when selecting lamps. Metal halide lamps are preferred in pedestrian areas. Mercury vapor lamps produce favorable lighting for enhanced landscape treatments. Energy efficient high-pressure sodium lamps are commonly used for large portions of the roadway.
- Use poles and fixtures with consistent maintenance requirements and procedures for lighting types used within the same maintenance district.
- Use accent color palette for poles (refer to Color Palette guideline, page 3.23, for more information).
- Select a sleek and simple pole configuration.
- Allow for context-sensitive design in fixtures and poles where appropriate, particularly in areas such as historic sites.
- Consider color properties when selecting lamps. Metal halide lamps are preferred in pedestrian areas. Mercury vapor lamps produce favorable lighting for enhanced landscape treatments. Energy efficient high-pressure sodium lamps are commonly used for large portions of the roadway.

13.3 Lighting height and brightness should be consistent with pedestrian scale needs in downtown or heavily pedestrian-oriented areas.
Create desirable pedestrian environments by using pedestrian-scale lighting along sidewalks.

- Fixtures should be more closely spaced than conventional “cobra head” street lights.
- Lighting height and brightness should clearly illuminate walking paths.
14.0 FENCING
14.1 Ensure right-of-way fencing blends with the landscape.
Fencing can be used in non-urban areas to delineate the highway right-of-way and control access.

- Use wire fencing that blends with the landscape and conforms to current Nevada Revised Statutes.
- Ensure right-of-way fencing is well maintained.

- Minimize the use of fencing within rights-of-way where possible.
- In urban areas, use colored steel fencing such as powder-coated, acid-washed, or stained-galvanized fencing that visually recedes into the urban background.

14.2 Ensure right-of-way fencing blends with the landscape.
Fencing can be used in non-urban areas to delineate the highway right-of-way and control access.

- Carefully grade slopes around natural outcrops and abrupt topography to improve aesthetics and allow for easier and more cost-effective maintenance.
- Topographic patterns should be considered with proposed grading. Valleys, high points, and ridges require graded transitions rather than abrupt embankment cuts or fills.
- At a minimum, ensure that all constructed slopes are revegetated (refer to Native Plant Revegetation Softscape Type guideline, page 3.44).

15.0 GRADING AND RETAINING WALLS
15.1 Avoid creating steep slopes.
Smooth, moderately inclined slopes will blend more readily with the surrounding landscape, are safer to maintain, and are less vulnerable to erosion.

- Flattened fill slopes can assist in decreasing erosion. Flattened slopes also reduce the need for guardrails and provide better accident recovery in the roadside clear zone.
- Acquire adequate right-of-way to provide enough land to construct the desired slope and grade.
- In some locations, steeper slopes may be unavoidable to protect important natural or cultural resources adjacent to the highway.

15.2 Create smooth landform transitions and revegetate slopes.

- Use finish-grading techniques, such as slope rounding at the top and bottom of cuts, to create smooth landform transitions that blend with the natural terrain.

- Contour grade to create effective planting embankments, shadow patterns, and artful earthwork.
- Where feasible, grade slopes to provide for water harvesting (reclaimed surface runoff).

15.3 Create artful earthwork.
Create landforms that respond to the uniqueness of the site, the surrounding landscape, and the roadway travel experience.

- Select retaining structures or slope stabilization methods that blend with the surrounding landscape and encourage revegetation.
- Provide landscape plantings in front of walls to soften their appearance.
- Provide a minimum of eight feet between terraces to provide for landscape planting.
- Carefully design gabion walls. Color should be dark and muted to match soil and surrounding landscape. Wire mesh should match stone color. Plant terraces with native vegetation to break up visual impacts.
- Retaining walls should be consistent within a segment and utilize a simple design palette and anchor to the earth.

15.4 Utilize retaining walls that reflect surrounding landform and soil colors to minimize large slope cuts.
Staggering, terracing, and progressive offset of retaining walls can stabilize slopes and reduce erosion while blending more smoothly into surrounding landforms than terraced high wall cuts.

- Carefully grade slopes around natural outcrops and abrupt topography to improve aesthetics and allow for easier and more cost-effective maintenance.
- Topographic patterns should be considered with proposed grading. Valleys, high points, and ridges require graded transitions rather than abrupt embankment cuts or fills.
- At a minimum, ensure that all constructed slopes are revegetated (refer to Native Plant Revegetation Softscape Type guideline, page 3.44).

15.5 Use rounded slope conditions.
Rounded slope conditions should be 1/6 of total slope.
Replace “V” swale profile that transitions to the embankment.

- Use a rounded slope condition at top and bottom of slope.

15.6 Smooth transitions between cut and fill slopes and existing conditions can be accomplished by rounding the slopes.

- Use rounded slope condition at top and bottom of slope.
- Carefully design gabion walls. Color should be dark and muted to match soil and surrounding landscape. Wire mesh should match stone color. Plant terraces with native vegetation to break up visual impacts.
- Retaining walls should be consistent within a segment and utilize a simple design palette and anchor to the earth.

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- Carefully design gabion walls. Color should be dark and muted to match soil and surrounding landscape. Wire mesh should match stone color. Plant terraces with native vegetation to break up visual impacts.
- Retaining walls should be consistent within a segment and utilize a simple design palette and anchor to the earth.
When gabion walls are necessary, ensure that the wire and stone colors complement one another and the surrounding landscape.

Avoid the tunnel effect created by retaining walls greater than 14 vertical feet.

Re-sculpted rock cuts change artificial slope banks into naturally occurring landforms. Plan cuts that terrace, bench, and use bedding planes found in existing rock formations.

Rock cuts and excavation should be natural in form, shape, and texture. Rock formations, such as this rhyolite outcrop, have an inherent visual form that can be duplicated in custom rock excavations.

Match new rock and soil excavations with existing rock and soil using rock staining, soil-coloring treatments, and/or accelerated weathering techniques.

Where site conditions and cost analysis permit, acquire adequate right-of-way to provide enough land to design and build the desired rock cut slope and grade.

Rock cuts and excavation should be natural in form, shape, and texture. Rock formations, such as this rhyolite outcrop, have an inherent visual form that can be duplicated in custom rock excavations.

16.6 ROCK CUT AND EXCAVATION

16.1 Analyze rock geology.

Provide a multi-disciplinary team of civil engineers, geotechnical engineers, and landscape architects to ensure that the inherent character of a rock's natural bedding planes, fractures, joints, and overall stability is carefully analyzed and informs the design of all rock cuts.

Conduct careful rock geology, site, and cost analyses, and design rock cuts that avoid the need for rock fall protection fencing.

16.2 Design rock cuts to be natural in form, texture, and color in relationship to the surrounding landforms.
Chapter Three — Design Guidelines

SECTION FOUR: Highway Facilities Guidelines

17.0 DRAINAGE

17.1 Use naturalized channel design and infiltration methods.
Avoid paving drainage ditches or check dams with asphalt or concrete. Where possible, secure check dams with rock and use naturalized channel design and infiltration methods to enhance, both functionally and visually, highway drainage systems.

- In unique situations, utilize geotextiles, impervious mats, or stone lining to maintain the appearance of a natural channel.
- Excessive flow velocities and erosion potential may demand paved drainage surfaces. Consider the use of open cell concrete block with native grass or rock mulch that blends with the surrounding soil.
- Vary the size of rock treatments. Meander naturalized treatments so that they feather into the landscape.

17.2 Revegetate drainage infrastructure.
Drainage detention and infiltration areas should be shaped with natural undulating edges and bottoms rather than angular embankment slopes.

- Upper slopes of drainage detention basins should be revegetated or covered with appropriate ground treatment (refer to Ground Treatment softscape type guideline and Native Plant Revegetation softscape type guideline, page 3.41).

17.3 Naturalize culvert ends.

- Use rock to naturalize inlets and outlets.
- Culverts should not be exposed except at the end of headwalls and endwalls or with mitered end sections.
- When it is essential to have portions exposed, they should be stained to blend with the surroundings.
- Consider whether trails or wildlife passages can be coordinated with culverts.

18.0 EROSION CONTROL

18.1 Stabilize soils to ensure successful revegetation and to control erosion. Use native materials for stabilization and revegetation, to blend with surrounding landscape.

- Use techniques such as heavy textured soil and/or gravel mulches to slow water runoff and provide dust control.
- Where water concentrates, riprap material and/or geotextile reinforcement may be used to avoid erosion.
- Permanent revegetation efforts can be improved by providing in situ topsoil, native vegetation fragments, and rocks and improving soil salvage techniques and seed mixes.
- Provide uncompacted topsoil surfaces prior to seeding (approximately 85% compaction).

18.2 Refer to temporary and permanent erosion control best management practices as prepared and documented by NDOT.

- Permanent revegetation efforts can be improved by providing in situ topsoil, native vegetation fragments, and rocks and improving soil salvage techniques and seed mixes.
- Provide uncompacted topsoil surfaces prior to seeding (approximately 85% compaction).

18.2 Refer to temporary and permanent erosion control best management practices as prepared and documented by NDOT.
19.0 WATER HARVESTING

19.1 Maintain soil moisture and improve water retention by preserving topsoil, site surfacing, site grading, track walking, applying mulches and tackifiers, sensitively siting features, and using permeable paving or cisterns.

The collection of runoff for use in landscape design is especially important in arid climates. Increase the availability of natural water by directing runoff and precipitation into areas such as planting beds prior to moving it off site into drainage structures. Water harvesting methods also reduce the amount of runoff, thereby reducing non-point source pollution, erosion, and flooding while recharging the groundwater. Soil moisture and water retention can be maintained and enhanced in several ways, including:

- **Topsoil preservation**: Stripping and salvaging the existing topsoil, vegetation seeds, and plant fragments for later reapplication should occur at every site requiring disturbance. This live topsoil contains organisms, seeds, and plant fragments that increase the potential success of revegetation and increases both the quantity of organic matter and permeability of the soil.

- **Site surfacing**: Rock surface composition should simulate the original or adjacent surface cover or be integrated as part of the overall design. Create artful water harvesting features that contribute to the aesthetic quality as well as functionality of landscape treatments. Placing rocks and shaping landforms to create depressions increases water retention and provides moisture to the plants. Rocks create impervious cover, resulting in water harvesting for the remaining soil and seeds. Rocks also create a rough, uneven surface, thereby slowing water runoff, allowing water to collect and increasing infiltration. Rock mulches retain moisture and protect plants by reducing evaporation, providing wind protection, and moderating the soil temperature so that it is cool in the summer and warm in the winter, effectively lengthening the growing period.

- **Site grading**: Grade surfaces to slow water flow, encouraging absorption. Instead of a continuously angled slope, position breaks or depressed areas around planted areas. Contour slopes so that water slows and infiltrates around vegetation. Prevent erosion by minimizing slope angle and directing water flow.

- **Track walking**: Where possible, track walk all slope surfaces to stabilize material and minimize potential erosion. Track walking should be performed perpendicular to the contours.

- **Mulches and tackifiers**: Use mulch and tackifiers to hold seed and topsoil cover and assist with moisture retention during germination. Mulches such as bark or straw can be used to stabilize seeds and topsoil and assist in moisture retention during plant germination and growth.

- **Siting of features and facilities**: Thoughtful consideration should be given to the siting of features and facilities. Rest area and other facilities where vegetation is desired should be located where natural surrounding upland topography can provide increased water to the planted areas. Within interchanges, planted areas should be sited where roadway runoff can be directed to provide water to these areas before it enters structured drainage systems. This method enhances plant growth, and supplements the irrigation needed for high water use plants, thereby reducing the cost of irrigation. Features used to direct or store water can be part of the aesthetics of design.

- **Permeable pavements**: Pavements such as flagstone or permeable asphalt should be used where appropriate to aid in the infiltration of precipitation in urban areas.

- **Water storage in cisterns or tanks**: In some cases it may be desirable to store water in a cistern for later use. Storage provides the most control and flexibility in the use of harvested water. Cisterns collect water throughout the year and store it until it is needed during the height of summer. Consider the need for mosquito abatement during design. Water should not be stored in open systems for long periods of time. Cisterns can be sculptural and incorporated into an aesthetic design, or they can be large but relatively flat, and located under a parking lot.

19.2 Use natural and/or artificial products to collect, store, and release water for plant use.

Use products such as:

- **Pumice wicks**
- **Polymer products**
- **Diatomaceous earth**
- **Wattles**

![Water basins should utilize natural materials and be used as a water source for adjacent landscape areas.](image-url)
20.0 IRRIGATION

20.1 Select efficient and effective irrigation systems.
Select efficient and easily maintained drip irrigation systems that have a central controller.

- Consider the use of reclaimed water, including fully treated effluent and water harvesting techniques, as a supplement to irrigation.
- If a non-domestic water source is used, include a filter system to prevent clogging of emitters.
- Consider threaded emitters as opposed to punch-in types to minimize vandalism.

20.2 Provide appropriate irrigation for each softscape type.
The early stage of revegetation growth demands the most water use and is most critical to the establishment of young plants in an arid climate. As revegetation becomes more established and mature, the demand for water will lessen to the point of complete removal.

- Temporary watering is required for containerized native plants for a period of approximately one to two years, depending on the success rate of revegetation.
- Permanent irrigation to individual plants is required for all enhanced native, regionally adapted, and regional ornamental softscape types.
- When a water source is not available, consider water harvesting methods or the use of vertical elements and structures.

20.3 Manage the high concentration of salts.
Nevada’s desert soils often concentrate salts at the outer edge of the wetted soil volume, including near the soil surface, particularly in drip irrigation situations.

- Salt management techniques include flushing the soil periodically with heavy watering and/or planting salt tolerant materials.

21.0 SOFTSCAPE TYPES AND TREATMENTS
GENERAL GUIDELINES

21.1 Consider aesthetics and maintenance of selected softscape treatment.
In all non-paved areas, select ground treatments that meet both aesthetic and maintenance requirements.

21.2 Select appropriate plant sizes.
The minimum plant size used should consider plant survival and the visual effect of the material.

- Consider sunlight, water requirements, and wind exposure when placing plant material.

21.3 Preserve healthy trees and vegetation.
Mature vegetation is an integral part of community identity and an important public resource that enhances the quality of life. Previously landscaped areas with ornamental plant materials that are in good condition, form, and health shall be preserved. All softscape treatment projects shall include a tree inventory listing all protected trees and other landscape materials within the right-of-way. The plan should include a listing of species, size and condition of each tree, index of trees to remove or preserve, and specifications for tree maintenance during construction.

- Drip irrigation is required for all enhanced native, regionally adapted, and regional ornamental softscape types even after they have reached maturity.
- Certain plant species such as Ephedra and Rabbitbrush are adapted to survival in saline soils.
21.6 Coordinate ground treatment with surrounding landscape.
Ground treatment should coordinate in size, texture, color, and aggregate mix with the surrounding landscape.

- Mulches composed of multi-sized rock that resemble natural patterns of surrounding soils should be considered as a matching technique.
- Distribute scattered rock mulch in a pattern similar to that found in the surrounding landscape instead of a thick, even spread of rock mulch.

21.8 Carefully select native plant species.
In addition to plant species identified in Mapping Ecosystems along Nevada Highways and the Development of Specifications for Vegetation Remediation (Tueller, et al 2002), use the list of native plant species provided for revegetation efforts. Plant palettes are not restrictive. They provide a starting point for plant selection.

- Ensure the plant palette selected for the site complements existing desirable vegetation in the surrounding landscape.
- Salvage existing native plants and topsoil prior to construction. Species salvagability depends on size, location, soils, and analysis of plant value, including the potential survival rate. Salvaged plants can readily improve the roadside aesthetic by providing mature plants that would normally take many years to establish. Where

### GROUND TREATMENT SOFTSCAPE TREATMENT

21.5 Implement appropriate ground treatment and softscape types.
Use recommended ground treatment and softscape types to assist with erosion and dust control, consistent with NDOT specifications.

- Rock mulch, where used, should complement and/or match the surrounding natural environment.
- For rural areas, ground treatment should be derived from natural patterns found in playas, foothills, or ephemeral drainages.
- For landscaped areas in urban settings, use rock mulches to create patterned and textured ground treatments.
- Implement a ground treatment retrofit program to treat areas of bare soil.

### NATIVE REVEGETATION SOFTSCAPE TREATMENT

21.7 Apply native revegetation softscape along open, rural highways.
Reestablish the native conditions using the native plant revegetation softscape type. The native plant revegetation softscape type is the background planting for the majority of the corridor and should be implemented as indicated in the landscape design segments.

- Roadside revegetation should be planned to reduce erosion.
- Plant density and spacing should mimic surrounding conditions, incorporating scattered rock mulch to reduce erosion and improve revegetation success.
- Select an appropriate native plant palette. Sites should be evaluated for elevation, soil conditions, and ecosystem type (for example, riparian, playa, or salt flat).
existing native plants cannot be re-used, chip salvaged plants and incorporate into the topsoil. In addition, ensure native topsoil is collected and stored for reuse. Native topsoil provides a seed source and important bacteria for salvaged plant establishment and growth. Carefully re-move, stockpile, and store the native topsoil of new construction projects to be used as final bedding material. Ensure native soil stockpiles are protected from the wind to avoid erosion and the creation of a dust hazard. Organic mulches may be used to improve soil quality. Firmly anchor mulches to the site. Carefully ana-lyze the site to determine the need for fertilizers and pH amendments.

• Salvage and stockpile native rock mulch. Existing rock naturally blends with the landscape. Re-use of existing materials should be considered as part of site design.

• Additional plants not included in the ad-jacent list can be included upon review and approval.

