



LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL PHASE II

MASTER PLAN
JUNE 1, 2009

CITY OF HENDERSON



DESIGNWORKSHOP
Locsha Engineering

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EXECUTIVE SUMMARY

In an ongoing effort to establish a fully connected trail system, the City of Henderson has undertaken the development of the Lake Mead Parkway and Wetlands Trail Phase II Master Plan. The Lake Mead Parkway Trail is a shared-use trail that runs the length of Lake Mead Parkway from Boulder Highway on the west to the City's incorporated boundary at Lake Mead National Recreation Area to the east.

Per the City's Open Space and Trails Plan, the Lake Mead Parkway trail consists of a 55-foot wide trail corridor. The corridor width includes a 25-foot wide landscape buffer from the roadway where feasible and a 30-foot wide shared-use trail zone. The 30-foot wide shared-use trail zone is located within the Nevada Department of Transportation (NDOT) right-of-way, and includes a 12-foot wide paved trail, amenities and landscape improvements. The trail corridor is located along both the north and south sides of the Lake Mead Parkway.

The Wetlands Trail - Phase II will link the existing Phase I trail to the trailhead at Clark County Wetlands Park. This shared-use path and equestrian corridor provides access to existing trails in the Wetlands Park. Two trailheads are planned. One on the north side of Lake Mead Parkway near Golda Way, and one just east of the Wetlands Park, between the Wetlands Park and Lake Las Vegas. A non-paved pedestrian access path is planned from the Wetlands Trailhead north along a maintenance access road to Rainbow Gardens.

The project will link existing and proposed commercial and residential areas, transit stops, schools, parks, recreation facilities and trailheads. The trail design will be unified through landscape, monumentation, public art and built structures.

Utilities and other infrastructure are and will be installed under the trail section. Utility access, such as manholes, will be incorporated into the trail at regular intervals if needed. The trail alignment will also provide access for repair and maintenance vehicles. Key elements include the following:

- Wayside architectural and public art components
- Trail signage
- Trail user amenities
- Trail lighting and other safety enhancements
- Drought tolerant landscaping and the use of structures for shade
- Use of landform to define the trail experience

This document, provides recommendations for trail alignments, conceptual plans for trailheads, trail user amenities, and an overall visual design vocabulary and guidelines along Lake Mead Parkway.



INTRODUCTION

Project Overview

The Lake Mead Parkway Trail and Wetlands Trail – Phase II project consists of three separate but connected trail segments: the Lake Mead Parkway Trail the Wetlands Trail – Phase II and the Rainbow Gardens Pedestrian Trail. The trail systems tie into the River Mountains Loop Trail, Burkholder Trail, existing bike lanes, Wetlands Park, Lake Las Vegas Resort, Rainbow Gardens, and the Lake Mead National Recreation Area (LMNRA).

Lake Mead Parkway Trail

The Lake Mead Parkway Trail will include a 12' wide shared use path along the north and south side of the Parkway from the Boulder Highway intersection east to LMNRA. East of the Golda Way intersection, the trail connects to the existing River Mountains Loop Trail to the south and the Wetlands Trail – Phase I to the north.

The Lake Mead Parkway Trail will then utilize the planned sections of the River Mountains Loop Trail until it reaches the Lake Mead National Recreation Area where the trail connects to another existing portion of the River Mountains Loop Trail. A 4' wide equestrian path is included in this portion of the trail corridor. The equestrian path is separated from the shared-use path by a minimum of 5'. Thereby the Lake Mead Parkway Trail not only serves to link the more urban areas of Henderson to commercial, residential, and recreation destinations, but it also completes the loop of the River Mountains Loop Trail along Lake Mead Parkway.

Wetlands Trail - Phase II

The Wetlands Trail - Phase II portion of the project includes a trailhead located along Lake Mead Parkway, a trailhead located adjacent the Wetlands Park, and a 12' wide shared-use path with separated equestrian path connecting the existing Wetlands Trail - Phase I to the planned trailhead at the Wetlands Park. Additionally a 4' wide non-paved hiking/pedestrian connection is planned to Rainbow Gardens and its existing trails.

Trailhead facilities include vehicular and equestrian parking, walking paths, restroom and water facilities, trail map kiosks, and equestrian facilities. Additionally, the Wetlands Trailhead provides neighborhood park facilities. Coordination with Clark County's design of the Magic Way trailhead is important as their planned facilities are sited directly to the west of the City's facilities. Duplication of amenities should be minimized.

Coordination with City Landscape Standards

Lake Mead Parkway Trail design elements will include landscaping, lighting, signage, pedestrian amenities and bicycle facilities. Commercial access drives and connecting roadways periodically cross the trail to provide access to the commercial, public and private parcels along Lake Mead Parkway. All landscape development occurring along the Parkway will be performed by each individual parcel owner in partnership with the City of Henderson in accordance with these landscape guidelines.

Design considerations should be coordinated with the City of Henderson's Landscape Design Standards. Selection of both materials and plant palettes will utilize the recommendations of this document as it is coordinated with the City standards. Refer to the City's Landscape Design Standards for installation details.

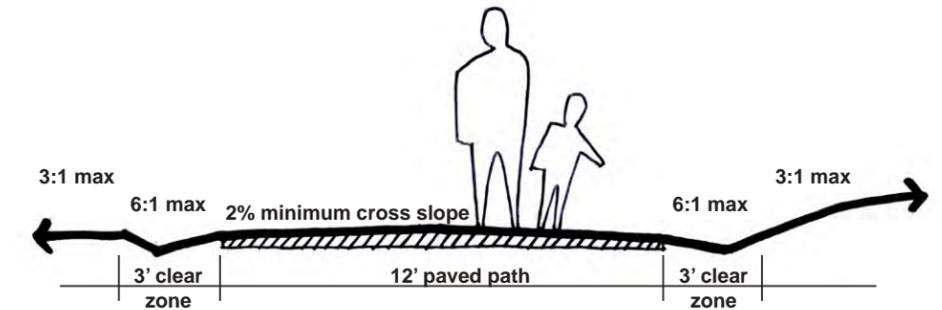
Coordination with NDOT Lake Mead Parkway Widening Project

The Nevada Department of Transportation (NDOT) is undergoing the design and environmental documentation of the Lake Mead Parkway widening project. Proposed, phased improvements include widening the roadway from Boulder Highway to Lake Las Vegas and associated hydraulic and landscape and aesthetic design enhancements. The environmental documentation for the Lake Mead Parkway Trail will be included within the environmental documentation being completed for the widening project. This environmental work is underway for the right-of-way corridor from Boulder Highway east to the Lake Mead National Recreation Area boundary. Therefore, trail improvements should be within the right-of-way. Aesthetic improvements are coordinated with the NDOT landscape division of road design and reflect the recommendations of the I-15 Landscape and Aesthetics Corridor Plan.

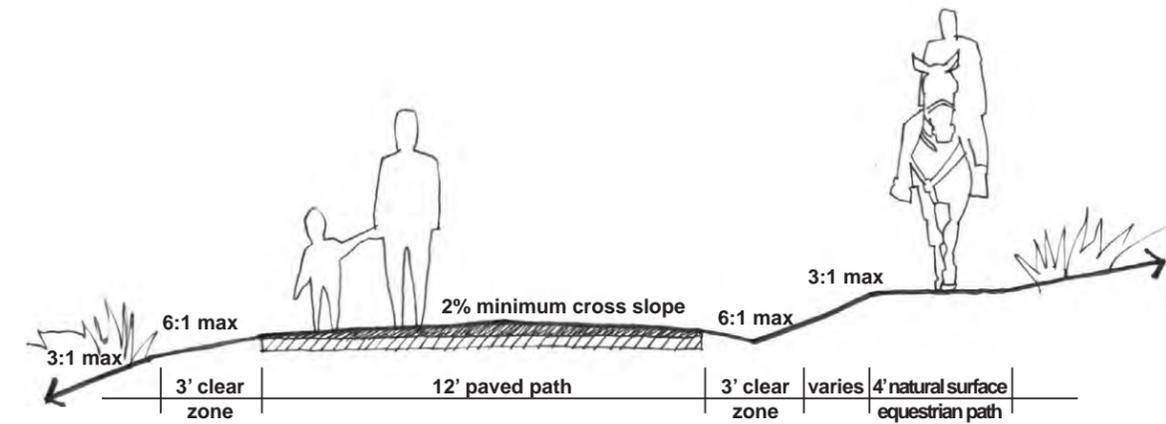
Trail Width and Clearance

The minimum paved width for the trail shall be 12 feet, plus a 3-foot clear zone along either side of the trail. In extenuating circumstances, due to current infrastructure development, topographic and/or other constraints, the City of Henderson Parks and Recreation Director may consider paths down to 8 feet wide for short distances. Lateral obstructions such as boulders, fences, signage, light poles, mailboxes, trees, utility poles, walls and guardrails etc. may not be placed within the 3-foot clear zone. The 3-foot wide clear zone shall slope away from the trail at a maximum 6:1 slope, with a maximum of 3:1 slope beyond the clear zone. The vertical clearance to overhangs and obstructions shall be a minimum of 12 feet above.

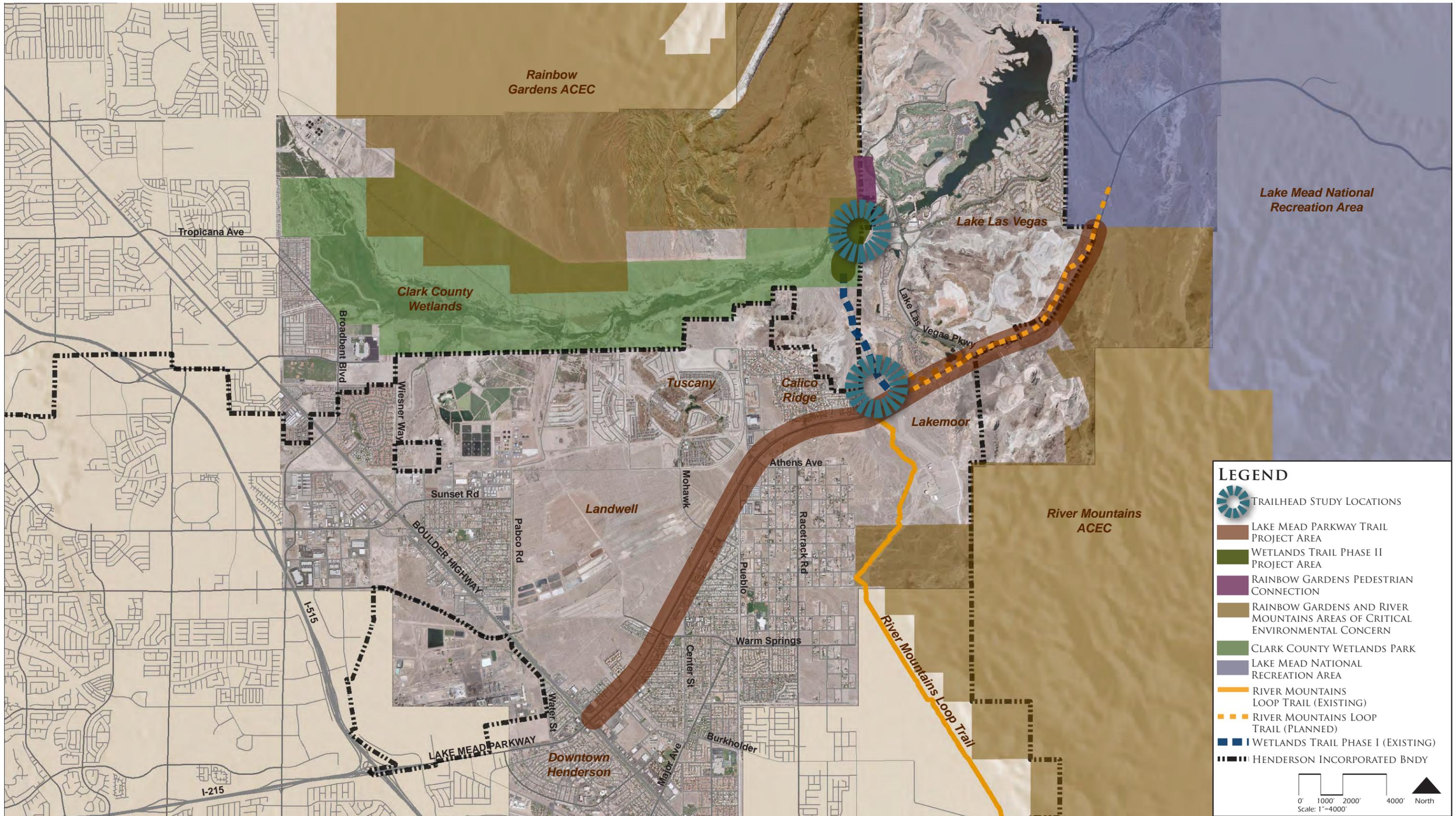
Equestrian paths are 4' wide and utilize a stabilized natural earth material in lieu of paving. Equestrian uses should be separated from the shared-use paths to the greatest extent possible. In narrow trail corridors, a 5' wide separation may be provided so long as it includes other appropriate physical barriers such as plant material or fencing. Refer to the illustrations on this page for a typical trail section.



Typical Trail Cross Section



Typical Trail Cross Section and Equestrian Path



LEGEND

- TRAILHEAD STUDY LOCATIONS
- LAKE MEAD PARKWAY TRAIL PROJECT AREA
- WETLANDS TRAIL PHASE II PROJECT AREA
- RAINBOW GARDENS PEDESTRIAN CONNECTION
- RAINBOW GARDENS AND RIVER MOUNTAINS AREAS OF CRITICAL ENVIRONMENTAL CONCERN
- CLARK COUNTY WETLANDS PARK
- LAKE MEAD NATIONAL RECREATION AREA
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- WETLANDS TRAIL PHASE I (EXISTING)
- HENDERSON INCORPORATED BNDY

0' 1000' 2000' 4000' North
Scale: 1"=4000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

STUDY AREAS

DESIGN FOUNDATION

LEGACY GOALS

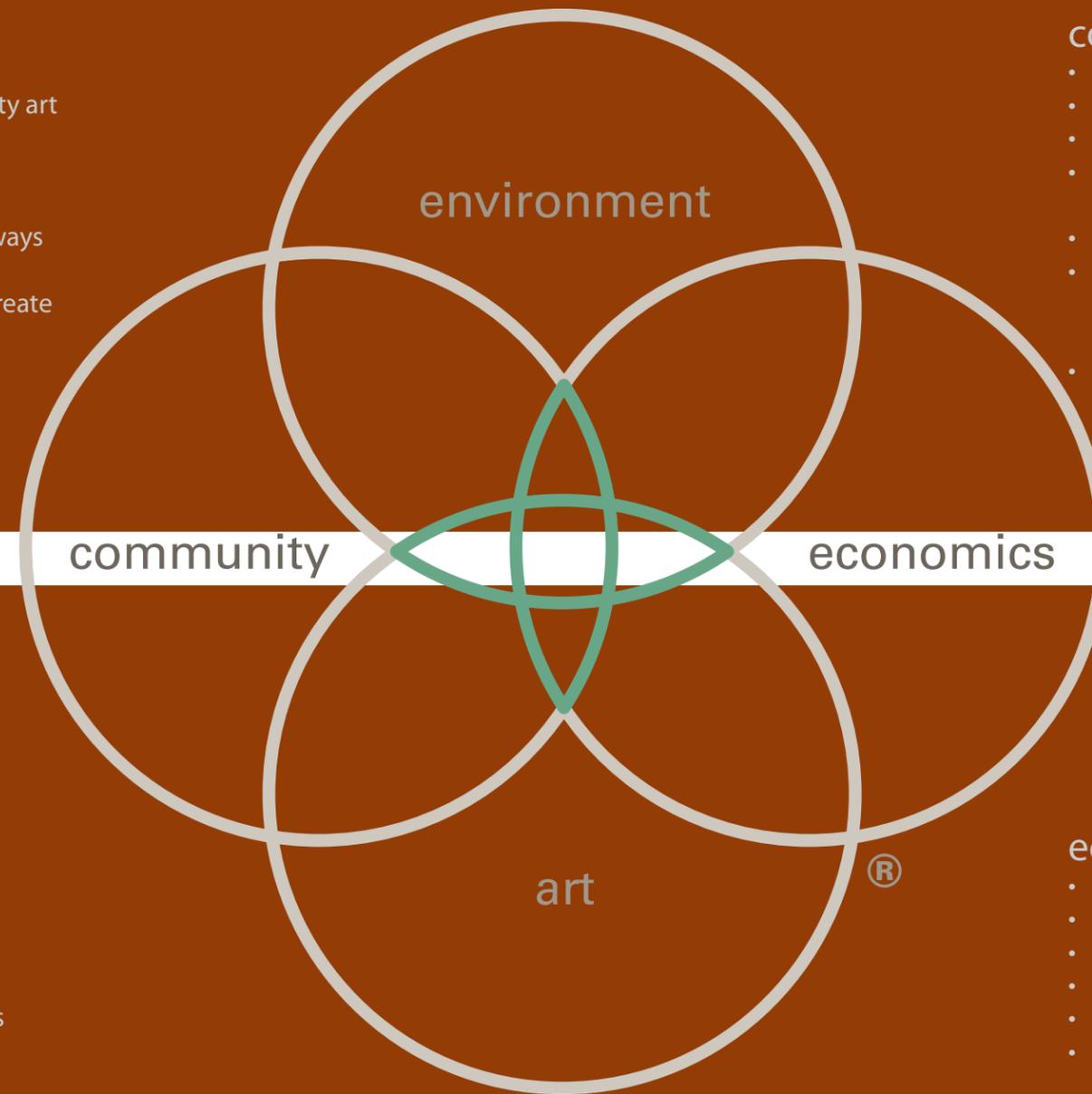
DW Legacy Design

aesthetic goals

- embrace the desert
- provide opportunities for public art and community art participation
- create artistic methods to incorporate alternative energy sources
- use common materials in new and extraordinary ways
- beautify Lake Mead Parkway
- engage trail users with the landscape context to create an enjoyable experience and promote use
- utilize wayfinding to enhance placemaking

community goals

- provide clear connections to transit
- create connections to commercial areas
- promote trail stewardship
- provide opportunities for public art and community art participation
- minimize user conflicts
- link existing and planned trails, parks, schools, and neighborhoods to create coordinated greenway/park system with destination points
- provide user comfort to promote use and community gathering opportunities

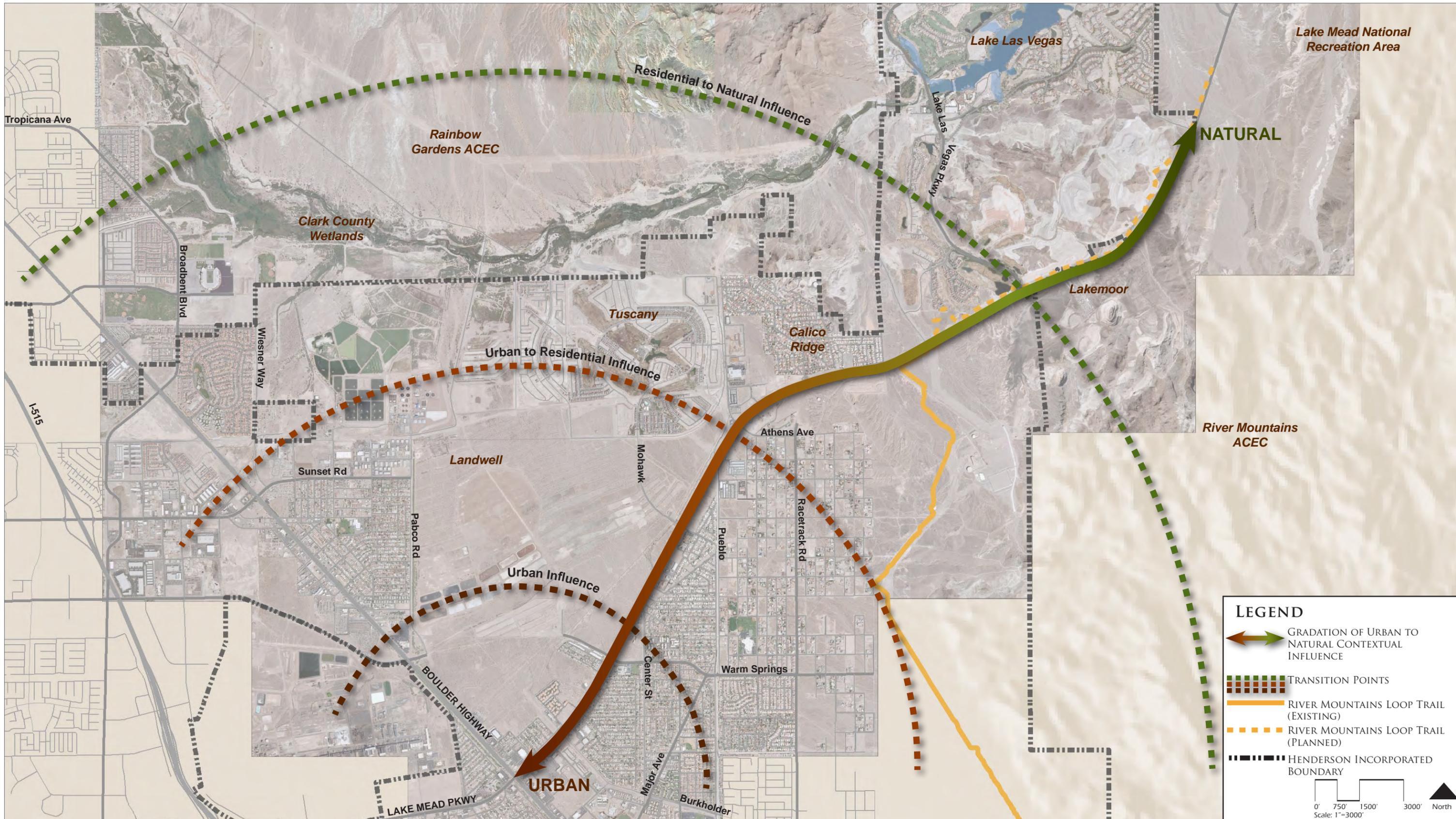


environmental goals

- embrace the desert
- promote energy and water conservation
- use alternative energy sources
- minimize wayside trail disturbance
- use native or low-water use, desert-adapted plants

economic goals

- provide long-lasting facilities
- create connections to commercial areas
- promote trail stewardship
- use alternative energy sources where feasible
- promote working relationships with stakeholders
- coordinate facilities to allow for "event" hosting



LEGEND

- GRADATION OF URBAN TO NATURAL CONTEXTUAL INFLUENCE
- TRANSITION POINTS
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- HENDERSON INCORPORATED BOUNDARY

0' 750' 1500' 3000' North
Scale: 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

ZONES OF INFLUENCE

THE EXPERIENCE

Embrace the Desert

The desert has a simple beauty and elegance offering a palette that subtly influences the trail design. As users move from the urbanized center of Henderson into the natural recreation zones of Lake Mead National Recreation Area, Clark County Wetlands, and Rainbow Gardens the expression of forms and landscape move from rugged and rough to those that blend more with the natural surroundings. This shift reflects the cultural influences within the urban areas and their use of minerals and extractions versus naturalized zones gracious acceptance of the pure state of the landscape and its resources.

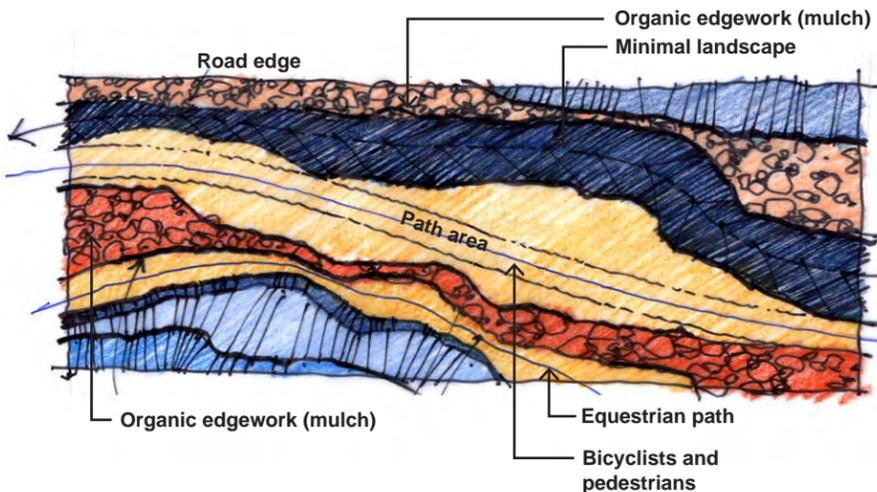
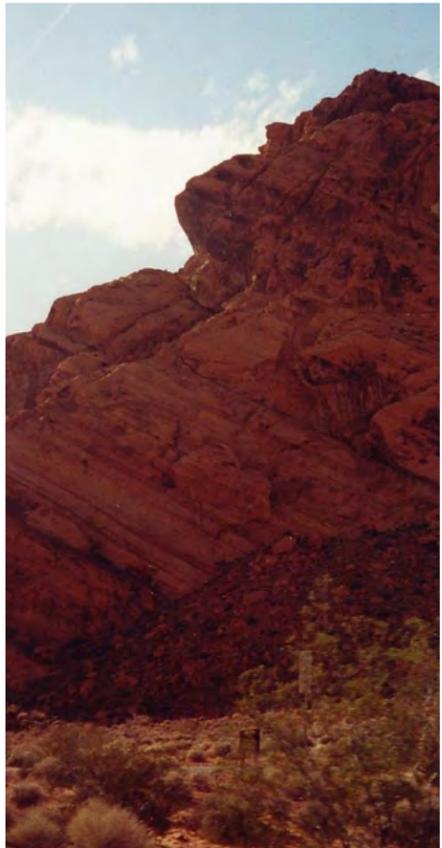
Derision

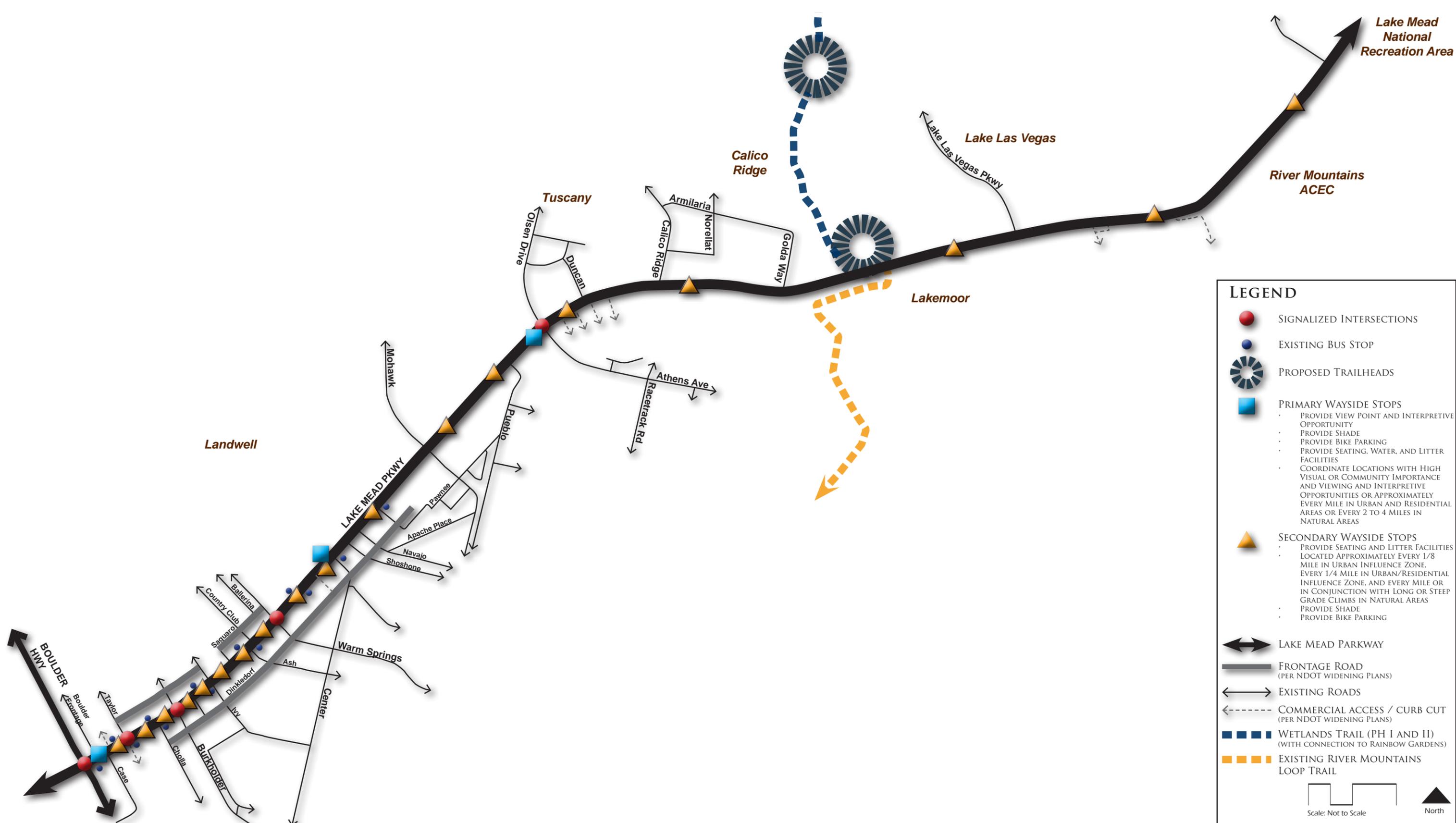
Forms and amenities derive their meaning from the site's geologic forces and resources. These include elements which:

- shaped the site,
- bound the site with expressive ranges and rock sculptures, and
- provided a means and resource for settlement of Henderson.

Articulation and Form

- Common materials are used in a beautiful, artistic way.
- Views are focused and directed. Shelter and shade is provided to promote user comfort and trail use.
- Flexibility allows for neighboring developments to influence and add a richer meaning to the overall experience.
- Landscape and cultural context drive the design and meaning.





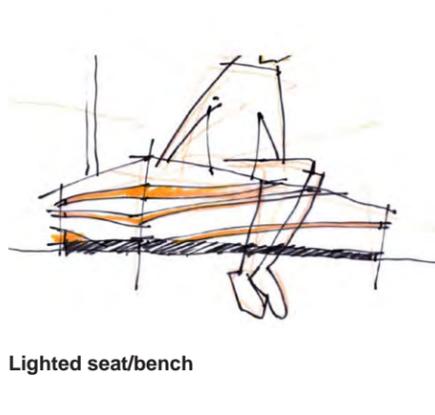
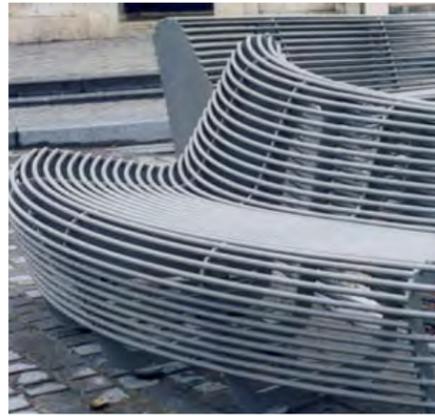
LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
 HENDERSON, NEVADA

WAYSIDES AND ART OPPORTUNITIES

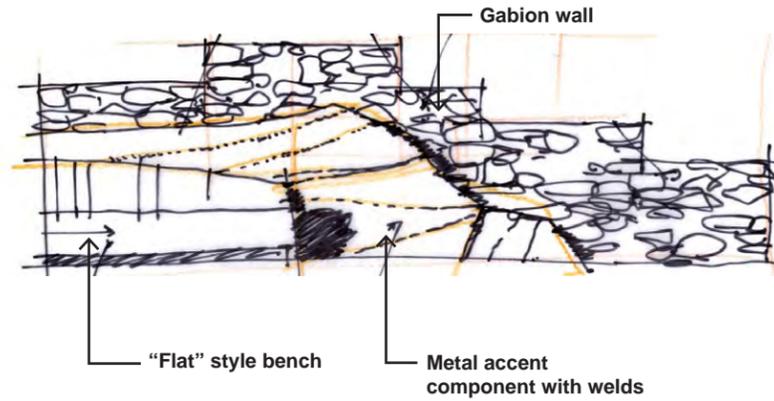


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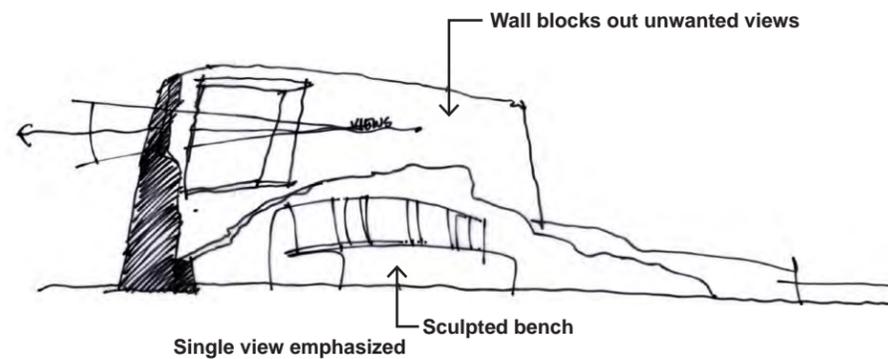


Lighted seat/bench



"Flat" style bench

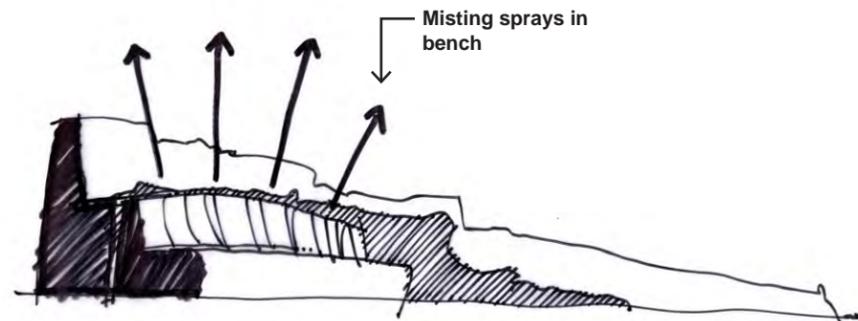
Metal accent component with welds



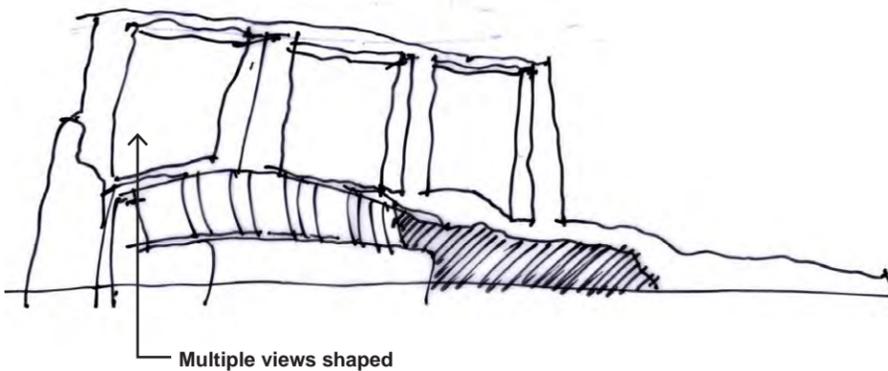
Wall blocks out unwanted views

Sculpted bench

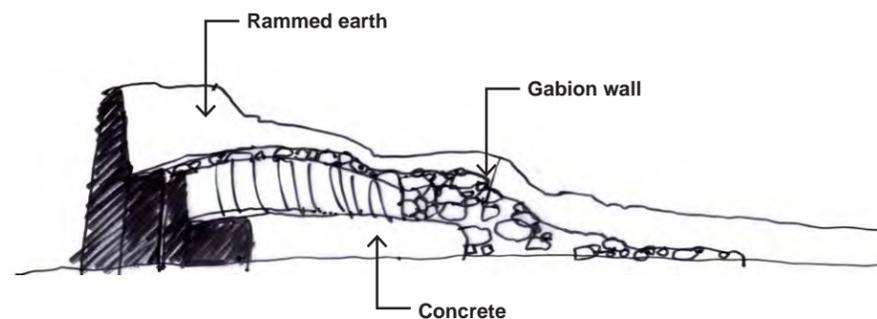
Single view emphasized



Misting sprays in bench



Multiple views shaped



Rammed earth

Gabion wall

Concrete

ART

Principles:

A rich trail experience that uses artistic expression of the landscape context in its design and implementation not only provides a beautiful place to be but also adds depth and interest to the trail system and promotes community ownership.