21.9 Utilize proper revegetation methods.

• Reestablish native conditions using the native plant revegetation softscape type. Select perennial grasses, forbs, and shrubs that have been established with little or no maintenance over the long term. In-corporate the Native Wildflower Program in revegetation efforts. Select plants that have been evaluated for drought tolerance, salt and alkali tolerance, seedling vigor, fire retardant characteristics, growth habit, suitable soil groups, seedling rates, Pure Live Seed (PLS) availability, and general costs of native seed sources. Ecosystem categories and suitable plant species have been identified for revegetation specifications along Nevada’s highways in Mapping Ecosystems Along Nevada Highways and the Development of Specifications for Vegetation Remediation (Tueller et al, 2002). Tueller’s report offers a complete description of suitable plant species and plant communities, soil classification units, and best management practices for vegetation remedia-tion, and should be used as a guide for revegetation.

• Salvage existing native plants and topsoil prior to construction. Species salvagability depends on location, soils, and analysis of plant value, including the potential sur-vival rate. Salvaged plants can be utilized at revegetation sites to improve roadside aesthetics and to provide mature plants that would otherwise take years to es-tablish. In addition, ensure native topsoil is collected and stored for reuse. Native topsoil provides a seed source and im-portant bacteria for salvaged plant establish-ment and growth. Carefully remove, stockpile, and store the native topsoil of new construction projects to be used as final bedding material. Ensure native soil stockpiles are protected from the wind to avoid erosion and the creation of a dust hazard. Organic mulches may be used to improve soil quality. Firmly anchor mulches to the site. Carefully analyze the site to determine the need for fertilizers and pH amendments.

• Apply a prescribed soil treatment such as plowing, diskng, harrowing, furrowing, hydrosedding, applying mulches (such as straw), and using tackifying agents (such as dark-colored netting). Soils should be rough-ened before and after planting to create favorable seed sites, particularly for grass and forb seeds. In silty conditions, a soil stabilizer, such as a hydromulch, or a mat-ting material can reduce potential dust problems. On some sites, deep ripping can loosen hardpan and improve seeding success. In conditions of steep cuts and slopes greater than 40%, slope diskng may create seed pockets. Use scattered rock mulch in coordinate with revegeta-tion. This mulch provides seed pockets and protects plant establishment.

**Figure 14 - Native Revegetation Plant Palette**

**North of Las Vegas Valley**

**Lower Mojave/Creatozone Zone**

**Shrubs:**

**Atropis hynomatoide - Holly Leaf Saltbush**
5' x 8' Full sun Low water use Spring

**Atropis ledebourii - Quailbush**
8' x 8' Full sun Low water use Spring

**Larrea tridentata - Creosote Bush**
5' x 6' Full sun Low water use Spring

**Accents:**

**Echinocereus triglochidiatus - Red Hedgehog Cactus**
4' x 1' 1/2 Full sun Low water use Year-Round

**Ferocactus cylindraceus - Barrel Cactus**
3' x 1' 1/2 Full sun Low water use Sp/Sum

**Opuntia basilaris - Beavertail Cactus**
1' x 3' Full sun Low water use Spring

**Opuntia echinocarpa - Silver Cholla**
3' x 3' Full sun Low water use Spring

**Mammillaria tetrancistra - Mojave Fishhook Cactus**
5' x 2' Full sun Low water use Spring

**Yucca schidigera - Mojave Yucca**
12' x 6' Full sun Low water use Spring

**Yucca brevifolia - Joshua tree**
30' x 1' 1/2 Full sun Low water use Spring

**South of Las Vegas Valley**

**Blackbrush Zone; Corridor Crosses Cresozone-Burseage and Blackbrush Zones**

**Trees:**

**Aristocereus greggii - Catclaw**
25' x 15' Full sun Low water use Sp/Fall

**Chilopsis linearis - Desert Willow**
20' x 15' Full sun Low/Flood water use Sp/Fall

**Prosopis glandulosa - Honey Mesquite**
25' x 35' Full sun Moderate water use Summer

**Shrubs:**

**Cakile maritima - Blackbrush**
5' x 6' Full sun Low water use Spring

**Eriodyctyon angustifolium - Yerba Santa**
4' x 6' Full sun Low water use Summer

**Eriogonum wrightii - Wright’s Buckwheat**
2' x 3' Full sun Low water use Summer

**Eriogonum fasciculatum var. polifolium - Flattop Buckwheat**
3' x 4' Full sun Low water use Spring

**Fallugia paradoxa - Eaton’s or Firecracker Penstemon**
4' x 4' Full sun Low water use Sp/Fall

**Phoradendron fremontii - Indigo Bush**
5' x 5' Full sun Moderate water use Summer

**Salvia purpurea - Mojave Sage**
3' x 3' Full sun Low water use Summer

**Accents:**

**Agave potatorum - Utah Agave**
5' x 8' Full sun Low water use Sp/Sum

**Atriplex prostrata - Desert Four O’Clock**
4' x 4' Full sun Low water use Summer

**Opuntia erinacea - Old Man Cactus**
3' x 3' Full sun Low water use Spring

**Opuntia acanthocarpa - Buckhorn Cholla**
4' x 3' Full sun Low water use Summer

**Yucca baccata - Banana Yucca**
3' x 3' Full sun Low water use Summer

**Yucca schidigera - Mojave Yucca**
12' x 6' Full sun Low water use Summer

**Grasses:**

**Achillea millefolium - Indian Ricegrass**
2' x 2' Full sun Low water use Spring

**Bromus rubens - Red Brome**
1' x 5' Full sun Low water use Winter

**Hilaria rigida - Big Calliandra**
1' x 5' Full sun Low water use Summer

**Stipa complexa - Desert Needlegrass**
3' x 3' Full sun Low water use Summer

**Wildflowers:**

Wildflowers like the Prince’s Plume (Stanleya pinnata) and the Apricot-Mallow (Sphaeralcea ambigua) can be planted but if the soil is harvested and carefully maintained – all the necessary seeds should be contained within the soil. In the interest of preserving the most natural landscape and avoiding breaks in type or structure of vegetation – harvesting and re-using topsoil from the same area without wildflower re-seeding should provide an abundance of wildflowers native to that area.

**Native penstemons for Mojave:**

**Penstemon eatoni - Eaton’s or Firecracker Penstemon**
2' x 3' Full sun Low water use Spring

**Penstemon parryi - Parry’s Penstemon**
4' x 2' Full sun Low water use Spring

**Penstemon utahensis - Utah Penstemon**
1' x 3' Full sun Low water use Spring

**Penstemon palmeri - Palmer’s Penstemon**
4' x 2' Full sun Low water use Spring

**Figure 14 - Native Revegetation Plant Palette**

<table>
<thead>
<tr>
<th>Height x Width</th>
<th>Exposure to sun</th>
<th>Water Requirement</th>
<th>Seasonal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Collect native seed. Initiate a process for native seed collection at the start of each project where revegetation is designated. Native seed should be collected from a site in close proximity to the revegetation area. Because unpredictable weather patterns can affect seed availability, plan ahead to ensure usable seed. Native seed can also be purchased through seed companies or BLM nurseries.

• Monitor revegetation during construction to ensure that specified materials and installation methods have been used. Plan and budget for maintenance of revegetation and weed control areas until the desired species are established. In addition, continue to monitor revegetation plantings for up to five years after construction to ensure successful establishment. Include temporary irrigation if needed. Provide training for NDOT staff who oversee revegetation administration. Failures in revegetation can often be attributed to poor installation and maintenance practices.

• Develop a program to control noxious weeds and invasive plant species. In areas requiring revegetation, quickly establishing native species is the most effective method of controlling invasive species. In much of the corridor, however, re-establishing native plant communities may take many years. Use biotic or organic forms of control, such as temporary mulches, to prevent invasive species from establishing. Provide regular and frequent monitoring of new plantings to identify when additional forms of control may be needed.

(1) Native revegetation is appropriate for highway medians in rural settings.

(2) Native revegetation softscape types should be used to repair and restore roadsides along the majority of the highway.
ENHANCED NATIVE SOFTSCAPE TREATMENT

21.10 Apply enhanced native softscape along transition zones and as part of simple gateway treatments.

Enrich the native softscape palette with the enhanced native softscape type. The enhanced native softscape type is the second most commonly used plant palette throughout the corridor and should be utilized as shown in the landscape design segments.

- Typical applications are specified for transition zones into communities as well as simple gateway treatments. The enhanced native softscape type enriches the Mojave Desert plant palettes with a mix of vertical heights and densities.
- A variety of native species are planted in moderately dense patterns to create this landscape.
- Enhanced native softscapes use the plant material of the native revegetation palette as a base and add a limited number of regionally adapted trees, shrubs, and other materials for diversity in form. Plants are placed in massings and at a closer proximity to one another than in the surrounding native landscape.

21.11 Carefully select enhanced native plant species.

In addition to the plants listed in the native plant revegetation landscape type, the following list of plants comprise the enhanced native landscape type. Use these species to create plant communities with variations in plant height and width.

- Ensure the plant palette selected for the site complements existing vegetation in the surrounding landscape.
- Use existing vegetation as a cue to selecting appropriate plant species.
- Additional plants not included in previous palettes or the adjacent list may be included upon review and approval.

### Figure 15 - Enhanced Native Plant Palette

<table>
<thead>
<tr>
<th>Height x Width</th>
<th>Exposure to Sun</th>
<th>Water Requirement</th>
<th>Seasonal Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tress:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salix exigua - Coyote Willow</td>
<td>10’ x 6’</td>
<td>Partial sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Prosopis glandulosa - Honey Mesquite</td>
<td>25’ x 35’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Prosopis pubescens - Screwbean Mesquite</td>
<td>25’ x 25’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Quercus turbinella - Desert Scrub Oak</td>
<td>8’ x 1’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Acacia minuta - Sweet Acacia</td>
<td>20’ x 20’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Prosopis chinesis - Chilean Mesquite</td>
<td>25’ x 40’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Vitex agnus-castus - Chaste Tree</td>
<td>25’ x 35’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Cercidium microphyllum - Foothills Palo Verde</td>
<td>20’ x 20’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Prosopis velutina - Velvet Mesquite</td>
<td>25’ x 30’</td>
<td>Full sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Cercis occidentalis - Western Redbud</td>
<td>15’ x 10’</td>
<td>Full/Partial sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Shrubs:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encelia farinosa - Brittlebush</td>
<td>3’ x 4’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Cassia nemophila - Desert Cassia</td>
<td>6’ x 6’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Eremophila spp. - Valentine or Emu Bush</td>
<td>4’ x 4’</td>
<td>Full sun</td>
<td>Low/Mod water use</td>
</tr>
<tr>
<td>Zauschneria californica - Hummingbird Flower</td>
<td>2’ x 3’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Accents/Grasses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetraneuris acaulis - Angelita Daisy</td>
<td>1’ x 1’</td>
<td>Full/Part sun</td>
<td>Moderate water use</td>
</tr>
<tr>
<td>Balsamia multirudiflora - Desert Marigold</td>
<td>1’ x 1’</td>
<td>Full/Part sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Polystephor cooperi - Paper Flower</td>
<td>1’ x 1’</td>
<td>Full/Part sun</td>
<td>Low/Mod water use</td>
</tr>
<tr>
<td>Opuntia engelmannii - Engelmann’s Prickly Pear</td>
<td>6’ x 10’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Opuntia santa-rita - Santa Rita Prickly Pear</td>
<td>4’ x 6’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
<tr>
<td>Schoropogon brevifolius - Burrograss</td>
<td>1’ x 1’</td>
<td>Full sun</td>
<td>Low water use</td>
</tr>
</tbody>
</table>

Note: See Native Revegetation Plant Palette for more plant options.

(1) Enhanced native softscape type utilizes greater plant massing and begins to add more color, texture, and verticality to the native palette.
CHAPTER THREE — DESIGN GUIDELINES

SECTION FOUR: Highway Facilities Guidelines

REGIONALLY ADAPTED SOFTSCAPE TREATMENT

21.12 Apply regionally adapted softscape in urban areas and locations of high visibility.
Use the regionally adapted softscape type where identified in each landscape design segment. This softscape type utilizes the Mojave, Sonoran, and Chihuahuan plant palettes along with other low-water use plants that are well adapted to local conditions.

- Typical applications include welcome centers, gateways, rest areas, urban areas, and other high visibility locations
- Plants are arranged in greater densities, forming overstory and understory layers, to create a richness of color, texture, form, and seasonal change, enhancing the desert garden

21.13 Carefully select regionally adapted plant species.
Use regionally adapted plant species. In addition to the plants listed in the revegetation landscape type and the enhanced native landscape type, the following list of plants should be used to comprise the regionally adapted landscape type.

- Use plant species to create plant communities with variations in plant height and spread
- Additional plants not included in previous palettes or the adjacent list may be included upon review and approval

### Figure 16 - Regionally Adapted Plant Palette

<table>
<thead>
<tr>
<th>Trees:</th>
<th>Height x Width</th>
<th>Exposure to sun</th>
<th>Water Requirement</th>
<th>Seasonal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraxinus oxycarpa - Raywood Ash</td>
<td>35’ x 25’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Fraxinus velutina ‘Rio Grande’ - Modesto Ash</td>
<td>50’ x 30’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Gleditsia triacanthos inermis - Thornless Honey Locust</td>
<td>35’ x 25’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>n/a</td>
</tr>
<tr>
<td>Ulmus parvifolia - Drake Elm</td>
<td>60’ x 70’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Fall</td>
</tr>
<tr>
<td>Cupressus arizonica - Arizona Cypress</td>
<td>70’ x 30’</td>
<td>Full sun</td>
<td>Low/Mod water use</td>
<td>n/a</td>
</tr>
<tr>
<td>Eucalyptus microtrea - Coolbah Tree</td>
<td>40’ x 25’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>n/a</td>
</tr>
<tr>
<td>Acacia stenosphylla - Shoestring Acacia</td>
<td>50’ x 15’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Eysenhardtia orthocarpa - Kidneywood</td>
<td>10’ x 4’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Rhus lanceolata - Flame Leaf Sumac</td>
<td>15’ x 15’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Summer</td>
</tr>
<tr>
<td>Ungnadia speciosa - Mexican Buckeyes</td>
<td>15’ x 15’</td>
<td>Fullsun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Celtis pallida - Desert Hackberry</td>
<td>8’ x 10’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shrubs:</th>
<th>Height x Width</th>
<th>Exposure to sun</th>
<th>Water Requirement</th>
<th>Seasonal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buddleia davidii - Navajo Purple Butterfly Bush</td>
<td>8’ x 8’</td>
<td>Full/Part sun</td>
<td>Low water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Senna phylodenia - Silver Leaf Cassia</td>
<td>6’ x 6’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Dodonaea viscosa - Hopbush</td>
<td>10’ x 6’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Year round</td>
</tr>
<tr>
<td>Rhus ovata - Sugar Bush</td>
<td>10’ x 10’</td>
<td>Full/Part sun</td>
<td>Low water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Sabia clevelandi - Chaparral Sage</td>
<td>4’ x 3’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Phomis fruticosa - Jerusalem Sage</td>
<td>4’ x 3’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Sp/Sum</td>
</tr>
<tr>
<td>Justicia californica - Chaparosa</td>
<td>3’ x 3’</td>
<td>Full/Part sun</td>
<td>Moderate water use</td>
<td>Summer</td>
</tr>
<tr>
<td>Tecoma x ‘Goldstar’ - Texas Yellow Star</td>
<td>20’ x 8’</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Summer</td>
</tr>
<tr>
<td>Senna oligophylla ‘Outback’ - Outback Cassia</td>
<td>3’ x 3’</td>
<td>Full sun</td>
<td>Low water use</td>
<td>Sp/Sum</td>
</tr>
</tbody>
</table>

### Cacti/Accents/Grasses/Groundcovers and Perennials:

| Fouquieria splendens - Ocotillo | 18’ x 10’     | Full sun        | Low water use     | Spring   |
| Coreopsis lanceolata - Sunray   | 1.5’ x 1’      | Full sun        | Moderate water use | Sp/Sum   |
| Hemerocallis spp. - Daylily     | 2’ x 2’        | Full sun        | Low water use     | Spring   |
| Nolina microcarpa - Bear Grass  | 4’ x 6’        | Full sun        | Low water use     | Spring   |
| P. spectabilis - Showy Penstemon | 3’ x 2’       | Full sun        | Low water use     | Spring   |
| Salvia leucantha - Mexican Bush Sage | 3’ x 3’     | Full sun        | Low water use     | Sp/Fall/Win|
| Dasyrion wheeleri - Desert Spoon | 4’ x 6’       | Full/Part sun   | Low water use     | Sum/Fall |
| Hyphalepia x ‘Autumn Joy’ - Autumn Joy Sedum | 4.5’ x 1.5’  | Full/Part sun   | Low water use     | Sp/Sum   |
| Bulbine frutescens - Shrubby Bulbine | 5’ x 5’       | Part sun        | Low water use     | Sp/Fall  |

Note: See Native Revegetation and Enhanced Native Plant Palettes for more plant options.

1, 2 Regionally adapted softscape planting introduces non-native species that are adapted to the desert climate.
CHAPTER THREE — DESIGN GUIDELINES

SECTION FOUR: Highway Facilities Guidelines

**REGIONAL ORNAMENTAL SOFTSCAPE TREATMENT**

21.14 Apply regionally ornamental softscape in areas of extremely high importance.

Use the regional ornamental softscape type to create cultural meaning, enhance a landmark feature, or both. The regional ornamental softscape type is the rarest treatment and should be used where identified in the landscape design segments.

- It is typically used in areas of extreme high importance as part of placemaking
- This softscape type emphasizes the unique cultural elements of a particular urban environment
- The use of non-native, ornamental plant species in this softscape type accentuates the composition possibilities inherent in form and color
- Dynamic ornamental forms, colors, and textures enhance the native Mojave Desert landscape in complementary patterns

21.15 Carefully select regional ornamental plant species.

In addition to the plants listed in the Revegetation landscape type, the enhanced native landscape type, and the regionally adapted landscape type, the following list of plants comprise the regional ornamental landscape type.

- The species listed represent those plants with significant cultural value.
- Alternative plants that have the same form and characteristics, thereby evoking a similar cultural meaning, may be more desirable if the alternative plant is better suited to the environmental conditions, requires less maintenance, and is more drought-tolerant.

- Additional plants not included in previous palettes or the adjacent list may be included upon review and approval

**Figure 17 - Regional Ornamental Plant Palette**

<table>
<thead>
<tr>
<th>Tree:</th>
<th>Height x Width</th>
<th>Exposure to Sun</th>
<th>Water Requirement</th>
<th>Seasonal Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olea europea 'Swan Hill' - Fruitless Olive Tree</td>
<td>30' x 30'</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Summer</td>
</tr>
<tr>
<td>Pinus elliottii - Monadel Pine</td>
<td>50' x 30'</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Summer</td>
</tr>
<tr>
<td>Pistacia chinensis - Chinese Pistache</td>
<td>40' x 20'</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Full</td>
</tr>
<tr>
<td>Sophora secundiflora - Mescal Bean</td>
<td>15' x 10'</td>
<td>Full sun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
<tr>
<td>Ptelephellodium flexicaule - Texas Ebony</td>
<td>20' x 15'</td>
<td>Full/part sun</td>
<td>Moderate water use</td>
<td>Spring</td>
</tr>
</tbody>
</table>

**Palm:**

- Chamaerops humilis - Mediterranean Fan Palm*: 20’ x 20’ Full sun Low/moderate water use Summer
- Phoenix dactylifera - Date Palm*: 50’ x 25’ Full sun Moderate water use Year round
- Washingtonia filifera - California Fan Palm*: 50’ x 15’ Full/moderate water use Summer

**Shrubs:**

- Caesalpinia mexicana - Mexican Bird of Paradise: 10’ x 6’ Full sun Moderate water use Summer
- Caesalpinia pulcherrima - Red Bird of Paradise: 8’ x 8’ Full sun Moderate water use Summer
- Calliandra eriophylla - Fairy Duster: 4’ x 4’ Full/part sun Low Summer
- Eriogonum x Ebingii - Ebbing’s Silverberry: 9’ x 9’ Full sun Moderate water use Summer
- Rosmarinus officinalis - Spreading Rosemary: 2’ x 8’ Full sun Moderate water use Summer
- Caryopteris x clandonensis 'Dark Knight' - Blue Mist: 3’ x 4’ Full/part sun Low Summer
- Justicia spicigera - Mexican Honeysuckle: 3’ x 4’ Full/part sun Low Summer

**Accents, Cacti, and Grasses:**

- Agave vilmoriniana - Octopus Agave: 4’ x 4’ Full sun Low water use n/a
- Agave bracteosa - Spider Agave: 2’ x 3’ Full/part sun Low water use n/a
- Dasylirion longissimum - Sotol: 6’ x 4’ Full sun Low water use n/a
- Drosanthemum hispidum - Ice Plant: 2’ x 3’ Full/part sun Low/moderate water use Spring
- Euphorbia characias - Shrubby Spurge: 3’ x 2’ Full/part sun Moderate water use Winter
- Hesperaloe parviflora 'Yellow' - Yellow Hesperaloe: 4’ x 4’ Full/part sun Low water use Summer
- Muhlenbergia capillaries 'Regal Mist' - Regal Mist: 3’ x 4’ Full/part sun Moderate water use Spring
- Phormium tenax - New Zealand Flax: 15’ x 4’ Partial sun Low/moderate water use Summer
- Pennisetum setaceum 'rubrum' - Red Fountain Grass: 3’ x 3’ Full sun Moderate water use Year round

*Note: See Native Revegetation, Enhanced Native, and Regionally Adapted Plant Palette for more plant options.

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(1) The regional ornamental softscape type requires permanent irrigation and is used to highlight points of significant interest and landmark quality.

(2) The regional ornamental softscape type adds to the identity and placemaking of areas of high importance.
22.0 WILDLIFE CROSSINGS AND PROTECTION

22.1 Engage appropriate agencies in the planning and design of wildlife crossings.
Engage federal, state, and local agencies and wildlife professionals in the initial stages of planning and design through implementation of wildlife crossings.

- Coordinate information on historic migratory routes and daily wildlife movements to situate crossing structures in appropriate locations.
- Research information on the occurrence of wildlife-related automobile accidents, and explore designs to minimize these collisions.

22.2 Use ecologically-appropriate wildlife crossing structures that meet the needs of specific wildlife species in order to improve movement corridors and safety along the corridor.
Analyze wildlife behavioral traits to design effective crossing structures that meet the needs for all species that will use a structure.

- Specific design criteria varies with each species. Consider larger species, such as deer, and small species such as coyotes.
- Ensure structures complement the primary defense strategy for each wildlife species. For instance, animals such as deer, elk, pronghorn, and bighorn sheep depend on good visibility as a key defense mechanism.
- Use open-span bridges and culverts that are oriented perpendicular to the road in order to reduce the overall length and improve visibility. Proportionately increase the size of the underpass as the length increases.
- Restore vegetation leading up to wildlife crossings and provide cover to shield the entrance to each wildlife crossing from the road while maintaining clear visibility through the crossing.
- Within underpasses, incorporate naturally-occurring materials that exist in adjacent areas.
- Wildlife underpasses or overpasses combined with fencing have the highest documented rates of success for large and small animals. Most successful crossing structures are open-span bridges with sloping sidewalks.
- Road underpasses may be constructed of concrete boxes, elliptical metal culverts, or open span bridges. Increased width and height of structures usually correlate with increased use by large mammals. Sizes range from 6.5 by 6.5 foot culverts for small animals, to an opening width of 40 feet by a height of 16 feet for larger animals. Use natural bottoms for all underpasses that also accommodate streams or drainage patterns. Determine the actual size, location, and type of structure on a site by site basis.
- Placement of underpasses in relation to an animal’s habitat is crucial. The habitat within the crossing structure should also be enhanced to encourage use by wildlife.
- Limit human use of the underpass structures when possible.

22.3 Use different types of fencing as appropriate for different animals.

- At tortoise migration routes, use an 18 inch to 24 inch high welded-wire mesh fence with 6 inches located below ground to prevent tortoises from crawling under the fence along both sides of the highway. Secure the fence to a culvert that crosses beneath the road.
- Recommended fencing heights for big-horn sheep or deer is eight feet, variable-expanded metal mesh fence. Metal mesh fencing should be fastened to metal wire. Barbed wire is unacceptable. Fencing should occur on both sides of the road, and should extend to the underpass or overpass entrance.
- Incorporate breaks, known as jump-outs, in areas with continuous fencing to enable wildlife trapped within the road corridor to escape and return to habitat areas.

22.4 Develop a monitoring system for all major wildlife crossings to document crossing use and to collect data for similar projects.
Several studies in other states indicate that significant movement and migratory disruptions have occurred due to highway construction. Movement and behavior at crossings and other highway locations should be monitored to help improve success of these facilities as part of an on-going interagency cooperative research.

22.5 Include observation points and watchable wildlife opportunities in the design of crossings.
Consideration should only be given when observation points do not interfere with wildlife movement.

22.6 Retrofit existing highway facilities within the Destiny of the West Landscape Design Segment to restore wildlife migration patterns.
Consider broad areas within the landscape where existing topography provides opportunities. Coordinate location with migration corridors.

22.7 Design wildlife crossing structures to blend with surrounding landscape.
Visually screened bridges and culverts recede into the landscape. Combine recreational trails and wildlife crossings as part of bridge and culvert crossings where feasible.
23.0 CONSTRUCTION PRACTICES

23.1 Clear the site only within the limits of construction.
Avoid the visual scars and plant disturbance from excessive site disturbance.

23.2 Protect important environmental, landscape, and cultural features.
Identify and protect all areas to be preserved prior to construction. These include trees, shrubs, landscape and cultural features, and environmentally sensitive areas.
- Fence areas where vegetation is to remain, avoid disturbance and compaction of the ground.
- Maintain and enhance existing ground cover to ensure the area is left in a condition consistent with the surroundings.

23.3 Utilize Best Management Practices and appropriate short term stabilization measures to prevent erosion and sedimentation during construction.
Perform a site risk assessment prior to construction to determine the threat of introducing sediments and pollutants into nearby surface waters and drainage systems.
- Utilize short-term BMP’s to reduce sedimentation and pollutant run-off during construction.
- Consider site specificity, timing of execution, and application of man-made devices and/or vegetative or organic cover to stabilize banks during construction.
- Research alternatives to hard surface paving.
- Give preference to other sediment control devices including sediment basins, diversion earth forms, vegetative buffer areas, channel linings, energy dissipaters, seeding and mulching.

23.4 Carefully manage and dispose of waste material.
Asphalt millings inhibit slope revegetation, contaminates adjacent soils, and create a cluttered, unfinished appearance.
- Avoid placing disposed milled asphalt on highway shoulders.

23.5 Salvage and store topsoil and native plant materials.
After soil erosion and sediment control measures have been implemented and before grading work begins, remove and store topsoil for project reuse.
- Salvage areas should be designated on plans and staked on the site.
- Salvaged plant materials should be stored and maintained during construction, prior to replanting.
- Stripped topsoil in excess of the quantity required for the project should be stored at specified locations for future use.
- Topsoil of lesser quality can be blended with soil amendments to improve condition for final bedding.

23.6 Carefully consider location/reclamation of construction areas.
Construction staging areas, borrow pits, and other construction areas must be carefully located and returned to a condition that is equal to or better than original, and consistent with the Corridor Plan design guidelines.
24.0 MAINTENANCE FACILITIES AND PRACTICES

24.1 Locate and screen maintenance staging areas in visually unobtrusive areas.

Maintenance staging areas should be adequately set back from the highway. Where possible, site facilities so they are screened from the highway by existing landforms.

- Screen maintenance areas, particularly stockpiles, borrow pits, and equipment, from the highway or from adjacent developed property.
- Consider security fencing, landscape, and architectural solutions.

Grading and drainage is the most important consideration in the site planning and design of a maintenance area in order to prevent any environmental damage that could result from leachates in salt and gravel stockpiles. The NDOT Best Management Practices Manual outlines additional points for consideration when planning for maintenance staging areas including the following:

- Cover salt and sand piles to avoid watercourse and groundwater degradation.
- Provide space for equipment storage, vehicles, and supplies, as well as employee or visitor parking.
- Consider future expansion needs.

24.2 Coordinate with maintenance personnel when planning and designing maintenance areas.

Planning and design of maintenance areas requires close cooperation between designers and the personnel directly responsible for its use.

24.3 Consult Best Management Practices and provide for efficient and effective maintenance of landscape and aesthetic treatments.

With few exceptions, new landscape and aesthetics projects are designed to be low maintenance. Refer to NDOT Landscape and Aesthetics Maintenance Manual. Provide areas where maintenance equipment can be conveniently located. Consider maintenance routines required for the design program, and identify areas that may need additional care or attention initially and/or as the project matures. NDOT maintenance practices include:

- Trash and debris removal.
- Surface finish maintenance (painting, patching, graffiti removal).
- Grading and earthwork.
- Ground treatment (raking, replacing mulch or decorative rock, reconfiguring drainage structures).
- Weed control.
- Plantings (interim, temporary, and permanent irrigation, trimming, pruning of shrubs and trees, manual weed control, fertilizing).
- Disease and pest management (including invasive species control).
- Repair and replacement of structural and electrical components, irrigation, signage, and lighting.

24.4 Create a visual design unity among all existing and new structures based on the design theme.

Ensure a visual design relationship exists among all highway structures. This includes coordinating materials, patterns, and color.

24.5 Avoid pruning or shearing plant material except as required to remove dead, damaged, or diseased plant part or to provide clear visibility for traffic conditions.
25.0 RECOMMENDATIONS FOR SUSTAINABLE HIGHWAY ENVIRONMENTS

25.1 Use three key principles in highway construction and natural resource management to create sustainable highway environment – avoid, minimize, and mitigate. Concepts central to these principles include:

- Water conservation: efficiency, protection, and reuse
- Construction materials selection: reduce, reuse, and recycle
- Air quality protection
- Energy efficiency: use renewable energy
- Design innovation

25.2 Techniques for creating sustainable highway environments.

- Develop systems to encourage sustainable highways. Develop performance standards, monitoring procedures, and promote coordination between environmental and transportation agencies.
- Preserve air quality. Use construction mitigation techniques to minimize dust from construction sites.
- Minimize energy consumption and incorporate alternative energy sources. Where possible, use solar powered electronic signs, low energy use lights (such as LED), and passive solar design.
- Use recycled materials for construction. When applicable, use reclaimed concrete and asphalt, scrap tires, plastics, steel slag, roofing shingles, coal fly ash, and composted municipal organic wastes.
- Reduce waste. Waste reduction concepts include right-of-way management, re-use of organic materials, water conservation, and selection of long-lived materials.

25.3 Utilize sustainable development principles in the design and construction of the highway corridor.

Sustainable design is a holistic philosophy that includes all aspects of function and construction operations including, but not limited to: energy use, air quality, material selection, energy generation, water conservation, heating, solid waste, habitat enhancement, and protection.

- Consider sustainability in both the design and construction of highway systems.
- Restore disturbed man-made and natural habitats.

Solar power provides a sustainable, renewable energy source for lighting in remote areas.

Wind power generates a clean renewable energy source and should be used if available.

Consider recycled and reclaimed materials, such as plastic modular units, for roadway construction.
Chapter Four — Cost Analysis and Implementation

Cost Analysis and Implementation

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SECTION ONE: Cost Analysis

To understand the cost implications of the improvements proposed by this Corridor Plan, estimates on a cost per square foot (sf) and per acre basis have been prepared. At the planning budget level, these estimates can be applied to the landscape design segments to produce an overall maximum cost for the right-of-way sections through undeveloped areas, communities, and individual interchange improvements. These estimates will inform NDOT in the decision-making process, and help influence budget allocations for the landscape and aesthetics highway improvements.

APPLICATION OF DESIGN GUIDELINES

The Design Guidelines included in this report describe the elements that compose a typical right-of-way section and interchange along elevated highways and bypasses. They also describe a base level of landscape and aesthetic quality that is used to predict costs. The intent of this section is to develop a definition of what is considered a “standard” treatment. Within the Destiny of the West design segment, an accentuated treatment level should be considered the “standard” treatment. Upon adoption of the Corridor Plan, NDOT should initiate internal reviews to determine implementation strategies. These reviews will include cost evaluation, priorities, scheduling, and visual preference evaluations to test each standard proposed by this section.

Funding for the landscape and aesthetics portion of a project should not be used to cover the ordinary construction costs. The landscape and aesthetics budget is available for softscape and hardscape treatments that exceed the ordinary construction costs.

The following summary describes components contained within an NDOT standard project that are not generally considered landscape and aesthetic costs.

Roadside Service Facilities
- Service area program as defined in Chapter One that includes designated services

Non-motorized Transportation Systems
- Maintain existing sidewalk dimension of intersecting road across bridge overpass
- Maintain existing bike lane dimension of intersecting road across bridge overpass
- New bicycle paths and walkways that are part of an approved transportation plan
- Six foot concrete sidewalk (community transition zones)
- Ten foot concrete sidewalk (community interface zones)
- Painted zebra pattern pedestrian crossing with pedestrian crossing sign

Anti-Graffiti Control and Removal
- Application of a long-term, non-sacrificial anti-graffiti treatment coating to all appropriate structures

Bridge Structure
- Steel and concrete I-girders or steel and concrete box girder
- Cast-in-place concrete with variable vertical ribbed design
- Two color paint palette – base color with one accent color
- Concrete barrier rail with acrylic stain base color application or steel rail with painted finish
- Embossed bridgeloop name identification
- Pedestrian access across and under bridges used at interchanges and over topographic features

Retaining Walls
- Cast-in-place or pre-cast concrete with fractured fin or similar pattern
- Acrylic stain base color application

Noise Walls
- Cast-in-place or pre-cast concrete with fractured fin or similar pattern
- Acrylic stain base color application
- Variation in sound wall geometry, material, color, texture, and pattern to eliminate monotonous, linear stretches of wall

Concrete Barrier
- Cast-in-place concrete barrier
- Acrylic stain base color application

Guardrail
- Galvanized steel three-beam guardrail

Medians
- Revegetated median outside of community zones
Fencing

- Chain link fencing with color application—vinyl clad or painted finish with steel post supports where required (community zones)
- Multi-strand wire fencing with painted steel post supports at right-of-way limits (rural areas)
- Fencing required to control access, grading, and drainage

Grading

- Steepest desired slope of 3H:1V
- Rounded slopes that blend into existing grade
- See Project Design Development Manual (PDDM) 2.2.4.2 side slopes

Rock Cuts

- Rock cuts that appear natural in form and blend with existing landforms
- Staining of rock cut to provide weathered finish
- Rock fall protection structures, if necessary.