Goals:

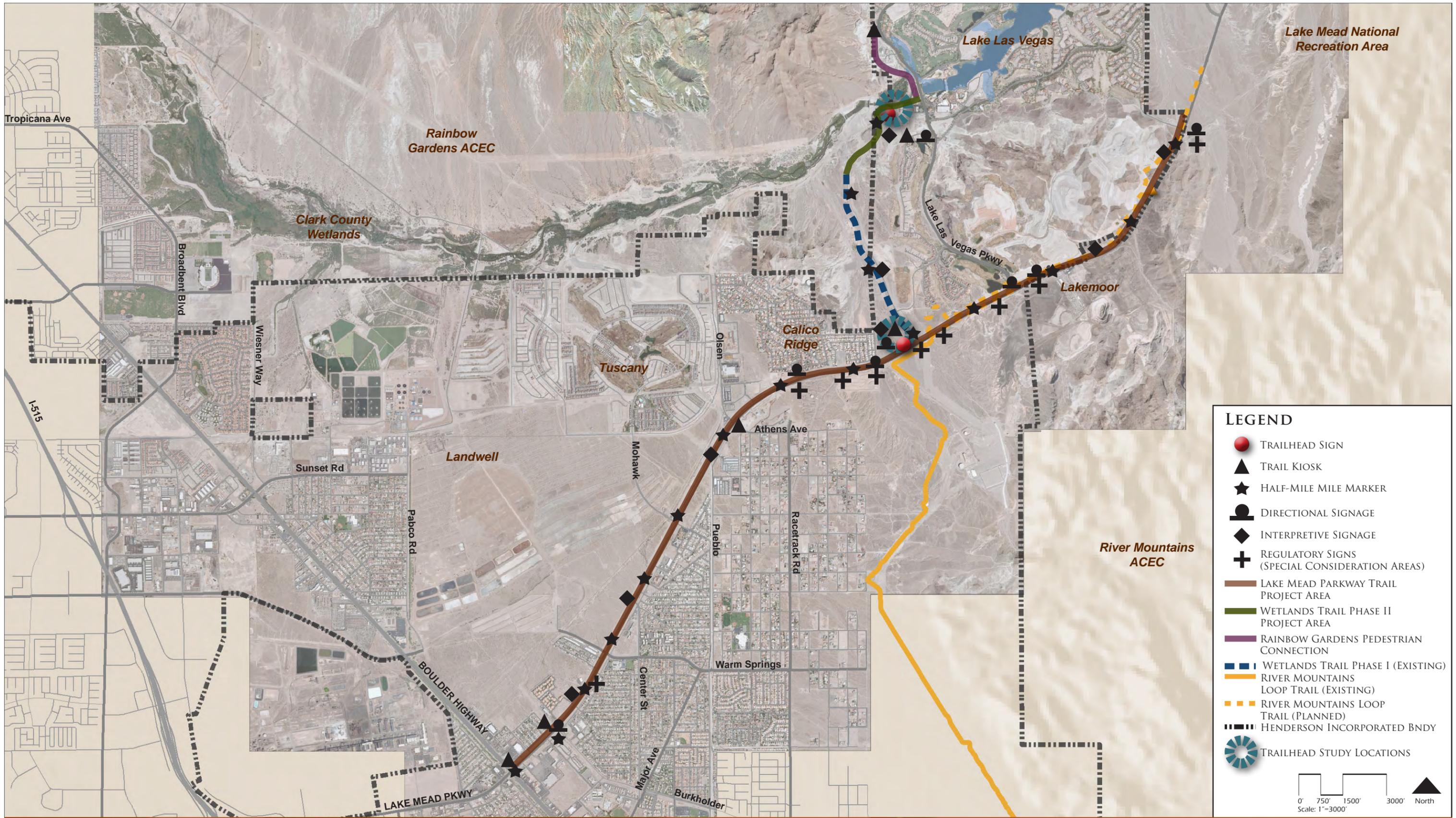
- Embrace the desert.
- Create a sequence of events to keep people engaged with the landscape context and trail experience.
- Derive expressions of texture and sensory immersion from the landscape.
- Beautify Lake Mead Parkway to enhance its recognition as a scenic byway.
- Provide a range of experiences that relate to both the immediate surroundings and the larger context.

Strategy:

- Use the materials palette and design guidelines to incorporate public art in trail design elements such as seating, wayfinding, and shade structures as well as to provide opportunities for display of public art pieces or installation pieces that promote community interest.

Metric:

- Fulfillment of scenic byway management plan requirements and scenic management of Lake Mead Parkway.
- Clear expression of meaning while preserving flexibility to adapt to surrounding developments and landscape context.



LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II

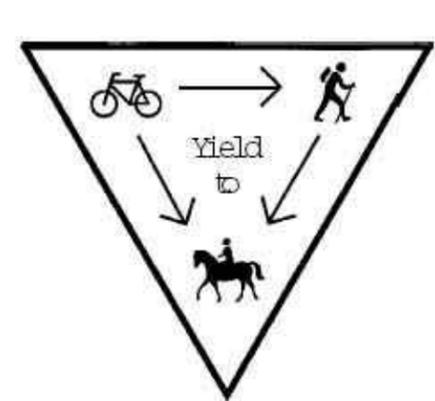
SIGN LOCATION PLAN

HENDERSON, NEVADA



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1 June 2009



TRAIL SIGNAGE

Maps and Wayfinding Signs Include:

- ▲ • Kiosk with trail system map
- Local points of interest and trail facilities
- ★ • Mile markers
- 🗺️ • Directional
- Trail logo to create trail recognition and identity

◆ Interpretive Signs Include:

- Interpretive panels
- Interpretive signs

✚ Regulatory and Trail Accessibility Signs Include:

- Stop
- Yield
- Speed Limit
- Exclusion: describing types of uses permitted on trail and other locations available for prohibited uses, parking prohibitions
- Yield to different user groups- trail etiquette & trail rules
- Trail accessibility ratings: including trail grade, cross slope, trail width, and length
- Trailhead signage: trail name, grade profiles, surface information, obstacles, etc.
- Trail intersection & roadway signage: summary of trailhead information
- Trail profile graphic to visually convey grade changes and trail difficulty
- Hazardous trail conditions identification
- Upcoming traffic-control devices
- Grade changes
- Changes in surface condition

MAPS AND WAYFINDING

▲ Primary Trail Kiosk:

The trail kiosk is a multi-function three-sided freestanding sign. It provides both shelter and specific trail information. The trail kiosk is placed at primary waysides or other specific areas or trail connections.

Content Guideline:

- Trail map: Illustrates trail system, connections, features and other regional specific information.
- Trail rules (do's and don'ts) with regulatory narrative and symbols.
- Trail interpretive elements with narrative and photos.
- Trail watch and web information.

Note: The City of Henderson is responsible for creating and providing electronic interpretive artwork.

Trail Kiosk Manufacturer:

Sea Reach, Ltd.

Susan Jurasz

PO Box 112

Rose Lodge, OR 97372

503-843-2005

Fax 541 994 6393

Typical Trail Signage

The typical trail marker is a multi-purpose sign consolidating as much information in one sign to reduce sign clutter. It identifies the trail (with the trail logo), informs the type of trail (through symbols), and can have half-mile marker information and regulatory and directional information such as trail connections.

Installation & Placement of Trail Signs

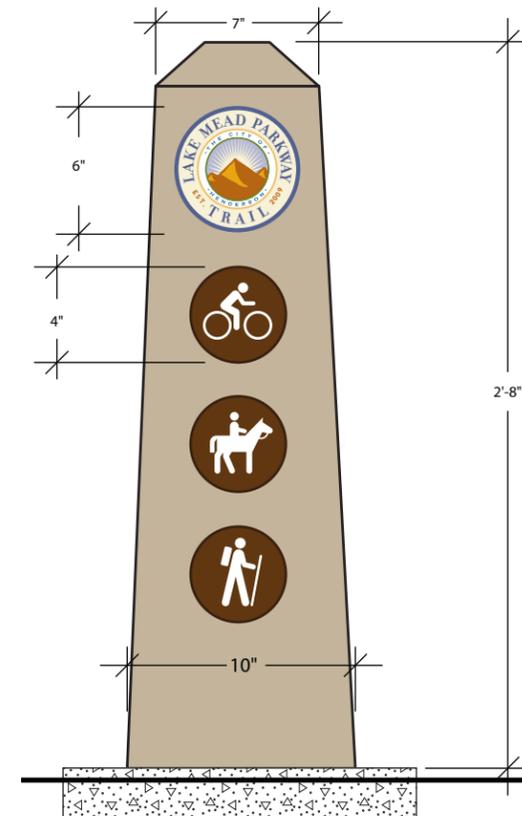
Trail signs are generally mounted on trail marker monuments specially designed for the trail. Where needed, signs may also be incorporated into existing or planned trail structures, according to the City's approved signing program.

The trail marker monuments are constructed of reinforced precast concrete and have an overall height of 32 inches, not including the footing. The monuments are 10 inch square at the base, tapering to 7 inch square at the top. The castings shall have various sizes and quantities of surface "niches" to facilitate the mounting of the aluminum directional signs and trail logo. The monuments shall have integral color added during production using inorganic pigments which are alkaline resistant and have a graffiti-resistant surface sealer. The poured in place concrete footing will have a diameter large enough to prevent tipping over and minimize its theft.

Trail logo signs are to be used to identify the trail, to guide users along the trail, and to direct users from connecting trails. The signs will generally be located along the trail every half mile and at primary trail junctions, trailheads and other major access points consistent with local agency policies. In addition to the trail logo, arrows and directional signs may be used, where needed. Each will measure approximately 3" in diameter. Arrows are generally used at trail junctions. Directional signs are used in conjunction with logo signage to direct trail users to and from connector trails.



Examples of a Trail Kiosk at the River Mountains Loop Trail. Henderson, Nevada



Elevation: Typical Trail Sign in Natural Areas Such as Along the River Mountains Loop Trail
Scale: 6"=1'-0"

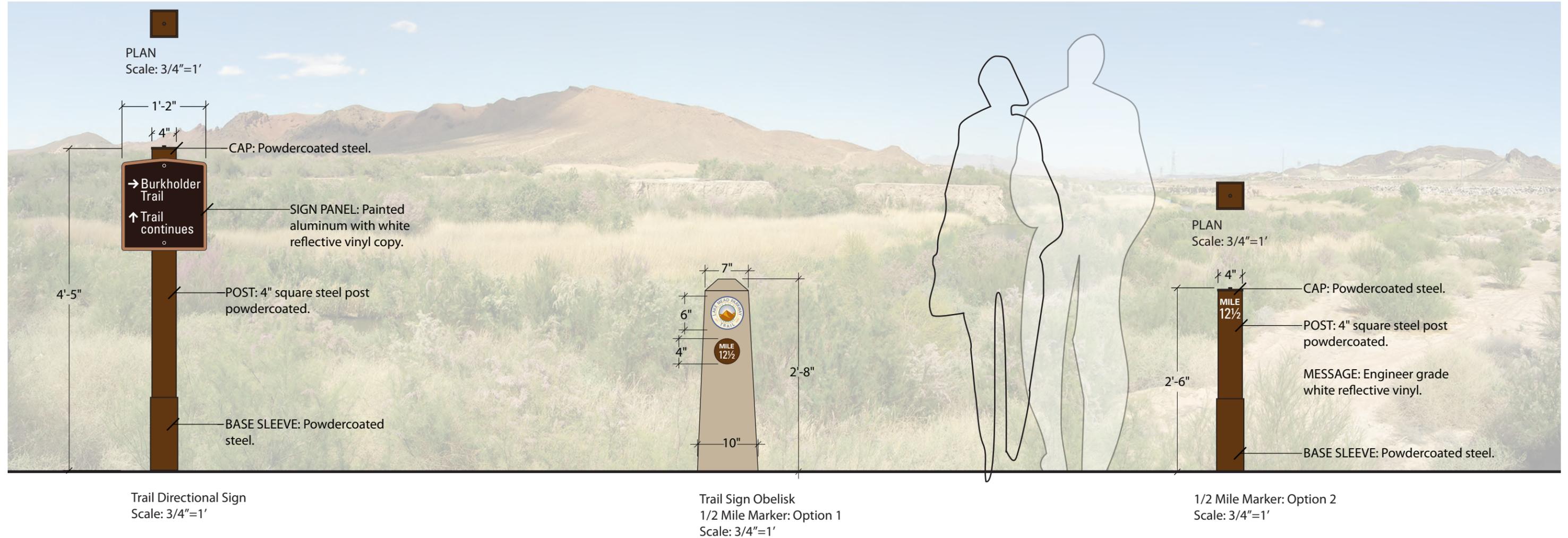
MAPS AND WAYFINDING

Trail Directional

The trail directional sign guides trail users to connecting trails and indicates where the trail continues.

Mile Marker

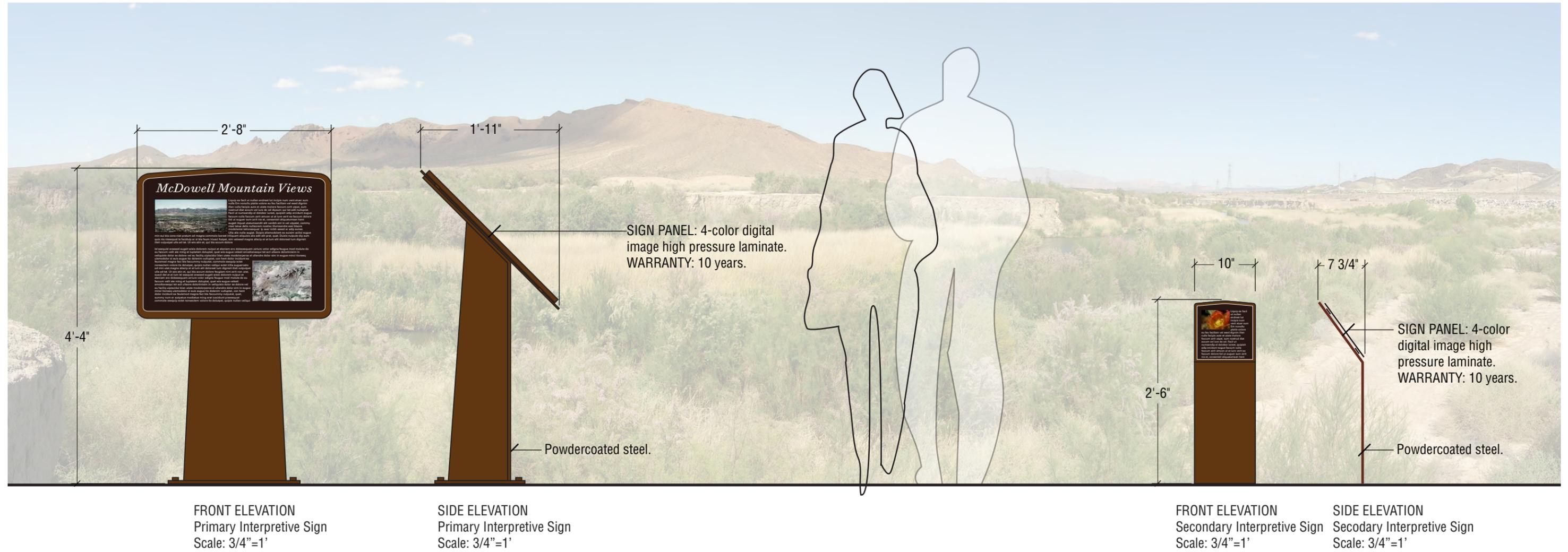
The mile marker sign identifies 1/2 mile distance increments along the trail. In rural areas and where the trail corresponds with the River Mountains Loop Trail, an obelisk mile marker style is used. In urban areas, pole signage may be more appropriate.



INTERPRETIVE SIGNS

◆ Interpretive Features:

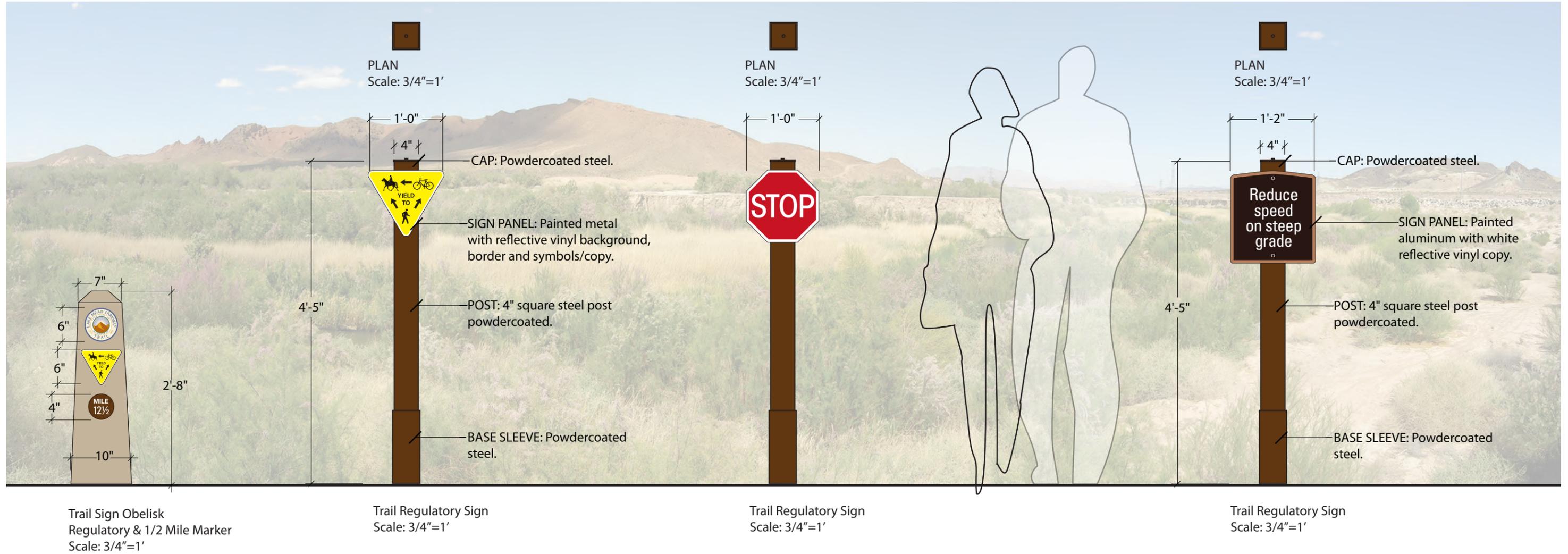
Interpretive features are written narratives illustrating local history, regional highlights (geology, flora, fauna, etc.) and points of interest. The feature can be a free-standing sign, part of seating, or plaques inset in paving, etc.



REGULATORY AND TRAIL ACCESSIBILITY SIGNS

✦ Regulatory (Caution, Yield, Allowed Uses):

The caution sign can warn trail users of changes in grade and to slow down for safety.



REGULATORY SIGNS

The Manual on Uniform Traffic Control Devices (MUTCD) provides a basis for regulatory/traffic control sign types such as stop signs, bike parking, bike routes, and bike lanes. Signage should be installed in accordance with the MUTCD. All signs shall be silk screened or graffiti proof, with class 6 reflectivity. Signs shall be placed along the trail, outside of the 3-foot clear zone, as required for pedestrian and bicyclist safety and information. At the onset of a trail segment it may become necessary to mount signs back to back in order to alert both motorist and trail users of conditions.

In order to minimize conflict between users of the shared-use path system and vehicular traffic entering and exiting private commercial drives, a series of recommended signs shall be installed at the ingress and egress of the intersections of the trail with private driveways. Included are MUTCD standard signs: Bike Crossing, Pedestrian Crossing, and Yield. Additional signs may be installed at the discretion of the City of Henderson.

Bicycles and other multi-modal transport vehicles shall be directed by installed traffic control signage to yield at driveways and stop at all major and minor intersections.



No parking signage



Trail use information



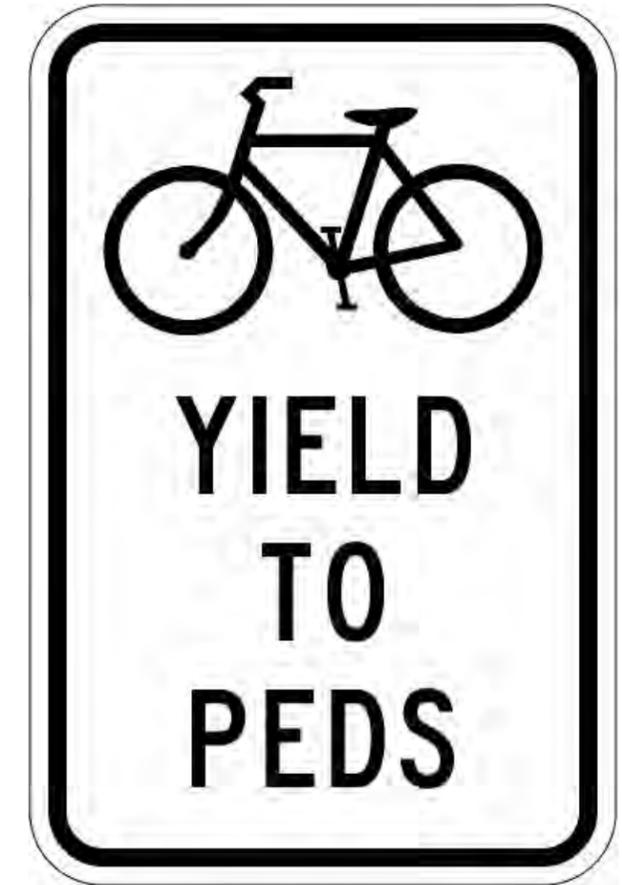
Trail begins (add-on sign piece)



Trail ends (add-on sign piece)



Trail directional sign (add-on sign piece)



Trail use information



Bike parking

LOGOS

Trail sign logos measure 6 inches across. Signs are produced using an adhesive applied to heavy gauge aluminum with a background color. Standard logo colors are brown and white. The backs of all exposed signs are painted brown. Arrows and directional signs are also available in the same dimensions and color schemes.

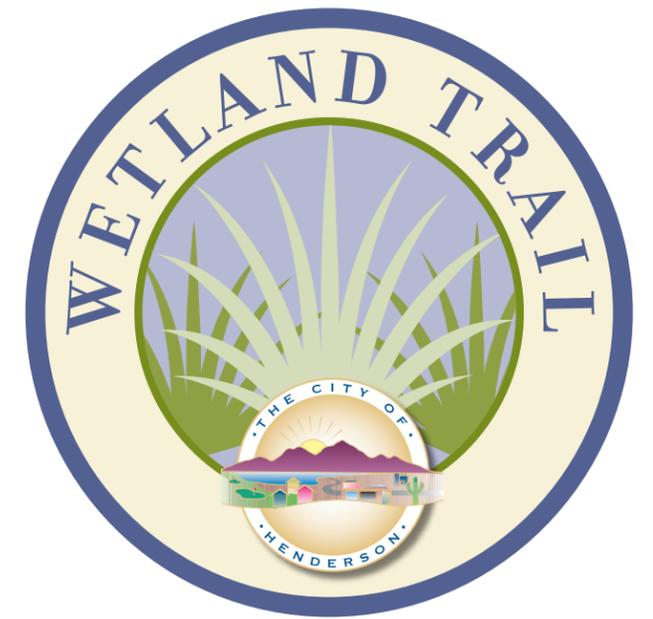
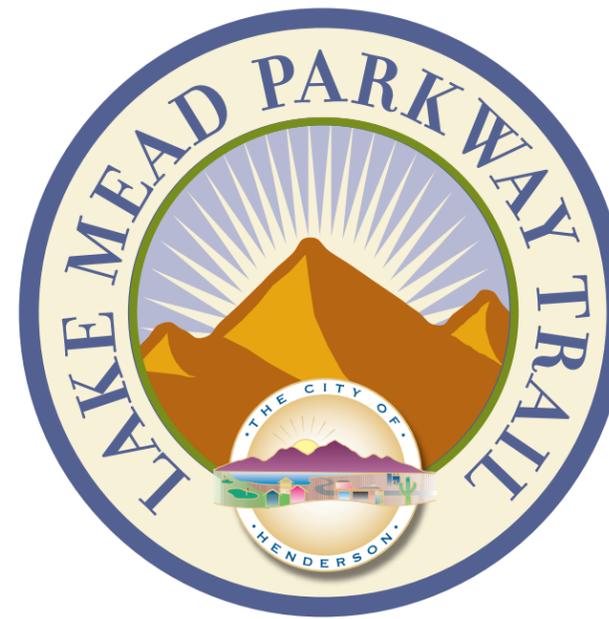
Final Trail Logo to be determined.



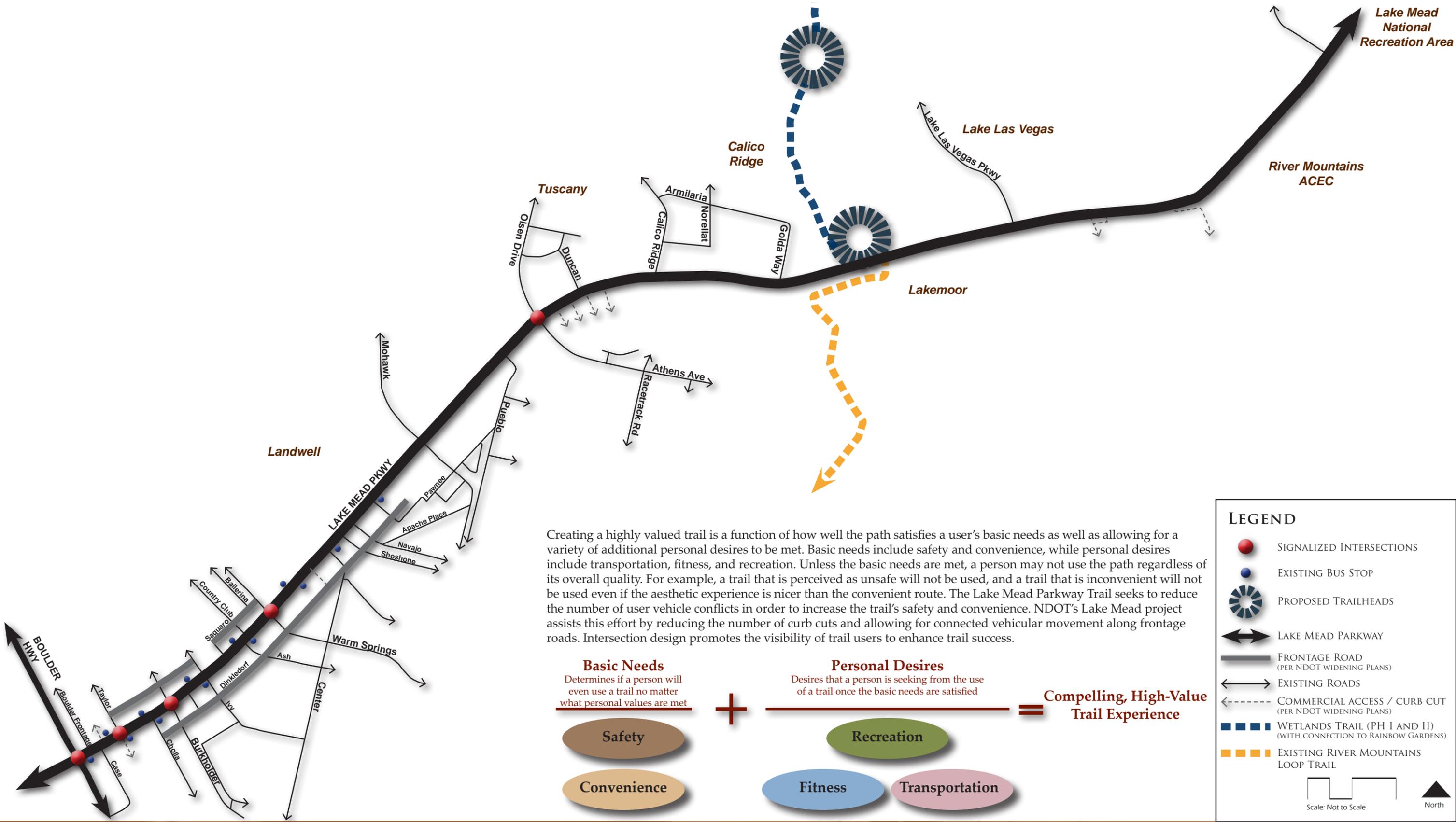
Logo design - Option A



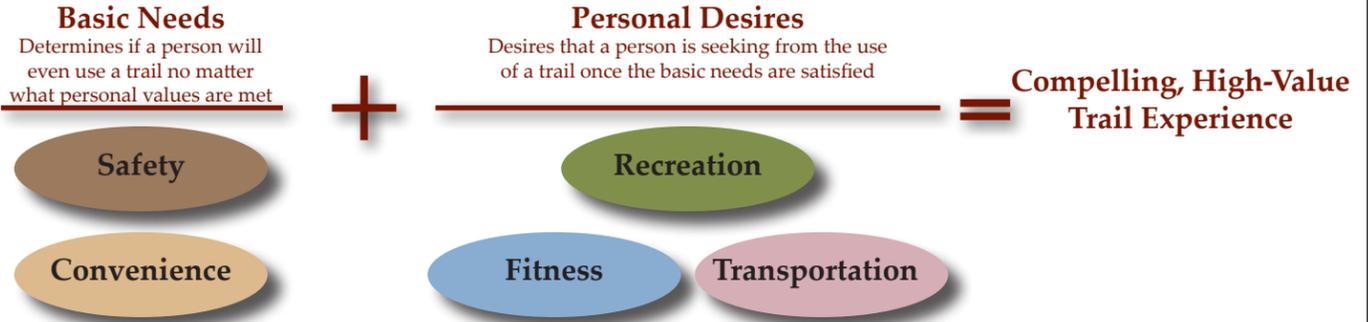
Logo design - Option B



Logo design - Option C



Creating a highly valued trail is a function of how well the path satisfies a user's basic needs as well as allowing for a variety of additional personal desires to be met. Basic needs include safety and convenience, while personal desires include transportation, fitness, and recreation. Unless the basic needs are met, a person may not use the path regardless of its overall quality. For example, a trail that is perceived as unsafe will not be used, and a trail that is inconvenient will not be used even if the aesthetic experience is nicer than the convenient route. The Lake Mead Parkway Trail seeks to reduce the number of user vehicle conflicts in order to increase the trail's safety and convenience. NDOT's Lake Mead project assists this effort by reducing the number of curb cuts and allowing for connected vehicular movement along frontage roads. Intersection design promotes the visibility of trail users to enhance trail success.



LEGEND

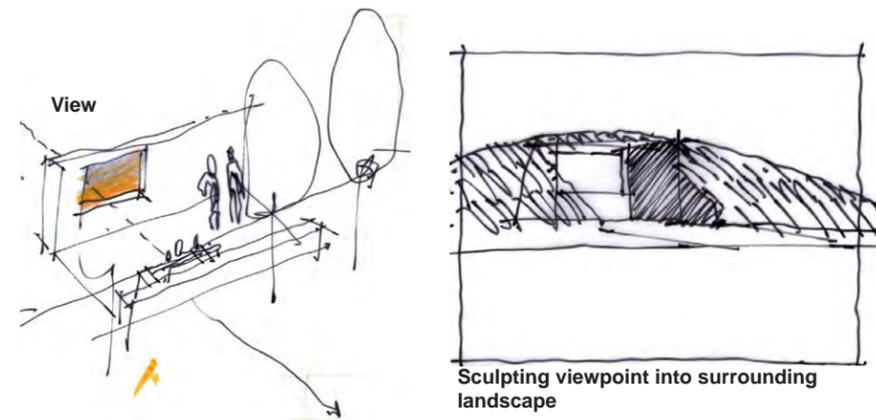
- SIGNALIZED INTERSECTIONS
- EXISTING BUS STOP
- PROPOSED TRAILHEADS
- LAKE MEAD PARKWAY
- FRONTAGE ROAD (PER NDOT WIDENING PLANS)
- EXISTING ROADS
- COMMERCIAL ACCESS / CURB CUT (PER NDOT WIDENING PLANS)
- WETLANDS TRAIL (PH I AND II) (WITH CONNECTION TO RAINBOW GARDENS)
- EXISTING RIVER MOUNTAINS LOOP TRAIL

Scale: Not to Scale

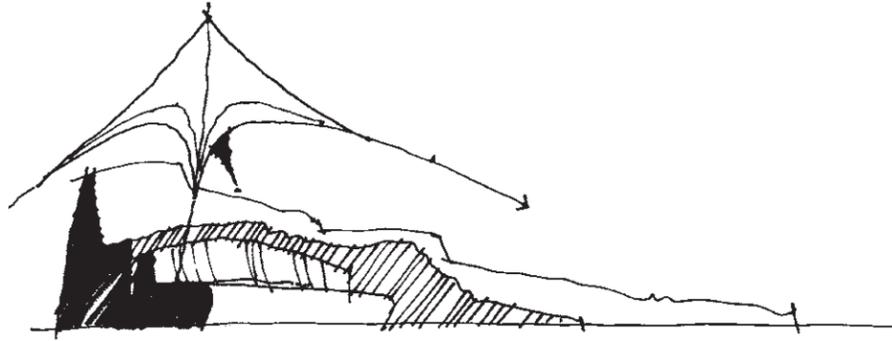
North

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

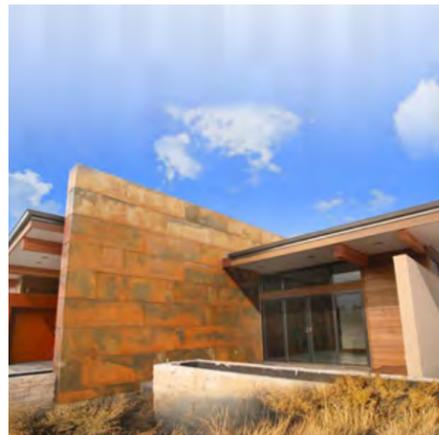
VEHICULAR INTERFACE



Sculpting viewpoint into surrounding landscape



Tensile Structure over bench



COMMUNITY

Principles:

Trail systems become deeply valued community resources when they are highly used and create a sense of place. Successful trails must satisfy safety and convenience needs first and then meet as many recreation, fitness, and transportation needs as the project goals and site allow.

Goals:

- Provide clear connections to transit.
- Minimize user interface with vehicular traffic.
- Create connections to commercial areas.
- Promote trail stewardship.
- Provide opportunities for public art and community art participation.
- Minimize user conflicts.
- Link existing and planned trails, parks, schools, and neighborhoods to create coordinated greenway/park system with destination points.
- Provide user comfort to promote use and community gathering opportunities.

Strategies:

- Parallel frontage road to minimize the number of curb cuts and intersection crossings.
- Create overall circulation diagram to ensure commercial areas, parks, schools, transit, and neighborhoods are linked.
- Separate trail users where possible.

Metrics:

- Trail used by community members to gain access to transit and trail destinations. Increased transit use along trail corridor.
- Increased number of bike racks provided by commercial and community areas as response to successful trail use.

ENVIRONMENT

Principles:

The desert is a fragile landscape where water is a scarce and finite resource, but opportunities for alternative energy abounds. Well-designed trail systems stimulate personal stewardship and increase the likelihood that people use the trail in an appropriate manner, avoid impacts to surrounding ecological systems, and educate others about sustainable ethics and practices. A theme must be strong enough to keep people engaged and on the trail.

Goals:

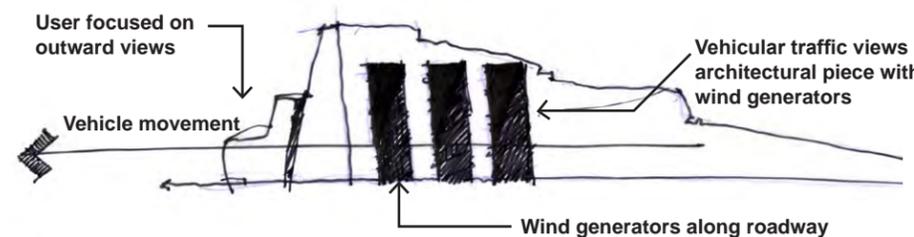
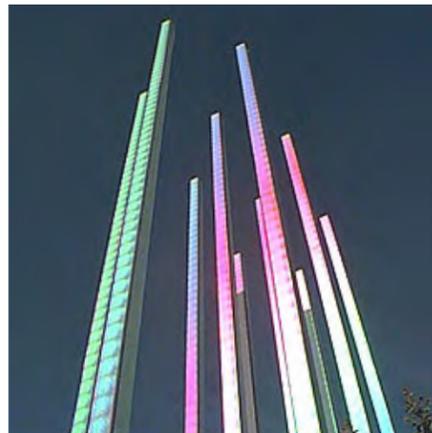
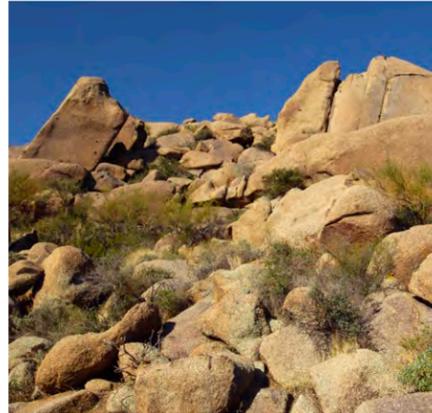
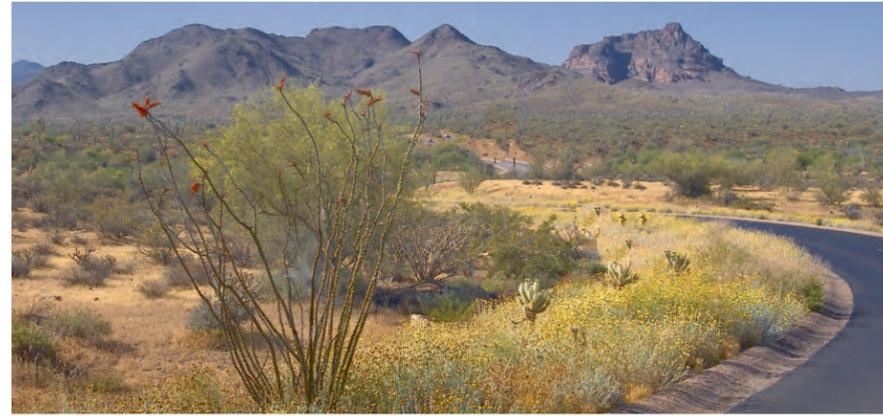
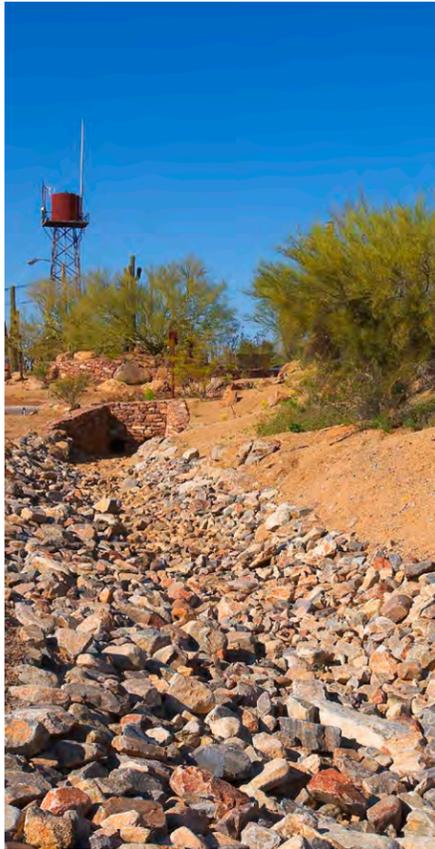
- Embrace the desert.
- Promote energy and water conservation.
- Use alternative energy sources.
- Minimize wayside trail disturbance.
- Use of native or low-water use, desert-adapted plant materials.