Drainage

- Basic channel conveyance, culverts, and drainage structures
- Erosion resistant channels
- Water quality basins
- Man-made or constructed wetlands fulfilling mitigation requirements

Erosion Control

- Provision of temporary erosion control during construction
- Permanent erosion control
- Temporary and permanent erosion control best management practices

Native Revegetation for All Disturbed Portions of Highway Construction

- Salvage and storage of topsoil (six inch horizon minimum) with native plant fragments
- Re-spreading of stockpiled topsoil and native plant fragments to minimum six inch depth (amend topsoil when necessary)
- Application of native plant revegetation seed mix in combination with scattered rock mulch
- Supplemental irrigation to establish plantings when necessary (two year minimum by maintenance contract)
- Provide invasive and noxious weed control (two-year minimum by maintenance contract)

Construction and Maintenance Management Practices

- Use of dust control practices
- Construction fencing to preserve sensitive areas
- Maintenance period to ensure establishment of native revegetation
- Development of a native revegetation general maintenance program

Project Components Required for Compliance

- All practices must be in compliance with applicable Federal and State regulations

Roadway Lighting

- 30 foot high pole with galvanized finish, concrete foundation, and high pressure sodium luminaire (rural areas)
- 30 foot high pole with powder-coat finish, concrete foundation with acrylic powder-coated base color application, and high pressure sodium luminaire with shoe-box fixture (community zones)

Wildlife Crossing

- Under or overpass structures to allow maintenance of natural migration and animal travel patterns
- Cast-in-place concrete bridges with textured finish and two-color paint palette
- Wire mesh fencing with painted steel post supports

PROCESS

Costs (in 2006 dollars) for individual hardscape and softscape treatments, such as pedestrian crosswalks, curb extensions, raised planters, concrete form liner imprints, retaining walls, and landscape irrigation, were gathered from several sources, including NDOT, local engineering and landscape architecture firms, contractors, and product manufacturers. This information was analyzed and compiled into a database that could be applied to several prototypical examples of landscape and aesthetic treatment levels. The softscape and hardscape costs presented here represent the capital costs of construction and do not include extended maintenance costs. The treatments correlate to those presented in the NDOT Landscape and Aesthetics Master Plan. A separate report prepared by UNLV, entitled Maintenance Cost Study for Corridor.
Planning, examines long-term maintenance costs such as graffiti removal, pruning, and irrigation.

Prototypical designs for each of the five softscape types and four hardscape treatments were created for sections of highway rights-of-way outside of communities, in developing commercial areas, and in downtown areas. Within communities, designs were created for two-lane, three-lane, and four-lane roadway conditions. The project area was then incorporated into the estimate to create the square foot and acre cost analysis.

Overall cost estimates for each level of treatment were developed from these and compared to the costs from actual projects for verification. A similar process was applied to these areas to create a per square foot and per acre cost for each hardscape and softscape type.

COST ESTIMATES

Cost information presented here is provided for the purpose of long-range planning and budgeting. It is not intended to substitute for a project-level detailed cost projection.

Softscape Treatments

Using the process described above, planning level construction cost estimates for the different softscape treatments were determined in 2006 dollars. They are as follows:

Softscape Type Cost Estimate (sf & acre)
Ground Treatment/Native Revegetation:
$1.20 - $1.40 sf
$52,500 - $61,950 acre
L & A Cost: N/A
L & A Cost: N/A

Enhanced Native:
$1.50 - $1.70 sf
$64,500 - $74,000 acre
L & A Cost: $0.30 - $0.50 sf
L & A Cost: $12,000 - $21,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Regional Ornamental:
$3.70 - $6.50 sf
$160,000 - $280,000 acre
L & A Cost: $2.50 - $5.30 sf
L & A Cost: $107,500 - $227,500 acre

Enhanced Native:
$1.50 - $1.70 sf
$64,500 - $74,000 acre
L & A Cost: $0.30 - $0.50 sf
L & A Cost: $12,000 - $21,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Enhanced Native:
$1.50 - $1.70 sf
$64,500 - $74,000 acre
L & A Cost: $0.30 - $0.50 sf
L & A Cost: $12,000 - $21,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Enhanced Native:
$1.50 - $1.70 sf
$64,500 - $74,000 acre
L & A Cost: $0.30 - $0.50 sf
L & A Cost: $12,000 - $21,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

Regionally Adapted:
$2.40 - $2.90 sf
$105,000 - $126,000 acre
L & A Cost: $1.20 - $1.70 sf
L & A Cost: $52,500 - $73,500 acre

The cost for ground treatment/native revegetation is covered under the general construction costs as part of the NDOT standard. The data shown for the different treatment levels represents a total cost. The L & A cost is the portion of the total cost that is above the NDOT standard. For example, a regionally adapted softscape costs about $1.20 sf more than the standard ground treatment/native revegetation level of treatment, for a total cost of $2.40 sf ($1.20 + $1.20 = $2.40). The additional $1.20 sf is funded through the L & A construction budget because it is above and beyond the NDOT standard. The regional ornamental treatment exhibits the widest range of costs due to the highly customized nature of this type.

Structures and Hardscape Treatments

Within communities, the construction of curbs, sidewalks, and medians compose the majority of hardscape costs. Along elevated highways and bypasses, bridges and sound walls are the main hardscape cost components. For the purposes of cost estimation, the right-of-way conditions established for softscape costs were also used to determine hardscape costs. In addition, a 12,000 square foot (60 foot by 200 foot) bridge was assumed for elevated highways and bypasses. The estimate for the various hardscape levels is:

Hardscape Type Cost Estimate (sf & total)
Standard:
$115 - $120 sf
$1,386,000 - $1,500,000 total
L & A Cost: N/A
L & A Cost: N/A

Accentuated:
$132 - $142 sf
$1,575,000 - $1,700,000 total
L & A Cost: $17 - $27 sf
L & A Cost: $189,000 - $200,000 total

Focal:
$180 - $195 sf
$2,145,000 - $2,335,000 total
L & A Cost: $65 - $80 sf
L & A Cost: $759,000 - $949,000 total

Landmark:
$225 - $270 sf
$2,646,000 - $3,150,000 total
L & A Cost: $110 - $155 sf
L & A Cost: $1,260,000 - $1,764,000 total

The cost for the standard treatment would be covered by the general capital construction budget.

How to Understand Landscape and Aesthetics Costs:

1) Determine the cost of the NDOT standard treatment for softscape and hardscape.
Softscape (Native Revegetation)
$1.20 to $1.40 per sf
Hardscape (Standard)
$115 to $120 per sf

2) Determine the cost of the selected treatment type.
Softscape (Regionally Adapted)
$2.40 to $2.90 per sf
Hardscape (Focal)
$180 to $195 per sf

3) Subtract the standard treatment cost from the cost of the selected treatment type.
Softscape:
$2.40 (Regionally Adapted Cost)
- $1.20 (Native Revegetation Cost) = $1.20 (Landscape and Aesthetics Cost)
Hardscape:
$180 (Focal Cost)
- $115 (Standard Cost) = $65 (Landscape and Aesthetics Cost)

The portion of cost allocated as a landscape and aesthetics cost is the additional cost.
by the landscape and aesthetics budget (up to 3% for new construction) or community partnerships. The landmark level shows the widest range of cost because of the custom nature of many elements such as complex concrete form liners, custom railings, and transportation art that are included in this treatment.

To place the estimates in the context of a highway corridor, an estimate was calculated for a one-mile section of road. Typical sections of highway right-of-way for rural and community applications were developed. Two-lane (50 foot ROW), three-lane (76 foot ROW), and four-lane (102 foot ROW) examples for both suburban and downtown applications were used to determine this value (Figures 19-50, pages 4.5-4.12). The approximate softscape and hardscape costs to develop one mile of corridor right-of-way at each treatment level were estimated.
FIGURE 19 - RURAL HIGHWAY
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

- Wire right-of-way fence
- Decomposed granite mulch
- Revegetation with scattered rock and native plant fragments

Total Cost: $35,000 - $42,000 / acre of ROW area
L&A Cost: $0 / acre

FIGURE 20 - RURAL HIGHWAY
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

- Wire right-of-way fence
- Shrub planting
- Decomposed granite mulch
- Revegetation with scattered rock

Total Cost: $43,000 - $50,000 / acre of ROW area
L&A Cost: $8,000 - $14,000 / acre

FIGURE 21 - RURAL HIGHWAY
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

- Wire right-of-way fence
- Tree planting
- Decomposed granite mulch
- Revegetation with scattered rock
- Shrub planting
- Landscape boulders
- River cobble

Total Cost: $69,000 - $85,000 / acre of ROW area
L&A Cost: $34,000 - $50,000 / acre

FIGURE 22 - RURAL HIGHWAY
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

- Wire right-of-way fence
- Revegetation
- Landscape boulders
- Decomposed granite mulch
- Tree planting
- River cobble
- Shrub planting

Total Cost: $107,000 - $185,000 / acre of ROW area
L&A Cost: $72,000 - $150,000 / acre
SECTION ONE: Cost Analysis

CHAPTER FOUR — Cost Analysis and Implementation

FIGURE 23 - BYPASS/ELEVATED HIGHWAY INTERSECTION
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

Guardrail
Rock mulch
Bridge with standard aesthetic treatment
5' concrete walkway
Revegetation with scattered rock

Total Cost: $1,785,000 (infield landscape and bridge deck)  L&A Cost: $0/acre

FIGURE 24 - BYPASS/ELEVATED HIGHWAY INTERSECTION
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

Guardrail
Tree
Pedestrian/bikeway
Bridge with aesthetic treatment
Rock mulch
Groundcover/shrubs
Revegetation with scattered rock

Total Cost: $2,100,000 (infield landscape and bridge deck)  L&A Cost: $315,000/acre

FIGURE 25 - BYPASS/ELEVATED HIGHWAY INTERSECTION
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

Retaining wall
Landscape light
Guardrail
Pedestrian/bikeway
Bridge with aesthetic treatment
Tree
Groundcover/shrubs
Rock mulch
Revegetation with scattered rock

Total Cost: $2,890,000 (infield landscape and bridge deck)  L&A Cost: $1,105,000/acre

FIGURE 26 - BYPASS/ELEVATED HIGHWAY INTERSECTION
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

Groundcover/shrubs
Retaining wall
Tree
Guardrail
Pedestrian/bikeway
Bridge with aesthetic treatment
Landscape light
Accent tree
Rock mulch

Total Cost: $4,200,000 (infield landscape and bridge deck)  L&A Cost: $2,415,000/acre
SECTION ONE: Cost Analysis

FIGURE 27 - TWO LANE SUBURBAN HIGHWAY
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

Total Cost: $1,627,000 - $1,908,000 per mile of ROW
L&A Cost: $0 per mile

FIGURE 28 - TWO LANE SUBURBAN HIGHWAY
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

Total Cost: $1,696,000 - $2,025,000 per mile of ROW
L&A Cost: $69,000 - $117,000 per mile

FIGURE 29 - TWO LANE SUBURBAN HIGHWAY
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

Total Cost: $2,128,000 - $2,509,000 per mile of ROW
L&A Cost: $501,000 - $601,000 per mile

FIGURE 30 - TWO LANE SUBURBAN HIGHWAY
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

Total Cost: $2,846,000 - $4,336,000 per mile of ROW
L&A Cost: $1,680,000 - $2,430,000 per mile
FIGURE 31 - TWO LANE DOWNTOWN HIGHWAY
Softscape Type: Ground Treatment/Native Revegetation
Structures and Hardscape Type: Standard

- 10' sidewalk
- Street light
- 4' bike lane
- Striped crosswalk

Total Cost: $3,148,000 - $3,644,000 per mile of ROW
L&A Cost: $0 per mile

FIGURE 32 - TWO LANE DOWNTOWN HIGHWAY
Softscape Type: Native Revegetation
Structures and Hardscape Type: Accentuated

- 12' sidewalk
- Street light
- 4' bike lane
- Bench and pedestrian amenities
- Street tree
- Striped crosswalk

Total Cost: $3,419,000 - $3,970,000 per mile of ROW
L&A Cost: $271,000 - $329,000 per mile

FIGURE 33 - TWO LANE DOWNTOWN HIGHWAY
Softscape Type: Regionally Adapted
Structures and Hardscape Type: Focal

- 12' sidewalk with pavers
- Street light
- 4' bike lane
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Street tree
- Enhanced crosswalk
- Bollard

Total Cost: $4,218,000 - $5,600,000 per mile of ROW
L&A Cost: $1,070,000 - $965,000 per mile

FIGURE 34 - TWO LANE DOWNTOWN HIGHWAY
Softscape Type: Regional Ornamental
Structures and Hardscape Type: Landmark

- 12' sidewalk with pavers and stone
- Street light
- Street tree
- 4' bike lane
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Enhanced crosswalk and intersection paving
- Bollard

Total Cost: $5,579,000 - $8,089,000 per mile of ROW
L&A Cost: $2,431,000 - $4,445,000 per mile
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FIGURE 35 - THREE LANE SUBURBAN HIGHWAY
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

Total Cost: $1,647,000 - $1,943,000 per mile of ROW
L&A Cost: $0 per mile

FIGURE 36 - THREE LANE SUBURBAN HIGHWAY
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

Total Cost: $1,706,000 - $2,033,000 per mile of ROW
L&A Cost: $59,000 - $99,000 per mile

FIGURE 37 - THREE LANE SUBURBAN HIGHWAY
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

Total Cost: $2,150,000 - $2,535,000 per mile of ROW
L&A Cost: $508,000 - $601,000 per mile

FIGURE 38 - THREE LANE SUBURBAN HIGHWAY
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

Total Cost: $2,982,000 - $4,550,000 per mile of ROW
L&A Cost: $1,335,000 - $2,616,000 per mile
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SECTION ONE: Cost Analysis

FIGURE 39 - THREE LANE DOWNTOWN HIGHWAY
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

- 10’ sidewalk
- Street light
- 4’ tighter scoring pattern in the 12’ sidewalk
- Concrete raised median
- On-street parallel parking
- Striped crosswalk

L&A Cost: $0 per mile

Total Cost: $3,001,000 - $3,599,000 per mile of ROW

FIGURE 40 - THREE LANE DOWNTOWN HIGHWAY
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

- 12’ sidewalk
- Street light
- 4’ accentuated paving area in the 12’ sidewalk
- Raised median and enhanced native planting
- On-street parallel parking
- Bench and pedestrian amenities
- Street tree
- Striped crosswalk
- Curb extension

L&A Cost: $1,284,000 - $1,396,000 per mile

Total Cost: $4,385,000 - $4,990,000 per mile of ROW

FIGURE 41 - THREE LANE DOWNTOWN HIGHWAY
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

- 12’ sidewalk with pavers
- Street light
- On-street parallel parking
- Raised median with regionally adapted planting
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Street tree
- Enhanced crosswalk
- Bollard
- Curb extension

L&A Cost: $1,678,000 - $3,030,000 per mile

Total Cost: $4,779,000 - $6,629,000 per mile of ROW

FIGURE 42 - THREE LANE DOWNTOWN HIGHWAY
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

- 12’ sidewalk with pavers and stone
- Street light
- On-street parallel parking
- Street tree
- Raised median with regional ornamental planting
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Enhanced crosswalk and intersection paving
- Bollard
- Curb extension

L&A Cost: $2,825,000 - $3,817,000 per mile

Total Cost: $5,926,000 - $7,411,000 per mile of ROW
SECTION ONE: Cost Analysis

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**FIGURE 43 - FOUR LANE SUBURBAN HIGHWAY**
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

Total Cost: $2,479,000 - $2,916,000 per mile of ROW
L&A Cost: So per mile

**FIGURE 44 - FOUR LANE SUBURBAN HIGHWAY**
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

Total Cost: $3,021,000 - $3,113,000 per mile of ROW
L&A Cost: $142,000 - $197,000 per mile

**FIGURE 45 - FOUR LANE SUBURBAN HIGHWAY**
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

Total Cost: $3,465,000 - $4,038,000 per mile of ROW
L&A Cost: $986,000 - $1,122,000 per mile

**FIGURE 46 - FOUR LANE SUBURBAN HIGHWAY**
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

Total Cost: $4,619,000 - $7,165,000 per mile of ROW
L&A Cost: $3,140,000 - $4,249,000 per mile

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**CHAPTER FOUR — COST ANALYSIS AND IMPLEMENTATION**

**FIGURE 47 - FOUR LANE DOWNTOWN HIGHWAY**
Softscape Type - Ground Treatment/Native Revegetation
Structures and Hardscape Type - Standard

- 10' sidewalk
- Street light
- 4" tighter scoring pattern in the 12' sidewalk
- Concrete raised median
- On-street parallel parking
- Striped crosswalk

Total Cost: $3,172,000 - $3,681,000 per mile of ROW
L&A Cost: $0 per mile

**FIGURE 48 - FOUR LANE DOWNTOWN HIGHWAY**
Softscape Type - Enhanced Native
Structures and Hardscape Type - Accentuated

- 12' sidewalk
- Street light
- 4" accentuated paving area in the 12' sidewalk
- Raised median and enhanced native planting
- On-street parallel parking
- Striped crosswalk
- Curb extension

Total Cost: $4,495,000 - $5,132,000 per mile of ROW
L&A Cost: $1,323,000 - $1,443,000 per mile

**FIGURE 49 - FOUR LANE DOWNTOWN HIGHWAY**
Softscape Type - Regionally Adapted
Structures and Hardscape Type - Focal

- 12' sidewalk with pavers
- Street light
- On-street parallel parking
- Raised median with regionally adapted planting
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Street tree
- Enhanced crosswalk
- Bollard
- Curb extension

Total Cost: $5,022,000 - $6,878,000 per mile of ROW
L&A Cost: $2,090,000 - $2,770,000 per mile

**FIGURE 50 - FOUR LANE DOWNTOWN HIGHWAY**
Softscape Type - Regional Ornamental
Structures and Hardscape Type - Landmark

- 12' sidewalk with pavers and stone
- Street light
- On-street parallel parking
- Street light
- Raised median with regional ornamental planting
- Bus shelter, bench, and pedestrian amenities (turn out lane recommended)
- Street tree
- Enhanced crosswalk and intersection paving
- Bollard
- Curb extension

Total Cost: $6,819,000 - $9,437,000 per mile of ROW
L&A Cost: $3,147,000 - $5,756,000 per mile
The diagram below demonstrates how the cost estimate information can be used to determine a planning level estimate of the landscape and aesthetics costs for this hypothetical five mile section of highway corridor. The costs shown are for the landscape and aesthetics enhancements that are above the standard project construction costs.