Strategies:

- Use porous paving materials to allow for water infiltration and ground water recharge without adding burden in stormwater facilities. Use bioswales where porous paving is not a viable option.
- Use signage and good trail design techniques to keep people on the trail and minimize damage to the desert environment.
- Use of geothermal heat exchange for cooling of trailhead facilities.

Metrics:

- No increased capacity needs of stormwater infrastructure facilities.
- 50% reduction in water use requirements for landscape treatments.





ECONOMICS

Principles:

Highly valued trails provide an economic resource to their community and create a benefit to neighboring commercial areas. Community resource trails become easier to maintain as users develop personal ownership and stewardship for the trail and surrounding environment. Alternative energy resources will most likely be used when they do not create an economic burden but rather provide an economic advantage to the user.

Goals:

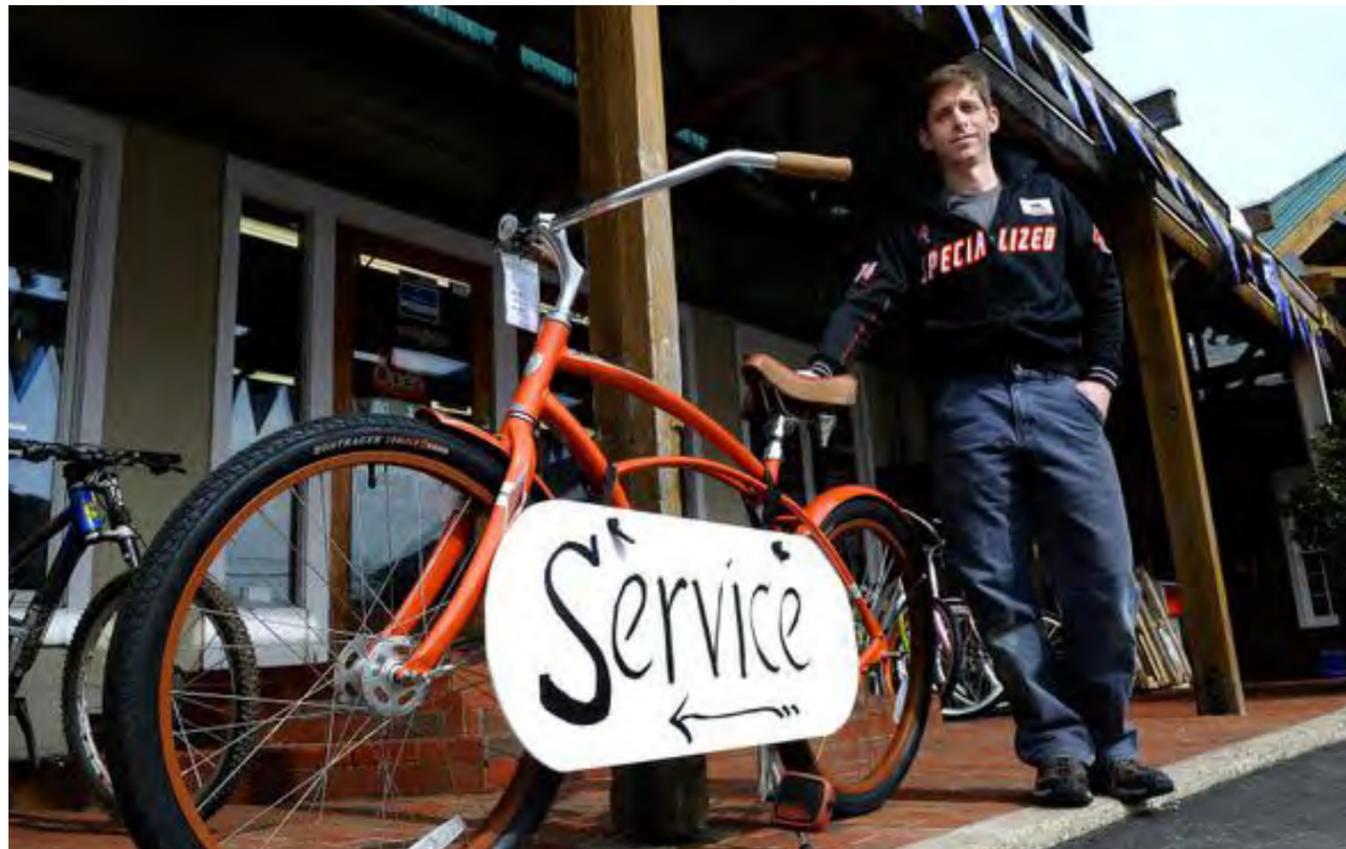
- Provide long-lasting facilities.
- Create connections to commercial areas.
- Promote trail stewardship.
- Use alternative energy sources where possible.
- Promote working relationships with stakeholders.
- Coordinate facilities to allow for "event" hosting.

Strategies:

- Use long-lasting, easy-to-maintain materials in innovative and artistic ways.
- Coordinate trail development with stakeholders to develop beneficial partnerships.
- Design trail with long-term vision to allow for flexibility in use and accommodation of new "events" and commercial opportunities.
- Use solar energy sources for lighting needs.

Metrics:

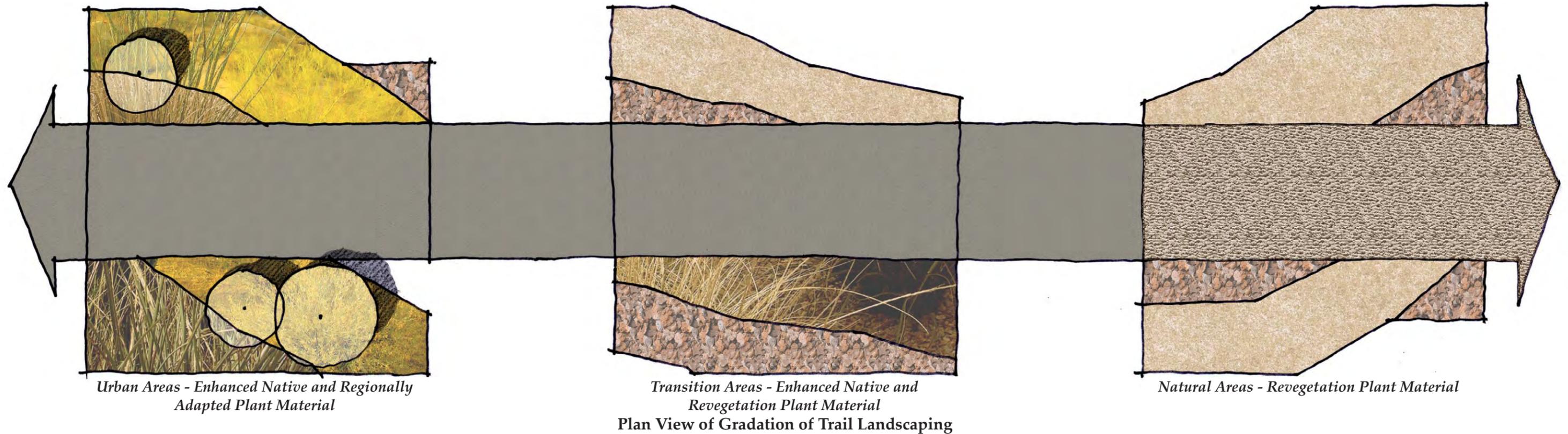
- Increased property values along trail corridor.





APPLYING DESIGN
CONCEPTS

LANDSCAPE TREATMENTS



Landscape Treatment Application

As the trail corridor moves east from the urban area of downtown Henderson to the natural area of the Lake Mead National Recreation Area, the adjacent plant material reinforces the transition. Contextual plant materials, colors, and site amenities unify the trail system while allowing the Wetlands Trail connection to also have a slightly different character. Bands of rock mulch and scattered native rock are consistently used in all areas. Drainage areas are designed as part of the overall landscape application and serve not only to carry surface and storm water flows but also to prevent erosion and simulate a natural wash character. All landscape development occurring along Lake Mead Parkway will be performed by each individual parcel owner in partnership with the City of Henderson in accordance with these landscape guidelines.

Urban Areas

Areas closest to the downtown area include both enhanced native and regionally adapted plant material. A greater density and variety of plant materials are combined to create a layering effect. Trees are incorporated into the plant palette. Shade structures are used.

Transition Areas

Where the trail corridor transitions from urban to rural, a combination of enhanced native and native revegetation materials are applied. Plant selections use native species in greater densities than naturally found within the landscape. Trees are used sparingly and the use of shade structures increases.

Natural Areas

As the path nears the Lake Mead National Recreation Area and the Clark County Wetlands, plant material simplifies. Native revegetation and scattered rock mulch are predominantly used. Seedlings should be interspersed with mature plantings to create a natural plant community character while minimizing the need for permanent supplemental irrigation. Shade structures are used at waysides to provide cover.

Plant Palette Design Considerations

The following design considerations shall be regarded when selecting materials and planning planting palettes and schemes. The plant list contains plant materials to be considered in addition to the City of Henderson's approved list. Refer to the City of Henderson Landscape Design Standards for installation details.

The recommended plant list was developed with an emphasis on low-water use vegetation. Suggestions include plants from either the City's or NDOT's approved plant lists. On the Wetlands Trail, the trail connection to Rainbow Gardens, and the Wetlands trailhead, plant material selection should also refer to the Clark County Wetlands Park Master Plan. Aggressive species such as the Texas Honey Mesquite should be avoided.

Re-establishing surrounding native plant communities increases in importance along the trail's central and eastern portions where it is bounded by the natural landscape. In these areas, a revegetation palette should be used for disturbed areas. Utilize identified on-site native plant species and species noted in Mapping Ecosystems along Nevada Highways and the Development of Specifications for Vegetation Remediation by Paul Teuller of the University of Nevada and incorporate scattered rock mulch harvested from the site.

Do not plant noxious weeds. Refer to the Nevada Department of Agriculture's Noxious Weed List for a current list of plants which should not be used. Remove noxious weeds such as Tamarisk species whenever possible as part of site improvements. Revegetate area with native plant material. Harvest and carefully maintain top soil.

Representative Landscape Design Standards

- A. Trees have rooting characteristics which may cause trail upheaval. Approved root barriers shall be installed for trees located within 10 feet of a utility or adjacent to asphalt trail.
- B. Tree form & size shall permit a minimum trimmed height of 12 feet to the lowest branch within the designated landscape area.
- C. Tree and shrub placement should avoid creating blind spots and/or hiding areas. Plant material and associated foliage shall not block trail lighting. Use lower growing shrubs closest to the trail to maximize visibility.
- D. Shrub and ground cover plant materials shall be native or adapted to the City of Henderson area, drought tolerant, require minimal pruning and maintenance and be low growing (under 3 feet at mature height). Location and placement of these plant materials shall not promote growth over or onto the trail surface. Accent plantings may be over 3 feet in height if planted so as to not inhibit site visibility from the trail or promote growth onto the trail. Agaves, cacti, yuccas, accent natives and desert plant materials with spines may be used, but shall be planted a minimum of 10 feet away from the path. Refer to the City of Henderson Development Code and the Crime Prevention through Environmental Design (CPTED) documents for additional information.
- E. All landscaped or otherwise disturbed areas are to receive an application of pre-emergent weed barrier, top and bottom, and a minimum 2" layer of rock mulch, color to be determined. Rock sizes to vary depending upon slope conditions, wash areas, etc. All applications of rock mulch shall be feathered in seamlessly to one another to create a naturalistic transition between different sizes of material.



PLANT PALETTE

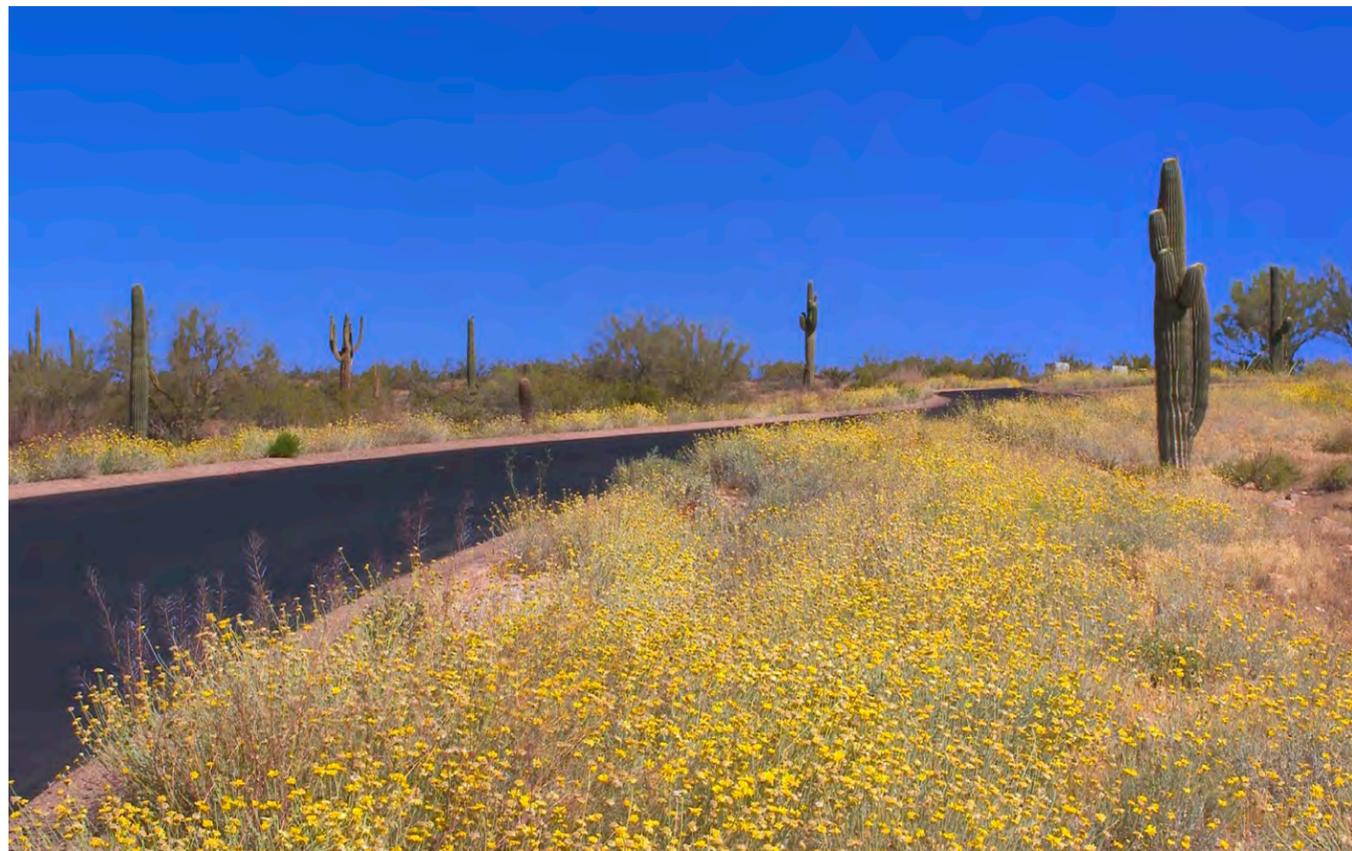
	Type	Native	Henderson Plant List	Saint Rose Parkway Plant List	NDOT L&A Plant List	Height x Width	Water Requirement	Seasonal
Trees:								
<i>Acacia smallii</i> - Desert Sweet Acacia	Deciduous		X	X		15' x 15'	Low****	Spring
<i>Acacia greggii</i> - Catclaw	Deciduous	Native	X	X	X	20' x 20'	Low****	Sp / Fall
<i>Acacia stenophylla</i> - Shoestring Acacia	Evergreen		X	X	X	30' x 15'	Low****	Spring
<i>Cercidium floridum</i> - Blue Palo Verde	Deciduous		X			20' x 20'	Low****	Spring
<i>Cercidium microphyllum</i> - Foothills Palo Verde	Deciduous		X	X	X	20' x 20'	Low****	Spring
<i>Cercidium 'Desert Museum'</i> - Desert Museum Palo Verde	Deciduous		X	X		25' x 25'	Low****	Spring
<i>Chilopsis linearis</i> - Desert Willow	Deciduous		X	X	X	20' x 15'	Low****	Sp / Fall
<i>Chitalpa tashkentensis 'Pink Dawn'</i> - Pink Dawn Chitalpa	Deciduous		X	X		30' x 20'	Low****	Sp - Fall
<i>Cordia boissieri</i> - Texas Olive	Deciduous		X	X		15' x 15'	Low	Sp-Sum
<i>Cupressus arizonica</i> - Arizona Cypress	Evergreen		X	X	X	70' x 30'	Low****	n/a
<i>Cupressus sargentii</i> - Sargents Cypress	Evergreen		X			30' x 25'	Low****	n/a
<i>Eysenhardtia orthocarpa</i> - Kidneywood	Semi-evergreen				X	10' x 6'	Moderate	Spring
<i>Fraxinus velutina 'Rio Grande'</i> - Rio Grande Ash	Deciduous		X		X	50' x 30'	Low****	Spring
<i>Gleditsia triacanthos inermis</i> - Thornless Honey Locust	Deciduous		X		X	35' x 25'	Moderate	n/a
<i>Olea europaea</i> - Majestic Beauty	Evergreen		X			20' x 18'	Low****	Spring
<i>Parkinsonia aculeata</i> - Jerusalem Thorn, Mexican Palo Verde*	Deciduous		X	X		18' x 18'	Low****	Spring
<i>Parkinsonia x 'Desert Museum'</i> - Desert Museum Palo Verde *	Deciduous			X		20' x 20'	Low	Spring
<i>Pinus eldarica</i> - Afghan Pine**	Evergreen		X	X		40' x 20'	Low****	n/a
<i>Pistacia atlantica</i> - Mt. Atlas Pistache	Evergreen		X	X		45' x 45'	Low****	n/a
<i>Pithecellobium flexicaule</i> - Texas Ebony**	Evergreen		X	X		20' x 20'	Low	Spring
<i>Prosopis chilensis 'Thornless'</i> - Chilean Thornless Mesquite	Deciduous		X	X	X	25' x 40'	Low****	m. stem Summer
<i>Prosopis glandulosa 'Maverick Thornless'</i> - Maverick Thornless Honey Mesquite	Deciduous		X	X	X	25' x 35'	Low****	Summer
<i>Prosopis pubescens</i> - Screwbean Mesquite **	Deciduous (multistem)		X		X	25' x 25'	Low****	Spring
<i>Rhus lancea</i> - African Sumac	Evergreen		X			20' x 20'	Low****	n/a
<i>Robinia pseudoacacia</i> - Black Locust	Deciduous		X			50' x 35'	Low****	Spring
<i>Salix exigua</i> - Coyote Willow ***	Deciduous				X	10' x 6'	Moderate	Spring
<i>Ulmus parvifolia</i> - Drake Elm	Deciduous		X		X	60' x 70'	Low****	Fall
<i>Vitex agnus-castus</i> - Chaste Tree	Deciduous		X	X	X	25' x 25'	Low****	Summer

* Multi-stem

** Screening or user management barrier

*** Use only in wetlands area

**** City of Henderson recommended because of low water use



Plant Palette (cont)

Shrubs:								
<i>Ambrosia dumosa</i> - White Bursage	Evergreen		X	X		2' x 3'	Low****	Sp - Sum
<i>Anisacanthus thurberi</i> - Desert Honeysuckle***	Deciduous			X		6' x 6'	Low	Summer
<i>Baccharis pilularis</i> 'Centennial' - Centennial Coyote Bush (groundcover)	Deciduous		X	X		2' x 6'	Low****	n/a
<i>Baileya multiradiata</i> - Desert Marigold	Deciduous	Native	X	X		1' x 2'	Low****	Sp - Sum
<i>Buddleia marrubifolia</i> - Woolly Butterfly Bush	Evergreen			X		5' x 5'	Low	Sp - Sum
<i>Caesalpinia</i> spp. - Bird of Paradise	Deciduous		X	X		6' x 6'	Low****	Summer
<i>Calliandra californica</i> - Baja Fairy Duster	Evergreen		X	X		4' x 4'	Low****	Sum - Fall
<i>Calliandra eriophylla</i> - Fairy Duster	Evergreen		X	X		2' x 4'	Low****	Spring
<i>Cassia nemophylla</i> - Desert Cassia	Semi-evergreen		X	X	X	6' x 6'	Low	Spring
<i>Chrysothamnus nauseosus</i> - Rabbit brush	Deciduous	Native		X		4' x 6'	Low	Fall
<i>Convolvulus cneorum</i> - Bush Morning Glory	Evergreen		X	X		1' x 3'	Low****	Sp - Sum
<i>Dalea pulchra</i> - Pink Indigo Bush	Deciduous		X	X		5' x 5'	Low****	Win-Sp
<i>Dietes vegeta</i> - African Iris	Evergreen		X	X		4' x 3'	Low****	Sp - Sum
<i>Encelia farinosa</i> - Brittlebush	Deciduous	Native	X	X	X	3' x 4'	Low****	Spring
<i>Encelia frutescens</i> - Green Brittlebush	Evergreen	Native		X		3' x 4'	Low	Sp - Fall
<i>Eremophila</i> spp. - Valentine or Emu Bush	Evergreen				X	4' x 4'	Low to Mod	Winter
<i>Ericameria laricina</i> - Turpentine Bush	Evergreen	Native		X		3' x 3'	Low	Fall
<i>Erigonum wrightii</i> - Wright's Buckwheat	Perennial		X	X	X	2' x 3'	Low	Summer
<i>Erigonum fasciculatum</i> v. <i>poliofolium</i> - Flattop Buckwheat	Perennial		X	X	X	3' x 4'	Low	Spring
<i>Fallugia paradoxa</i> - Apache Plume	Semi-evergreen	Native		X	X	6' x 4'	Low	Spring
<i>Justicia californica</i> - Chuparosa	Evergreen			X	X	3' x 3'	Moderate	Summer
<i>Larrea tridentata</i> - Creosote Bush	Evergreen	Native	X	X		6' x 8'	Low****	Spring
<i>Leucophyllum</i> spp. - Texas Sage	Evergreen		X	X		4' x 4'	Low****	Sum - Fall
<i>Mahonia aquifolium</i> - Oregon Grape	Evergreen		X			4' x 4'	Low****	Spring
<i>Myoporum parvifolium</i> - Myoporum groundcover	Evergreen		X			6" x 4'	Low****	Spring
<i>Pittosporum tobira</i> - Japanese Mock Orange	Evergreen		X			10' x 10'	Low****	Summer
<i>Pittosporum tobira</i> 'Variegata' - Variegated Mock Orange	Evergreen		X			6' x 6'	Low****	Spring
<i>Pittosporum tobira</i> 'Wheeler's Dwarf' - Wheeler's Dwarf Mock Orange	Evergreen		X			3' x 3'	Low****	Spring
<i>Purshia mexicana</i> - Cliff Rose	Deciduous	Native		X		6' x 6'	Low	Sp - Sum
<i>Quercus turbinella</i> - Scrub Oak	Evergreen	Native		X		8' x 12'	Low	Spring
<i>Rhamnus californica</i> - Coffeeberry	Evergreen	Native		X		6' x 6'	Low	n/a
<i>Rhus lanceolata</i> - Flame Leaf Sumac	Evergreen			X	X	15' x 15'	Low	Sp / Fall
<i>Rhus ovata</i> - Sugar Bush	Evergreen		X	X	X	10' x 10'	Low****	Spring
<i>Rhus trilobata</i> - Squaw Bush	Deciduous	Native		X		4' x 8'	Low	Sp / Fall
<i>Ribes aureum</i> - Golden Currant	Deciduous		X			4' x 4'	Low	Spring
<i>Salvia clevelandii</i> - Chaparral Sage	Evergreen		X	X	X	4' x 6'	Low	Spring
<i>Salvia mojavnensis</i> - Mojave Sage	Deciduous	Native	X	X	X	3' x 3'	Low	Spring
<i>Sphaeralcea ambigua</i> - Globe Mallow	Perennial	Native	X	X		3' x 3'	Low****	Spring
<i>Tagetes lemmonii</i> - Desert Marigold	Evergreen			X		2' x 2'	Low to Mod	Win - Sp
<i>Tecoma</i> x 'Goldstar' - Texas Yellow Star	Semi-evergreen		X	X	X	20' x 8'	Moderate	Summer
<i>Teucrium chamaedrys</i> - Germander	Evergreen		X	X		2' x 3'	Low****	Sp / Fall
<i>Vauquelinia californica</i> - Arizona Rosewood	Evergreen		X	X		15' x 10'	Low****	Spring
<i>Zauschneria californica</i> - Hummingbird Flower	Deciduous			X	X	2' x 3'	Low	Sum/Fall

Plant Palette (cont)

Cactii and Succulents:								
<i>Agave americana</i> - Century Plant	Succulent		X	X		4' x 4'	Low	n/a
<i>Agave harvardiana</i> - Harvard Agave	Succulent		X	X		5' x 5'	Low	n/a
<i>Agave parryii</i> - Parry's Agave	Succulent		X	X		1.5' x 2'	Low	n/a
<i>Agave scabra</i> - Rough-leaved Agave	Succulent		X	X		4' x 4'	Low	n/a
<i>Dasyliirion acrotriche</i> - Green Desert Spoon	Succulent		X	X		6' x 5'	Low****	n/a
<i>Dasyliirion longissimum</i> - Stick Palm	Succulent		X	X		10' - 6'	Low****	n/a
<i>Dasyliirion wheeleri</i> - Desert Spoon	Succulent		X	X		4' x 4'	Low****	n/a
<i>Echinocactus grusonii</i> - Golden Barrel	Cactus		X	X		3' x 2'	Low****	Summer
<i>Echinocereus engelmannii</i> - Strawberry Hedgehog	Cactus	Native	X	X		1' x 1'	Low****	Spring
<i>Ferocactus acanthodes</i> - Compass Barrel Cactus	Cactus		X	X		4' x 1.5'	Low****	Spring
<i>Ferocactus wislizenii</i> - Fishhook Barrel Cactus	Cactus		X	X		3' x 2'	Low****	Spring
<i>Fouquieria splendens</i> - Ocotillo	Cactus		X		X	18' x 10'	Low****	Spring
<i>Hesperaloe parviflora</i> - Red Yucca	Succulent		X	X		2' x 4'	Low****	Sum - Fall
<i>Opuntia acanthocarpa</i> - Buckhorn Cholla	Cactus	Native		X	X	4' x 3'	Low	Spring
<i>Opuntia basilaris</i> - Beavertail Cactus	Cactus	Native	X	X		2' x 3'	Low****	Sp - Sum
<i>Opuntia engelmannii</i> - Engelmann's Prickly Pear	Cactus				X	6' x 10'	Low	Sp - Sum
<i>Opuntia erinacea</i> - Old Man Cactus	Cactus	Native		X	X	2' x 4'	Low	Spring
<i>Opuntia microdasys</i> - Bunny Ears	Cactus		X			2' x 4'	Low****	Summer
<i>Opuntia santa-rita</i> - Santa Rita Prickly Pear	Cactus		X		X	4' x 6'	Low****	Sp - Sum
<i>Yucca baccata</i> - Banana Yucca	Cactus	Native		X	X	3' x 3'	Low	Summer
<i>Yucca brevifolia</i> - Joshua Tree	Succulent	Native	X	X		15' x 8'	Low****	Summer
<i>Yucca gloriosa</i> - Spanish Dagger	Succulent			X		10' x 8'	Low	Summer
<i>Yucca recurvifolia</i> - Penulous Yucca	Succulent		X	X		6' x 6'	Low****	Spring
<i>Yucca rupicola</i> - Twisted Yucca	Succulent		X	X		2' x 3'	Low****	Summer
<i>Yucca schidigera</i> - Mojave Yucca	Succulent	Native	X	X	X	12' x 6'	Low****	Spring
Grasses:								
<i>Achnatherum hymenoides</i> - Indian Ricegrass	Deciduous				X	2' x 2'	Low	Spring
<i>Bromus rubens</i> - Red Brome	Deciduous				X	1' x 5'	Low	Winter
<i>Festuca ovina 'Glauca'</i> - Blue Fescue	Deciduous		X			1.5' x 1.5'	Low	Summer
<i>Hilaria rigida</i> - Big Galleta	Deciduous				X	3' x 4'	Low	Summer
<i>Muhlenbergia dumosa 'Regal Mist'</i> - Regal Mist Muhly Grass	Deciduous		X			4' x 4'	Low to Mod	Winter
<i>Muhlenbergia rigens</i> - Deer Grass	Deciduous		X	X		4' x 4'	Low to Mod	Fall
<i>Nolina microcarpa</i> - Bear Grass	Deciduous			X	X	3' x 4'	Low	Summer
<i>Stipa speciosa</i> - Desert Needlegrass	Deciduous	Native		X	X	1' x 5'	Low	Summer



Plant Palette (cont)

Groundcovers and Accents:												
<i>Acacia redolens</i> - Creeping Acacia	Evergreen		X							3' x 8'	Low****	Spring
<i>Acacia redolens 'Desert Carpet'</i> - Desert Carpet Acacia	Evergreen		X	X						2' x 15'	Low****	Spring
<i>Atriplex semibaccata</i> - Australian Salt Bush	Evergreen		X							1' x 3'	Low****	n/a
<i>Baileya multiradiata</i> - Desert Marigold	Perennial							X		1' x 1'	Low	Sp - Fall
<i>Bulbine frutescens</i> - Shrubby Bulbine	Perennial							X		2' x 3'	Low	Sp / Fall
<i>Dalea capitata 'Sierra Gold'</i> - Sierra Gold Dalea	Deciduous		X	X						1' x 3'	Low****	Sp / Fall
<i>Dalea greggii</i> - Prostrate Indigo Bush	Deciduous		X	X						2' x 6'	Low****	Summer
<i>Eschscholzia mexicana</i> - Mexican Gold Poppy	Perennial		X							1' x 1'	Low	Spring
<i>Gazania</i> - Gazania	Perennial		X							9" x 2'	Low****	Sp - Sum
<i>Lantana camara</i> - Bush Lantana	Evergreen		X	X						3' x 4'	Low****	Sp - Fall
<i>Lantana montevidensis</i> - Trailing Lantana	Deciduous		X	X						1' x 6'	Low****	Sp - Fall
<i>Lantana montevidensis 'New Gold'</i> - New Gold Lantana	Deciduous		X	X						1.5' x 3'	Low****	Sp - Fall
<i>Justicia spicigera</i> - Mexican Honeysuckle	Evergreen		X							3' x 3'	Low****	All Year
<i>Macfadyena unguis-cati</i> - Cat Claw Vine	Vine, Semi-evergreen		X	X						25' +	Low****	Summer
<i>Melampodium leucanthum</i> - Blackfoot Daisy	Perennial		X	X						1' x 2'	Low****	Sp - Fall
<i>Penstemon eatoni</i> - Eaton's or Firecracker Penstemon	Perennial		X	X	X					2' x 3'	Low	Spring
<i>Penstemon palmeri</i> - Palmer's Penstemon	Perennial		X	X	X					4' x 2'	Low	Spring
<i>Penstemon parryi</i> - Parry's Penstemon	Perennial		X	X	X					4' x 2'	Low	Spring
<i>Penstemon spectabilis</i> - Showy Penstemon	Perennial		X	X	x					3' x 2'	Low	Spring
<i>Penstemon utahensis</i> - Utah Penstemon	Perennial		X	X	X					1' x 1.5'	Low	Spring
<i>Psilotrophe cooperi</i> - Paper Flower	Perennial				X					1' x 1'	Low to Mod	Sp - Fall
<i>Rosmarinus spp.</i> - Rosemary	Evergreen		X							2' x 8'	Low	Sp - Sum
<i>Rosmarinus officinalis 'Arp'</i> - Arp Rosemary	Evergreen				X					2' x 4'	Low	Sp / Fall
<i>Rosmarinus officinalis 'Huntington Carpet'</i> - Huntington Carpet Rosemary	Evergreen				X					2' x 8'	Low	Spring
<i>Salvia chamaedryoides</i> - Mexican Blue Sage	Deciduous		X							2' x 2'	Low****	Sp - Sum
<i>Salvia leucantha</i> - Mexican Bush Sage	Evergreen							X		3' x 3'	Moderate	Sp / Fall / Win
<i>Tetranneurus acaulis</i> - Angelita Daisy	Perennial							X		1' x 1.5'	Moderate	Sp - Fall
<i>Trachelospermum jasminoides</i> - Star Jasmine	Vine, Evgrn		X							2' x 20'	Low****	Summer
<i>Verbena gooddingii</i> - Gooding's Verbena	Perennial				X					1' x 2'	Low	Sp - Sum
<i>Verbena rigida</i> - Sandpaper Verbena	Perennial		X	X						1' x 4'	Low****	Sum - Fall

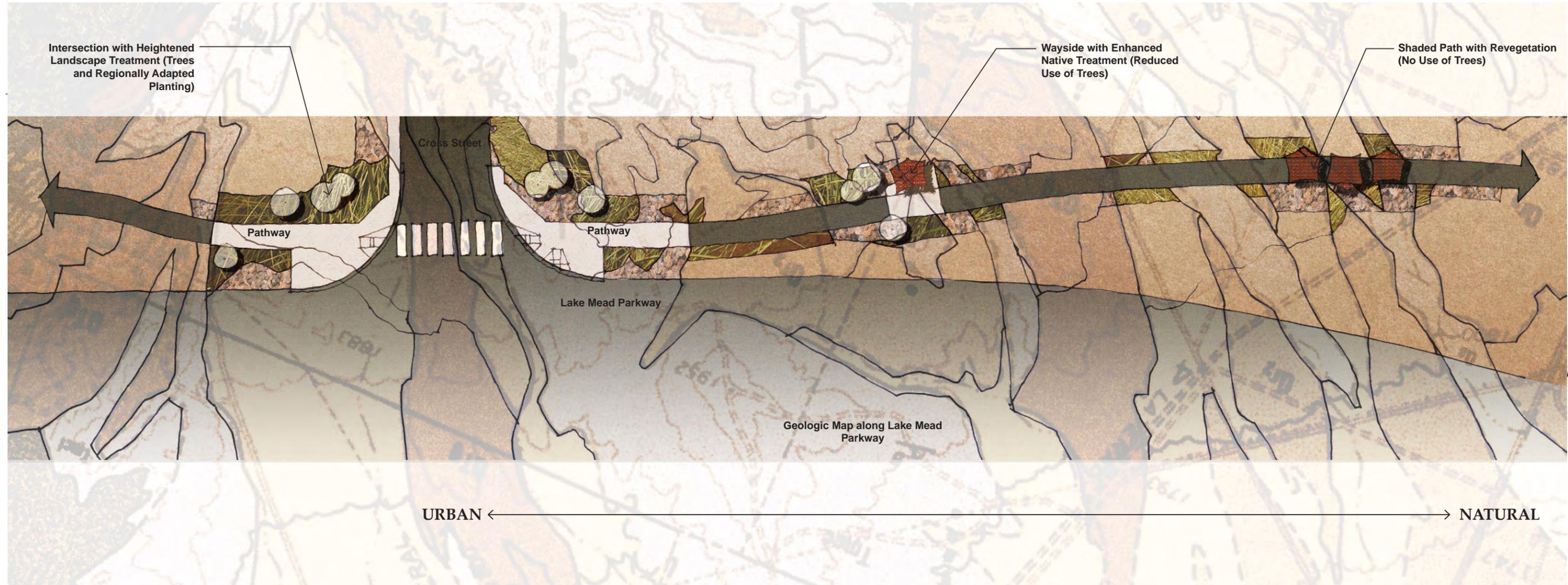
* Multi-stem

** Screening or user management barrier

*** Use only in wetlands area

**** City of Henderson recommended because of low water use

RHYTHM



Plan View of Rhythm of Amenities and Treatments

Rhythm of Amenities and Treatments

Consistent with the City's desire to recognize the beauty of the desert, application of the design concept focuses on minimizing the sense of intense landscape improvements. Use of trees and adapted plant material is kept low. No high-water plant material should be used. Instead the desert is celebrated in simple elegance while allowing the patterning of a geologic base to read through the landscape at the ground plane.

MATERIALS

Material choices should reflect the landscape context and graduate from urban areas to natural areas. Materials applied to the Wetlands Connector Trail corridor should use colors and existing treatments found within the Wetlands (vegetation, rocks, and rock formations).

Paving

The minimum acceptable pavement structure shall be four (4) inches of asphalt over six (6) inches Type II aggregate base, or as directed by a soils report, with a 2% cross-slope on the asphalt to allow surface water to flow into adjacent drainage areas. The path sub-grade shall be placed over a soil surface stripped free of any organic material and compacted to a 95% dry density.

Where the trail crosses drainage channels and at accent areas, use colored concrete. Color additive should conform to ASTM C979 - Pigments for Integrally Colored Concrete. Dry mixes aren't recommended. The color should correspond Dunn Edwards color 6130 (NDOT Corridor Plans base color for the Dynamic Desert Metropolis). This color corresponds to Solomon Colors ColorFlo 306 - Burlap. At drainage crossings, incorporate a concrete cutoff wall at either end in order to provide a structural trail design resistant to damage, erosion, and undermining. Where drainages are deeply incised, consider a combination of a low flow culvert under the trail to handle nuisance flows and a dip through the wash to allow larger runoff events to overtop the trail.

Striping

Trails are designed to be used by pedestrians, strollers, wheelchairs, bicycles, and other multi-modal vehicles. In order to avoid collision or conflict between trail users traveling at different speeds, there shall be a striping system installed upon the trail. The trail shall be bisected by a dashed yellow center line. All yellow striping shall be 4" wide. Stop Bars shall be white, and shall be 12" wide. Regional Transportation Commission of Southern Nevada (RTC) approved paint striping products shall be used.

Lighting

All trails are to be lit. Fixed-source lighting along the trail will serve to reduce conflict while allowing users to see the trail direction, surface condition and oncoming obstacles. Lighting within the 30-foot wide shared-use trail zone shall be installed so that it ties into existing City of Henderson power. In the event that City power is not available at the time of development, lighting shall be installed in such a way as to allow the City to tie into the power at a time the City is able.