**Figure 51 - Planning Level Cost Estimate**

<table>
<thead>
<tr>
<th>Mile 1</th>
<th>Mile 2</th>
<th>Mile 3</th>
<th>Mile 4</th>
<th>Mile 5</th>
</tr>
</thead>
</table>
| 1 mile @ $0 per mile  
(Native Revegetation / Standard) | 1 interchange @ $315,000 per interchange  
(Enhanced Native / Accentuated) | 2 miles @ $250,000 per mile  
(Enhanced Native / Accentuated) | 1 mile @ $1,750,000 per mile  
(Regionally Adapted / Focal) | 1 mile @ $0 per mile  
(Native Revegetation / Standard) |
| $0 L&A cost | $315,000 L&A cost | $500,000 L&A cost | $1,750,000 L&A cost | $0 L&A cost |

Total L&A cost: $2,565,000
Maintenance Costs

The Corridor Plan identifies the level of landscape and aesthetic treatment, and the maintenance investment. Therefore, it is important that maintenance cost data be incorporated in the Corridor Plan. Furthermore, local public agencies and others will be interested in maintenance expenses to help navigate the long-term maintenance implications of retrofit projects.

In collaboration with the Corridor Plan, long-term maintenance costs have been researched by UNLV and compiled as the Maintenance Cost Study for Corridor Planning. Figure 52 diagrams how total life-cycle maintenance costs were developed for the different Landscape and Aesthetic treatments. Figure 53 shows the maintenance costs that were determined for the various combinations of softscape and hardscape types. Current estimates exhibit relatively wide variations in cost due to the limited amount of data available; however, further research and tracking of projects will result in more clearly defined maintenance cost estimates.

Figure 52 - Total Life Cycle Maintenance Costs

Figure 53 - Maintenance Costs for Landscape Treatment Types
SECTION TWO: Implementation

POTENTIAL FUNDING OPPORTUNITIES

Many opportunities exist to provide funding for the implementation of the corridor projects. Features described as standard will be undertaken by NDOT as new construction, capacity improvements, and replacement of facilities occurs. Upgrades to the standard landscape and aesthetic features will be considered as new highway construction occurs. Funding for new landscape and aesthetic projects associated with the state's highway program will be provided by State and Federal sources. Up to 3% of the total project construction cost may be allocated for landscape and aesthetic improvements associated with all new construction and capacity improvements.

When a landscape and aesthetics project can significantly influence an adjacent community or area, the community may choose to be involved in the process, and participate. The matching funds program annually provides matching funds up to 50% of the cost for specific community projects. In-kind services, State, and Federal monies may be used for the community match.

Additionally, communities may request enhanced levels of landscape and aesthetic treatments. Capital cost and maintenance cost-sharing agreements with NDOT are required. Communities may also require that developers with properties located directly adjacent to the NDOT right-of-way follow the corridor plan recommendations to improve their areas.

Banking landscape and aesthetic project funds is encouraged. In so doing, NDOT can shift landscape and aesthetics money to priority areas needing landscape and aesthetic treatment. The capacity to re-allocate funds allows NDOT to broadly manage landscape and aesthetics on a corridor-wide basis.

Facilities such as rest area and view pull-offs will require NDOT funding. However, funding partnerships with other agencies and organizations are encouraged. Other partnership opportunities include the development of the statewide Place Name Signage Program and Audio Interpretation Program. With these two programs promoting statewide tourism, a partnership between NDOT and Nevada Commission on Tourism (NCOT) could succeed. Private sector partners, including the Nevada Mining Association and the Nevada Ranchers Association, could also be enlisted.

A Main Street Program in Nevada could assist numerous communities in downtown beautification and economic development efforts. This program could be anchored at the state level, with an organization such as the Nevada Commission on Economic Development. Funding could be provided by community chambers of commerce or other direct sources.

Project and programs described in the Corridor Plan are outlined in Figure 54 along with opportunities for potential partnerships, suggested lead agency, and potential funding sources. Counties, cities, agencies, and other organizations should be familiar with the Corridor Plan and coordinate community plans, master plans, and other governing documents in order to provide an integrated approach towards achieving the vision and goals set forth. Active participation and review of the Corridor Plan, coordinated with a review of other community documents, will increase the potential for action and success. Also refer to Section One of the Appendix which describes potential community funding sources.
## Figure 54 - Funding Opportunities

<table>
<thead>
<tr>
<th>Projects and Programs</th>
<th>Lead Agency</th>
<th>Coordinating Agency</th>
<th>Possible Funding Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Gateways</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match</td>
</tr>
<tr>
<td>Upgrade Downtown Streetscape</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction</td>
</tr>
<tr>
<td>Upgrade Suburban Streetscape</td>
<td>Community (with Developer support)</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction</td>
</tr>
<tr>
<td>Upgrade Rural Streetscape</td>
<td>Community (with Developer support)</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction</td>
</tr>
<tr>
<td>Pedestrian Crossings</td>
<td>NDOT</td>
<td>Community</td>
<td>Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction, Developers building adjacent the ROW</td>
</tr>
<tr>
<td>Standard Sidewalk</td>
<td>NDOT</td>
<td>Community</td>
<td>NDOT funding</td>
</tr>
<tr>
<td>Enhanced Sidewalk</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match, Landscape and Aesthetics up to 3% for new construction, Developers building adjacent the ROW</td>
</tr>
<tr>
<td>Street Trees and Planting Strips</td>
<td>Community</td>
<td>NDOT, NDF</td>
<td>Enhancement Fund, Community Match, Developers building adjacent the ROW, NDF plant supply</td>
</tr>
<tr>
<td>Community Lighting</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match, Developers building adjacent the ROW</td>
</tr>
<tr>
<td>Community Rest Areas</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund, Community Match</td>
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<td>Community Environmental Graphics</td>
<td>Community</td>
<td>NCOT</td>
<td>Enhancement Fund, Community Match</td>
</tr>
<tr>
<td>Statewide Gateways</td>
<td>NDOT</td>
<td>County and Communities</td>
<td>Enhancement Fund, NDOT funding sources</td>
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<tr>
<td>Roadside Services</td>
<td>NDOT</td>
<td>NDSP</td>
<td>NDOT funding sources</td>
</tr>
<tr>
<td>Statewide Place Recognition Sign Program</td>
<td>NDOT</td>
<td>NCOT</td>
<td>NDOT funding sources, NCOT grant</td>
</tr>
<tr>
<td>Audio Interpretation Program</td>
<td>NDOT</td>
<td>NCOT</td>
<td>NDOT funding sources, NCOT grant</td>
</tr>
<tr>
<td>Transportation Art</td>
<td>Community</td>
<td>NDOT</td>
<td>Enhancement Fund</td>
</tr>
<tr>
<td>Color Palette Retrofit of Existing Facilities</td>
<td>NDOT</td>
<td>Community</td>
<td>Enhancement Fund, Community Match</td>
</tr>
<tr>
<td>Non-Motorized Transportation Systems</td>
<td>Community</td>
<td>NDOT</td>
<td>Landscape and Aesthetics up to 3% for new construction, SAFETEA-LU</td>
</tr>
<tr>
<td>Standard Highway Facilities</td>
<td>NDOT</td>
<td>Community</td>
<td>Landscape and Aesthetics up to 3% for new construction</td>
</tr>
<tr>
<td>Enhancements to Highway Facilities above what the 3% would Achieve</td>
<td>NDOT</td>
<td>Community</td>
<td>Enhancement Fund, Community Match, Developers building adjacent the ROW</td>
</tr>
<tr>
<td>Wildlife Crossings and Protection</td>
<td>NDOT</td>
<td>NDW</td>
<td>Landscape and Aesthetics up to 3% for new construction, NDW grant</td>
</tr>
<tr>
<td>Main Street Approach</td>
<td>Community</td>
<td>NDOT, Nevada Commission on Economic Development</td>
<td>Consortium of Communities, Nevada Commission on Economic Development grant</td>
</tr>
<tr>
<td>Native Wildflower Program</td>
<td>NDOT</td>
<td></td>
<td>Surface Transportation and Uniform Relocation Assistance Act, Landscape and Aesthetics up to 3% for new construction</td>
</tr>
<tr>
<td>Anti-littering Campaign</td>
<td>NDOT</td>
<td>Communities</td>
<td>NDOT funding</td>
</tr>
<tr>
<td>Scenic Highway Designation</td>
<td>NDOT</td>
<td></td>
<td>NDOT funding</td>
</tr>
<tr>
<td>Rest Area and Shuttle System in the Tahoe Basin</td>
<td>NDOT</td>
<td>NDSP, USFS, TRPA</td>
<td>Southern Nevada Land Planning Management Act</td>
</tr>
</tbody>
</table>

**List of Acronyms**

NDF – Nevada Division of Forestry
NDSP – Nevada Division of State Parks
NCOT – Nevada Commission on Tourism
NDW – Nevada Division of Wildlife
USFS – United States Forest Service
SAFETEA-LU – Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

4.16
SECTION THREE: Priorities

This section describes priority levels for projects within the landscape design segments. The priority levels are based on current capital improvements, as well as landscape and aesthetics planning. They are intended to act as a guide and represent those projects the Corridor Planning team recommends as having the greatest potential impact on the aesthetics of the entire corridor. The priorities identified in this chapter are subject to change according to the availability of funds for individual project improvements. Capital projects are significantly influenced by the availability of funding.

First priority was given to highly visible and identifiable projects and sections of road, areas of significant and immediate quality, and projects that are currently in progress. Second priority applies to projects that will provide additional benefits and aesthetics as part of the long range plan. Third priority was given to areas that currently display a reasonable level of aesthetic quality and, upon enhancement, will complete the landscape and aesthetics program for their particular landscape design segment. General comments received from the public and TRC members influenced the designation of priorities.

The following activities have been selected as high priorities because of the immediate and significant impact they will have on the overall aesthetics and sense of place for the entire corridor:

- Enhancing the community and highway compatibility
- Providing flexibility for streetscape improvements within urban areas
- Retrofitting existing structures and hardscape elements through painting/staining
- Creating a unified highway system using color and other features represents a major step towards place-making.

Wildlife movement corridors are an important component of the corridor environment. Recommendations to analyze wildlife corridor movement and provide improved crossing structures are listed as medium priority due to the large capital cost. However, a few specific crossing areas are designated as first priority due to current crossing use and the importance for providing wildlife with safe and contiguous habitat connections. Community gateway establishment is noted as a second priority unless a project is underway because many communities have existing entry signage.

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Conclusion
Conclusion

The Southern US 95 and US 93 Landscape and Aesthetics Corridor Plan represents a significant step in Nevada’s renewed commitment to landscape and aesthetics as integral elements of the state’s highways. This document is designed to guide decisions and policies that affect the aesthetic quality of Nevada’s highways on a corridor-wide basis down to the level of individual projects. It presents extensive research and analysis of the existing conditions of Nevada, its highway corridors, and its scenic natural landscapes. The Corridor Plan describes the composition of elements and programs that will be used to enhance the level of landscape and aesthetics across the state. Perhaps most importantly, the Corridor Plan sets the stage for discussion of:

- Facilitation of community improvements
- Implementation strategies
- Cost evaluation/strategies
- Priorities and scheduling
- Visual preference evaluation

To accomplish an increased level of landscape and aesthetics for Nevada’s highways, the Corridor Plan has detailed a new NDOT standard level of treatment for capital projects. The new standard significantly enhances the basic level of aesthetics on all future projects.

The Corridor Plan is a public/private partnership initiative. The Plan provides a foundation for this unique initiative to build a comprehensive vision for the landscape and aesthetics of the corridor. The partnership policy, outlined in the NDOT Landscape and Aesthetics Master Plan, clearly states the unique and exciting result of this process.

Many groups and agencies have reviewed and endorsed the Corridor Plan. Additionally, the planning process has received high recognition from various organizations. This is evidence the intent of this document to inspire and encourage context sensitive solutions will be realized. As a result, the landscape and aesthetics of Nevada’s highway corridors will experience significant benefits in the years to come.

Highways can be perceived as edges or boundaries that separate city or landscape. Interchanges are seen as intersections, nodes, and gateways. These perceptions argue strongly for a design approach that recognizes cultural boundaries and deals with the landscape and aesthetic design of the highway as a corridor segment, rather than on an individual project basis.
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SECTION TWO: Mapping Ecosystems Along Nevada Highways............. A.4
SECTION ONE: Potential Community Funding Sources

STATE AND FEDERAL GRANT PROGRAMS

The sources and structure for funding sources within NDOT are described in the Program Development Manual. Numerous State and Federal funding programs exist for use by communities for highway and community improvements. The following list provides a summary of a few funding sources communities may consider as they develop projects. Additional funding opportunities are available when other issues are present, such as a brownfield site located along a highway, tribal land influences, and the presence of historic structures. A list of federal grants is also located at http://www.grants.gov.

Communities should review each grant and determine its applicability for a specific project. Separate projects addressing the same issue may be combined and submitted as a single grant application. Many programs overlap, and proponents may use a combination of the funding and organizational resources listed below, as well as others that might not be shown.

Nevada Grant Programs

Nevada Division of Forestry
Nevada Urban and Community Forestry Southern Region Grant Project and Northern Nevada Urban and Community Forestry Grant Program
Funds education and outreach related to the urban forest, including planning, management, restoration, and sustainability improvements. A tree planting component must be not more than 50% of the project.
http://www.forestry.nv.gov/docs/summary2_012204.pdf
http://www.forestry.nv.gov

Nevada Department of Cultural Affairs
Nevada Arts Council
Provides a quarterly grant program to assist artists, support exemplary art projects, and support a variety of other art related efforts.
http://dmla.clan.lib.nv.us/docs/arts/programs/grants/grantsfororgs.htm

NDEP – Nevada Brownfields
Agency provides access to funding for brownfield redevelopment. Administered through the US Environmental Protection Agency (EPA), the program allows communities to establish their own brownfields program by designating an area where redevelopment is to be targeted. Additional funds may be awarded for projects categorized as Demonstration Pilots and have a greenspace component. These monies can be accessed through the Brownfields Assessment Demonstration Pilots and Supplemental Assistance for Demonstration Pilots application processes.
http://www.ndep.nv.gov/bca/brownfld_2.htm

ARCO Foundation
Foundation grants are made in five program categories (education, community, arts and humanities, the environment, and public information). (213) 486-3342 or www.arco.com/init/foundation/index2.html

ArtsREACH
Provides modest grants to partnerships of cultural, business, social, government, civic, and religious organizations. ArtsREACH is a National Endowment for the Arts (NEA) pilot program designed to increase the level of direct NEA grant assistance to arts organizations in underserved areas. http://arts.endow.gov

Clorox Company Foundation (Reno)
The Clorox Company Foundation is dedicated to improving the quality of life in communities where Clorox employees live and work. The Foundation makes grants, mobilizes employee volunteers, and works with community leaders and other funders.
http://www.thecloroxcompany.com/community/index.html

Grantmakers in Nevada
Lists a variety of potential grants within Nevada.
http://www.fundsnetservices.com/nevada.htm
Federal Grant Programs

Federal Grant Program information can be found by accessing the Catalog of Federal Domestic Assistance (CFDA) at www.cfda.gov. The CFDA is a database of all Federal programs available to State and local governments; federally-recognized Indian tribal governments; domestic public, quasi-public, and private profit and nonprofit organizations and institutions; specialized groups; and individuals. The grant programs can be found by selecting the “Search for Assistance Program” on the CFDA website and entering the provided “Program Number”.