All lighting shall be installed within the 30-foot shared-use trail zone, near the trail, but outside of the 3-foot clear zone. The maintained horizontal illumination levels shall be 1.0 foot-candle (11 lux) at intersections and 0.5 foot-candle (5 lux) on trail applications. Where potential security issues exist, higher illumination may be required. Light standards and poles shall meet the required horizontal and vertical clearances or a minimum of 14-foot mounting height with a pole designed for 100 M.P.H. wind loads per City of Henderson Standards. Poles shall have a matching base plate to cover anchor bolts. The luminaire shall be a HPS Shoe Box Fixture (or equivalent) with a back shield to eliminate back lighting, a poly-carbonate/Lexan lens, and finished to match the pole. The light standard is to be in the Nevada Department of Transportation (NDOT) right-of-way and shall conform to appropriate NDOT standards such as breakaway base. Accent lighting may be incorporated as part of primary waysides and trailhead designs.



Bike Parking and Water



Benches/Seating



Benches/Seating



Accent Lighting



Walls



Walls



Litter Receptacles



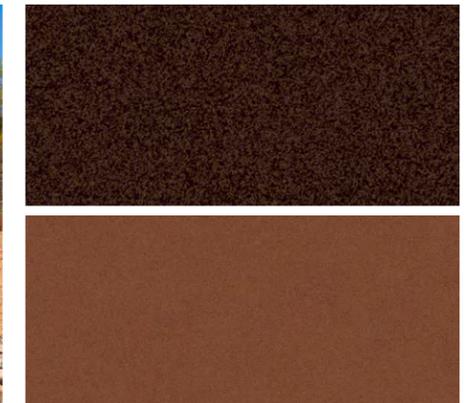
Shade Structures



Benches/Seating



Drainage Channel Rock Mulch



Finish Colors

Rock Mulch

A combination of rock mulch types should be incorporated to add variety, color, and texture. Larger rocks and boulders can be inset into rock mulches to provide shadow pockets and visual relief as they break up fields of rock mulch. For native areas (or recreating a natural, undisturbed look) harvest existing rock where possible and supplement with a rock mulch blend of 3/4" and 2"x 4" rock sizes. Two-thirds of the mix should be the 3/4" size and 1/3 of the mix should be the 2" x 4" size. Mulch should be distributed to mimic natural patterning.

The overall color palette includes a base color similar to Apache Gold and an accent area color similar to Fire Quartz. Sizes include: minus, used in non-planted areas; 1", used under large areas of plantings; 2"-4", used under smaller accent planting areas; and 6"-8", used in drainage areas.

Vehicular Control - Bollards and Boulders

Intersections provide unauthorized vehicles potential trail access. Use of a lockable folding bollard and two removable posts or bollards shall be provided at intersections to control the access onto the trail. Collapsible bollards provide opportunity for maintenance vehicles to temporarily lower the bollards to improve maintenance access.

Bollards shall be arranged in triangular fashion with one lockable folding bollard (located front and center of the two adjoining bollards) and two stationary bollards placed in the center of the entrance of the trail to allow two-way trail user travel. Bollards shall be placed so as to maintain a 5-foot distance between posts. The bollards shall be centered at the entrance of the trail and shall receive an application of diagonally striped reflective tape on front and back of the vertical surfaces. Folding bollards are available from Traffic Guard, Model # HDHB, or approved equal. For removable vehicle barrier post detail See City of Henderson Design Standards.

Large boulders may be appropriate at intersections and areas where vehicles typically park within the trail corridor. Use of boulders should appear naturalized while also fulfilling the function of vehicular control.

Equestrian Parking Areas

Trailheads which incorporate equestrian use should maintain separation between the equestrian areas and the vehicular areas. Fencing around the parking minimizes the likelihood of a horse getting loose and entering traffic areas. Berming and vegetation should be incorporated to additionally buffer equestrian uses from the roadways. Equestrian staging areas include facilities such as hitching posts, watering troughs, and restroom facilities to allow equestrian users the ability to stay close to their horse. The surface of equestrian parking areas should be a permeable material such as decomposed granite. Concrete paving markers should be used to mark parking spaces.

Fencing and Gates

Trails constructed on slopes along drainage ditches where the fill is steeper than a 3:1 ratio, within 5 feet of the trail shall be protected by railings, fences and/or barriers. If an overpass, underpass or pedestrian bridge is required to provide continuity of travel on the trail, the width of the approach of the shared-use trail to any such structure shall include a minimum 1-foot clear zone on both sides and the 12-foot high vertical clear zone.

Railings, fences and/or barriers on both sides of a bridge shall be a minimum of 4.5 feet (54 inches) high. Smooth rub rails shall be attached to the barriers at the handlebar height of 3.5 feet (42 inches). On all bridge decks, special care shall be taken to ensure that bicycle safe expansion joints are used.

Irrigation

Irrigation within the trail zone shall be installed to tie into existing City of Henderson water. In the event that City water is not available at the time of development, irrigation shall be installed in such a way as to allow the City to tie into the lines at a time the City is able. Efforts should be reduce the number of separate controllers needed for the irrigation system in order to streamline maintenance. Refer to the City of Henderson Landscape Design Standards for irrigation equipment specifications and installation details.



Rock Mulch



Rock Mulch



Rock Mulch



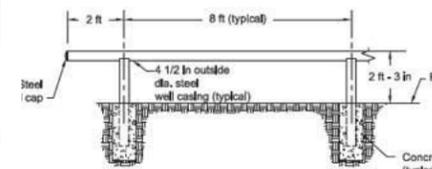
Rock Mulch



Collapsible Bollards



Equestrian Amenities



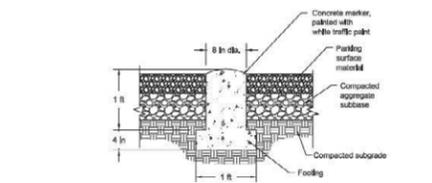
Equestrian Amenities



Equestrian Parking Area



Equestrian Parking Area



Paving Markers

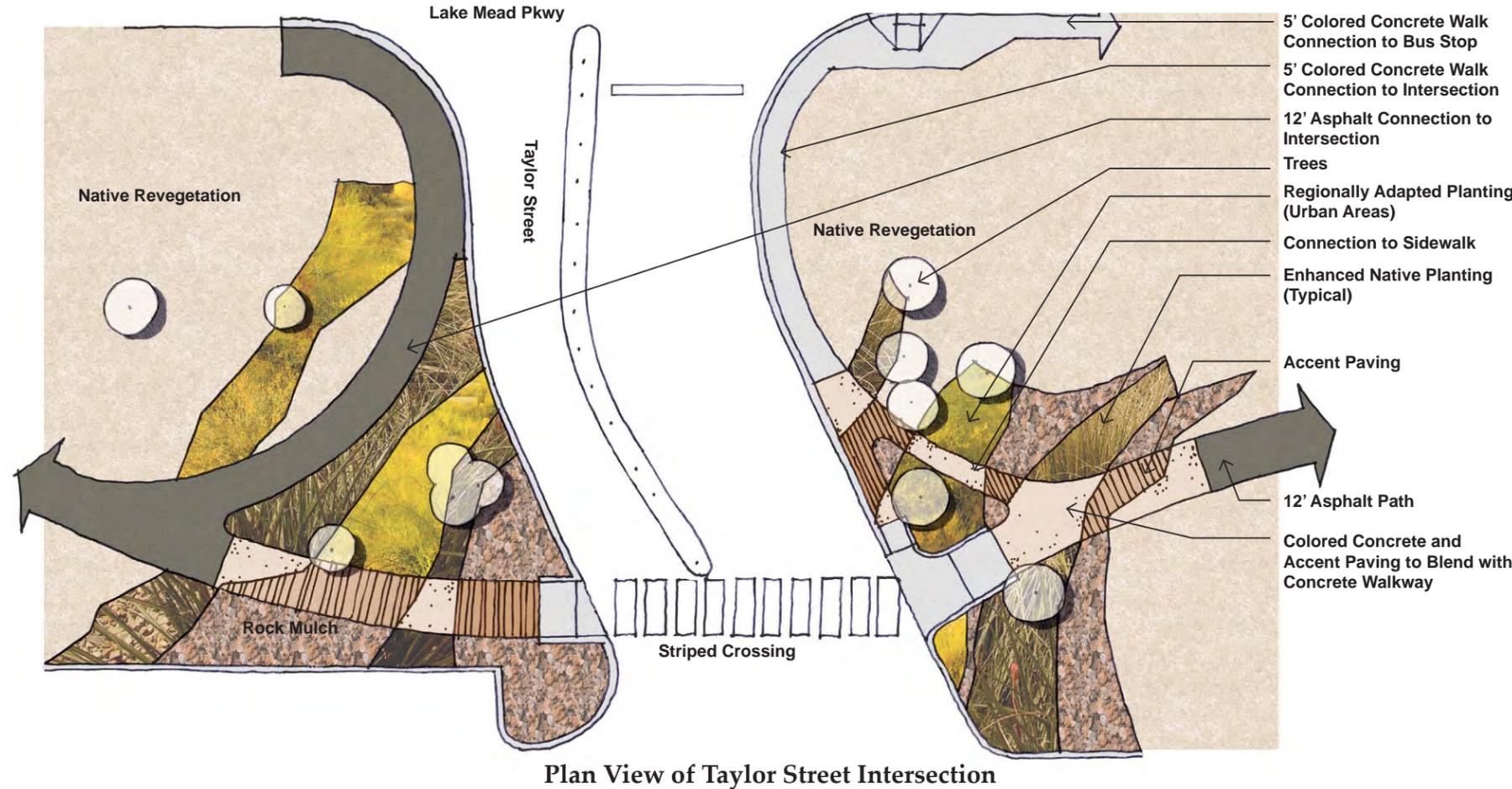


Fencing



Irrigation

INTERSECTION TREATMENTS & SHADED PATH SEGMENTS



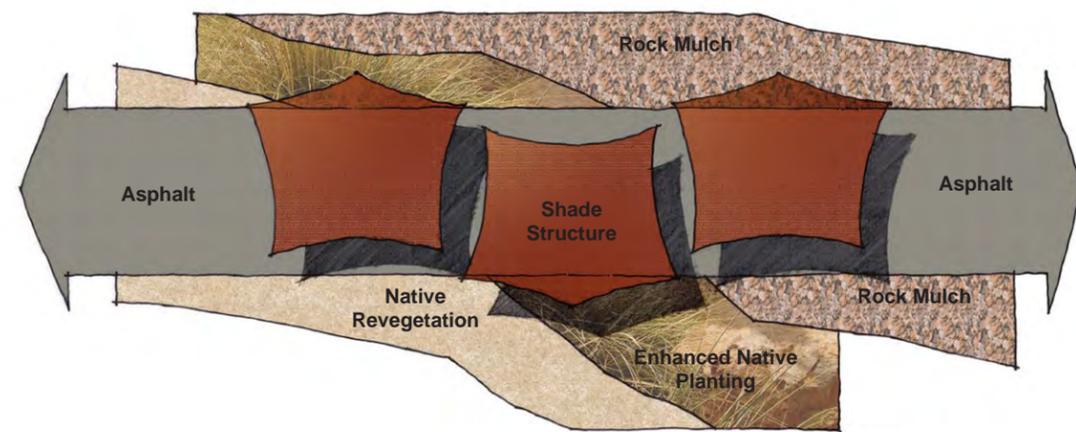
Intersection Treatments

Although trail design seeks to minimize the number of road crossings, where the trail does meet vehicular traffic, efforts are made to improve safety through signage and striping. Stop signs should be used for pathway signage and bike crossing signage provided along the roadway. Intersections are typically coordinated with an existing intersection of the parallel frontage road and cross street. This allows traffic to be more aware of an existing crossing rather than having a stand-alone mid-block crossing. It also minimized potential disturbance to the flood control facility's flowline.

Trail connections back to Lake Mead Parkway are made where there is a signalized intersection to allow for users to cross to either the north or south side of the Parkway and where a bus stop is present. As part of the NDOT widening project, 5' wide sidewalk connections are made from the trail to the intersection in order to minimize conflicts with culverts and traffic signal poles. In circumstances where the traffic signal pole does not create a conflict, a 12' wide path is provided and the culvert's headwall is extended. Fencing will be included where needed for safety. The main travel path should always be a minimum of 12' in width.

The design theme is expressed simply at intersections to allow flexibility and coordination with adjacent developments. Change in materials also helps notify a crossing is ahead to slow bikers.

Trail intersections and approaches shall be on relatively flat grades. Stopping sight distances at intersections shall be checked and adequate warning shall be given to permit trail users time to stop before reaching the intersection, especially on downgrades. Where a trail intersects another trail, a minimum radius of 5 feet shall be provided at all corners of the intersection. Where ramps are used at commercial driveway crossings, the ramp shall be the same width as the adjacent trail. Each driveway crossing shall have 6" curb on either side for the length of the driveway with the exception of the 12-foot wide paved trail and 3-foot wide clearance zones. Trail shall connect to the back of the sidewalk ramp at all intersections.



Plan View of Shaded Path

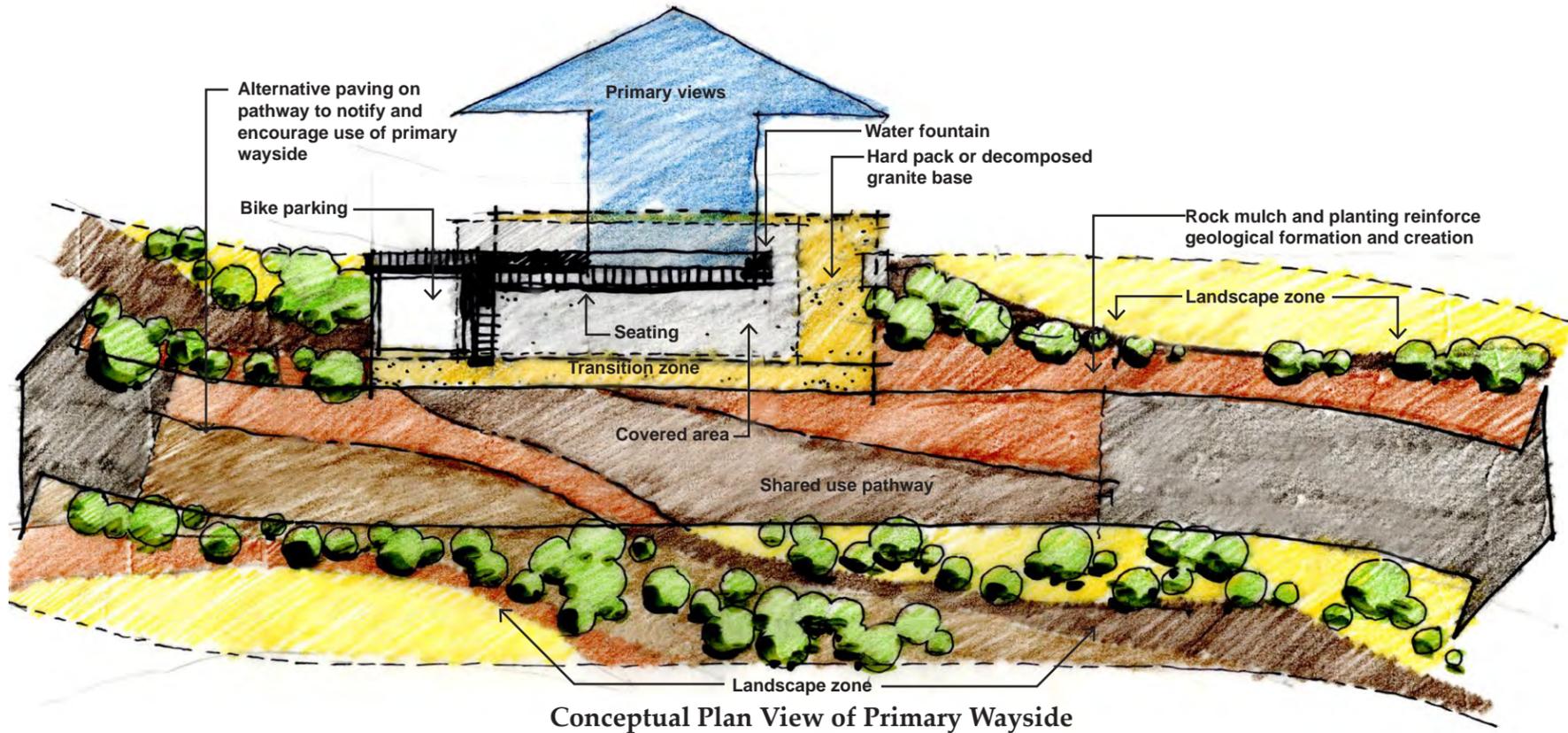


Perspective View of Shaded Path

Shaded Path Segments

The trail corridor includes shade structures to provide intermittent relief from the hot desert sun. Use of structures allows for reduced water use in lieu of over-using trees. Spacing of shaded path segments is dependant upon their coordination with other wayside facilities. Poles should be located outside of the 3' clear zone. Height of structure should allow for 12' clearance from trail elevation.

PRIMARY WAYSIDES

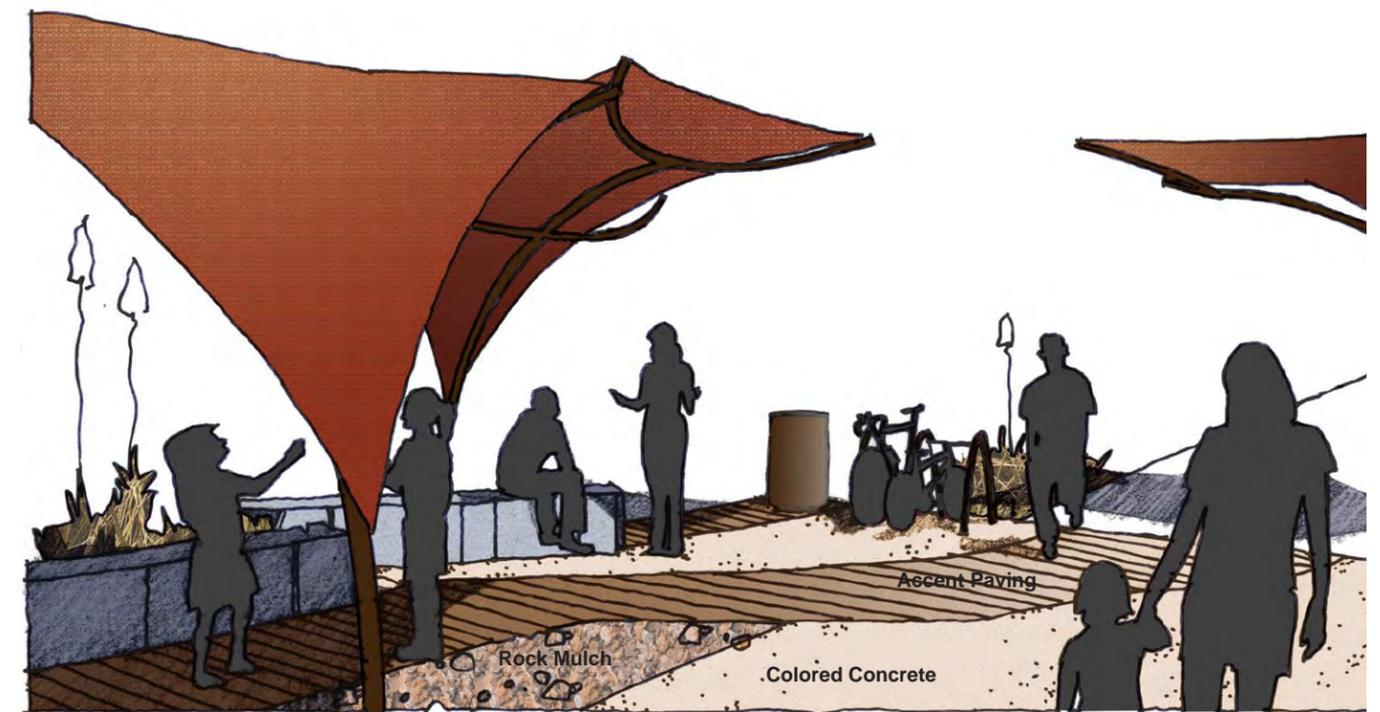
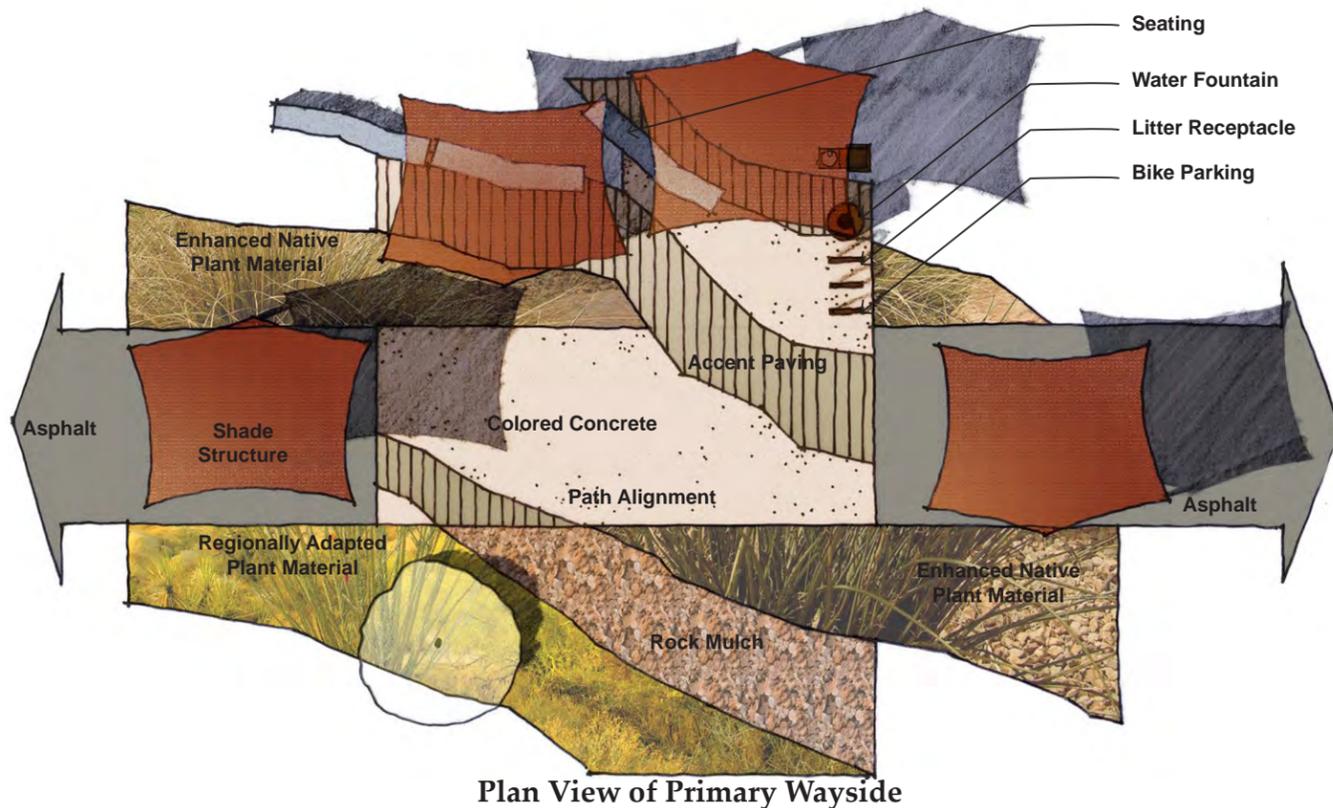


Primary Waysides

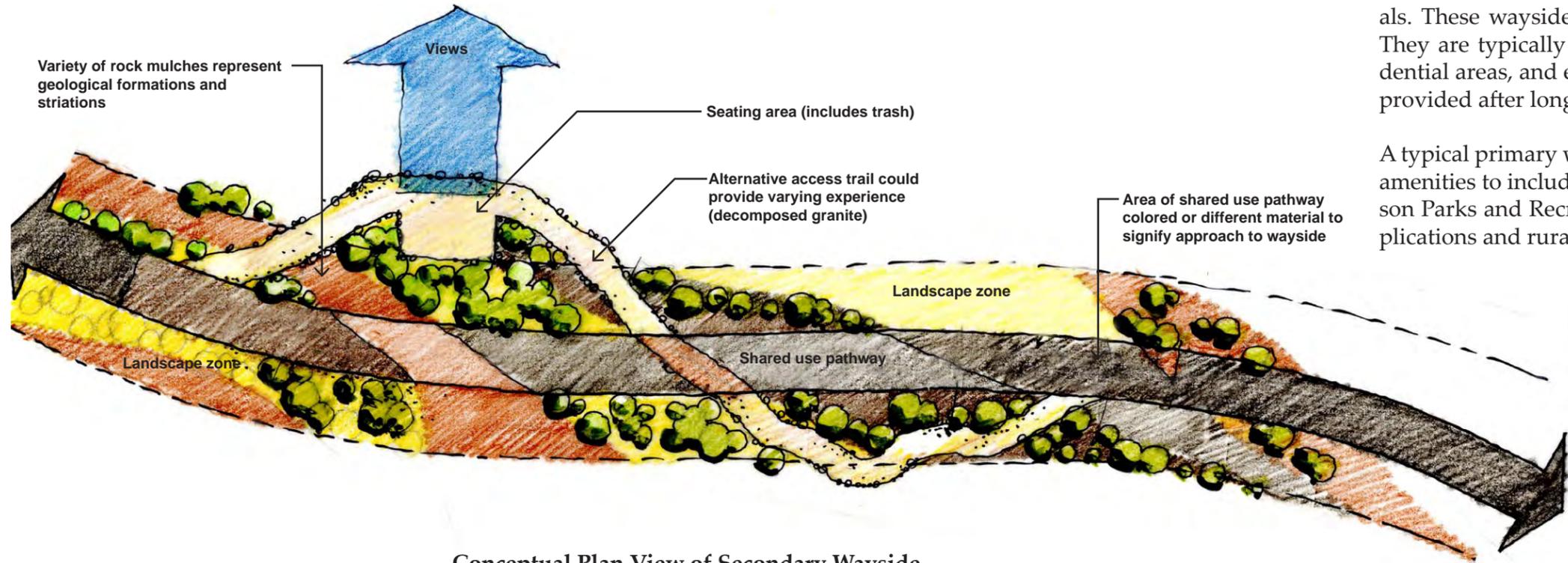
To meet the needs of trail users waysides shall be installed periodically to provide rest and shade. Primary waysides are to be located at view points and key interpretive sites. They are typically located a mile apart in dense, urban areas and at a 2 to 4 mile spacing in natural areas. Trail corridors serving high numbers of pedestrians will have a greater frequency of waysides than those with few pedestrians and more cyclists.

A typical primary wayside is approximately 15 feet by 30 feet with landscape and amenities to include each of the following, at the discretion of the City of Henderson Parks and Recreation Department. Plant materials will be installed more densely than the typical trail landscape. Trees may be included in more urban applications of the primary wayside. Rural areas utilize shade structures more than trees.

- Shade structure
- Bench and trash/ash receptacle (on hardened surface)
- Standard drinking fountain(s) and pet drinking fountain(s)
- Pet waste station
- Paved trail
- Landscape planting and irrigation
- Public art work
- Interpretive signage



SECONDARY WAYSIDES



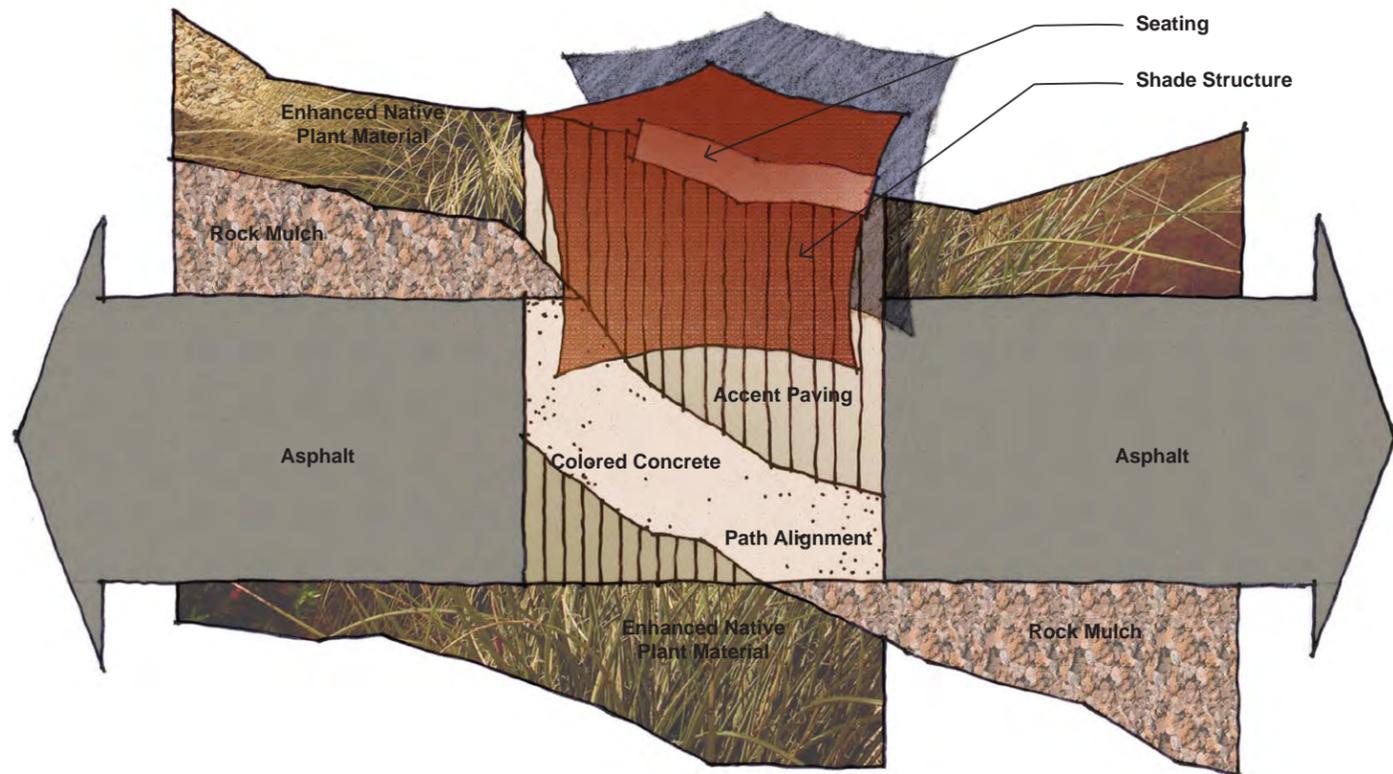
Conceptual Plan View of Secondary Wayside

Secondary Waysides

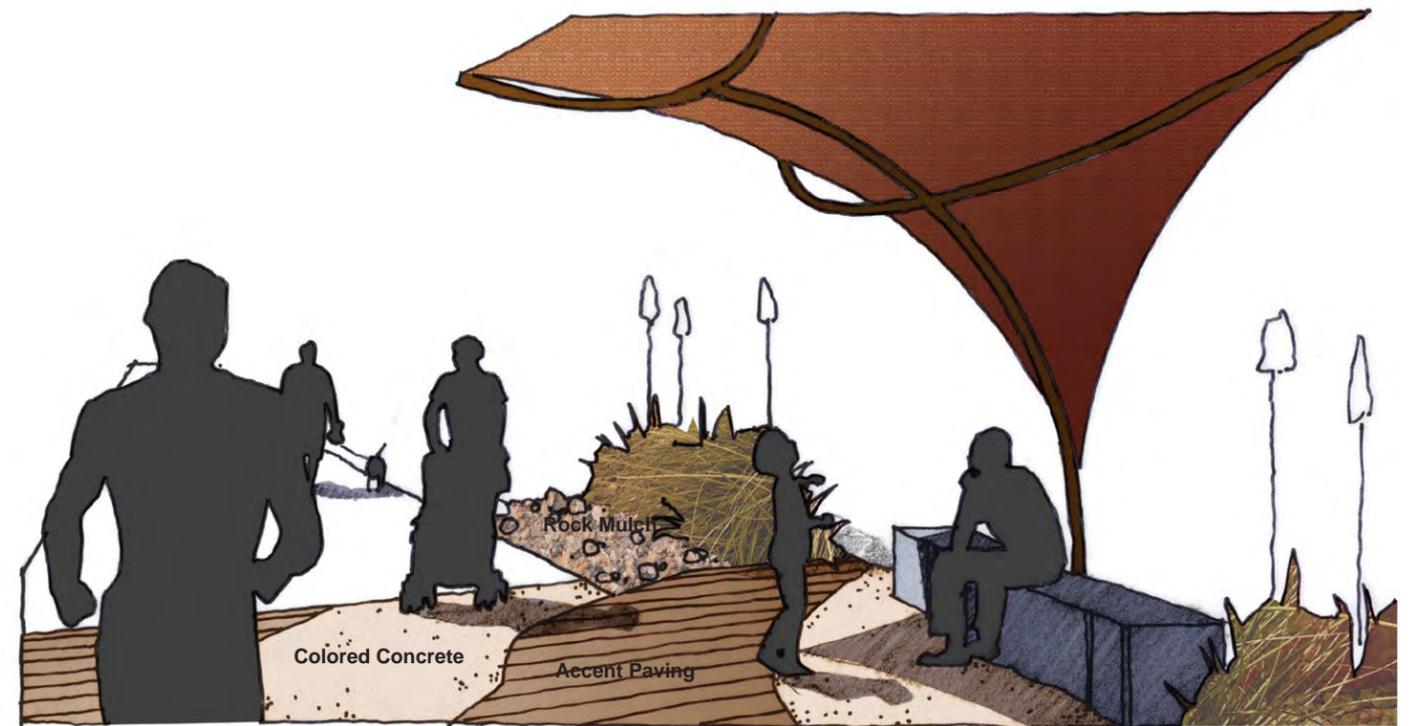
Secondary waysides provide intermediate rest and seating areas for trail users. Smaller scale than primary waysides, secondary facilities still use similar materials. These waysides are to be located at view points and key interpretive sites. They are typically located every 1/8 mile in urban areas, every 1/4 mile in residential areas, and every mile in natural areas. Secondary waysides should also be provided after long or steep grade climbs.

A typical primary wayside is approximately 7.5 feet by 15 feet with landscape and amenities to include each of the following, at the discretion of the City of Henderson Parks and Recreation Department. Trees may be included in more urban applications and rural areas may or may not incorporate shade structures.

- Shade structure
- Bench and trash/ash receptacle (on hardened surface)
- Paved trail
- Landscape planting and irrigation
- Interpretive signage

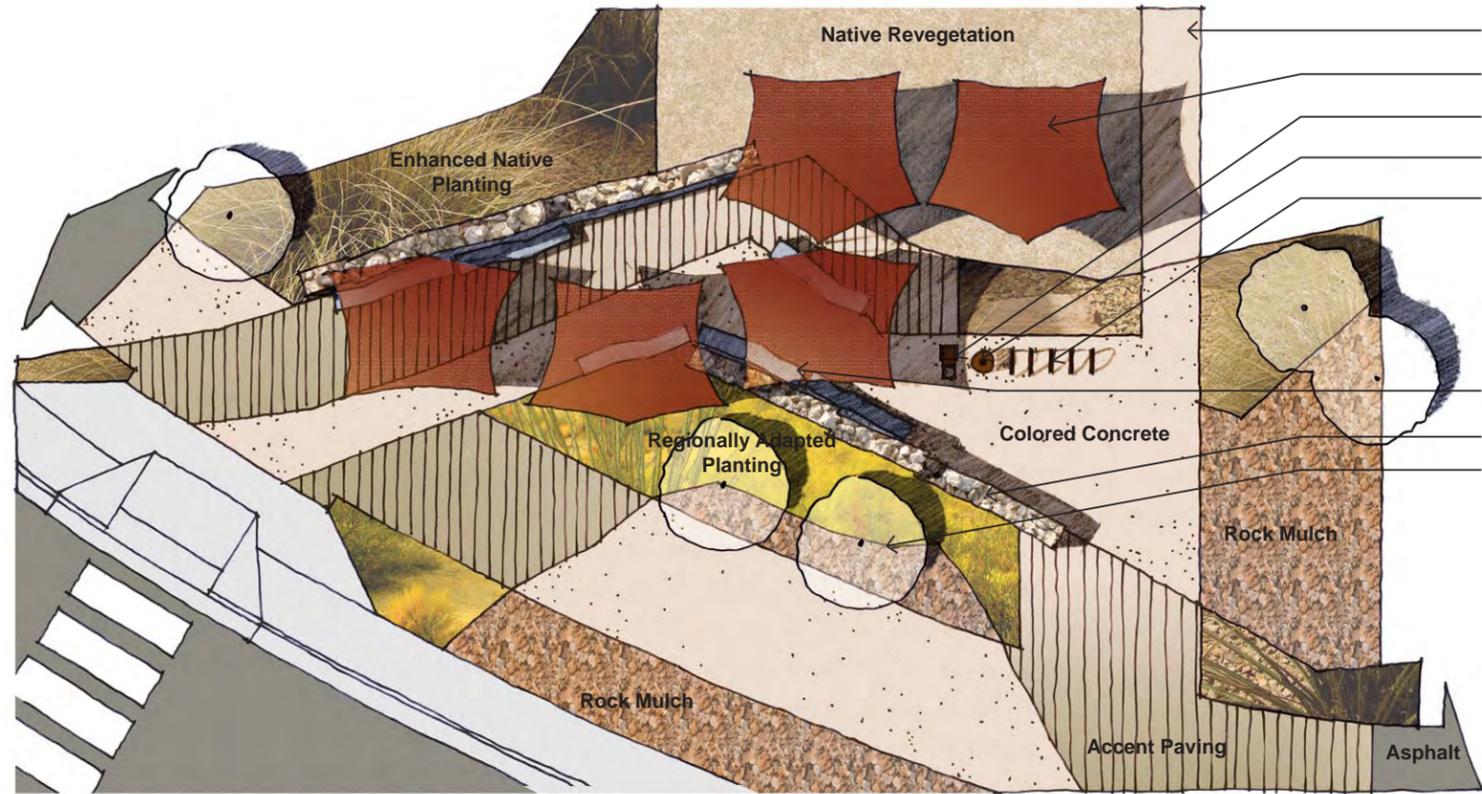


Plan View of Primary Wayside



Perspective View of Primary Wayside

GATEWAY AT LAKE MEAD PARKWAY / BOULDER HIGHWAY INTERSECTION



Plan View of Gateway on North Side of Intersection

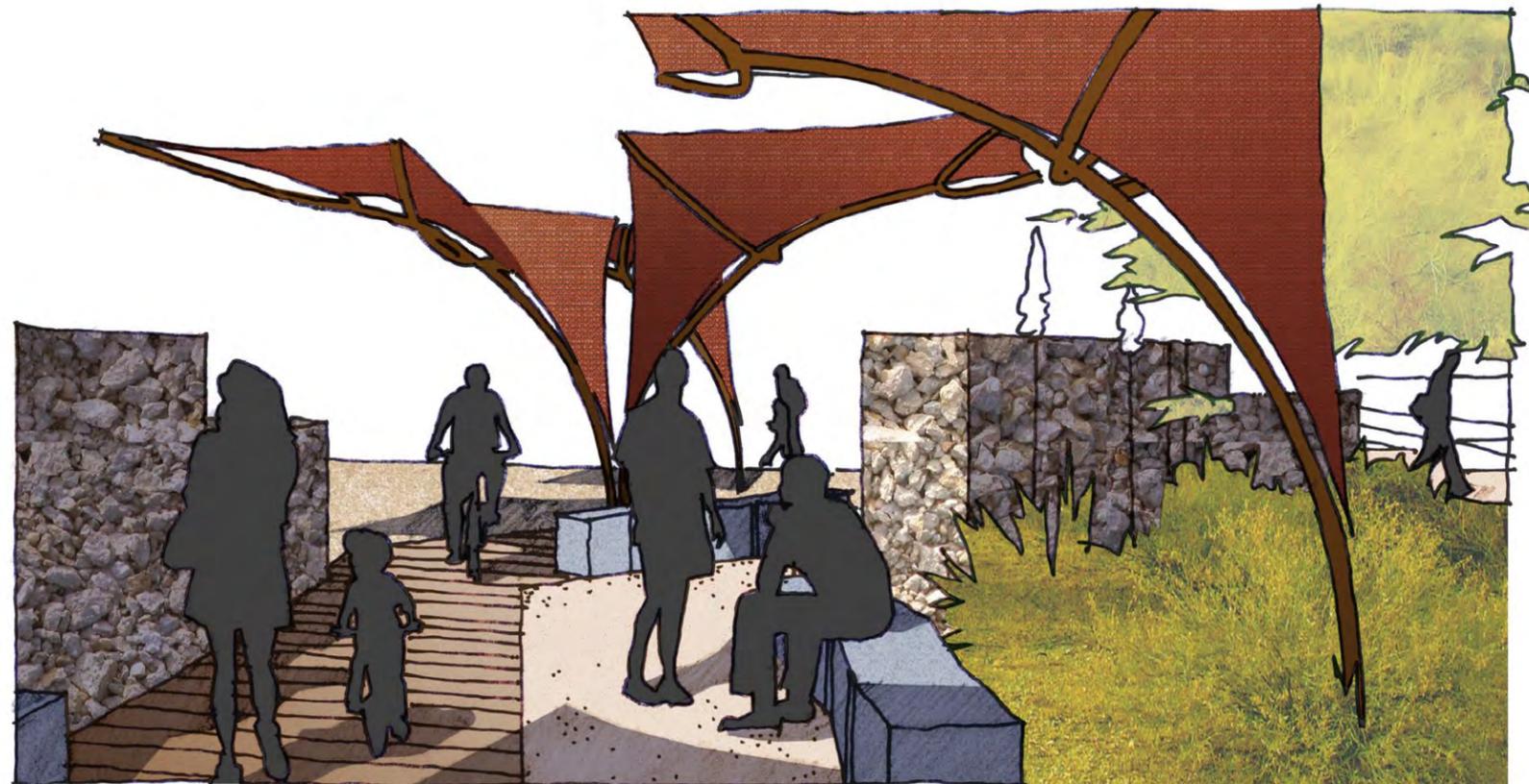
- Connections to Commercial Area
- Shade Structure
- Water Fountain
- Litter Receptacle
- Bike Parking

- Seating
- Gabion Accent Wall
- Trees

Gateway

The intersection of Lake Mead Parkway and Boulder Highway serves as the decision-making point for travel either to Lake Mead National Recreation Area to the east or downtown Henderson to the west. It also marks the beginning of the Lake Mead Parkway Trail project. NDOT's Lake Mead Parkway widening project will reduce the existing landscape and the intersection's gateway impression. An opportunity exists to re-establish the sense of a gateway with the trail corridor development.

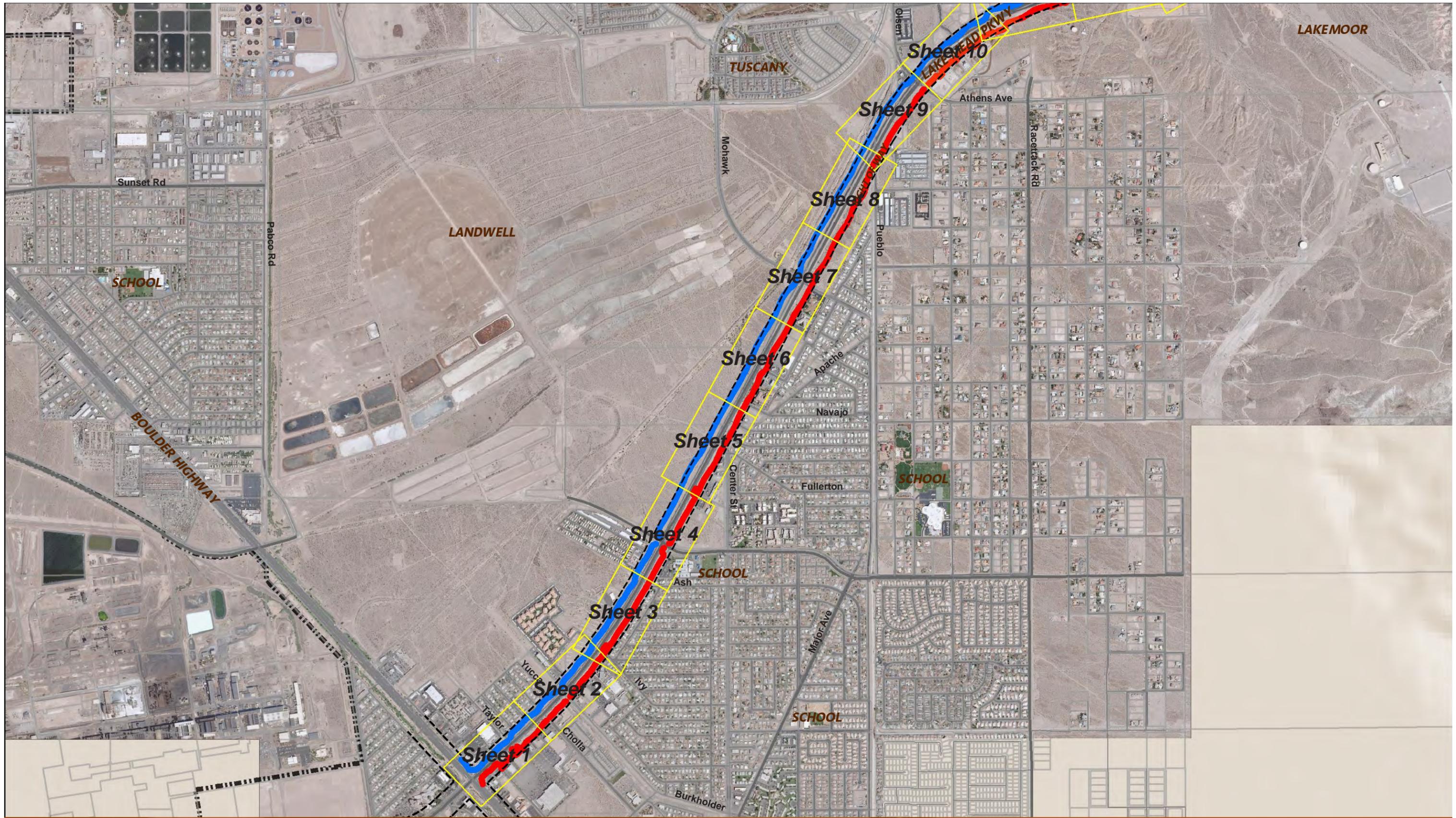
Pedestrian and cyclist amenities are incorporated with public art, seating, shade, and plant material to create a gateway that also serves as a primary wayside for trail users. Located in a commercial area, the gateway also connects users to retail and dining destinations. Material choices are coordinated with those found in downtown Henderson to reinforce the trail's connection to the city's history and existing development. Public art adds elegance as it harmonizes with the site context and other trail corridor improvements.



Perspective View of Gateway on North Side of Intersection



TRAIL ALIGNMENTS



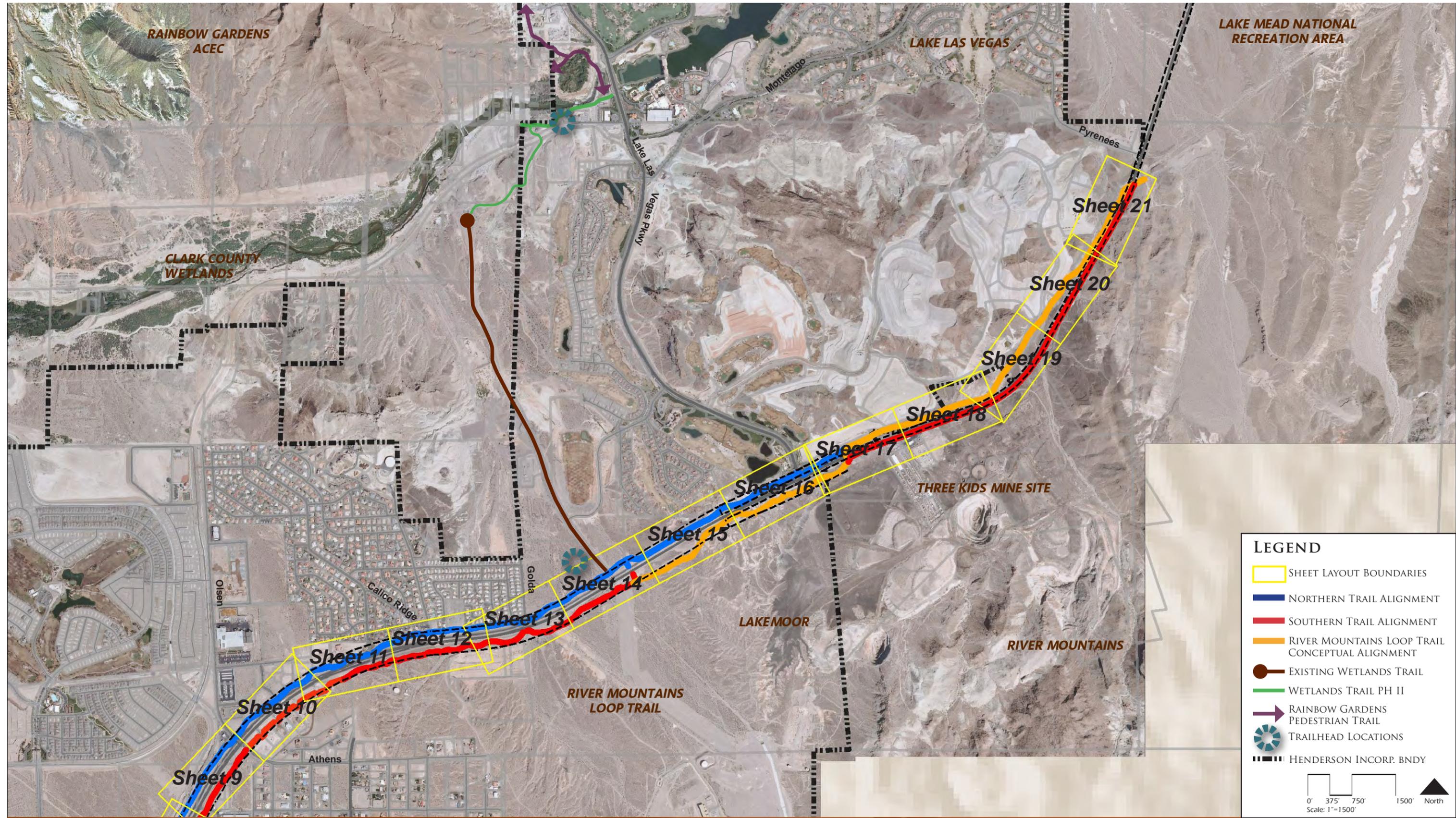
LAKE MEAD PARKWAY TRAIL
 HENDERSON, NEVADA

TRAIL ALIGNMENT OPTIONS
 LAKE MEAD PARKWAY - SOUTH



DESIGNWORKSHOP
 Locsha Engineering

1 June 2009



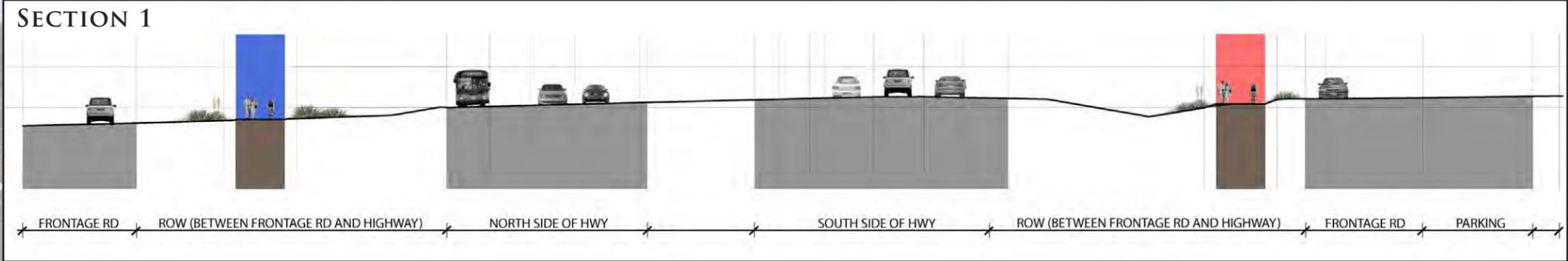
LAKE MEAD PARKWAY TRAIL
 HENDERSON, NEVADA

TRAIL ALIGNMENT OPTIONS
 LAKE MEAD PARKWAY - NORTH

DESIGNWORKSHOP
 Locsha Engineering

1 June 2009





1/2-mile Mile Marker with Regulatory Signage

Utilize existing trail alignment

Provide connections back to commercial area

Trail Kiosk: Map & Interpretive

Use landscaping to discourage cutting across streets to trail

Primary wayside to provide aesthetic entry into trail corridor

Provide connection to bus stop along 5' sidewalk

Extend headwalls and provide fencing.

Utilize existing trail alignment

Avoid disruption of channel flow

Bus Stop

Avoid disruption of channel flow

Provide connections back to commercial area

Provide easy curve movement to intersection

Connect to existing trail alignment

1/2-mile Mile Marker with Regulatory Signage

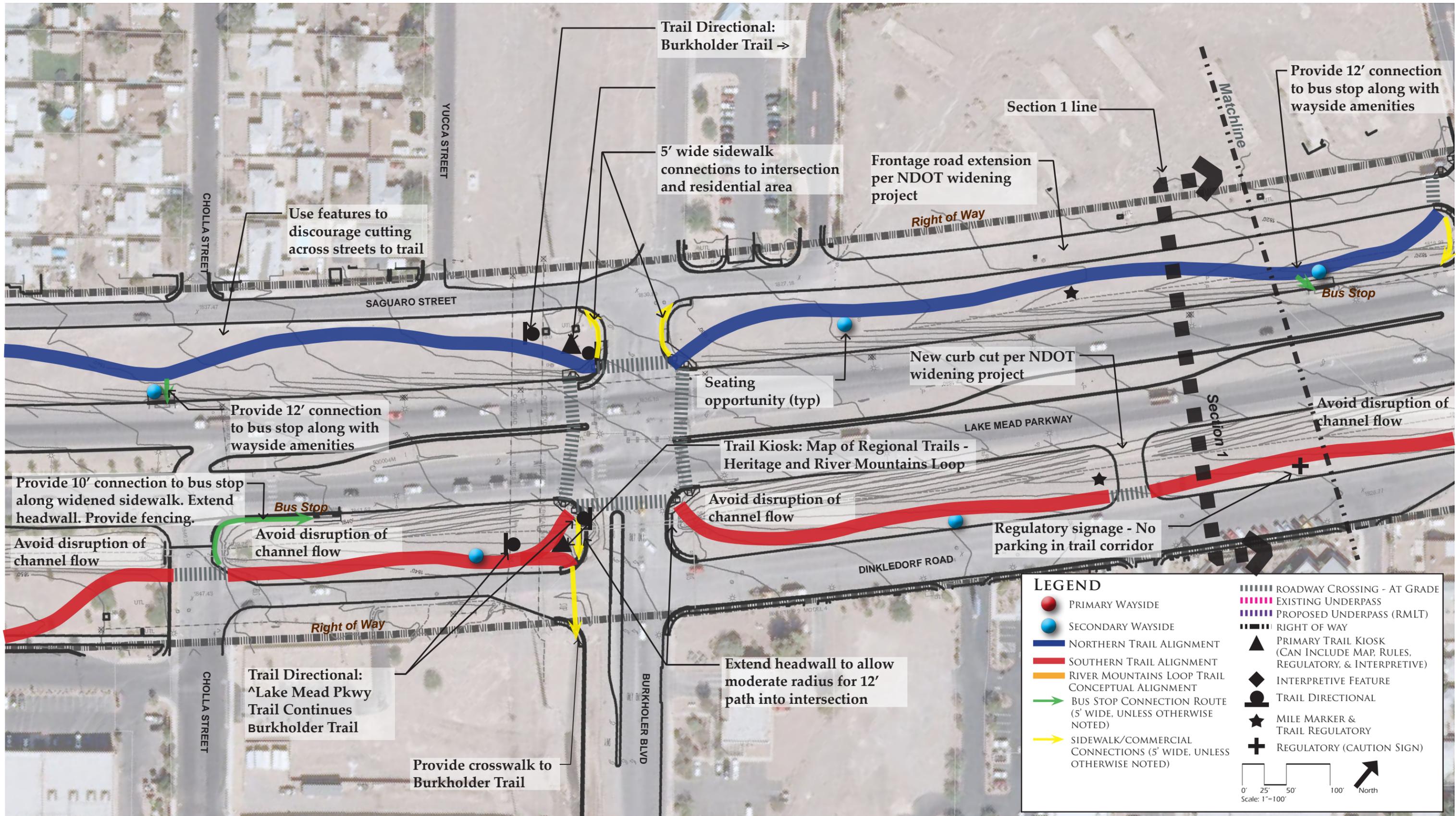
LAKE MEAD PARKWAY TRAIL
HENDERSON, NEVADA

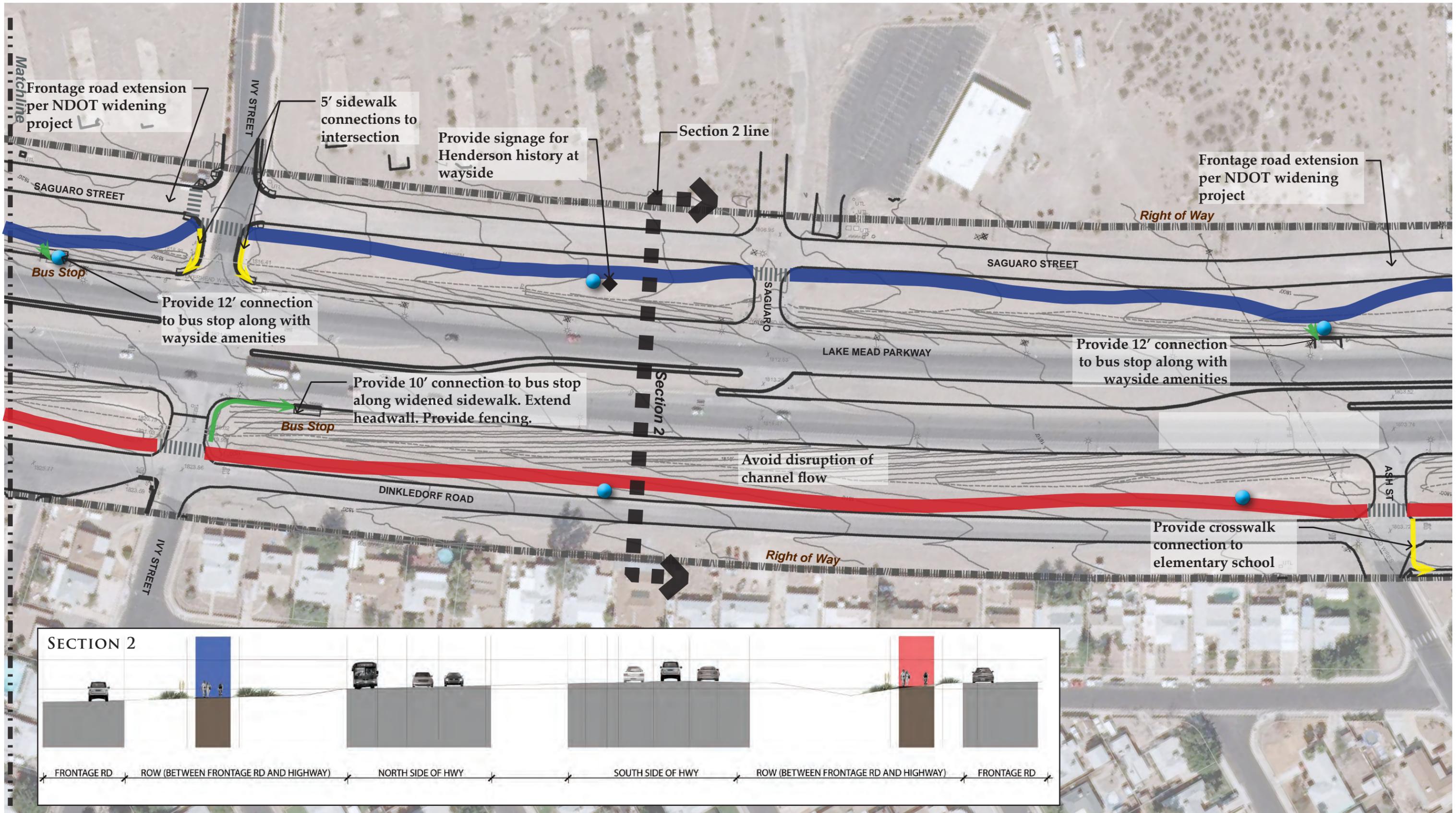
TRAIL ALIGNMENT OPTIONS
SHEET ONE -
BOULDER HIGHWAY TO TAYLOR

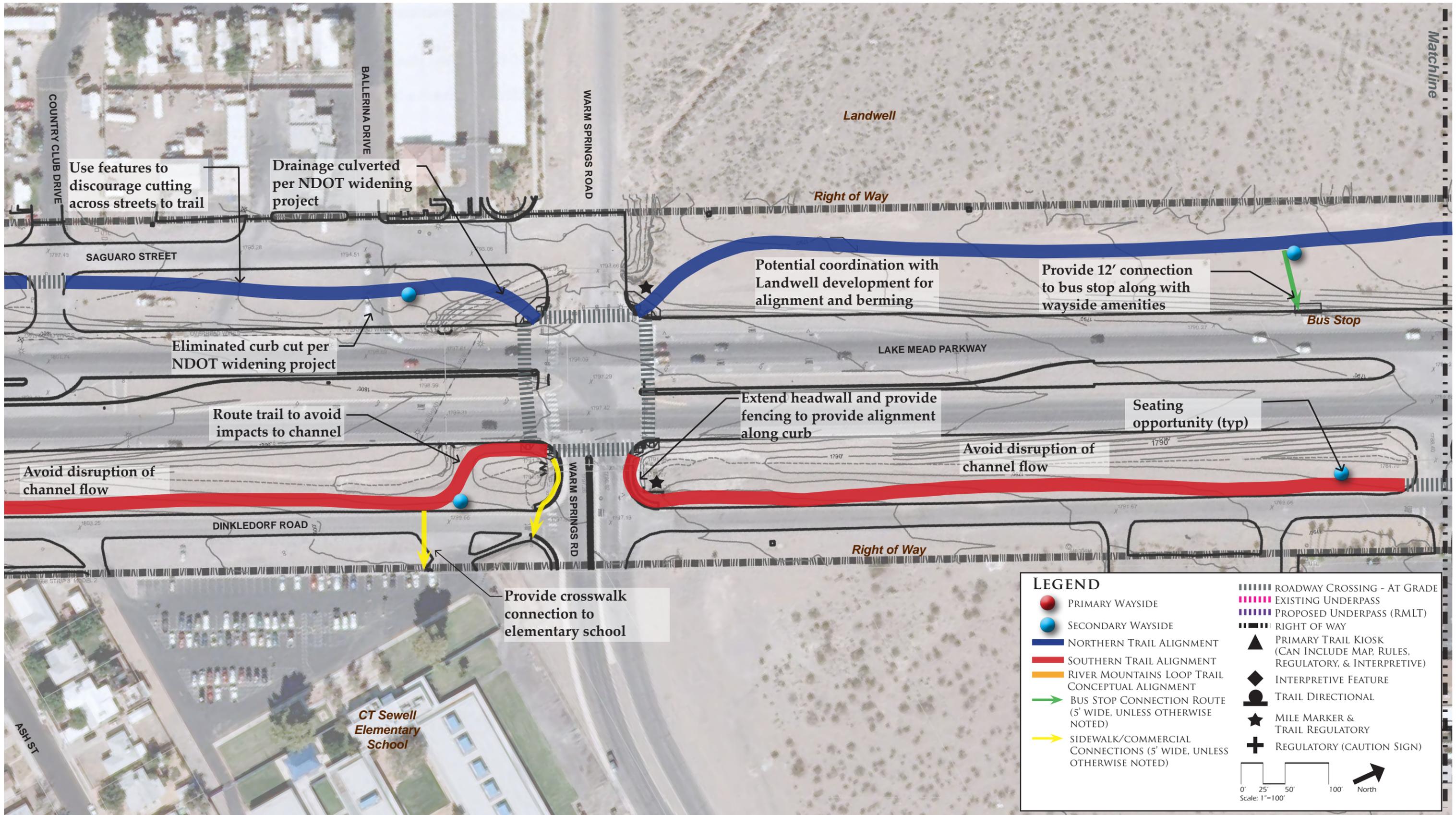


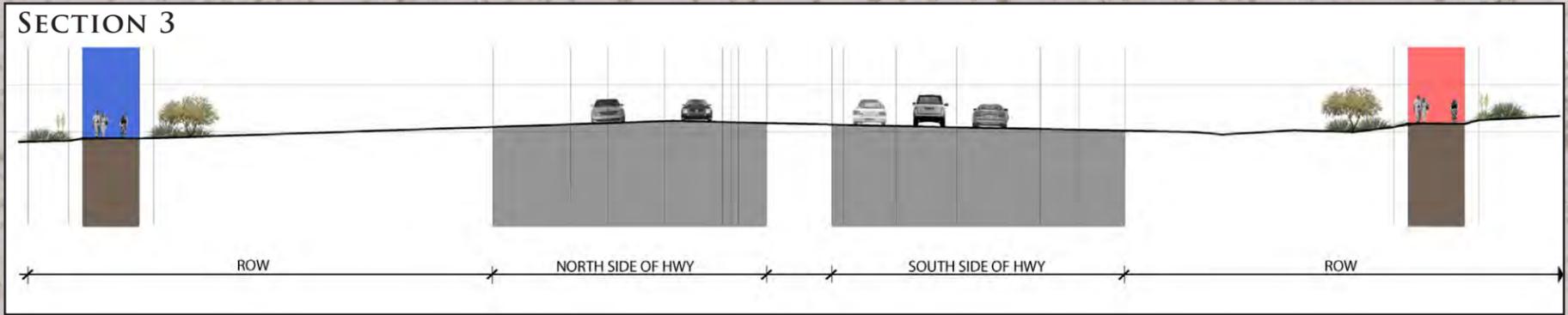
DESIGNWORKSHOP
Locsha Engineering

1 June 2009

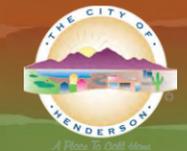
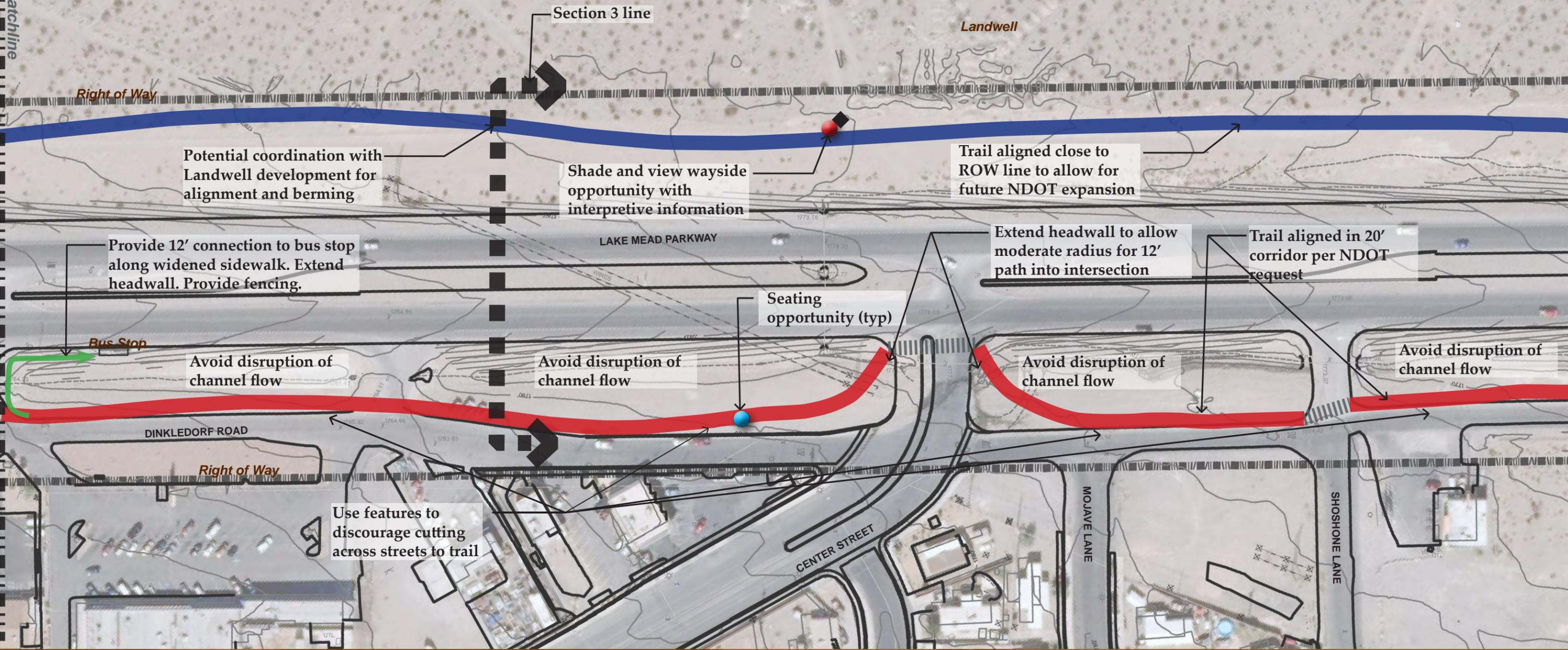


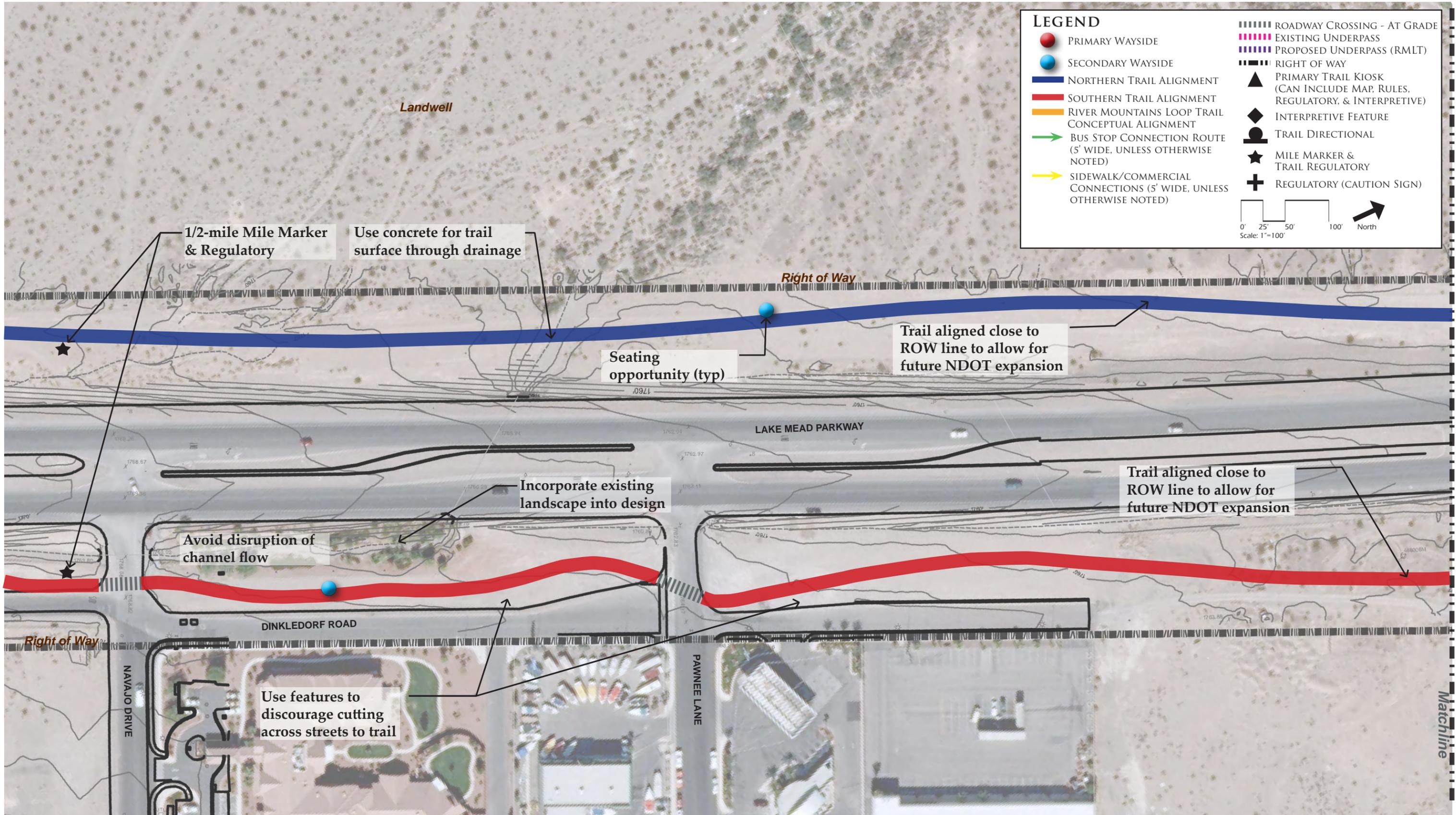


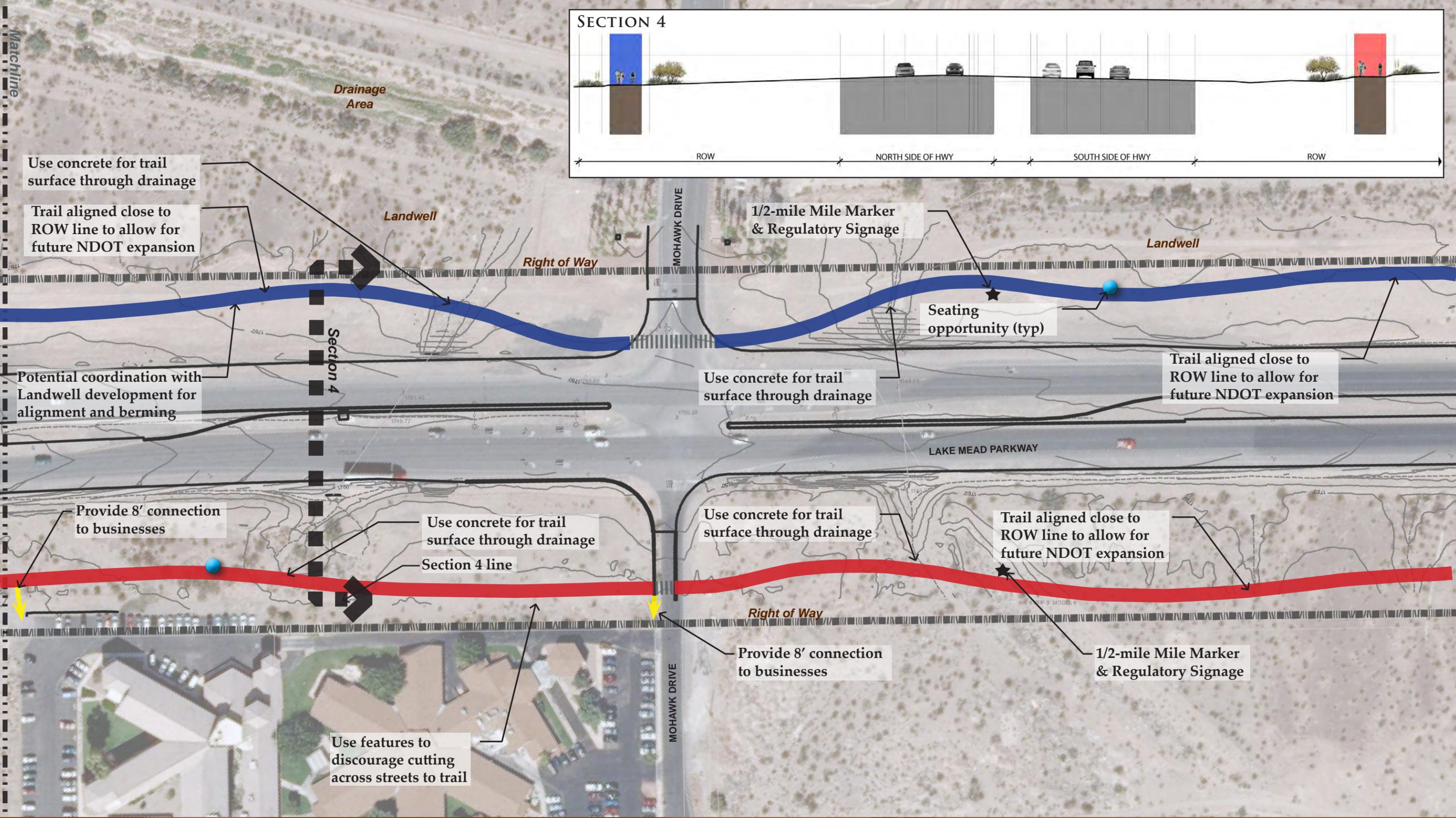


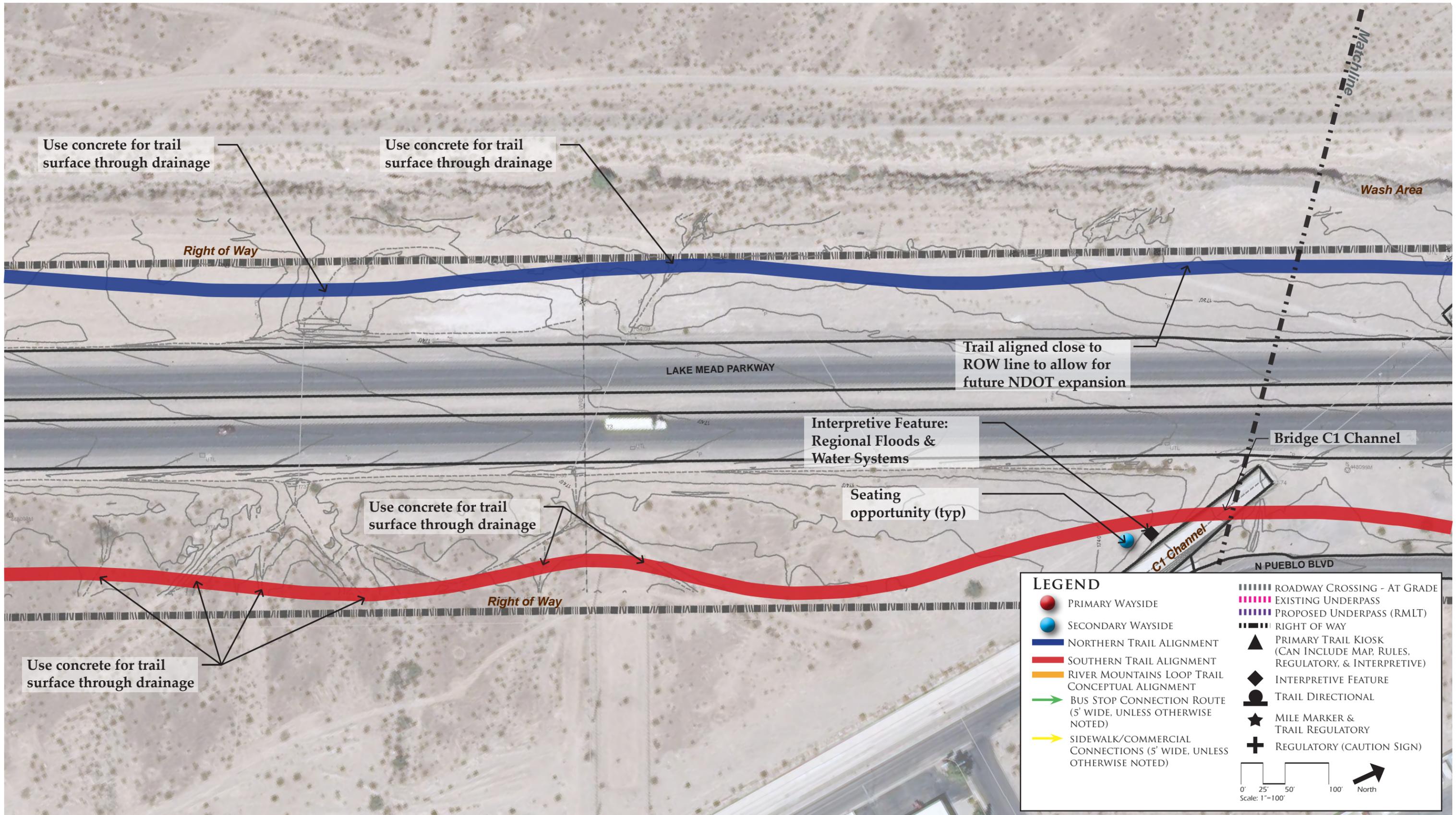


Matchline









Use concrete for trail surface through drainage

Use concrete for trail surface through drainage

Right of Way

Wash Area

LAKE MEAD PARKWAY

Trail aligned close to ROW line to allow for future NDOT expansion

Interpretive Feature: Regional Floods & Water Systems

Bridge C1 Channel

Use concrete for trail surface through drainage

Seating opportunity (typ)