USDA Rural Development

Provides services to further economic development in rural communities. Grants.gov provides information on more than 1,000 Federal government grant programs, totaling about $400 billion in funding each year. Rural communities can access funding opportunities at www.grants.gov and then type “rural” in the search section of the website. http://www.rurdev.usda.gov/nv/offices/offices.htm

National Park Service

Tribal Preservation Program

Assists tribes in preserving historic properties. The grants provide much needed assistance to tribal communities interested in protecting their cultural heritage. http://www.cr.nps.gov/hps/tribal/index.htm

Historic Preservation Fund

Provides funding support to State Historic Preservation Offices who administer state grants for historic preservation. http://www.cr.nps.gov/hps/hpf/hpfquest.htm

US Department of Housing and Urban Development

Community Development

Provides a grant program to support community development. http://www.hud.gov/local/nv/community/cdbg/index.cfm
http://www.hud.gov/grants/index.cfm

US Department of Agriculture

Business and Industrial Loans

Assists rural areas in obtaining quality loans for the purpose of improving the economic and environmental climate in rural communities including pollution abatement and control. Search: Program Number 10.768

Intermediary Re-lending Program Loans

Provides loans for business facilities or community development in rural areas. Search: Program Number 10.767

Empowerment Zones Program

Provides for the establishment of empowerment zones and enterprise communities in rural areas to stimulate the creation of new jobs, particularly for the disadvantaged and long-term unemployed, and to promote revitalization of economically distressed areas. Search: Program Number 10.772

Rural Business Enterprise Grants

Facilitates the development of small and emerging private business, industry, and related employment for improving the economy in rural communities. Search: Program Number 10.769

Small Business Innovation Research Grants

Provides monies to stimulate technological innovation in the private sector and strengthen the role of small businesses in meeting Federal research and development needs. Search: Program Number 10.212

Fund for Rural America: Research, Education, and Extension Activities

Grant Program

Supports unique, innovative, and high-impact research education, and extension projects to aid farmers, ranchers, and rural communities to address changes and challenges facing agriculture and rural communities as a result of fundamental reforms to Federal farm programs. Search: Program Number 10.224

US Department of Commerce

Economic Adjustment Program Grants

Assists State and local interests design and implement strategies to adjust or bring about change to an economy. Search: Program Number 11.307

Public Works and Development Facilities Grants

Promotes long-term economic development and assists in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress. Search: Program Number 11.300
SECTION ONE: Potential Community Funding Sources

**National Technical Assistance Program**
Provides funds to 1) enlist the resources of designated university centers in promoting economic development, 2) support innovative economic development projects, 3) disseminate information and studies of economic development issues of national significance, and 4) finance feasibility studies and other projects leading to local economic development.

Search: Program Number 11.303

**US Department of Defense**

- **Community Economic Adjustment Funding:** Alleviates serious economic impacts that result from Defense program changes.
  
  Search: Program Number 12.600

- **Community Economic Adjustment Planning Assistance:** Responds to military base closures and realignments.
  
  Search: Program Number 12.607

**Department of Housing and Urban Development**

- **Community Development Awards** grants to entitlement community grantees to carry out a wide range of community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services.
  
  http://www.hud.gov/local/nv/community/cdbg/index.cfm

- **Rural Housing and Economic Development**
  
  Expands the supply of affordable housing and access to economic opportunities in rural areas.
  
  Search: Program Number 14.250

**US Department of Interior**

- **Historic Preservation Fund**
  
  1) Provides matching grants to States for the identification, evaluation, and protection of historic properties; 2) provides matching grants to States to expand the National Register of Historic Places, assist in carrying out historic preservation activities; and 3) provides grants to Indian Tribes and Alaskan Native Corporations to preserve their culture.
  
  Search: Program Number 15.904.

- **Rivers, Trails and Conservation Assistance**
  
  Provides staff assistance to support partnerships between government and citizens to increase the number of rivers and landscapes protected and trails established nationwide.
  
  Search: Program Number 15.921

**Federal Highway Administration (FHWA)**

- **Scenic Byways Discretionary Program**
  
  Provides funds to accomplish projects on national scenic byways, all American roads, America’s byways, state scenic byways, and Indian tribe scenic byways. Selected projects recognize state priorities and should benefit the byway traveler’s experience, whether it will help manage the intrinsic qualities that shape the byway’s story, interpret the story for visitors, or improve facilities along the byway used by visitors.
  
  http://www.bywayonline.org/grants/

- **Ferry Boats Discretionary Program**
  
  Provided funding for water-taxi studies as well as construction of facilities.
  
  http://www.fhwa.dot.gov/discretionary/fbmemos.htm

- **Public Lands Highways Discretionary Program**
  
  Provides funds to improve access to and within the nation’s federal lands. Monies have been used for adjacent vehicular parking areas; interpretive signage; acquisition of necessary scenic easements and scenic or historic sites, provision for pedestrians and bicycles; construction and reconstruction of roadside rest areas (including sanitary and water facilities), transit facilities, and appropriate public road facilities such as visitor centers as determined by the Secretary. The replacement of the federally owned bridge over the Hoover Dam in the Lake Mead National Recreation Area between Nevada and Arizona was funded through the program.
  

- **National Recreational Trails Fund**
  
  Funds trails and trail-related projects such as urban trails, maintenance, restoration, easement acquisition, and trail-side and trail-head facilities.
  
  http://www.off-road.com/4x4web/land/nrtfaq.html
  http://environment.fhwa.dot.gov/ecological/eco_app_basp
SECTION TWO: Mapping Ecosystems

### Mapping Ecosystems Along Nevada Highways and the Development of Specifications for Vegetation Remediation

This report has been prepared by Dr. Paul T. Mueller, Professor in the Department of Environmental and Resource Sciences at UNR, Dick Post, Horticulturist Specialist with University of Nevada Cooperative Extension (Eccles) and Erin Neuman, a graduate student at UNR (now employed with the National Park Service at Fort Rayne, California).

#### September 20, 2002

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### Ecosystem Specifications

**MOJAVE DESERT – CREOSOTE BUSH/BURSAGE SITES**

#### Site Analysis

These are desert sites with plants adapted to very hot dry conditions. The soils are variable but are often quite rocky and gravely. Many of the soils are underlain by a siliceous or calcareous carbonate hardpan that restricts rooting depth. The plants are sparse. Perennial grasses are few and annuals and woody plants are common. Precipitation averages 3 inches or less over much of the range. The elevations are generally low, below 2,500 feet.

<table>
<thead>
<tr>
<th>Specie</th>
<th>lb/acre/here</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creosote bush – Larrea tridentata</td>
<td>2.0</td>
</tr>
<tr>
<td>Bararge – <em>Anabasis ammoca</em></td>
<td>2.0</td>
</tr>
<tr>
<td>Rabbitbrush – <em>Ambrosia artemisiifolia</em></td>
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</tr>
<tr>
<td>Purple sage – <em>Sphaeralcea coccinea</em></td>
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</tr>
<tr>
<td>Bristlebush – <em>Encelia farinosa</em></td>
<td>1.0</td>
</tr>
<tr>
<td>Evening dews – <em>Purshia tridentata</em></td>
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</tr>
<tr>
<td>Wolfeberry – <em>Lycium andersonii</em></td>
<td>0.5</td>
</tr>
<tr>
<td>Whipplebush acacia – <em>Acacia greggii</em></td>
<td>0.5</td>
</tr>
<tr>
<td>Utah cattail – <em>Aegocynetes umbrosa</em></td>
<td>0.25</td>
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</tbody>
</table>

#### Crazes

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Big galleta – <em>Hilaria rigida</em></td>
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</tr>
<tr>
<td>Desert reedgrass – <em>Schizachyrium scoparium</em></td>
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</tr>
<tr>
<td>Red broom – <em>Broomelobus rubens</em></td>
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</tr>
<tr>
<td>Six-weeks grass – <em>Brassica balthica</em></td>
<td>0.5</td>
</tr>
<tr>
<td>Ring mallow – <em>Malhowsbergia torreyi</em></td>
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</table>

#### Forbs

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<tr>
<td>Desert marigold – <em>Helianthus milledensis</em></td>
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</tr>
<tr>
<td>California poppy – <em>Eschscholzia californica</em></td>
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</tr>
<tr>
<td>Desert globe mallow – <em>Sphaeralcea ambigens</em></td>
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</tr>
<tr>
<td>Desert sunflower – <em>Vigilia dubiosa</em></td>
<td>0.5</td>
</tr>
<tr>
<td>Desert pipe – <em>Lupinus sparciformis</em></td>
<td>0.5</td>
</tr>
</tbody>
</table>

Total 17.5 Bsetare
SECTION TWO: Mapping Ecosystems

Technical Appendix

Site and Soil Preparation

Anything that adds organic matter to these harsh reestablishment sites would be beneficial. In most cases fertilizer treatments would not be needed. Supplemental irrigation for establishment would be the most critical and would likely require the handling of water. The presence of a hardpan and salts near the surface might require an amendment to control or amendurate pH. This would be in the form of agricultural grade sulfur or sodium carbonate, which is usually less water-soluble. The amount would have to be carefully regulated to avoid incurring any undue toxicity. On some sites deep ripping might help to loosen up a hardpan and improve seedling success.

Revegetation Procedures

In some cases we would recommend the placement of topsoil on disturbed sites in the Latosol soil type. The soil should be roughened to provide a seed bed. The seed can be broadcast or applied as a water-based slurry using a hydro-seeding method. Most plant transplants may be appropriate in some cases. On most Mojave sites, some type of a mulch should be used. A number of mulch materials can be used and because of the high frequency of winds it would be necessary to tackyfy the mulch to the soil surface using one of several procedures.

MOJAVE DESERT - BLACKBRUSH SITES
(Coecogynia ramosissima)

Site Analysis

Blackbrush is found at some of the higher elevations in the Mojave Desert, usually above 3000 feet. The dominant plant is blackbrush, but an understory of desert needle grass (Eriophorum species) may also be present. Other plants associated with this species are the Joshua tree (Yucca brevifolia) and Spanish broom (Cucumis hirsutus). Soils are often gravelly, and slopes vary from nearly 8 degrees to 36 degrees. As part of the Mojave Desert these sites are mostly dry, and rainfall is usually no more than 4 or 5 inches. Little effort has gone into revegetation efforts on blackbrush sites.

Species Selection

<table>
<thead>
<tr>
<th>Species</th>
<th>Bin seed/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackbrush</td>
<td>1.5</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>1.5</td>
</tr>
<tr>
<td>Purple sage</td>
<td>1.5</td>
</tr>
<tr>
<td>Three leaf sumac</td>
<td>1.0</td>
</tr>
<tr>
<td>Ceniza mediterranea</td>
<td>1.5</td>
</tr>
<tr>
<td>Fallopia pauciflora</td>
<td>1.0</td>
</tr>
<tr>
<td>Lycium andersonii</td>
<td>1.0</td>
</tr>
<tr>
<td>Panax pseudopseudogynium</td>
<td>1.0</td>
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<tr>
<td>A.5</td>
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</tbody>
</table>

Soils Preparation

Soils may be moved by scraping using a[Unit: 1] spoon that is to be placed over disturbed sites. These disrupted sites may require supplemental irrigation for establishment via three sprinkler irrigations. Irrigation most likely would need to be applied after initial seeding for one season. Fertilizer such as a NPK fertilizer (16-16-16), would help for seeding success. Approximately 300 pounds/acre should be applied.

Revegetation specifications

Container-grown species will be difficult to obtain. Such seed should be drilled in and with a small drill in the flat to moderate slopes. The soil should be roughened before and after to create favorable seed beds for grass and forb seeds. Mulches, such as straw mulch, would help with initial establishment and reduce dust hazards. Mulches should be tackified with light-colored setting. Hydroseeding may be an option, depending upon costs and the area is susceptible to high dust hazard.
SECTION TWO: Mapping Ecosystems

MOJAVE DESERT – DESERT RIPARIAN SITES

Site Analysis

These sites are found at the lowest elevation in the hot desert, which in Nevada translates to Mojave Desert. Soils may vary and can be quite saline with a high pH and salt accumulation at the surface. The surface soil horizons are mostly silty, but the lower horizons can have poor physical properties with clays and poor drainage. There may be stagnant water or no water in these drainages during parts of the year. A few have year-round streams, e.g. the Muddy River as it goes under Interstate 15.

Species Selection

Shrubs

<table>
<thead>
<tr>
<th>Species</th>
<th>lbs/seed/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodding willow – Salix gooddingii</td>
<td>1.0</td>
</tr>
<tr>
<td>Saltbush – Atriplex canescens</td>
<td>1.0</td>
</tr>
<tr>
<td>Henshaw’s willow – Salix exigua</td>
<td>1.0</td>
</tr>
<tr>
<td>White sage – Artemisia tridentata</td>
<td>1.0</td>
</tr>
<tr>
<td>Arizona saltbush – Atriplex canescens</td>
<td>1.5</td>
</tr>
<tr>
<td>Desert willow – Salix lasiolepis</td>
<td>1.5</td>
</tr>
<tr>
<td>Wash willow – Chilopsis linearis</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Grasses

<table>
<thead>
<tr>
<th>Species</th>
<th>lbs/seed/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand dropseed – Sporobolus cryptandrus</td>
<td>1.0</td>
</tr>
<tr>
<td>Giant Bermuda grass – Cynodon dactylon</td>
<td>1.0</td>
</tr>
<tr>
<td>Tall fescue – Festuca arundinacea</td>
<td>1.0</td>
</tr>
<tr>
<td>Acker wheatgrass – Eragrostis arenaria</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Forbs

<table>
<thead>
<tr>
<th>Species</th>
<th>lbs/seed/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desert marigold – Balearia multicaulis</td>
<td>1.0</td>
</tr>
<tr>
<td>California poppy – Eschscholzia californica</td>
<td>1.0</td>
</tr>
<tr>
<td>Globe mallow – Sphaeralcea coccinea</td>
<td>1.0</td>
</tr>
<tr>
<td>Sand verbena – Abronia villosa</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total 17.0 lbs/acre

Soil and Site Preparation

These wetland sites have a variety of soils as mentioned above. Some washes may be very rocky and thus predispose them in the way of site preparation. Some of the deeper soils may be silty at the surface and prone to wind erosion. A soil stabilizer, such as hydromulch or a seeding material, can be applied to reduce the potential dust problem. The soils also may be low in organic matter and may require some fertilization. These sites likely would be able to utilize a nitrogen application (possibly 1 pound of N10,000 square feet). Prior to seeding contouring may be required if slopes are steeper than 40 percent. If a high pH soil is found, then it will be necessary to add 800 pounds of agricultural grade sulfur.

Revegetation Procedures

Shallow slopes may lend themselves to the use of a drill. Steeper slopes should be seeded by broadcasting and mulching. Soils must be roughened in order to provide safe seed sites. This can be done using a disk if machinery can be used. On smaller areas hand-ripping will suffice. Shrubs and even ramets of grasses may do best if container-grown and then planted on the container of the site. Both container-grown and non-containerized areas must be moistened and then seeded.

SALT MARSH ZONE SITES

Site Analysis

These sites are found near the edges of playa throughout Nevada with a number of highways crossing them. The geomorphic potential is very high and most species, except those native to the area, are difficult to establish and maintain. The terrain is generally flat because of the basins. In addition to being very saline, soils often have a high clay content constituting a restrictive layer relative to root growth. The soil structure in the clay horizon is usually columnar and prismic with a high sodium content. Water often peeks up these sites in the spring. During much of the year, however, they can be very dry. These sites may also be in close proximity to wetlands associated with the playas, although the wetlands constitute a different set of requirements.
SECTION TWO: Mapping Ecosystems

SPECIFIC EXAMPLE SPECIFICATIONS

In this section, we have taken three specific sites and described specifications that might be followed in order to improve the aesthetics, dust control and other problems on these sites.

REVEGETATION PROTOCOL FOR THE VALLEY OF FIRE INTERCHANGE EAST OF LAS VEGAS.

Site Analysis

- This is a Mojave Desert site with extremely low rainfall.
- The soils are rocky and must have a turfgrass seeded with calcium carbonate or silica. Much of the topsoil has been removed.
- The soil should be analyzed before planting to determine which supplements should be added to assist in revegetation.
- We would recommend that native desert species be planted on this site, possibly merged with a grassy ground cover in a planting pattern.
- This site will require a new structure to reduce wind erosion.
- This site requires heavy traffic because it is along a major highway, and more importantly, it is near to one of Nevada’s premier recreation destinations.

Suggested Reclamation Stages

Step 1: Site Preparation

Rip the surface soil in preparation for planting.

Step 2: Application of Soil Amendments

Determine and apply appropriate fertilizers.

Step 3: Supplementation Irrigation

Install a 1- to 2-inch drip system to ensure establishment of watergrown grasses. Determine the appropriate number of emitters needed to irrigate a specific number of plants on this site. Water would come from several potential sources, for example, a large irrigation pond located on the site, a well or a catchment system. Irrigation on these sites would not continue but would only be done to enhance establishment.

Species Selection

The number of native species adapted to these sites is somewhat limited. Only a few species are highly adapted to these sites because of the requirement for high salt tolerance.

Shrubs

1. Russian thistle - Salsola kali
2. Russian olive - Elaeagnus angustifolia
3. Silver buffaloberry - Shepherdia argentea
4. Prickly willow - Salix exigua
5. Russian olive - Elaeagnus angustifolia
6. Soapweed - Yucca elata

Grasses

1. Salt grass - Distichlis spicata
2. Salt-leaf grass - Spartina maritima
3. Common reed - Arundo donax

Forbs

1. Alkali saltbush - Atriplex canescens
2. Early mallow - Sphaeralcea angustifolia
3. Alkali saltbush - Atriplex canescens

Soil/Site Preparation

The high salinity may require the use of soil amendments. High-sodium soils may require the addition of gypsum during establishment of these highly salt-tolerant species. On difficult sites as much as 4,000 pounds per acre might be applied. On more sites it may be important to apply a nitrifier to reduce wind erosion. There are a number of products available and the prices vary considerably.

Revegetation Procedures

These sites are generally quite flat and would allow a cell to be used. For some species container-grown material might be recommended. Sowing seeding would be recommended, but might present an access problem because of the size of these clay soils. Late fall seeding might be used if a mulch is applied onto the soil to protect the soil during the winter. The most expensive method would be using certified-clean straw. The potential for weed infestations is always a possibility.
SECTION TWO: Mapping Ecosystems

Step 4: Seeding/Planting of Native Plants
The excellent plant cover in the wash to the north cannot be repeated on the interdune but suggests some of the species that might be selected.