Right of Way

C1 Channel

N PUEBLO BLVD

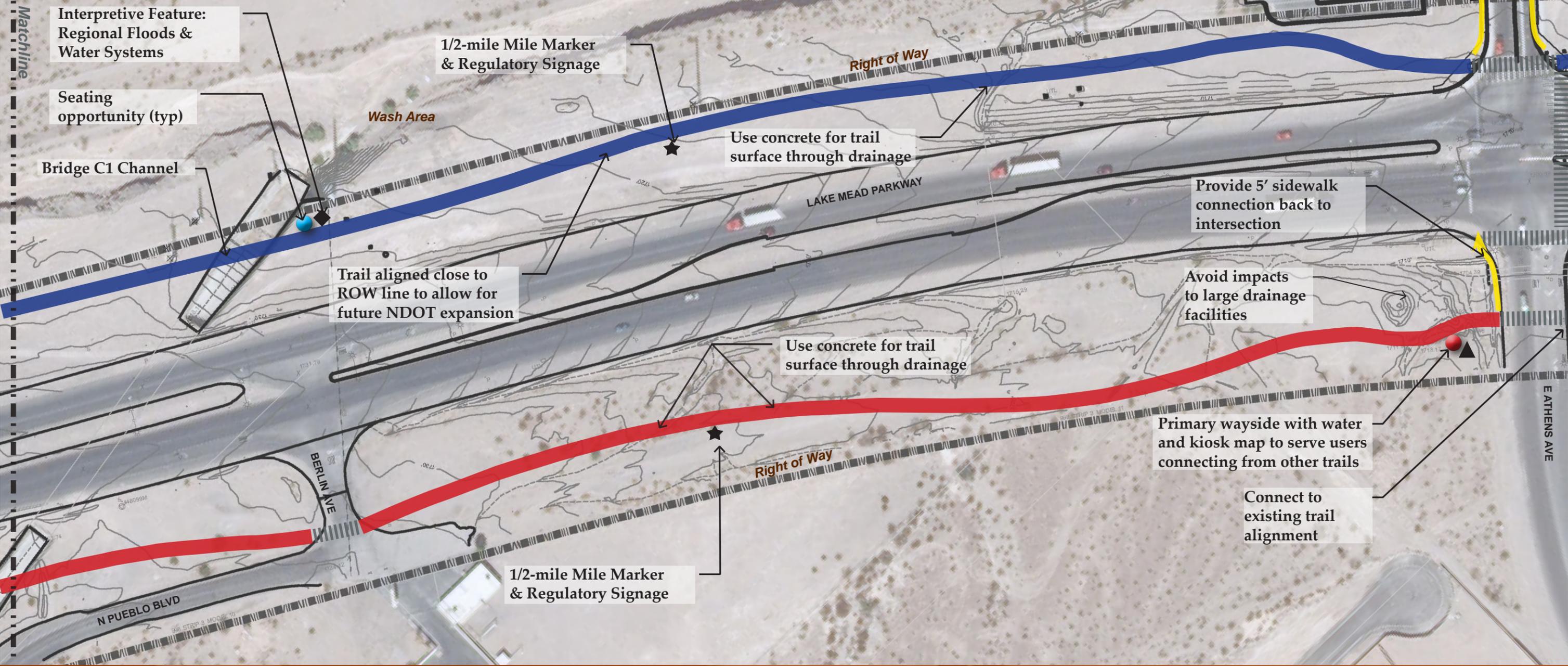
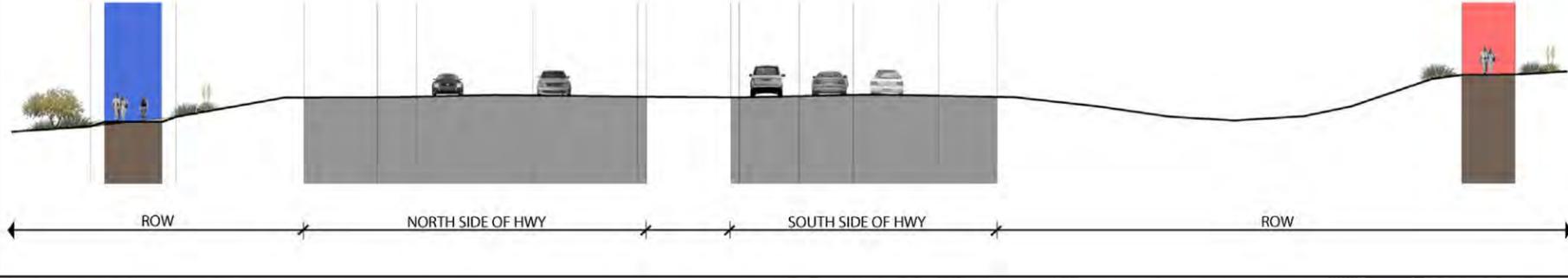
Use concrete for trail surface through drainage

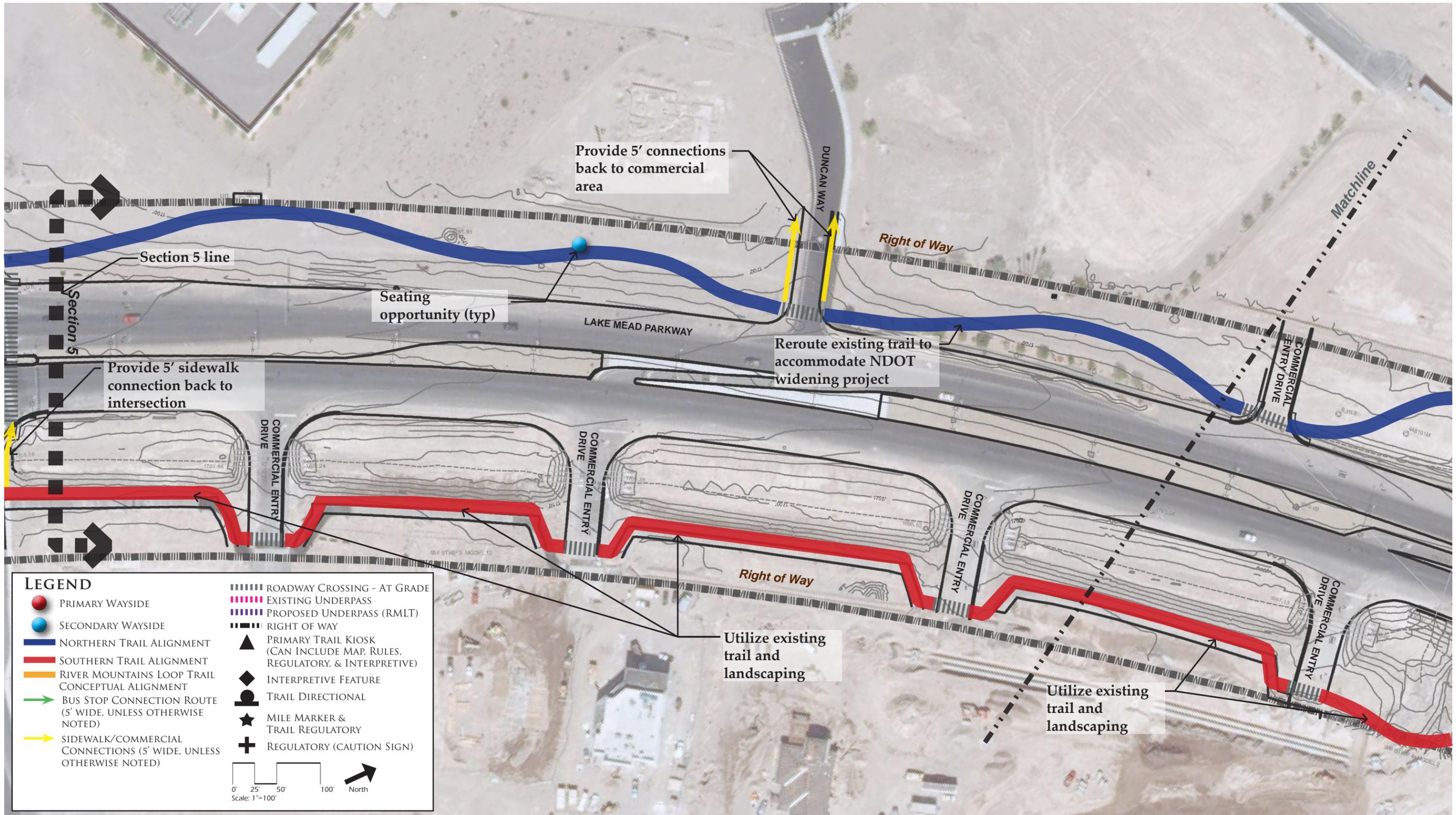
LEGEND

- PRIMARY WAYSIDE
- SECONDARY WAYSIDE
- ▬ NORTHERN TRAIL ALIGNMENT
- ▬ SOUTHERN TRAIL ALIGNMENT
- ▬ RIVER MOUNTAINS LOOP TRAIL CONCEPTUAL ALIGNMENT
- ➔ BUS STOP CONNECTION ROUTE (5' WIDE, UNLESS OTHERWISE NOTED)
- ➔ SIDEWALK/COMMERCIAL CONNECTIONS (5' WIDE, UNLESS OTHERWISE NOTED)
- ROADWAY CROSSING - AT GRADE
- EXISTING UNDERPASS
- PROPOSED UNDERPASS (RMLT)
- RIGHT OF WAY
- ▲ PRIMARY TRAIL KIOSK (CAN INCLUDE MAP, RULES, REGULATORY, & INTERPRETIVE)
- ◆ INTERPRETIVE FEATURE
- TRAIL DIRECTIONAL
- ★ MILE MARKER & TRAIL REGULATORY
- + REGULATORY (CAUTION SIGN)

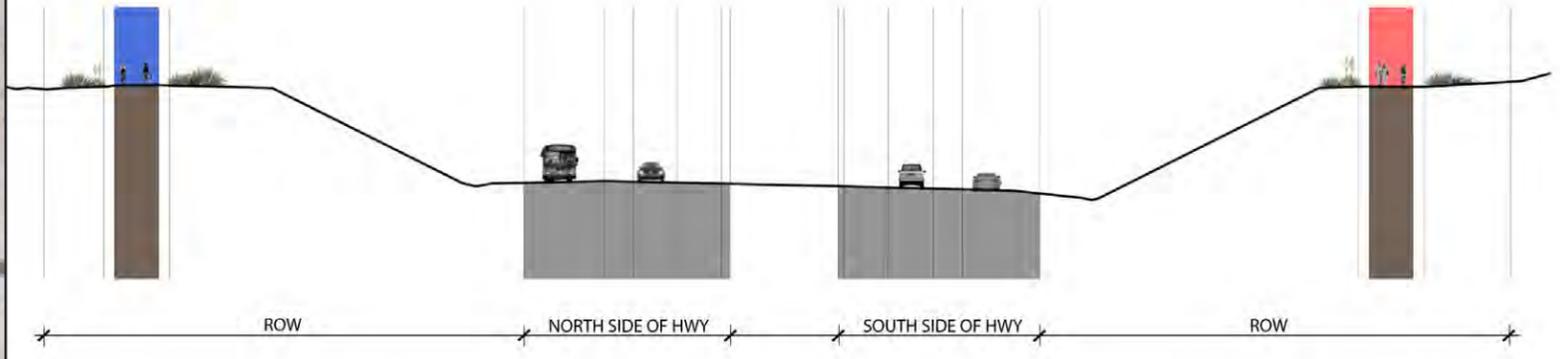
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SECTION 5

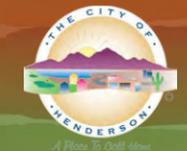
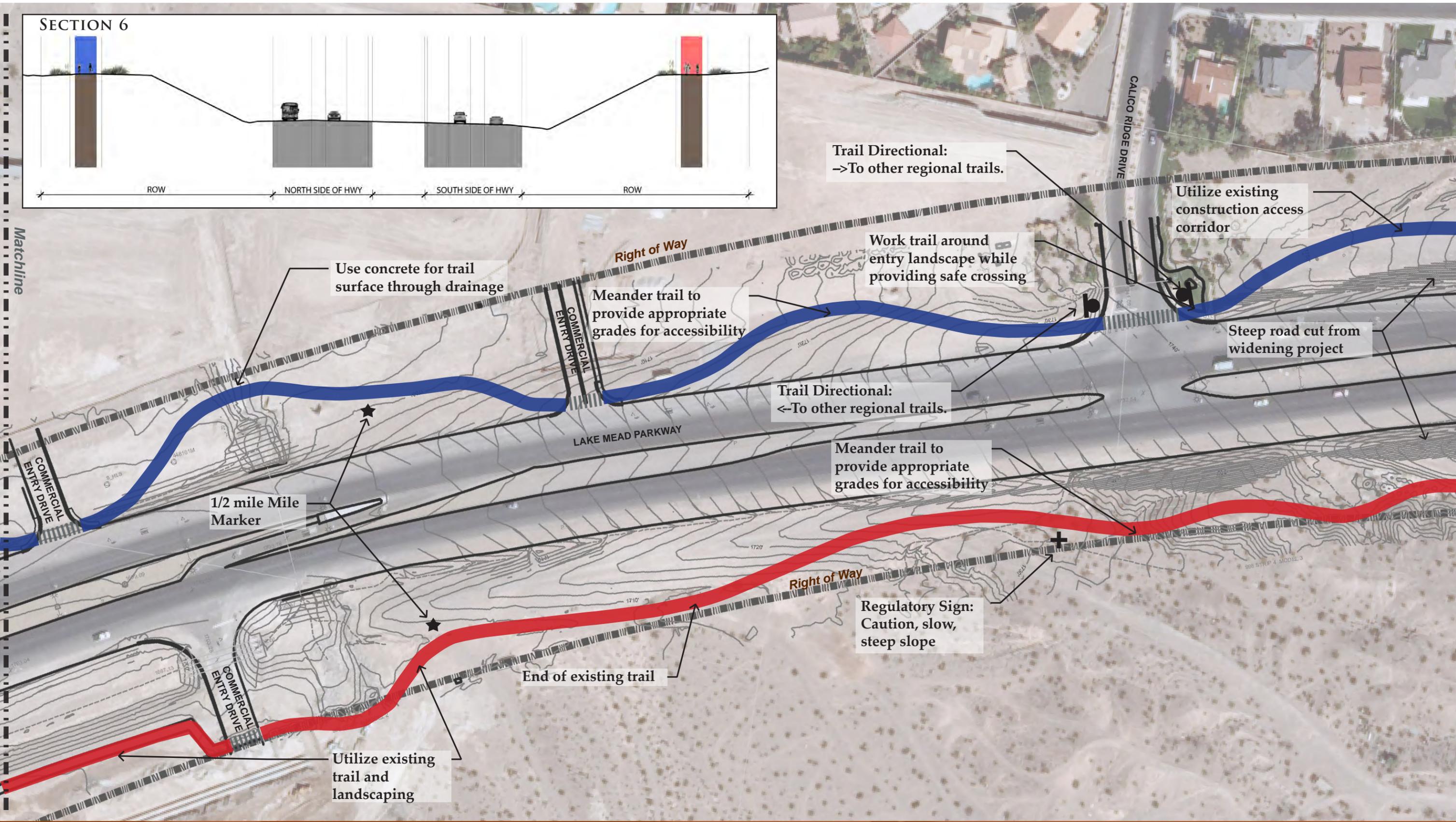


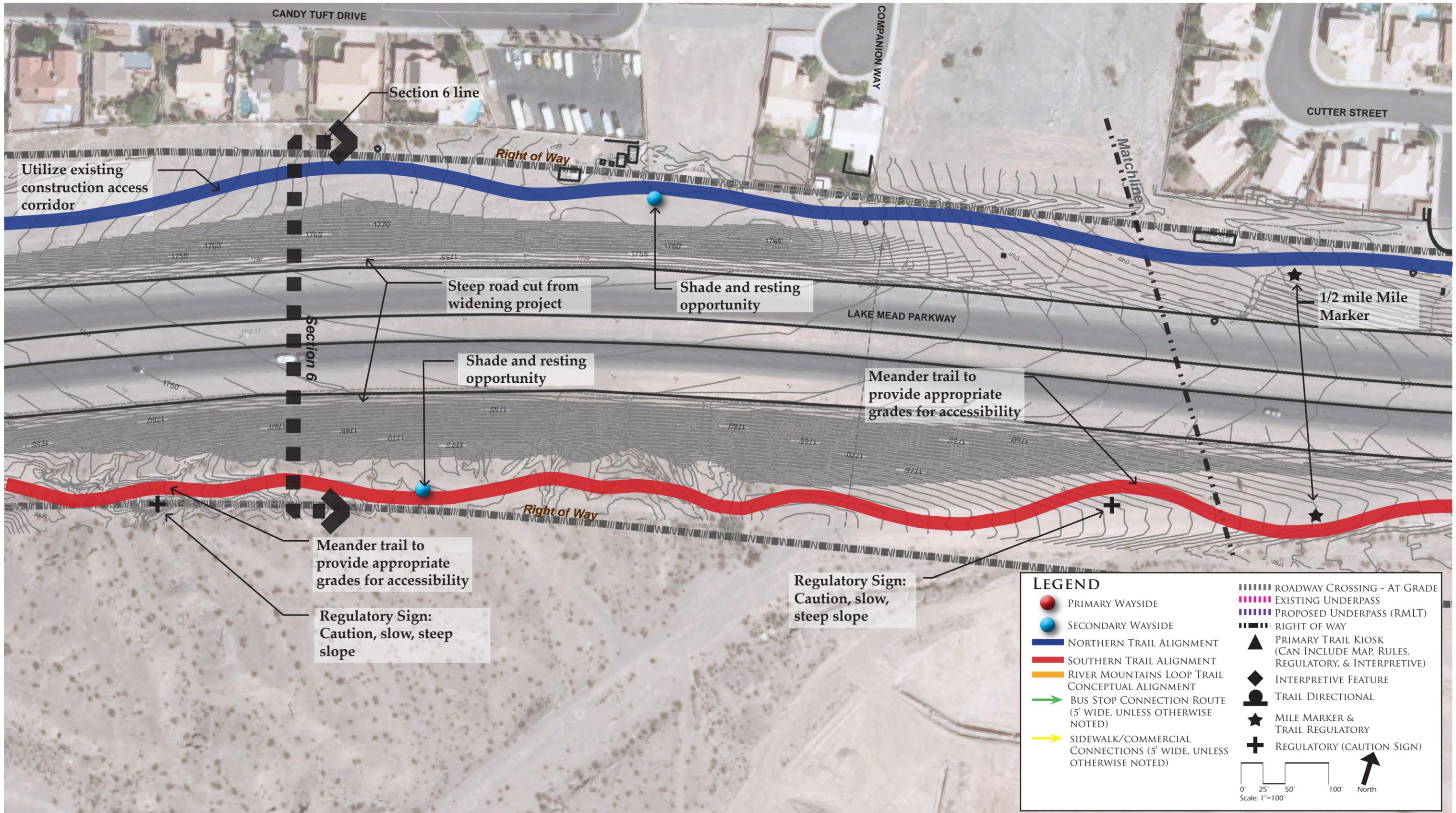


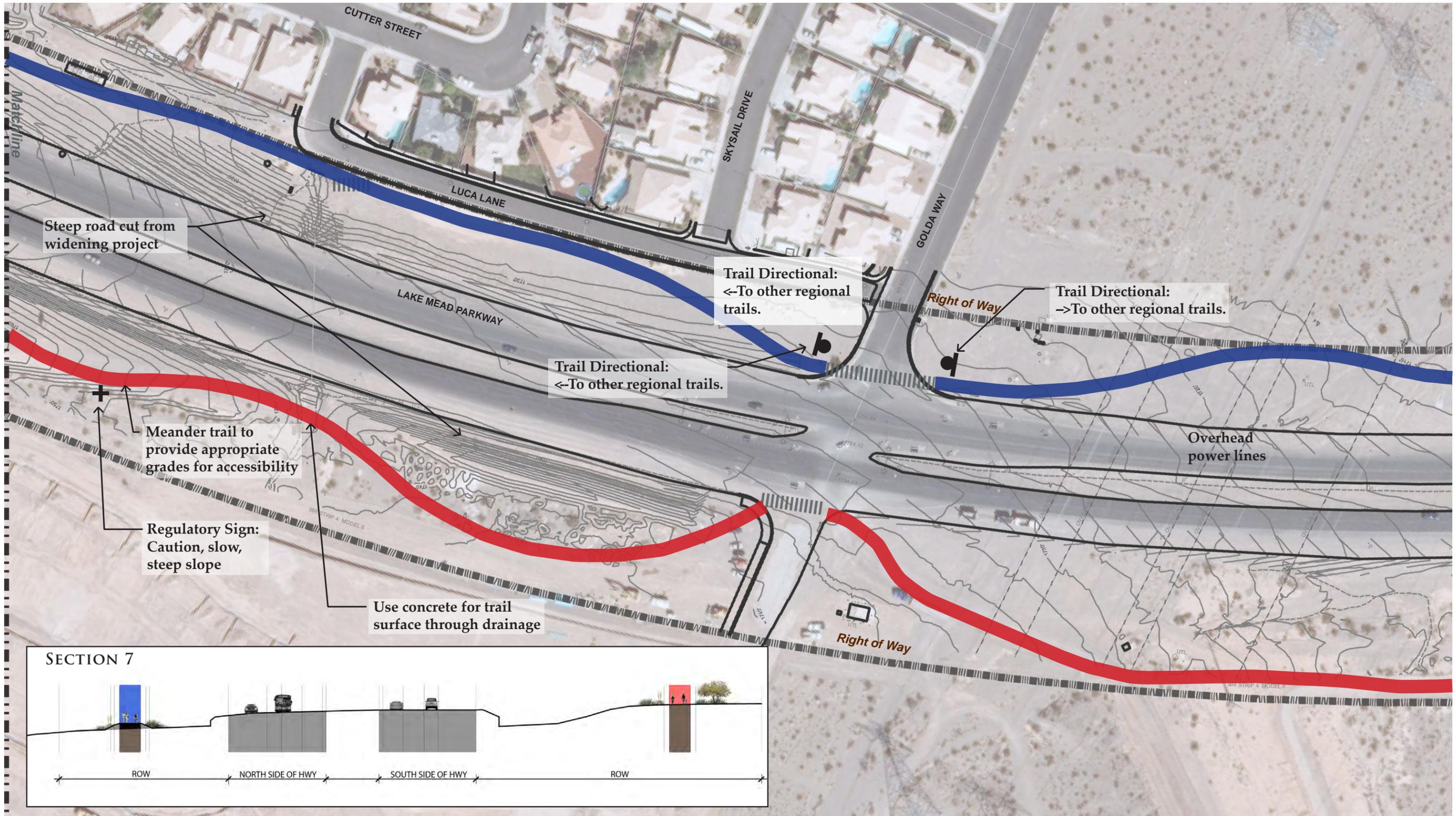
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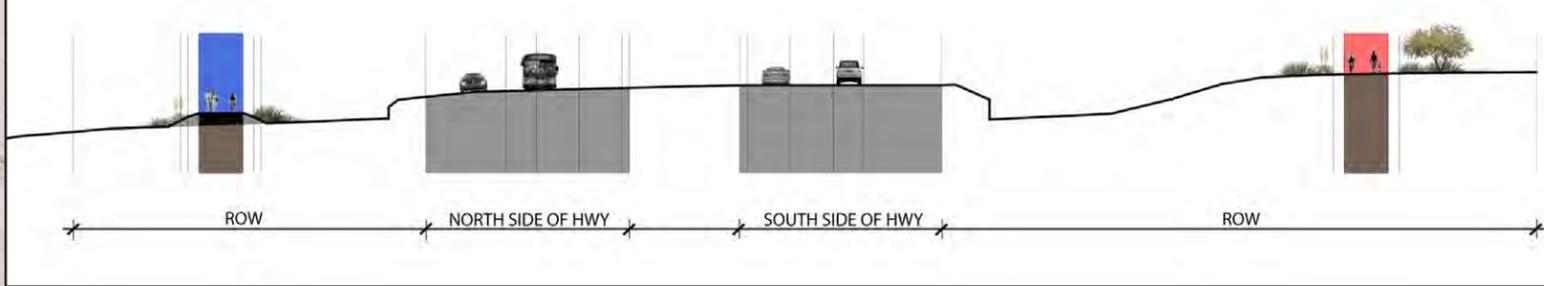
Matchline





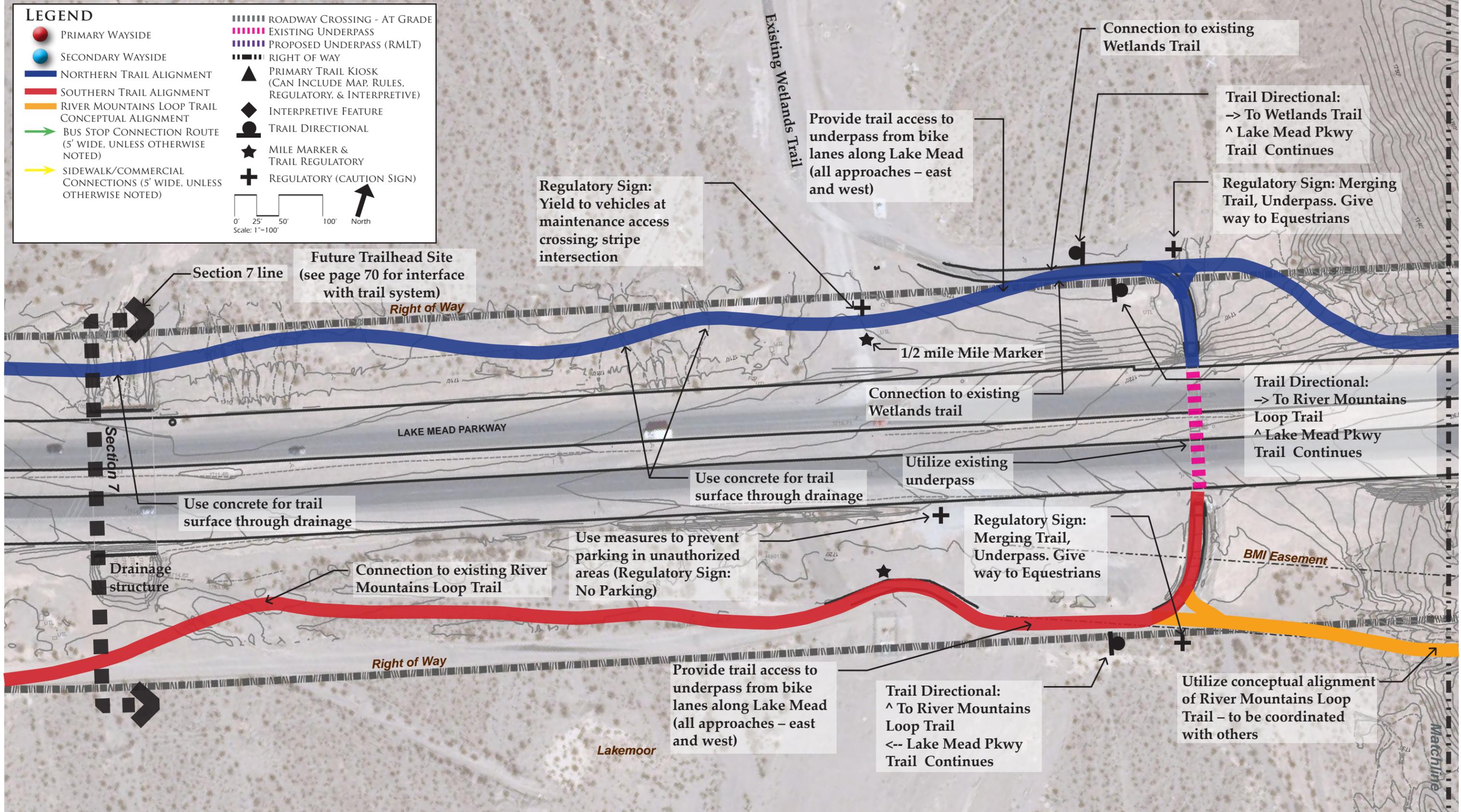


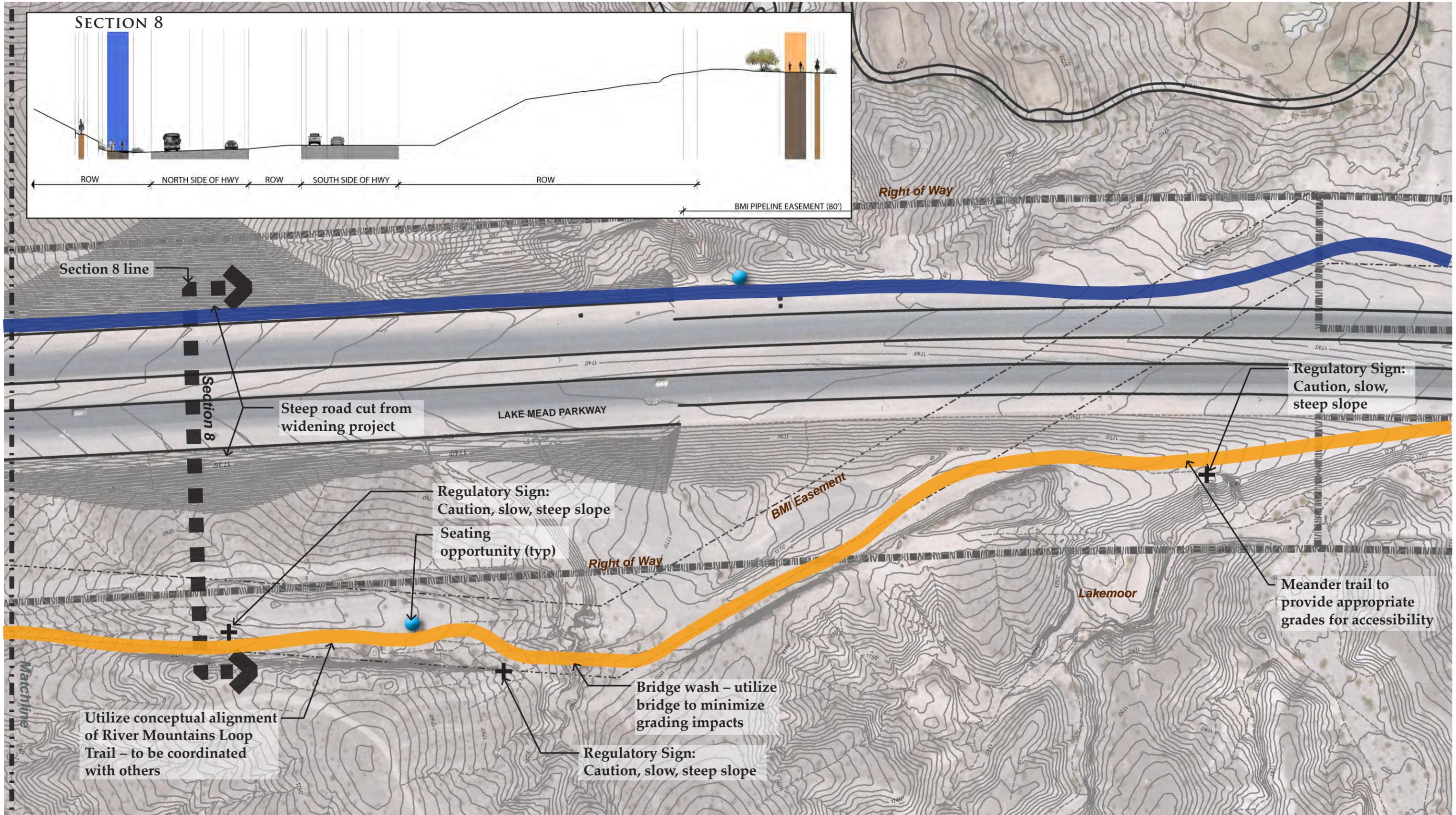
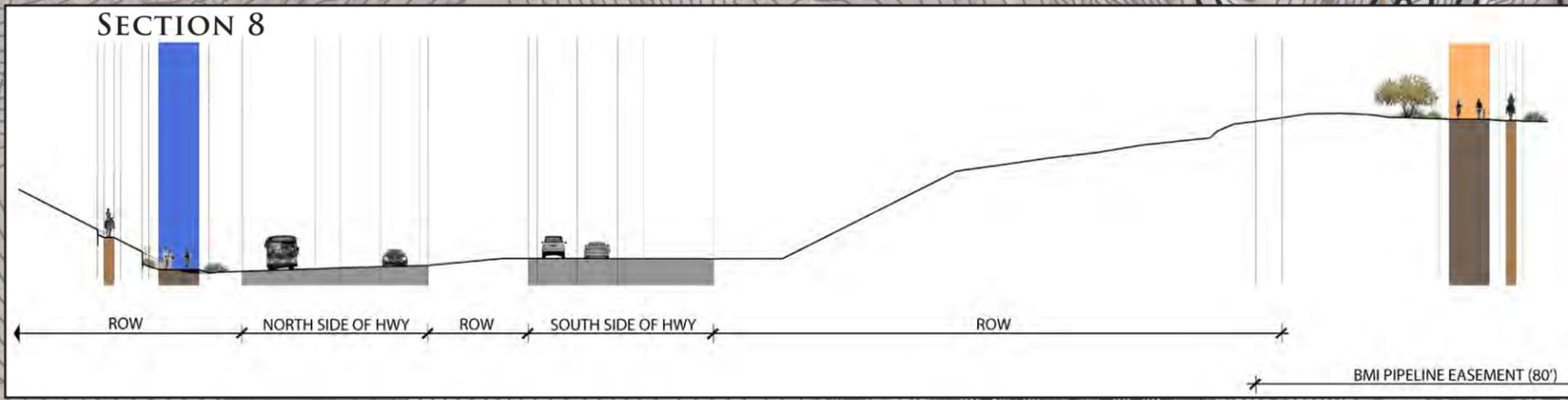
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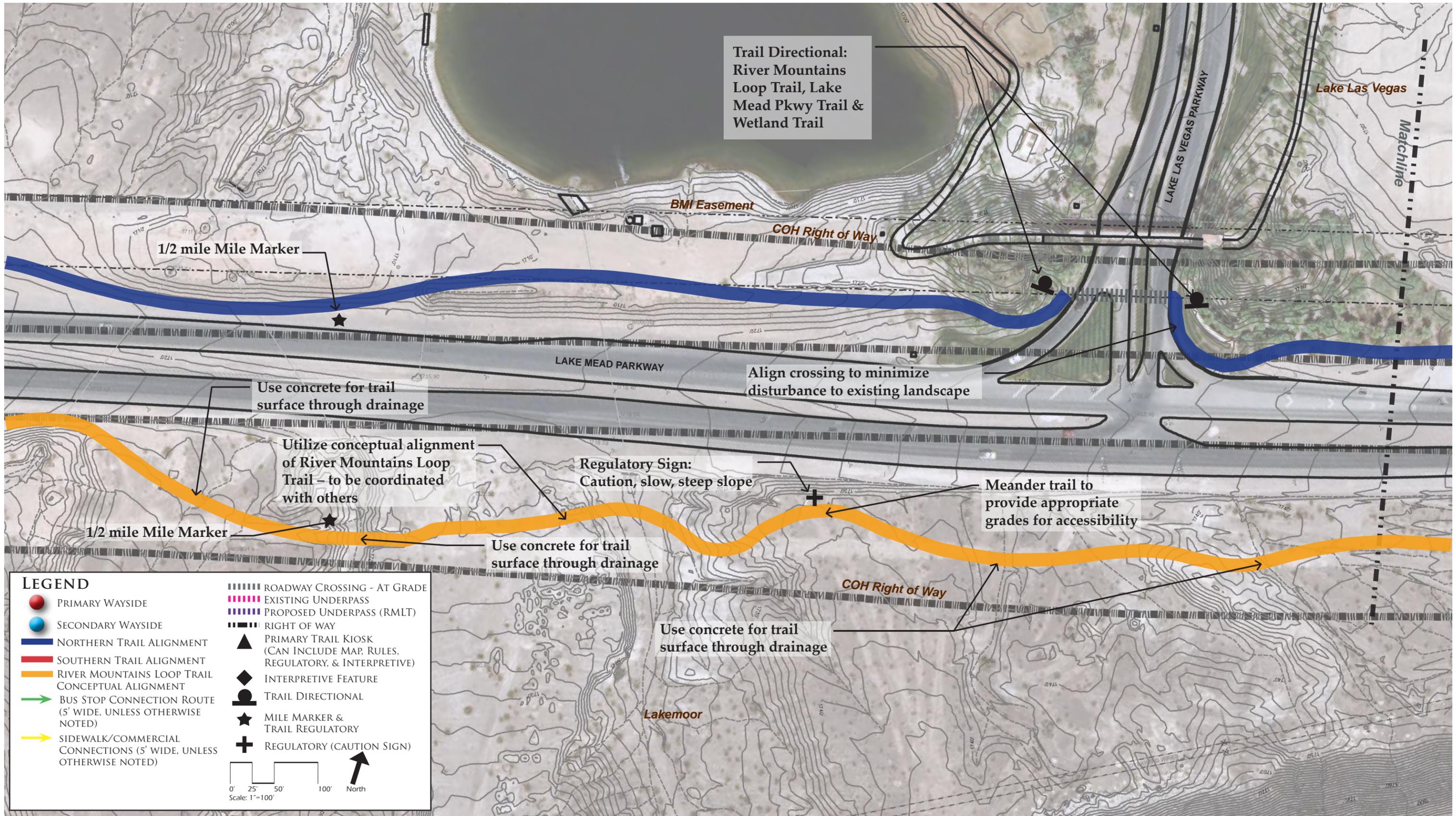


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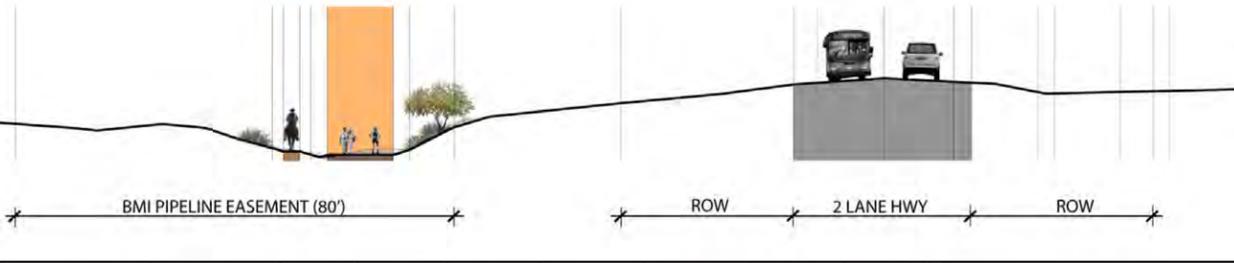
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 - ★ MILE MARKER & TRAIL REGULATORY
 - + REGULATORY (CAUTION SIGN)
- Scale: 1"=100'
- 0' 25' 50' 100' North



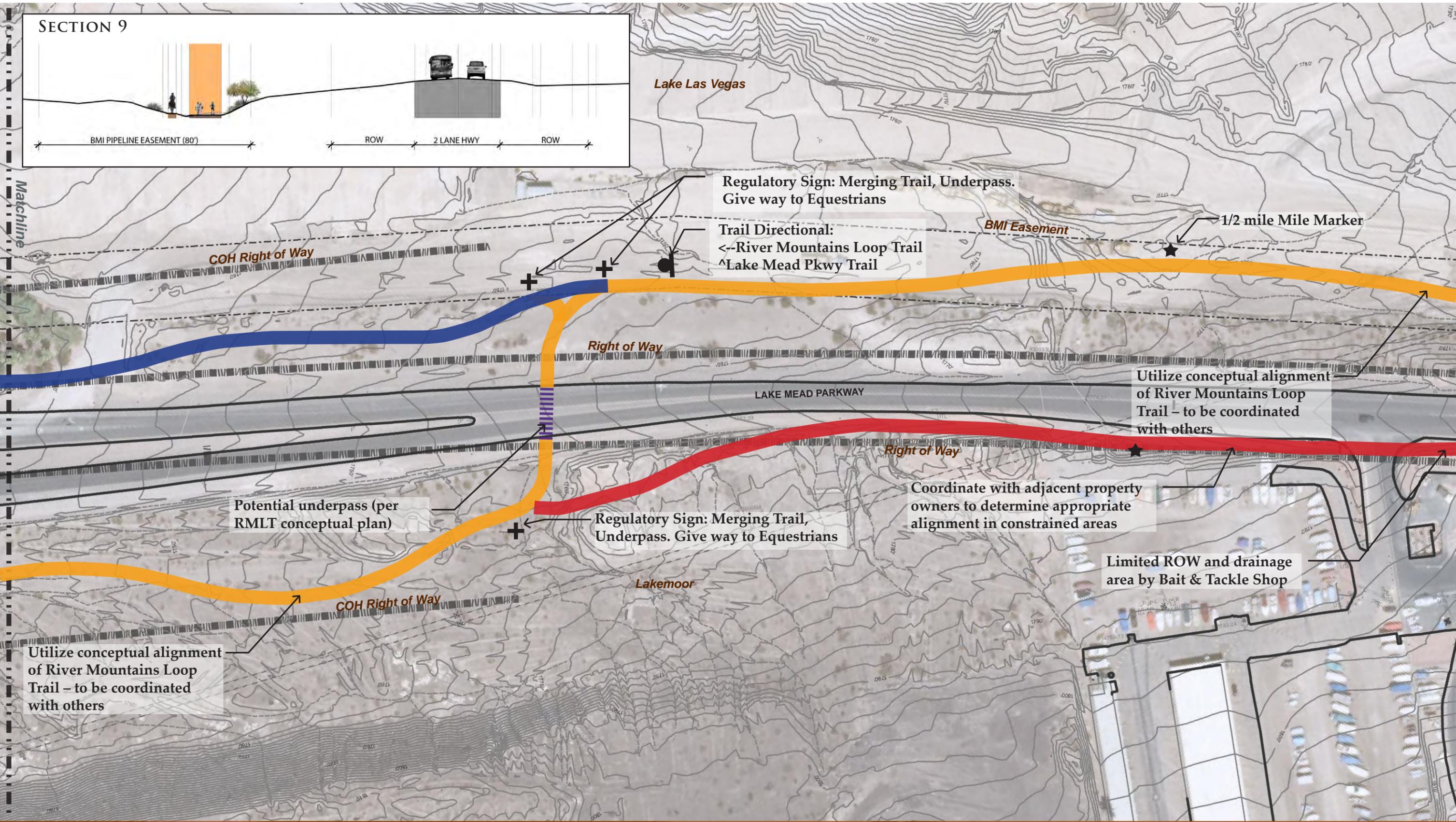


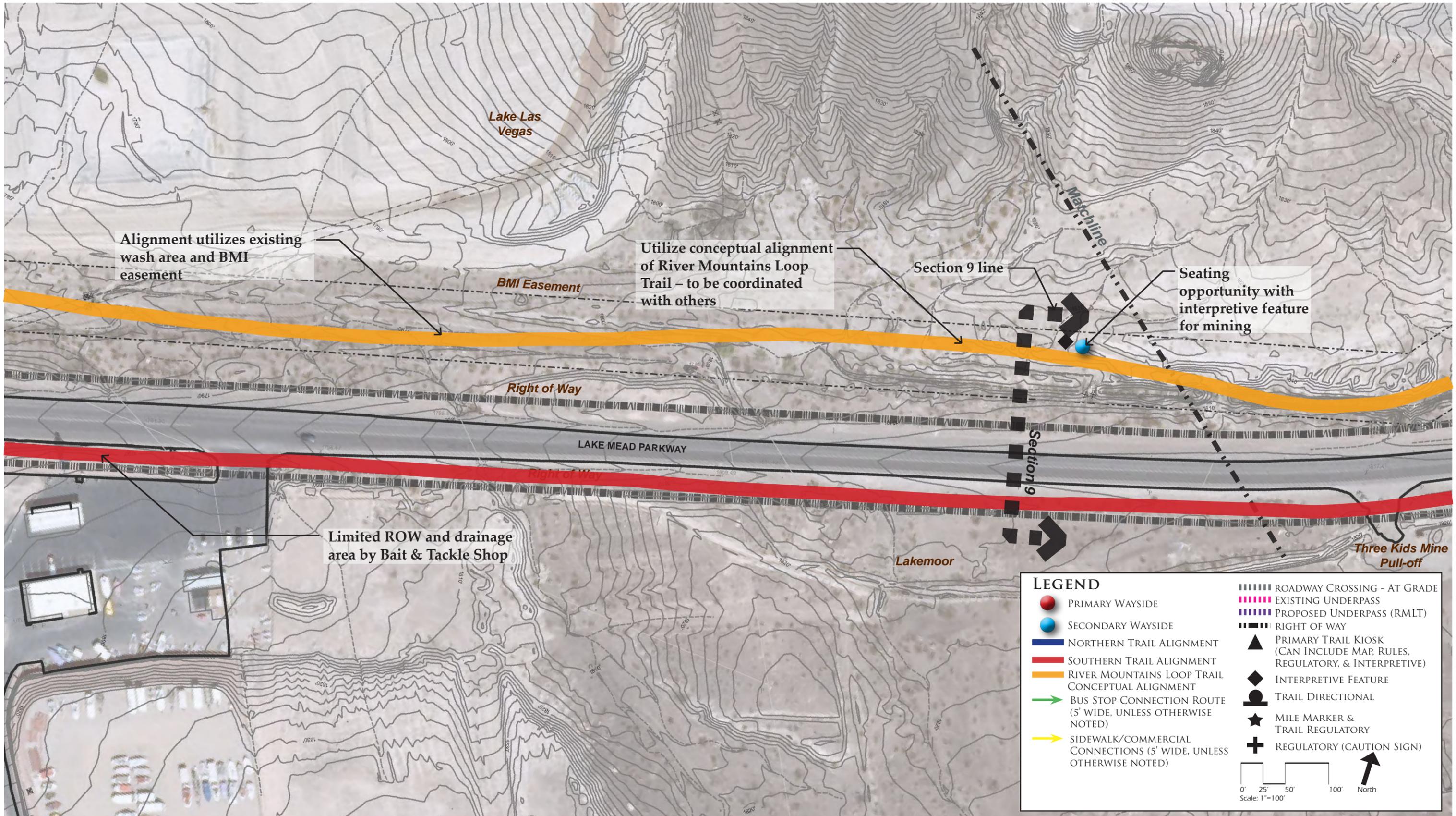


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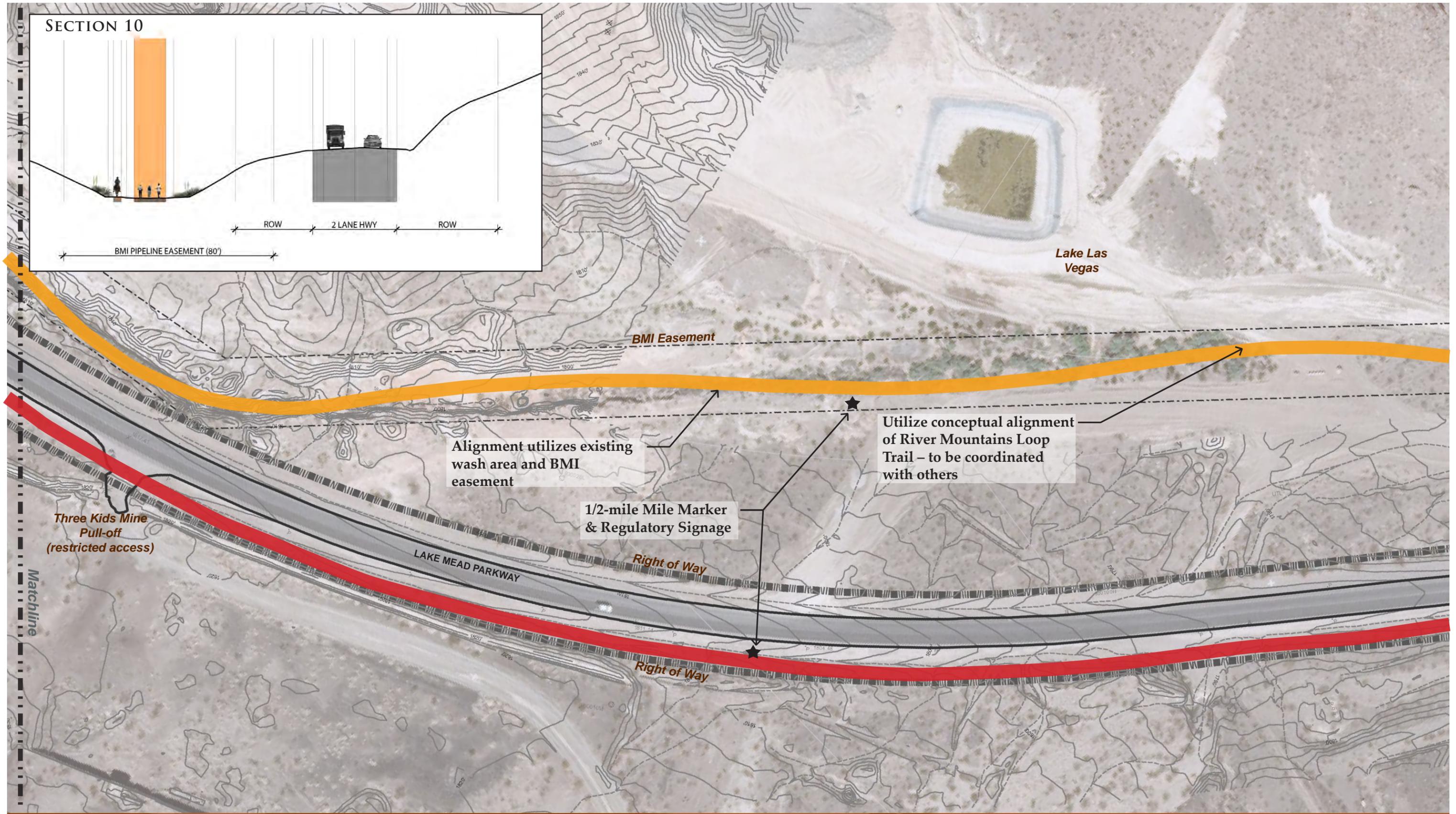
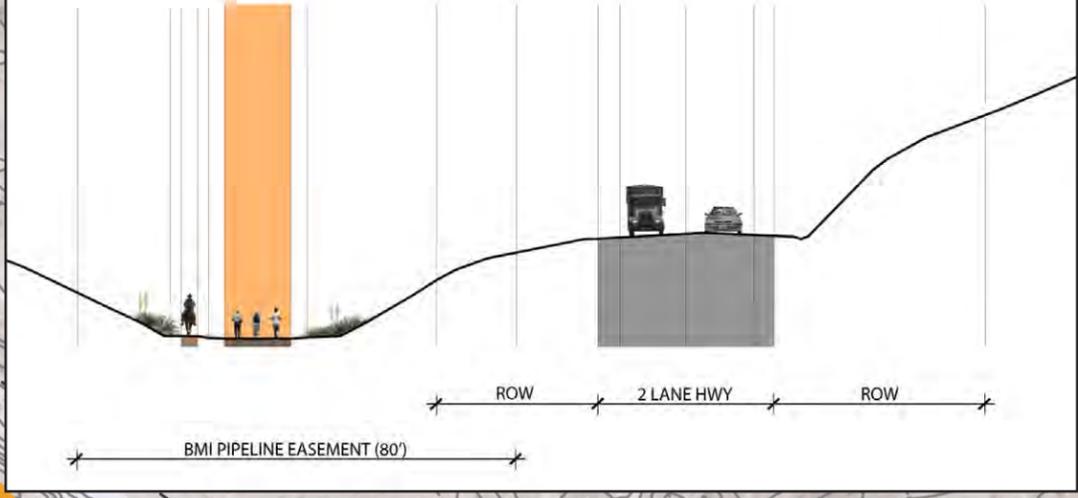


Matchline





SECTION 10

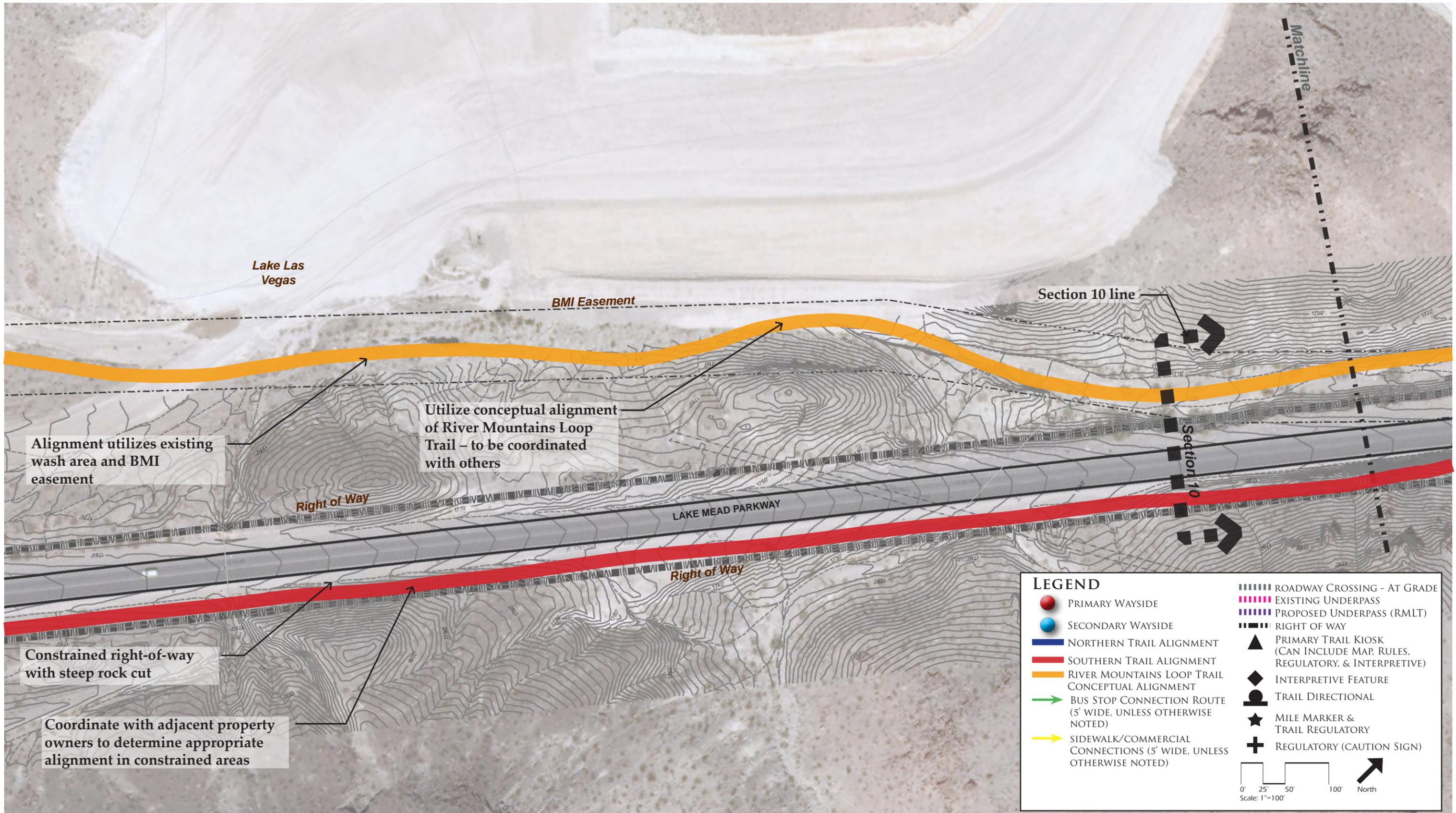


Alignment utilizes existing wash area and BMI easement

1/2-mile Mile Marker & Regulatory Signage

Utilize conceptual alignment of River Mountains Loop Trail – to be coordinated with others





Alignment utilizes existing wash area and BMI easement

Utilize conceptual alignment of River Mountains Loop Trail - to be coordinated with others

Constrained right-of-way with steep rock cut

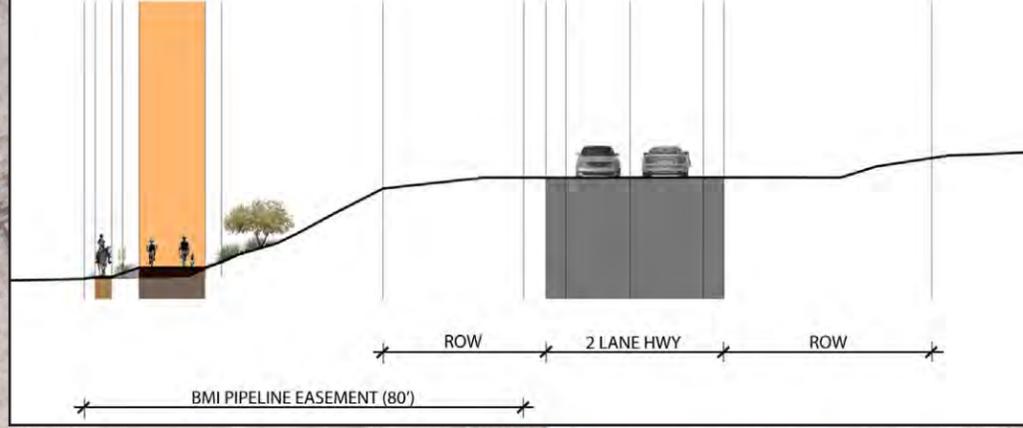
Coordinate with adjacent property owners to determine appropriate alignment in constrained areas

LEGEND

- PRIMARY WAYSIDE
- SECONDARY WAYSIDE
- ▬ NORTHERN TRAIL ALIGNMENT
- ▬ SOUTHERN TRAIL ALIGNMENT
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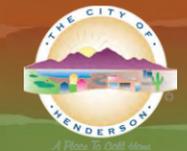
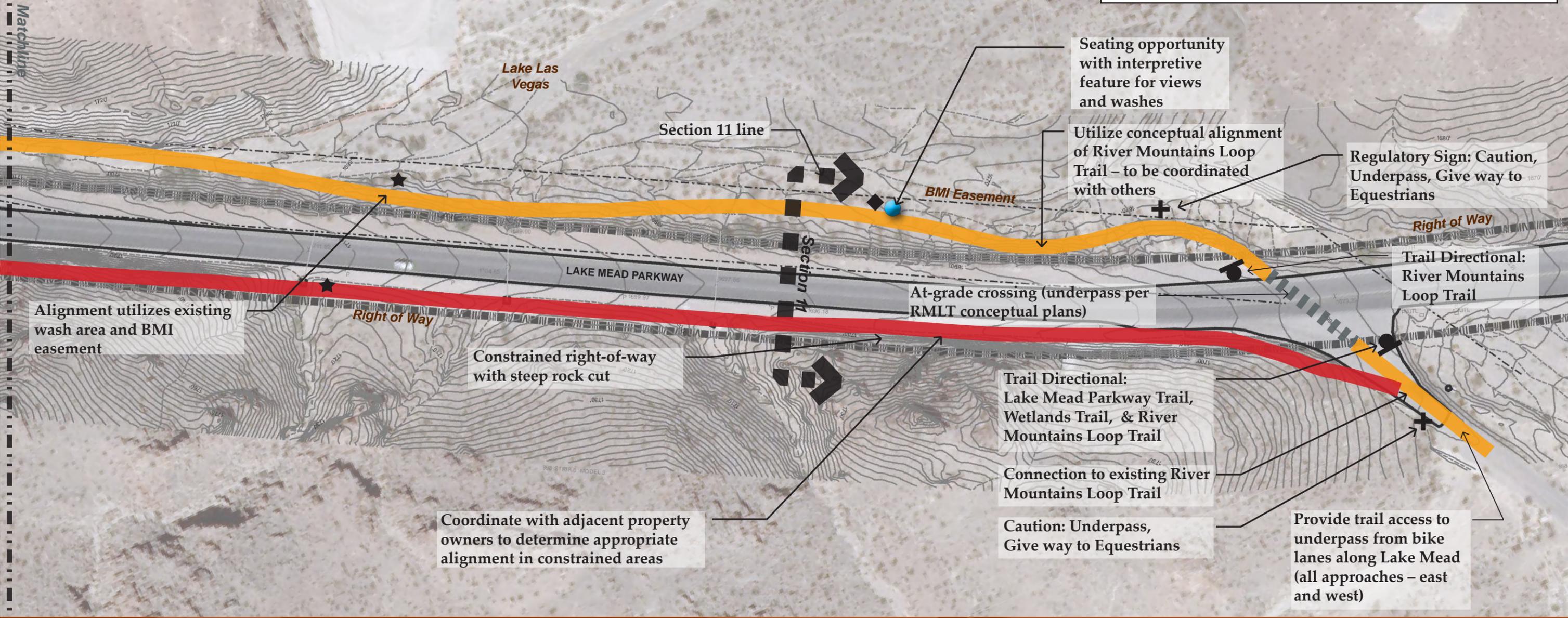
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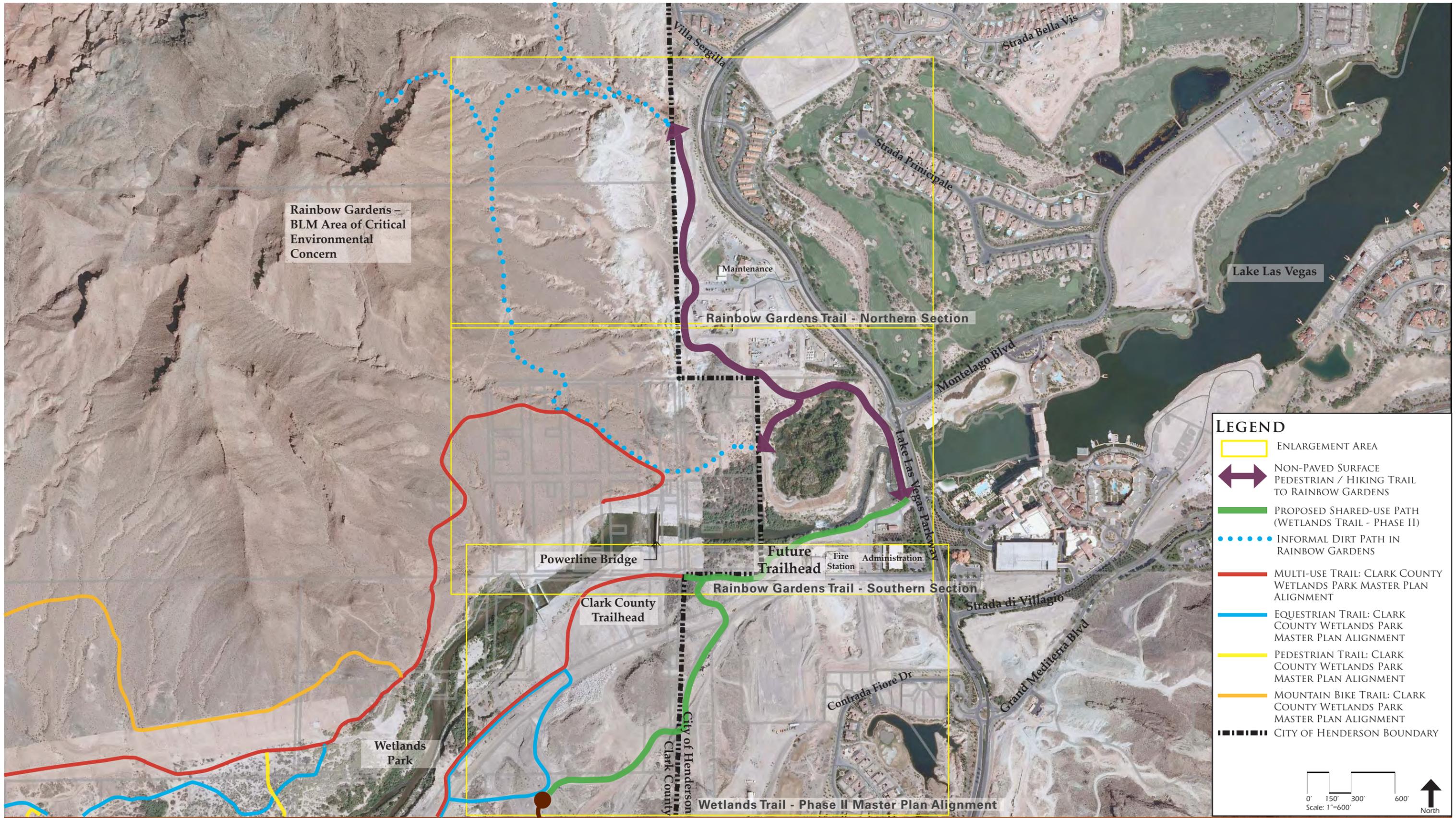
SECTION 11



LEGEND

- PRIMARY WAYSIDE
 - SECONDARY WAYSIDE
 - NORTHERN TRAIL ALIGNMENT
 - SOUTHERN TRAIL ALIGNMENT
 - RIVER MOUNTAINS LOOP TRAIL CONCEPTUAL ALIGNMENT
 - BUS STOP CONNECTION ROUTE (5' WIDE, UNLESS OTHERWISE NOTED)
 - SIDEWALK/COMMERCIAL CONNECTIONS (5' WIDE, UNLESS OTHERWISE NOTED)
 - ROADWAY CROSSING - AT GRADE
 - EXISTING UNDERPASS
 - PROPOSED UNDERPASS (RMLT)
 - RIGHT OF WAY
 - ▲ PRIMARY TRAIL KIOSK (CAN INCLUDE MAP, RULES, REGULATORY, & INTERPRETIVE)
 - ◆ INTERPRETIVE FEATURE
 - ▶ TRAIL DIRECTIONAL
 - ★ MILE MARKER & TRAIL REGULATORY
 - + REGULATORY (CAUTION SIGN)
- Scale: 1"=100'
- 0' 25' 50' 100' North





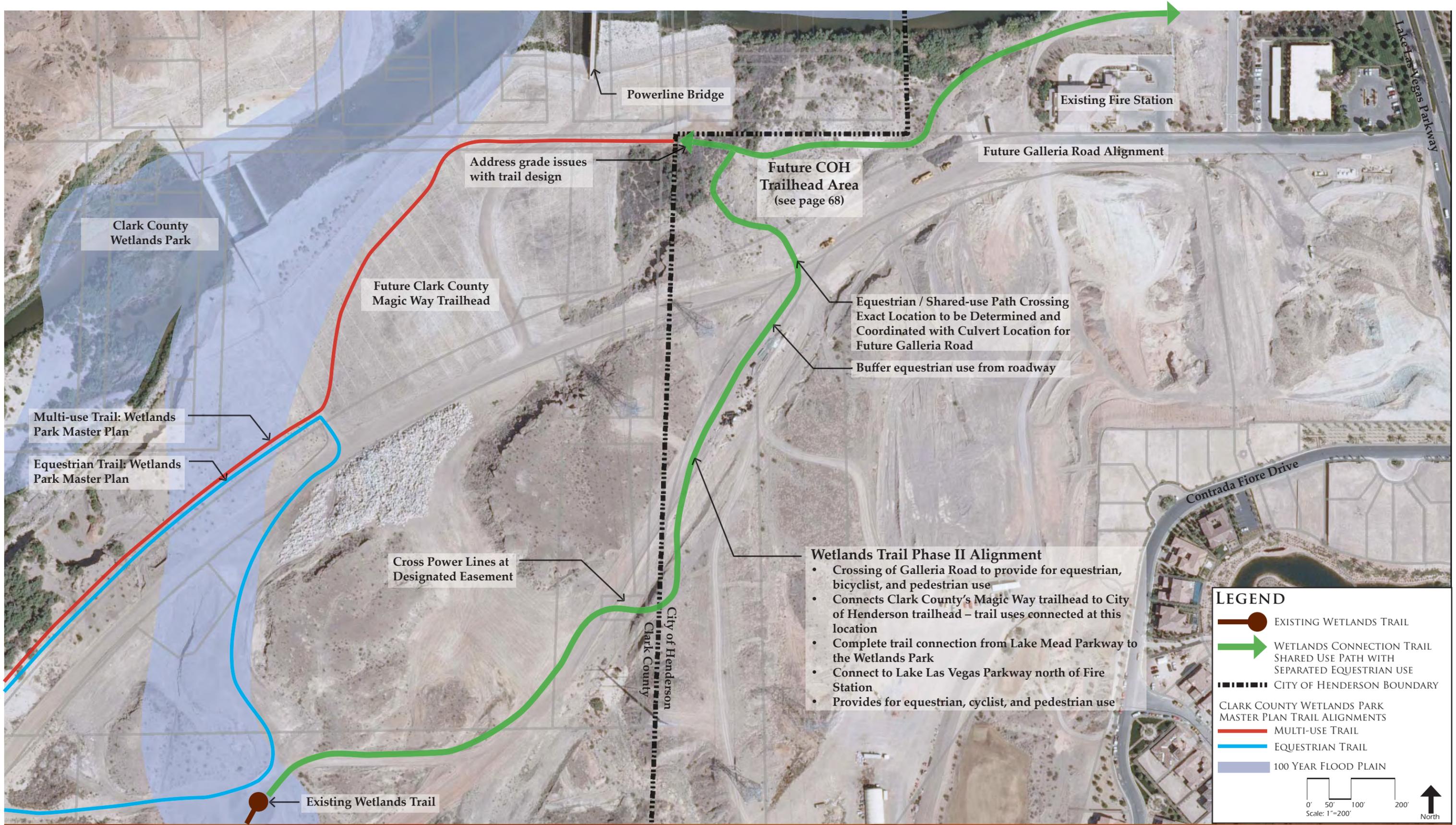
WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