Step 5: Mulching
A mulch should be applied to provide cover for the new seedlings on the site. A mulch, such as alfalfa or spruce, could be used to improve the chances for successful revegetation. This will help reduce the dust hazard.

Step 6: Species Selection
Here we have listed a number of species that can be used on this site. It is likely that container-grown native shrubs and one or two native grasses and forbs might be useful on this site.

Native Shrub Species:
- Creosote Bush – Larrea tridentata
- Bar sage – Artemisia dumosa
- Cattle Spinnus – Atriplex polycarpa
- Purple Sage – Salvia dorri
- Bishop Cress – Casuarius erosa
- Brittle bush – Eremothera barnosum
- Finch’s willow – Salix arctica
- Willow – Salix purpurea
- Weeping juniper – Juniperus chinensis

Native Grass Species:
- Big Saltgrass – Hilaria rigida
- Desert needlegrass – Achnatherum spinosum
- Red fescue – Festuca rubra
- Six-weeks grass – Bouteloua curtipendula
- Rush – Hymenothera torreyi

Native Forb Species:
- Desert marigold – Baileya multiradiata
- Desert globe mallow – Sphaeralcea ambigua
- Desert sunflower – Helianthus decapetalus
- Desert Lupine – Lupinus arizonicus

*Container-grown shrubs should be planted in relatively deep containers, at least 8 inches to 10 inches. The native grasses and forbs can be transplanted as either transplants or seedlings if they can be made available. Supplemental irrigation to ensure establishment would be required if a mixture of seed is to be planted on this site.

ADDITION

DUST CONTROL

Soil productivity is affected by wind erosion in various ways. Areas of erosion and deposition on disturbed sites require more costly and less efficient erosion control practices. Wind removes the smaller clay particles and organic matter from the soil while the coarser materials are left behind. The continued loss of fine particles reduces soil quality. In shallow soils and soils with a hardpan layer, wind erosion also results in decreased root zone depth and water holding capacity. Changes may occur slowly and go unnoticed for many years. Bare soil can lead to dust that may be detrimental to plant growth.

An emergency control method is available to reduce damage from wind-induced soil erosion that has already started or is anticipated:

- Tillage to produce ridges and ditches
- Addition of a mulch
- Irrigation to increase soil moisture
- Temporary artificial wind barriers
- Soil additives or spray-on adhesives

Choice of method, or combination of methods, depends on severity of erosion and the relationship to planned remediation procedures that have been prescribed for a site.

MONITORING

Since remediation efforts are somewhat costly, we would recommend that monitoring be done to measure the success and failure of these efforts. This can be done either on an ad hoc basis or by using a more objective methodology to determine success and/or failure over time. We would strongly recommend that an objective and scientifically based monitoring protocol be adopted to examine revegetated sites for several years after the treatment to assess the success and/or failure of the efforts. A number of excellent monitoring procedures are available. As a minimum we would suggest a series of transects where the seeded and volunteer species are counted one, two and five years after the treatment. Each belt should be about 15 meters or 50 feet in length and 1 meter or 3 feet wide. The number of transects would depend upon the size of the disturbed or seeded area. Small areas may require only two or three transects while larger areas may require several more to provide a good statistically valid sample.

Within each belt, a plant density count should be accomplished, counting the number of individual plants per unit area. Density should be determined for both seeded
and volunteer species. The purpose for looking at the density of the volunteer native species is to have some idea of the level of competition with the seeded species. For some non-invasive species, i.e., cheatgrass, it would be necessary to use a subsample to obtain a reliable but feasible density count. Plant vigor should also be measured. Vigor can be determined in several ways, e.g., measuring the height of grass culms, length of seedheads, and the height and number of leaves of both grasses and forbs. For grasses, a simple count of the number of seed heads giving rise to reproductive culms would be appropriate. These determinations should be done for all species but especially for seeded species. This can be accomplished in several ways such as counting the number of seed heads, measuring the height of the plant, and counting the number of seed heads for the grasses of interest. In many cases, a mixture will be used to revegetate and it would be valuable to know which of these species established best and exhibited the greatest vigor in a particular site.

NUMEROUS AND INVASIVE WEEDS

Table 4 is a list of various weeds that have been designated as weeds by the Nevada State Department of Agriculture. There are a few other species that can also be classified as invasive weeds. These might include cheatgrass (Bromus secalinus) and bogbean ( Ludwigia palustris) in the north and red clover (Trifolium rubens) and Mediterranean grass (Vulpia myuros) in the south. In some cases, species of coarser (Descurainia sp. and Lepidium sp.) are invasive and can contribute to the soil. Our assessment of these weeds along Nevada highways is summarized in Table 5 where we have listed those species that we encountered and the location of populations found along Nevada highways. It would be important for those involved in restoration to have a thorough knowledge of these plant species and to be able to identify them in the field. We have examined the records of the Nevada Department of Agriculture. They have documented the location of a number of weeds at specific points along the highways. We have these records and they are available in the offices of the Nevada Department of Agriculture, Division of Plant Industry.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
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<tbody>
<tr>
<td>Alien Rose</td>
<td>Paeonia lactiflora</td>
</tr>
<tr>
<td>Austrian Thistle</td>
<td>Cirsium arvense</td>
</tr>
<tr>
<td>Austrian Peacock</td>
<td>Euphorbia royleana</td>
</tr>
<tr>
<td>Black Henbane</td>
<td>Hyoscyamus niger</td>
</tr>
<tr>
<td>Camelthorn</td>
<td>Alhagi camelthorae</td>
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<tr>
<td>Common crypta</td>
<td>Cryptantha crypta</td>
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<tr>
<td>Dyer's Weed</td>
<td>Euphorbia serpyllifolia</td>
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<tr>
<td>Eurasian water-cress</td>
<td>Lythrum salicaria</td>
</tr>
<tr>
<td>Gotland</td>
<td>Galium officinale</td>
</tr>
<tr>
<td>Lamb's Ears</td>
<td>Potentilla erecta</td>
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<tr>
<td>Lesser Knapweed</td>
<td>Centaurea nigra</td>
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<tr>
<td>Lemon thistle</td>
<td>Centaurea solstitialis</td>
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<tr>
<td>Louisiana daisy</td>
<td>Coreopsis pubescens</td>
</tr>
<tr>
<td>Melilot</td>
<td>Melilotus albus</td>
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<tr>
<td>Mediterranean sage</td>
<td>Salvia officinalis</td>
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<tr>
<td>Mexican Crown Flower</td>
<td>Tithonia diversifolia</td>
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<tr>
<td>Mexican heather</td>
<td>Trichostema monticola</td>
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<tr>
<td>Mexican Wintercress</td>
<td>Cardamine californica</td>
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<tr>
<td>Mexican yellow star</td>
<td>Coreopsis tinctoria</td>
</tr>
<tr>
<td>Nevada thistle</td>
<td>Cirsium arvense</td>
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<td>Scientific Name</td>
<td>Common Name</td>
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<tr>
<td>-----------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Agropyron repens</td>
<td>Knaweed (b) Russian</td>
</tr>
<tr>
<td>Albugo canescens</td>
<td>Canesbourn</td>
</tr>
<tr>
<td>Anthoxanthum suda</td>
<td>Maywee shanmule</td>
</tr>
<tr>
<td>Carex rhaeas</td>
<td>Whetner or heay cress</td>
</tr>
<tr>
<td>Caratia maxima</td>
<td>Thistle: (b) Mok</td>
</tr>
<tr>
<td>Centaurea cyanus</td>
<td>Thistle: 4) Pips star</td>
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<tr>
<td>Centaurea ephedra</td>
<td>Knaweed: (a) Diffuse</td>
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<td>Centaurea ephedra</td>
<td>Thistle: (e) Bierian star</td>
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<td>Centaurea ephedra</td>
<td>Knaweed: (e) Spelled</td>
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<tr>
<td>Centaurea ephedra</td>
<td>Thistle: (g) Yellow star</td>
</tr>
<tr>
<td>Centaurea virgosa</td>
<td>Knaweed: (d) Squarrose</td>
</tr>
<tr>
<td>Chrysanthemum parner</td>
<td>Rusk skletoereed</td>
</tr>
<tr>
<td>Cicera macclerisa</td>
<td>Bunkock: (b) Wace</td>
</tr>
<tr>
<td>Cicera macclerisa</td>
<td>Bunkock: (a) Poison</td>
</tr>
<tr>
<td>Coenadum vulgaris</td>
<td>Common exupra</td>
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<tr>
<td>Convolvulus efficiniae</td>
<td>Houndednapse</td>
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<tr>
<td>Euphorbia swaia</td>
<td>Lely sparge</td>
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<tr>
<td>Galenax effectia</td>
<td>Gunsrae</td>
</tr>
<tr>
<td>Hapalea verticella</td>
<td>Radilla</td>
</tr>
<tr>
<td>Hyssopus niger</td>
<td>Black heabase</td>
</tr>
<tr>
<td>Hypericum perforatum</td>
<td>Kranelti weed</td>
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<tr>
<td>Isia tineata</td>
<td>Dye's wood</td>
</tr>
<tr>
<td>Lepidium italicum</td>
<td>Perennia pepperwood</td>
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<tr>
<td>Linaria dalmatica</td>
<td>Teakflax: Dalimian</td>
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<td>Linaria vulgaris</td>
<td>Teaflox, yellow</td>
</tr>
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<td>Lythrum salicaria</td>
<td>$L_{y}$ raganan &amp; culivers</td>
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<td>Myriophyllum siliquum</td>
<td>Eurasian water-niledil</td>
</tr>
<tr>
<td>Oenotherum aceratrum</td>
<td>Thistle: (e) Scethch</td>
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<tr>
<td>Pegegas cornula</td>
<td>Arakan Reykrews</td>
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<tr>
<td>Potentilla neca</td>
<td>Sarfe inqerebol</td>
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<tr>
<td>Borago osterica</td>
<td>Azerbai Jekerve</td>
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<tr>
<td>Solanum nesraki</td>
<td>Mediterranean sage</td>
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<td>Solanum ecreliense</td>
<td>Horse-neckle: (a) Carolina</td>
</tr>
<tr>
<td>Solanum ecreliense</td>
<td>Horse-neckle: (a) White</td>
</tr>
<tr>
<td>Sonora ecreliense</td>
<td>Thistle: (d) Sowe</td>
</tr>
<tr>
<td>Sorgum species, perennia, including, but not limited to:</td>
<td></td>
</tr>
<tr>
<td>(a) Johnson grass (b) Soughlin alario (c) Potential sweet sperman</td>
<td></td>
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</tbody>
</table>
SECTION TWO: Mapping Ecosystems

WILDFIRE HAZARD

Wildfire is of considerable concern to all Nevadans. Unfortunately many sites along Nevada highways possess vegetation characteristics that have a high potential for wildfire ignition. In this report, we are attempting to promote plants that do not constitute high fire hazard. Reference herein must be made to the USDA Fire Effects Information System, which has useful information about most of the plants we have listed as possible vegetation species in this report. The FES can be accessed at the following Web site (https://www.fs.fed.us/database/feis). Areas of high fire hazard have been identified on the vegetation maps. These areas with the highest fire hazard are sites with pure stands of cheatgrass (Bromus tectorum), various sagebrush species with seedheads of cheatgrass, sites with other weeds such as mustards, and other areas where weeds have become commonplace along the right-of-way. Cheyenne is the most common fire-susceptible species found along Nevada highways. These weeds generally be identified by examining the various vegetation polygons on the vegetation maps. Of course, under very dry conditions a wildfire can start anywhere. On especially high fire hazard sites, it may be wise to attempt to establish fire-resistant species along the highways. However, the cost of such an endeavor might be prohibitive. It then becomes a situation where the owner of the highway system must be informed about fire hazards. While the U.S. Forest Service and Bureau of Land Management are handling this, perhaps the NDOT could somewhat aid in the message, or work with them to help get the message out.

Selected References


Appendices

Appendix 1. Species selection

The species listed in the general ecosystem specifications are those that we selected from advertised seed sources. These species are thought to be adapted to the ecosystems in question. Species selection is of paramount importance and requires several steps. The first step is to evaluate the environment where the vegetation is to be planted. This would require examining the soil and climate conditions, topography and microtopography, and competing vegetation which may or may not be native species. Then familiarize with the native vegetation would begin the selection process. This would require going to various seed companies and determining what seed is available and what might best fit into a mixture, considering cost and the desirability to include a species in the mixture. Some western seed companies are listed in Appendix #2. Others are available. For each site there would be a number of species that would be appropriate and desirable. For the major ecosystems along Nevada highways, we have listed some of the appropriate species. After the selection process is complete, purchase and delivery can be requested. The species selected will be a function of availability and cost. In some cases the cost will preclude the inclusion of a species in the mixture even though it may be desirable. Also the cost and availability of container-grown plants must be carefully considered.

Seeding rates will vary from site to site depending on the soil, the species used, the price and availability of the selected seed. A reasonable rate of seed would be to seed at a rate of 19 pounds to 20 pounds/acre of pure live seed. In one of the appendices we have included information on how to convert the acre seeding rates to the weight of seed per square foot or per square meter. In addition, it is important to calculate, based on seed germination percentages, the pounds of bulk seed required to yield one pound of pure live seed. This information is also included in Appendix #3.

Appendix #2 Sources of native seeds

We have listed here only a few of numerous seed companies with emphasis on those who provide seed adapted to Nevada conditions. There certainly may be others that could be used.
SECTION TWO: Mapping Ecosystems

Appendix #3 Bulk pure live seed requirements for seed with specified germination rates.

<table>
<thead>
<tr>
<th>Percent Germination</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Pct.</td>
</tr>
<tr>
<td>90%</td>
</tr>
<tr>
<td>95%</td>
</tr>
<tr>
<td>98%</td>
</tr>
<tr>
<td>99%</td>
</tr>
</tbody>
</table>

Prepared by: [Author's Name], Soil Conservation Service

Appendix #4 Soil Samples

The following soil sampling suggestions were included from the "Objectives and Guidelines for Revegetation Success Under the Tabac Road Act" by Michael Hager. These methods are necessary to assess the soil properties vital to the success of the establishment and vigor of plant species used in revegetation efforts.
Pre-project soil sampling

Soil samples must be taken from the project site and from an adjoining unirrigated upland site, where possible, in order to establish nutrient needs and nutrient status.

- Soil samples must be taken by a qualified and trained individual using an approved method.
- Soil samples can be analyzed by a qualified soil laboratory using specific testing methodology. This methodology is that which was used by Chamber and Hagem (California Report R1530180) in collecting data referenced previously. Using this methodology, meaningful analysis can be accomplished. The analysis protocol has been developed for wildland soils analysis and is additional to any agronomic tests that may be required. These tests will be available from Plant and Soil Laboratory, Larrie Lifedford, (408) 727-0339. Other labs may be able to perform these tests. Inquiries should be made to the Nevada Natural Resources Conservation Service office (303) 341-4999.
- Soil samples must be analyzed by a soils laboratory using appropriate methods.

Appendix A5 Soil amendments, mixtures and soil stabilizations materials including blankets and tacks.

This list is not complete it does refer to many of the materials available on the market for soil stabilization and to facilitate revegetation.

Southwest Environmental Service, Inc., 2490 E. Erwin, P.O. Box, Tyler, Texas 75708 Phone (903) 531-2211, Fax (903) 531-2112, e-mail jotnam@usa.net, Web site www.southwestenvironmental.com.


Nikes Corporation, 1571 E. Formosa Drive, Englewood, CO 80112, Phone (303) 766-2006, Fax (303) 766-1110, e-mail Discover@link.com, Web site www.dicerocorridor.com.

Western Sure, P.O. Box 10490, Casa Grande, AZ 85226, Phone in Phoenix (602) 248-8511, in Tucson (520) 884-7111, or (520) 448-7317, e-mail email@westernsure.com, Web site www.westernsure.com.

Aqua-Sed Technologies, Inc., P.O. Box 193, 11421 Missouri St., South Fenton, TX 77567, (600) 061-5646, Fax (713) 947-5635, e-mail format@aquased.com, Web site www.aquased.com.

Gladue Gate Products, P.O. Box 1016, Davis, CA 95617, Phone & Fax (707) 532-6788, Web site www.gladuegateproducts.com.

National Seed, Nellis, P.O. Box 10120, Reno, Nevada 89510, Phone (702) 324-1371, Fax (775) 324-5131, E-mail nvseedco@iup.com.
Aesthetic – Gabion

AESTHETIC The visual appearance or look of an object, view, etc.

AMENITIES Aesthetic characteristics or other features of land development that increase its desirability or its marketability. Amenities may include such things as a unified building design, recreational facilities, security systems, views, landscaping, attractive site design, adjacent open space or water bodies.

BALANCE Balance in design refers to the equilibrium or equality of visual attraction. Symmetrical balance is achieved when one side of the design is a mirror image of the other side. Asymmetrical balance uses different forms, colors and textures to obtain balance of visual attraction (Ingram, 2006).

BUFFER A strip of land, compatible land uses, fence, or a border of trees, etc., between one use and another that somewhat mitigates negative impacts between uses. An area which provides a degree of insulation from certain highway or transportation effects on adjacent private property or protected natural resources and vice-versa (AASHTO, 1991).

CARRYING CAPACITY The number of individuals in a population that the resources of a habitat can support (Carrying Capacity, 2006).

COMMUNITY IDENTITY Community identity can be broadly defined as a community of interest or an emotional attachment or sense of belonging to a geographic area. (Province of Nova Scotia, 2006).

COMMUNITY INTERFACE Community interface zones are characterized by lower travel speeds, frequent curb cuts, cross streets, traffic control devices, and increased pedestrian and other non-vehicular traffic. Adjacent land uses are typically commercial, but may include residential areas, schools, parks, and other civic uses.

COMMUNITY TRANSITION Community transition zones include stretches of highway between the center of a community and its undeveloped edges.

CONNECTIVITY In landscape ecology, the measure of the degree to which a matrix, a corridor, or a network is connected. The fewer the gaps or aberrations, the greater the connectivity.

CONTEXT SENSITIVE Consideration for how a proposed project will fit within its physical location and how it preserves the aesthetic, environment, and historic character of its surroundings.

CONSTRAINT A feature or condition of the built or natural environment that poses an obstacle to design, planning, or construction.

CONTOUR GRADING Transitioned and rounded grading. Moving the earth to form a shape or obtain a smoothness.

CORRIDOR A stretch of road or highway along with its associated facilities, adjacent land uses and visual character.

CORRIDOR PLAN A detailed specific plan that considers land use and transportation issues within a carefully organized, collaborative planning process between local governments, regional entities, and NDOT.

CULTURAL RESOURCES Cultural resources include buildings, landscapes, archeological sites, ethnographic resources, objects and documents, structures and districts. They provide information about people from the past and establish important connections to the present (NPS, 2006).

CARRYING CAPACITY The number of individuals in a population that the resources of a habitat can support (Carrying Capacity, 2006).

DESIGN OBJECTIVES Highway types are categorized according to the type of road, the speed and volume of travel, and the type of access. Design Objectives establish program elements and goals that should always be considered when addressing projects located along roads with similar characteristics.

DESIGN SPIRIT The intent or vision of the design. What the designer hopes to accomplish.

DESIGN THEME A unifying concept throughout the design. A design theme provides a sense of consistency and harmony because it is created by the repetition of forms and materials throughout the design (Booth, 1999).

DISTANCE ZONES Landscapes are subdivided into 3 distance zones based on relative visibility from travel routes or observation points. The 3 zones are: foreground, middle-ground, and background. The foreground zone includes areas where the viewer can perceive details of the landscape and typically extends up to a ¼ mile from the viewer. The middle-ground zone is located between ¼ mile and 3 miles from the viewer. The background is the area beyond the middle-ground extending to the horizon or limit of the area that is seen.

DROUGHT TOLERANCE A term often used to describe plants with low water requirements, the ability to withstand extended periods without water, or plants of a desert region.

EARTH FORM A raised and elongated area of earth intended to direct the flow of water, visually screen, redirect out-of-control vehicles, or reduce noise levels by shielding a receiver from the highway (AASHTO, 1991).

FOCAL POINT A noticeable area or spot of attention, activity, or attraction. It may be such a spot because many paths, views, rays, walks, etc. converge or it is of a different color, texture, height, width, brightness, etc.

GABION A wire basket usually filled with stone which is used for erosion control/slope protection (AASHTO, 1991).
GATEWAY  An entrance to a city, community, valley, or
other large-scale space.

GROUND TREATMENT  Treatment to disturbed ground
such as seeded revegetation, pavement, stone mulch, etc.

HARDSCAPE  The hard surface elements of a planned (de-
signed) landscape that give it definition and style, includ-
ing walks, driveways, walls, buildings, fences, and large
ornamental or sculptural pieces.

INVASIVE  A term used to describe plants that vigorously
spread, propagate, have rapid unchecked growth, or invade
a surrounding landscape area.

LANDMARK  A conspicuous object on land that identifies a
locality, or a designated preservation site, such as a build-
ing, monument, or landscape (AASHTO, 1991).

LANDSCAPE DESIGN SEGMENT  Areas of similar character in
which the same major design theme is applied.

LANDSCAPE TREATMENT TYPE  Is the combination of vary-
ing intensities of softscape, structures, and hardscape.

LIGHT POLLUTION  Light pollution is excess or obtrusive
light. It obscures the night sky, interferes with astronomi-
cal observatories, wastes energy and disrupts ecosystems.

MAINTENANCE COST  The cost of maintaining a landscape.
May be calculated annually or over the life of the project.

MANAGED LANDSCAPE CHARACTER  Highway zone that
comprises areas of current growth or planned growth at
community edges along interstates or elevated highways.
Can be adjacent to a variety of land uses varying from resi-
dential to industrial.

MANAGEMENT PLAN  A written report of what the man-
agement of a project or property hopes to accomplish and
how it intends to do so.

MASSING  The grouping of plant materials.

SHARED-USE TRAIL  A trail used by a combination of us-
ers, including pedestrians, roller bladers, horseback riders,
bicyclists, etc.

NATIVE PLANTS  An original species in a region, as distin-
guished from an invader, imported or cultured species

NATURAL DRAINAGE  The flow of water over undisturbed
existing surface topography.

NATURAL FEATURES  Conditions produced by nature such
as surface land forms, geology, slopes, vegetation, wa-
ter, drainage patterns, aquifers, recharge areas, climate,
microclimate, floodplains, aquatic life, wildlife, views, and
landscape ecological patterns of path, corridor, or matrix.

NATURAL SYSTEM  Natural systems are any type of system
found in nature that is not manmade. A key characteristic
of a natural system is that we expect its operating rules
(laws) to stay the same forever. Examples include ecosys-
tems, physical, or biological systems.

NONSTRUCTURAL DRAINAGE DESIGN  Drainage features
using organic form and natural materials such as earth and
rock vs. pipes and concrete.

NOXIOUS WEAED  Noxious weed means any species of plant
which is, or is likely to be, detrimental or destructive and
difficult to control or eradicate. (NRS 555.005)

OPPORTUNITIES  A feature or condition of the built or
natural environment that provides an opportunity to de-
sign, planning, or construction.

ORIENTATION  The direction a person, structure, or any
upright feature with a face is directed, or facing.

ORNAMENTAL SOFTSCAPE  Plantings used for decorative
qualities.

PEDESTRIAN CONNECTIONS  A public walkway not adjacent
to a street. It may connect between two public streets,
or between a public street and a public facility, such as a
school or park. The standard pedestrian connection in-
cludes a sidewalk and landscaped buffers on each side.

PERENNIAL  A plant that persists or resprouts year to year
for several or many years.

PLACE-BASED KNOWLEDGE  Local knowledge. Knowledge
gained from direct experience with a geographic location.

PLACE-MAKING  Design solutions that use elements unique
to the place or new elements to establish a specific style.

PLACE NAME SIGN  A sign program that will provide clear
and consistent direction from the corridors to scenic areas,
points-of-interest, historical sites, and local attractions.

PLAN VIEW  A drawing of an item, site, community, city,
etc. as viewed from above.

PLANT COMMUNITY  All of the plant species within a mi-
icroclimate, habitat, or environment.

PLANT DIVERSITY  The variety of plants found in a given
area.

PRESEVE LANDSCAPE CHARACTER  Highway zone that
consists of agricultural uses or low-density residential and
where the potential for significant future growth appears
to be low.

PROGRAM  A list or outline of the elements and require-
ments the design solution should incorporate (Booth,
1999).

PROPORTION  Ratio of one thing to another (Putnam,
1996).

NATURAL SYSTEM  Natural systems are any type of system
found in nature that is not manmade. A key characteristic
of a natural system is that we expect its operating rules
(laws) to stay the same forever. Examples include ecosys-
tems, physical, or biological systems.

NONSTRUCTURAL DRAINAGE DESIGN  Drainage features
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natural environment that provides an opportunity to de-
sign, planning, or construction.

ORIENTATION  The direction a person, structure, or any
upright feature with a face is directed, or facing.

ORNAMENTAL SOFTSCAPE  Plantings used for decorative
qualities.
PUMICE WICK  A natural way to harvest rainwater and control erosion. Pumice is extremely hygroscopic and absorbs several times its own weight in water. Trees and shrubs can be planted on either side of the wick. The roots take in water from the underground sponge and establish more quickly with much less supplemental water.

RECOVERY ZONE  A clear recovery area free of hazards along the edge of the traveled roadway.

REGIONALLY ADAPTED PLANT SPECIES  Species adapted to the soil conditions present on the site and in the region of the state where it will be grown.

REVEGETATION  The replacement of plant material on a land area.

RHYTHM  Rhythm is achieved when the elements of a design create a feeling of motion which leads the viewer’s eye through or even beyond the designed area. Tools like color schemes, line and form can be repeated to attain rhythm in landscape design. Rhythm reduces confusion in the design (Ingram, 2006).

RIGHT-OF-WAY  A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation or utility purposes (AASHTO, 1991).

RIPARIAN VEGETATION  Plant communities occurring in association with any spring, lake, river, stream, creek, wash, arroyo, or other water body having banks and a bed through which water flows at least occasionally.

RIPRAP  A layer of stones, broken concrete, or boulders placed on a slope to stabilize it against slope failure or erosion due to precipitation, natural drainage, waves, or wind.

ROAD SERVICES  Areas along the highway that provide travelers with designated spaces to rest, interpret history and geography, and discover information about nearby activities and communities.

SCALE  Spatial proportion. Scale refers to the size of an object or objects in relation to the surroundings. Size refers to definite measurements while scale describes the size relationship between adjacent objects (Ingram). Items at pedestrian scale may be much smaller than those at motor vehicle scale, where speeds are much faster.

SCENIC BYWAY  Roads that are outstanding examples of scenic, historic, recreational, cultural, archeological and/or natural qualities.

SCENIC DESIGNATION  Highway zone that includes existing and proposed scenic byways where scenic, cultural, historic, recreational, and/or natural qualities dominate the highway landscape.

SCENIC EASEMENTS  The right for a public agency or other group to use an owner’s land for scenic enhancement, such as roadside landscaping or vista preservation, by restrictions on the area of the easement.

SCORING PATTERN  A pattern cut or scratched into a surface.

SECTION DIAGRAM  A drawing of a structure, landform, object, etc. as if it would appear if cut by an imaginary plane, showing any internal portions and outer edges along the intersection.

SENSE OF ENTRY  An introduction to a site or place. The impression of having arrived at a site or community.

SENSE OF PLACE  The unique impressions, perceptions and memories along with physical representations of a site.

SENSE OF SCALE  The feeling created or perceived when one is placed next to a very large object (such as a 50-story building 500 feet wide) or a small object (a toolshed 6 ft. tall and 8 ft. wide).

SEQUENCE OF ARRIVAL  Transition between spaces as a destination is approached.

SHADOW PATTERNS  Shadow patterns in structures occur due to relief of planes and specific shadow lines and may be part of the ornament of the structure.

SHRUB  A plant with many stems or much branching near the ground. It is woody and forms new wood from old wood each year.

SIGNAGE SYSTEM  A coordinated system of visual communications in symbols, pictures, letters, drawing, photographs, or words whose function is to communicate directions, identifications, warnings, advertisements, etc. to passersby.

SITE ANALYSIS  Observing, considering and evaluating the physical and man-made elements including the environmental, climatic, visual, cultural, historical and other factors relating to a particular location, corridor or region (AASHTO, 1991).

SITE CONTEXT  Where the site in question is located in relation to the greater landscape. The surrounding area, whether city, town, wilderness, etc.

SITE PLAN  A plan of a site showing the positions, size, and types of elements such as roads, drives, parking lots, play areas, land uses, or structures existing or proposed for a site. It may or may not show dimensions, contours, or have a legend.

SITE RISK ASSESSMENT  The process of evaluating the adverse effects caused by a substance, activity, lifestyle, or natural phenomenon.

SITE SPECIFIC  Peculiar to only one particular location (AASHTO, 1991).

SITE-SENSITIVE MATERIALS  Materials with qualities that blend with the surroundings.

SOFTSCAPE  The plantings used in a landscape.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Softscape Treatment Type</strong></td>
<td>Softscape treatments are compositions of plant materials including trees, shrubs, perennials, grasses, and ground treatments.</td>
</tr>
<tr>
<td><strong>Spirit of Place</strong></td>
<td>The unique, distinctive and cherished aspects of a place; as much in the invisible weave of culture (stories, art, memories, beliefs, histories, etc) as it is the tangible physical aspects of a place (monuments, boundaries, rivers, woods, architectural style, rural crafts styles, pathways, views, etc) or its interpersonal aspects (the presence of relatives, friends and kindred spirits, etc) (Spirit of Place, 2006).</td>
</tr>
<tr>
<td><strong>Street Tree</strong></td>
<td>Trees that are tolerant of city conditions, including pollution, poor soils, low soil moisture, strong winds and soil compaction. Many communities have a list of accepted trees for their area.</td>
</tr>
<tr>
<td><strong>Structures and Hardscape Treatment Type</strong></td>
<td>Varying levels of treatment for bridges, retaining walls, acoustic walls, pedestrian crossings, railings, barrier railings, lighting, and transportation art.</td>
</tr>
<tr>
<td><strong>Sub-Segment</strong></td>
<td>A portion of a Landscape Design Segment where unique historic, cultural or environmental features may result in a slightly different interpretation of the overall design theme.</td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td>The ability to sustain ecological integrity, including human needs throughout generations. The ability to maintain with little deviation, with little waste, with renewable energy, etc.</td>
</tr>
<tr>
<td><strong>Sustainable Design</strong></td>
<td>Landscape designs that work with nature rather than against it (Booth, 1999).</td>
</tr>
<tr>
<td><strong>Track Walking</strong></td>
<td>A method of erosion and sediment control. Track walking with machinery up and down a slope provides grooves that will catch seed, fertilizer, mulch, and rainfall, and reduce runoff.</td>
</tr>
<tr>
<td><strong>Transition</strong></td>
<td>A gradual change. Transition can be obtained by the arrangement of objects with varying textures, forms, or sizes in a logical sequential order (Ingram, 2006).</td>
</tr>
<tr>
<td><strong>Transportation Art</strong></td>
<td>Artwork along a transportation route that enhances the travel experience and relates to the surrounding place, the unique culture and environment of the area. Artwork should be of a scale appropriate to highway travel speed.</td>
</tr>
<tr>
<td><strong>Transportation Corridor</strong></td>
<td>A strip of land between two termini within which traffic, topography, environment and other characteristics are evaluated for transportation purposes; also a strip of land for transmission of a utility (AASHTO, 1991).</td>
</tr>
<tr>
<td><strong>Understory Shrubs</strong></td>
<td>The lower canopy in a layered planting.</td>
</tr>
<tr>
<td><strong>Unity</strong></td>
<td>The state when independent elements contribute harmoniously to the whole. (Williams, 1990).</td>
</tr>
<tr>
<td><strong>Urban Background</strong></td>
<td>Highway zone within urban regions that comprise areas dominated by commercial and residential development.</td>
</tr>
<tr>
<td><strong>Urban Confluence</strong></td>
<td>Highway zone within urban regions that serves as an important connector for people and commerce.</td>
</tr>
<tr>
<td><strong>Vernacular Forms</strong></td>
<td>Forms in indigenous styles constructed from locally available materials following traditional building practice and patterns not architect-designed.</td>
</tr>
<tr>
<td><strong>Vertical Design Element</strong></td>
<td>Site elements such as the facades of buildings, walls, fences, trees and tall shrubs, or steeply sloped ground. Vertical elements may be used as enclosures or for visual interest (Booth, 1999).</td>
</tr>
<tr>
<td><strong>Vertical Diversity</strong></td>
<td>Vertical elements that vary in texture, color, transparency, etc. in order to add visual interest to a site (Booth, 1999).</td>
</tr>
<tr>
<td><strong>Viewpoint</strong></td>
<td>A “pulloff” area on a highway where travelers can enjoy a view.</td>
</tr>
<tr>
<td><strong>Viewshed</strong></td>
<td>The total area visible from a point or series of points along a linear transportation facility and conversely the area which views upon the facility (AASHTO, 1991).</td>
</tr>
<tr>
<td><strong>Viewshed Analysis</strong></td>
<td>Scrutinizing a viewshed to determine the positive and negative aspects.</td>
</tr>
<tr>
<td><strong>Visual Relief</strong></td>
<td>A unique feature in an otherwise monotonous landscape or structure.</td>
</tr>
<tr>
<td><strong>Water Harvesting</strong></td>
<td>Catching and holding rain where it falls for future use. It may be stored in tanks or used to recharge groundwater.</td>
</tr>
<tr>
<td><strong>Wattles</strong></td>
<td>Poles intertwined with reeds or plants (willows, etc.) to create a fence, barricade, etc.</td>
</tr>
<tr>
<td><strong>Wetland</strong></td>
<td>An area that is inundated or saturated by surface or groundwater at a frequency, duration, and depth sufficient to support a predominance of emergent plant species (cattails, etc.) adapted to growth in saturated soil conditions.</td>
</tr>
<tr>
<td><strong>Wildlife Crossing</strong></td>
<td>Structures built to facilitate wildlife crossing highways and minimize wildlife-related automobile accidents.</td>
</tr>
<tr>
<td><strong>Wildlife Habitat Corridors</strong></td>
<td>Corridors that connect patches of wildlife habitat. These corridors allow wildlife to move between habitats and allow individual animals to move between groups, helping to restore or maintain genetic diversity that is essential both to the long-term viability of populations and to the restoration of functional ecosystems.</td>
</tr>
</tbody>
</table>
DOCUMENT REFERENCES


www.mainstreets.org
GLOSSARY REFERENCES

Unless otherwise noted, definitions were taken from the following book:

ADDITIONAL SOURCES