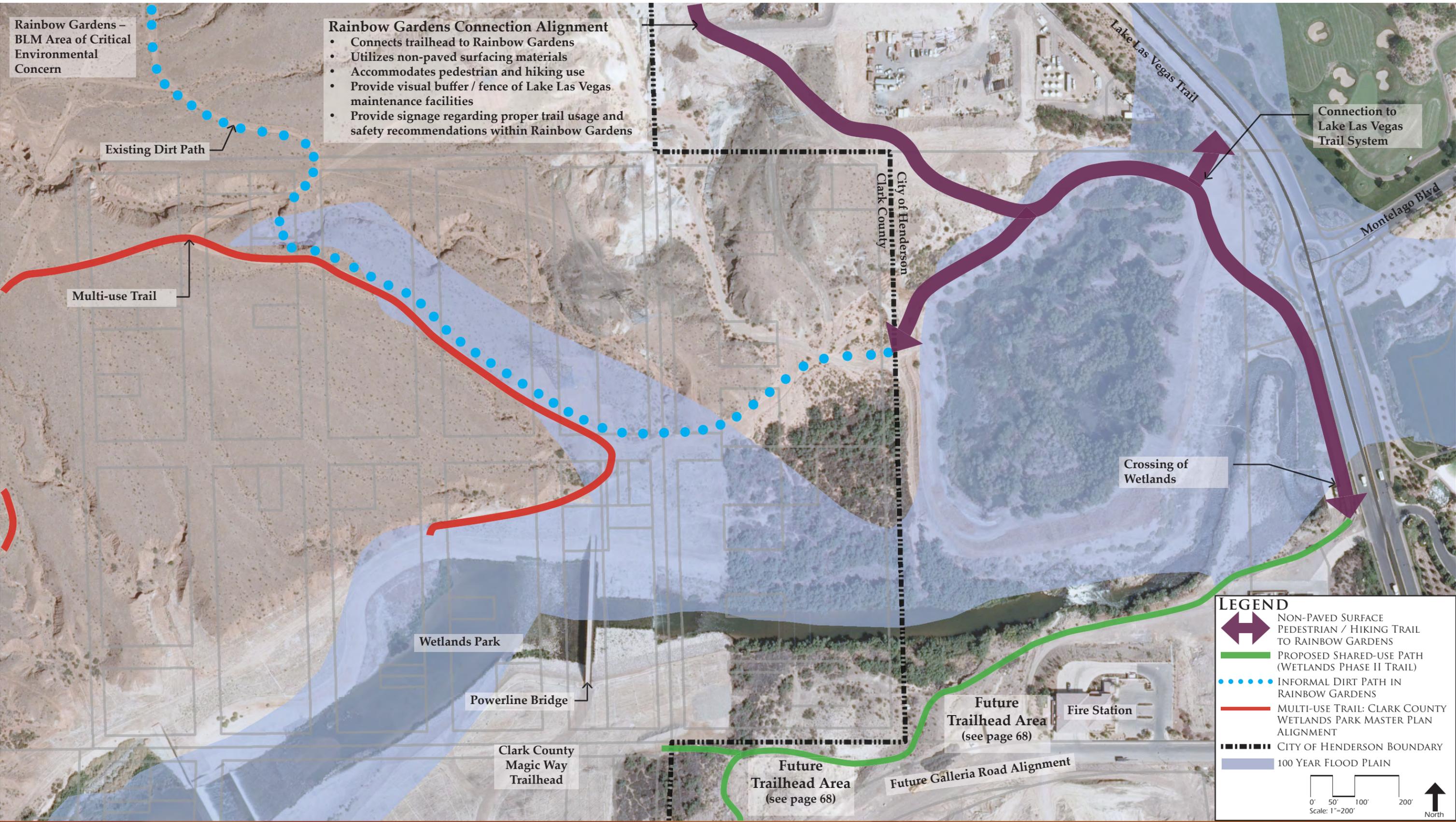
WETLANDS TRAIL PH II AND RAINBOW GARDENS TRAIL CONNECTION OVERALL ALIGNMENT



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1 June 2009





Rainbow Gardens – BLM Area of Critical Environmental Concern

- Rainbow Gardens Connection Alignment**
- Connects trailhead to Rainbow Gardens
 - Utilizes non-paved surfacing materials
 - Accommodates pedestrian and hiking use
 - Provide visual buffer / fence of Lake Las Vegas maintenance facilities
 - Provide signage regarding proper trail usage and safety recommendations within Rainbow Gardens

Connection to Lake Las Vegas Trail System

Existing Dirt Path

Multi-use Trail

Crossing of Wetlands

Wetlands Park

Powerline Bridge

Clark County Magic Way Trailhead

Future Trailhead Area (see page 68)

Fire Station

Future Trailhead Area (see page 68)

Future Galleria Road Alignment

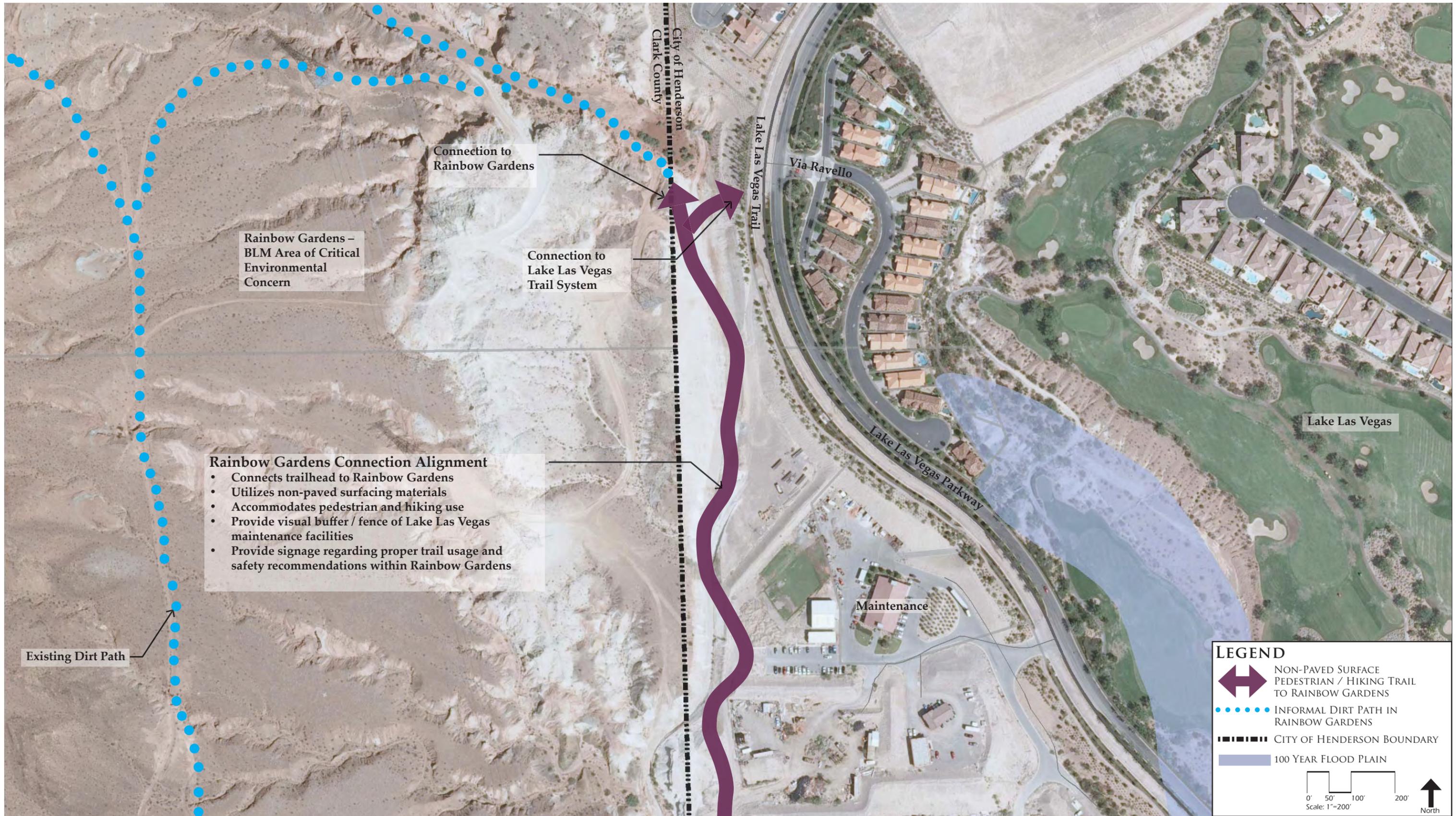
LEGEND

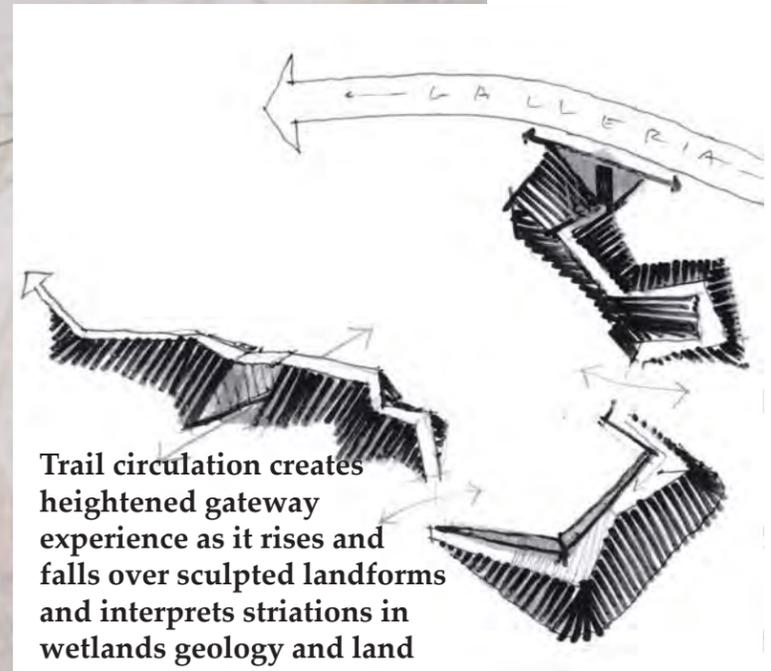
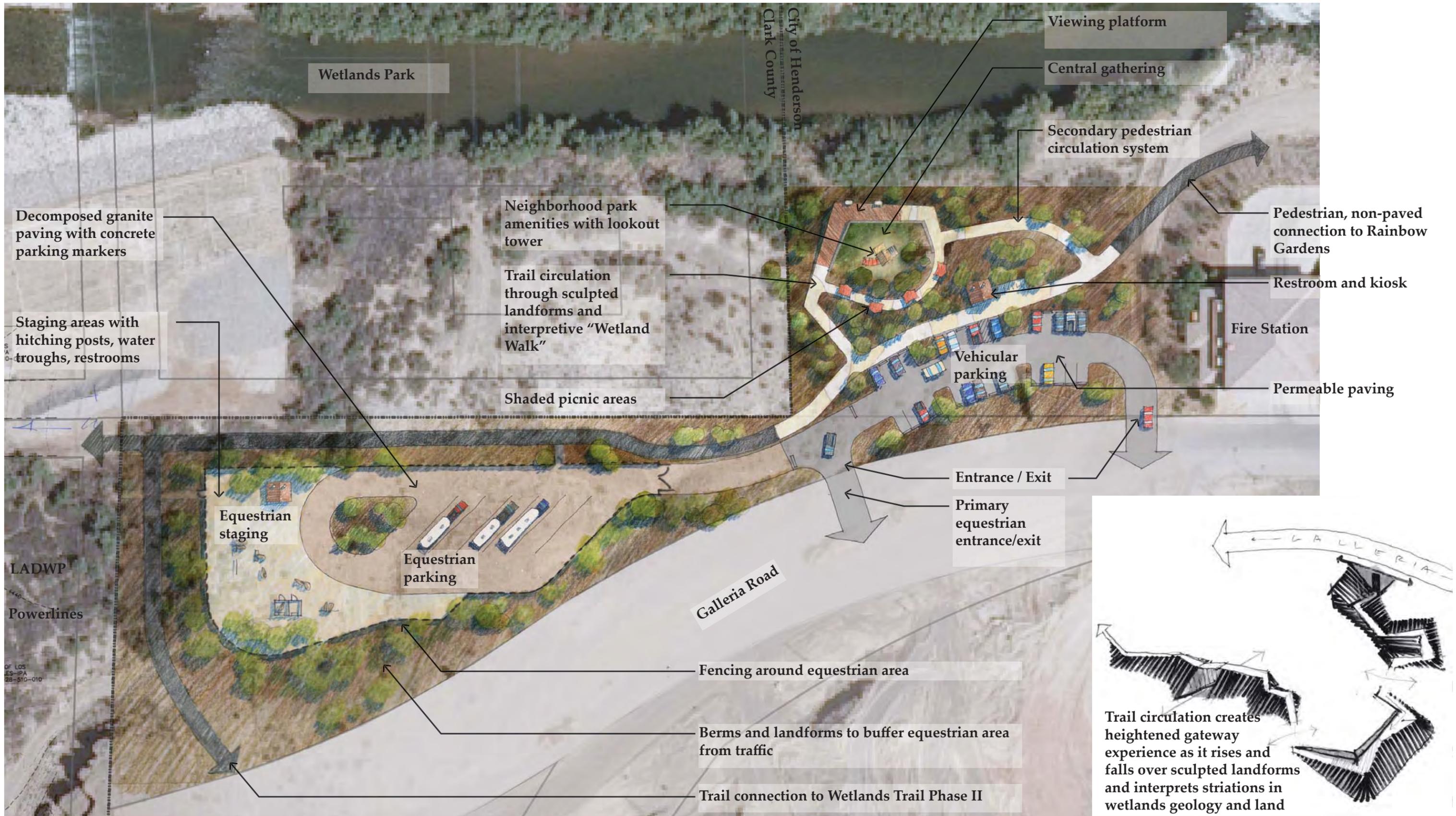
- NON-PAVED SURFACE PEDESTRIAN / HIKING TRAIL TO RAINBOW GARDENS
- PROPOSED SHARED-USE PATH (WETLANDS PHASE II TRAIL)
- INFORMAL DIRT PATH IN RAINBOW GARDENS
- MULTI-USE TRAIL: CLARK COUNTY WETLANDS PARK MASTER PLAN ALIGNMENT
- CITY OF HENDERSON BOUNDARY
- 100 YEAR FLOOD PLAIN

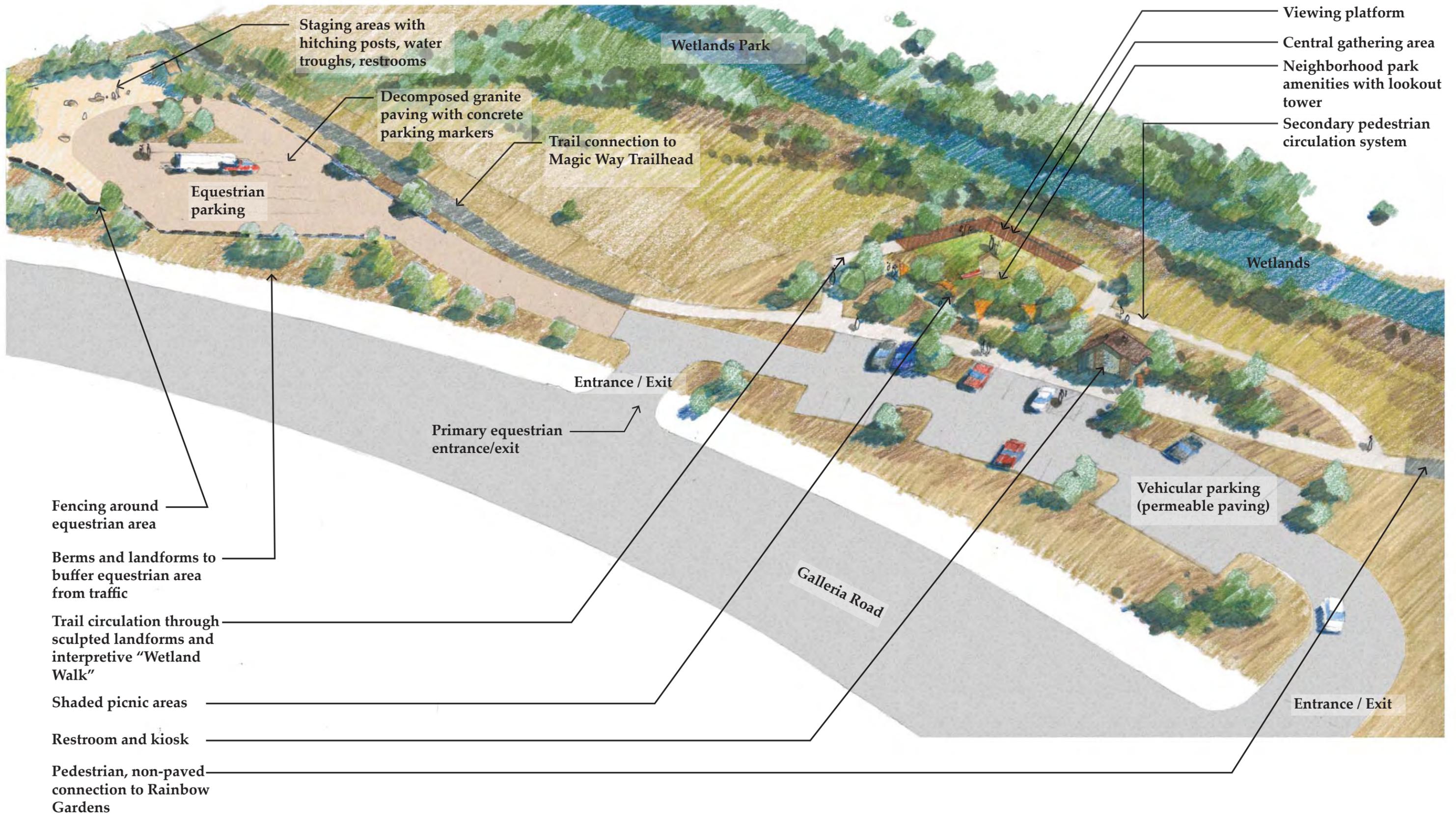
0' 50' 100' 200'
Scale: 1"=200'

North









WETLANDS TRAIL - PHASE II

HENDERSON, NEVADA

**WETLANDS PHASE II TRAILHEAD
BIRD'S EYE VIEW**



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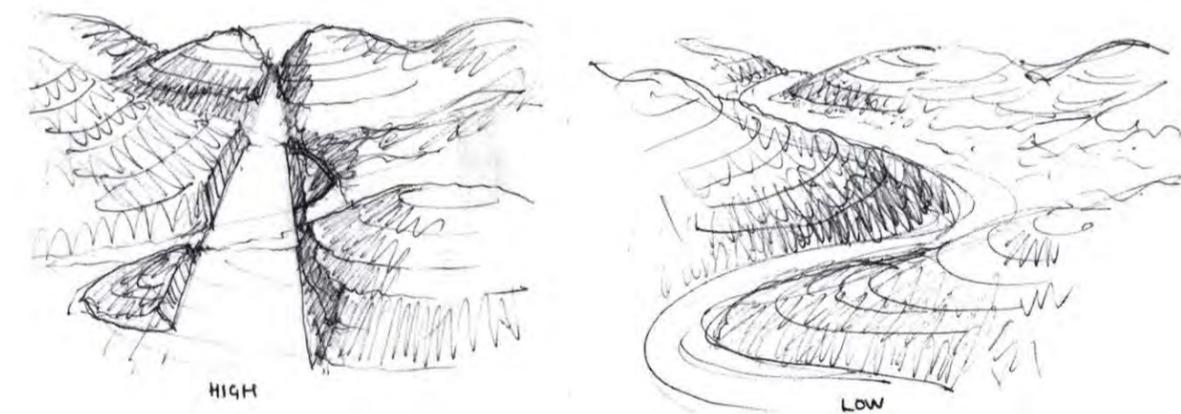
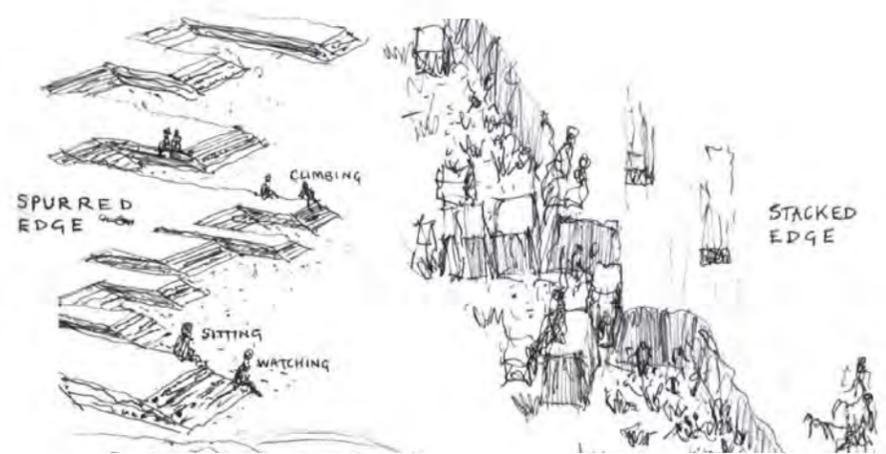
1 June 2009



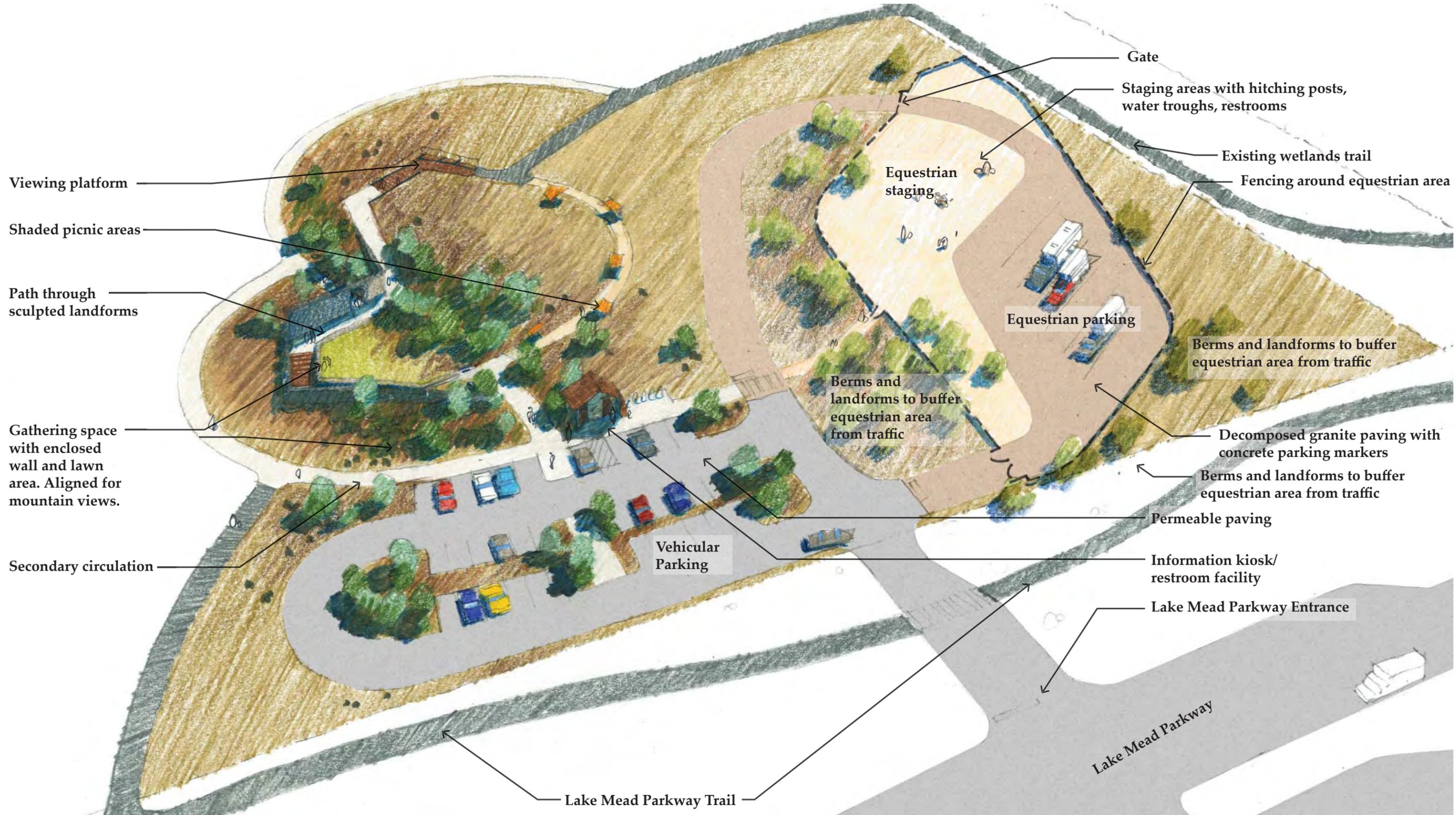
- Existing wetlands trail
- Fencing around equestrian area
- Gate
- Staging areas with hitching posts, water troughs, restrooms
- Decomposed granite paving with concrete parking markers
- Equestrian staging
- Equestrian parking
- Berms and landforms to buffer equestrian area from traffic
- Gate
- Permeable paving
- Lake Mead Parkway Entrance



Sculpted landform to define gathering space

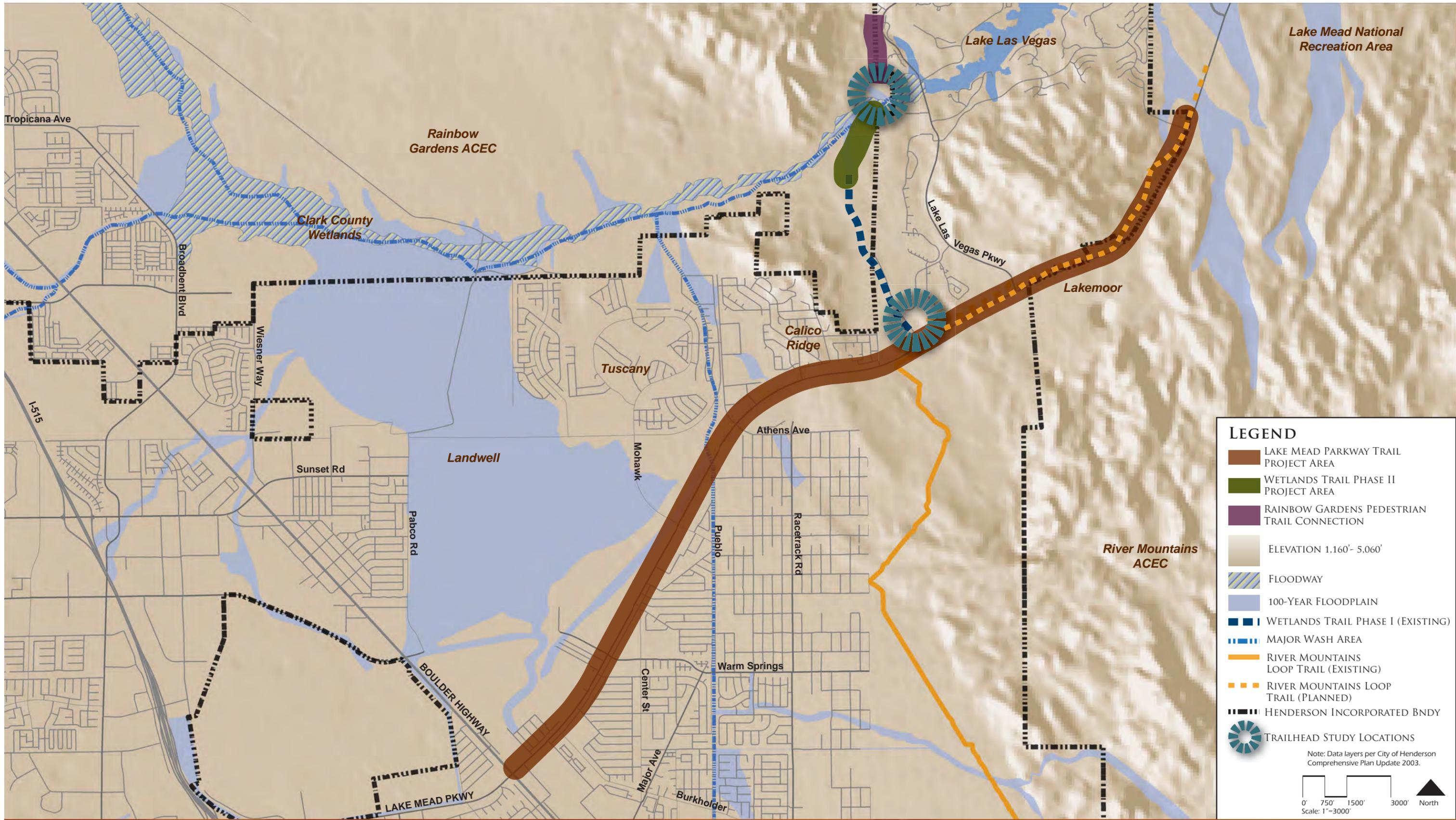


DEGREES OF INTERVENTION IN PATH DESIGN





SITE CONTEXT/
OPPORTUNITIES AND
CONSTRAINTS



LEGEND

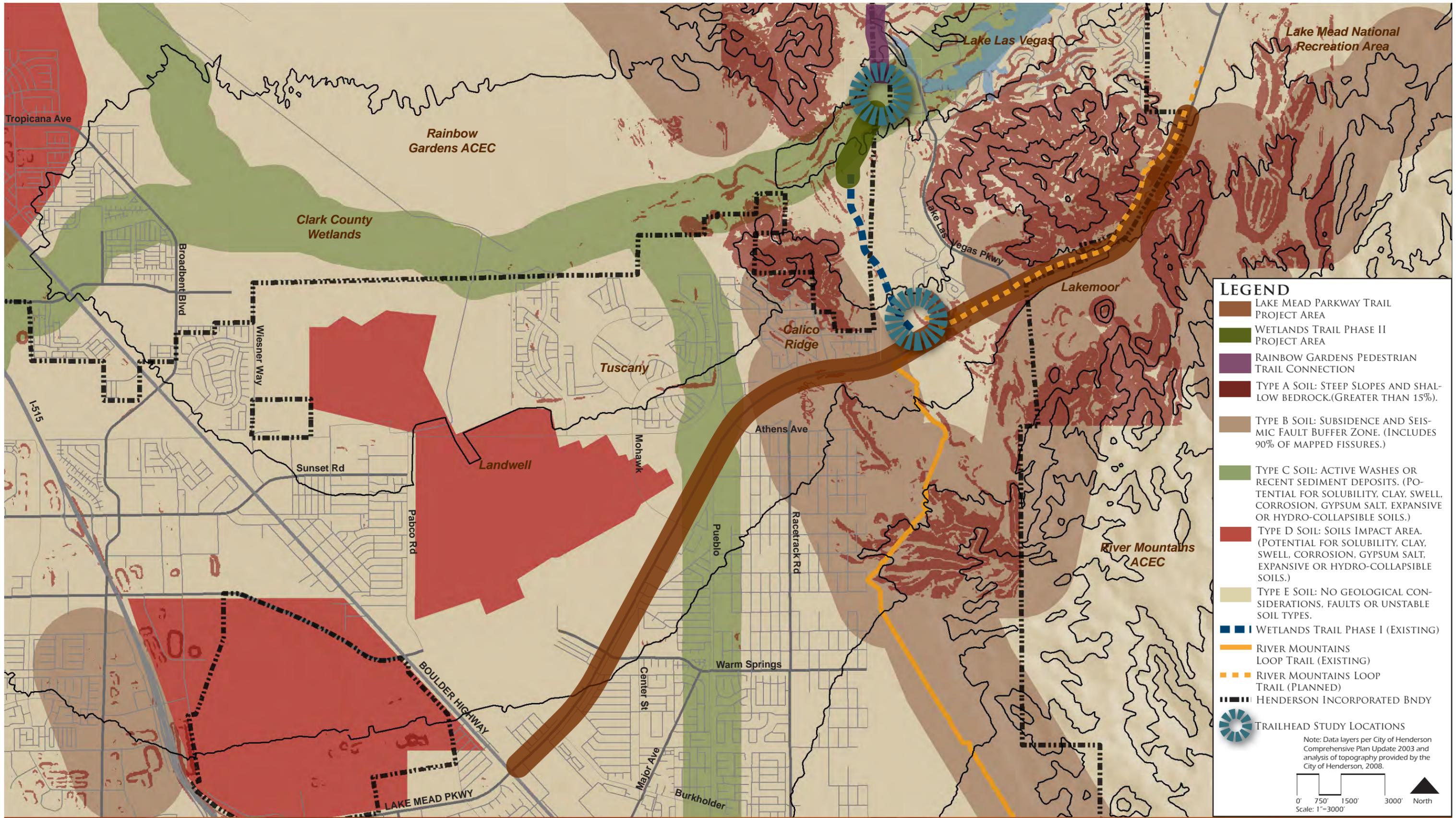
- LAKE MEAD PARKWAY TRAIL PROJECT AREA
- WETLANDS TRAIL PHASE II PROJECT AREA
- RAINBOW GARDENS PEDESTRIAN TRAIL CONNECTION
- ELEVATION 1,160' - 5,060'
- FLOODWAY
- 100-YEAR FLOODPLAIN
- WETLANDS TRAIL PHASE I (EXISTING)
- MAJOR WASH AREA
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- HENDERSON INCORPORATED BNDY
- TRAILHEAD STUDY LOCATIONS

Note: Data layers per City of Henderson Comprehensive Plan Update 2003.

0' 750' 1500' 3000' North
Scale: 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

TOPOGRAPHY AND DRAINAGE



LEGEND

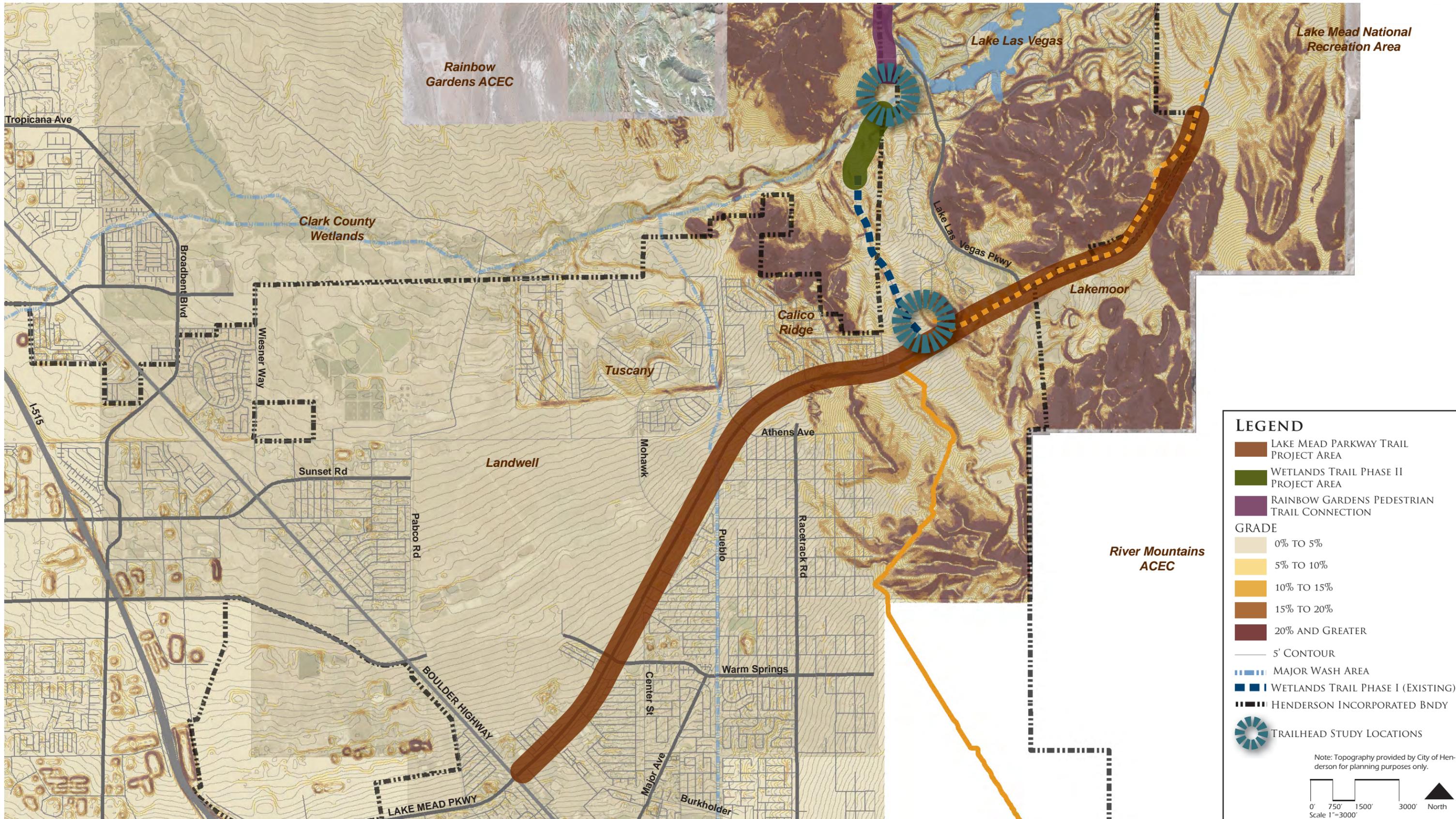
- LAKE MEAD PARKWAY TRAIL PROJECT AREA
- WETLANDS TRAIL PHASE II PROJECT AREA
- RAINBOW GARDENS PEDESTRIAN TRAIL CONNECTION
- TYPE A SOIL: STEEP SLOPES AND SHALLOW BEDROCK. (GREATER THAN 15%).
- TYPE B SOIL: SUBSIDENCE AND SEISMIC FAULT BUFFER ZONE. (INCLUDES 90% OF MAPPED FISSURES.)
- TYPE C SOIL: ACTIVE WASHES OR RECENT SEDIMENT DEPOSITS. (POTENTIAL FOR SOLUBILITY, CLAY, SWELL, CORROSION, GYPSUM SALT, EXPANSIVE OR HYDRO-COLLAPSIBLE SOILS.)
- TYPE D SOIL: SOILS IMPACT AREA. (POTENTIAL FOR SOLUBILITY, CLAY, SWELL, CORROSION, GYPSUM SALT, EXPANSIVE OR HYDRO-COLLAPSIBLE SOILS.)
- TYPE E SOIL: NO GEOLOGICAL CONSIDERATIONS, FAULTS OR UNSTABLE SOIL TYPES.
- WETLANDS TRAIL PHASE I (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- HENDERSON INCORPORATED BNDY
- TRAILHEAD STUDY LOCATIONS

Note: Data layers per City of Henderson Comprehensive Plan Update 2003 and analysis of topography provided by the City of Henderson, 2008.

0' 750' 1500' 3000' North
Scale: 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

GEOMORPHIC CHARACTERISTICS



LEGEND

- LAKE MEAD PARKWAY TRAIL PROJECT AREA
- WETLANDS TRAIL PHASE II PROJECT AREA
- RAINBOW GARDENS PEDESTRIAN TRAIL CONNECTION

GRADE

- 0% TO 5%
- 5% TO 10%
- 10% TO 15%
- 15% TO 20%
- 20% AND GREATER

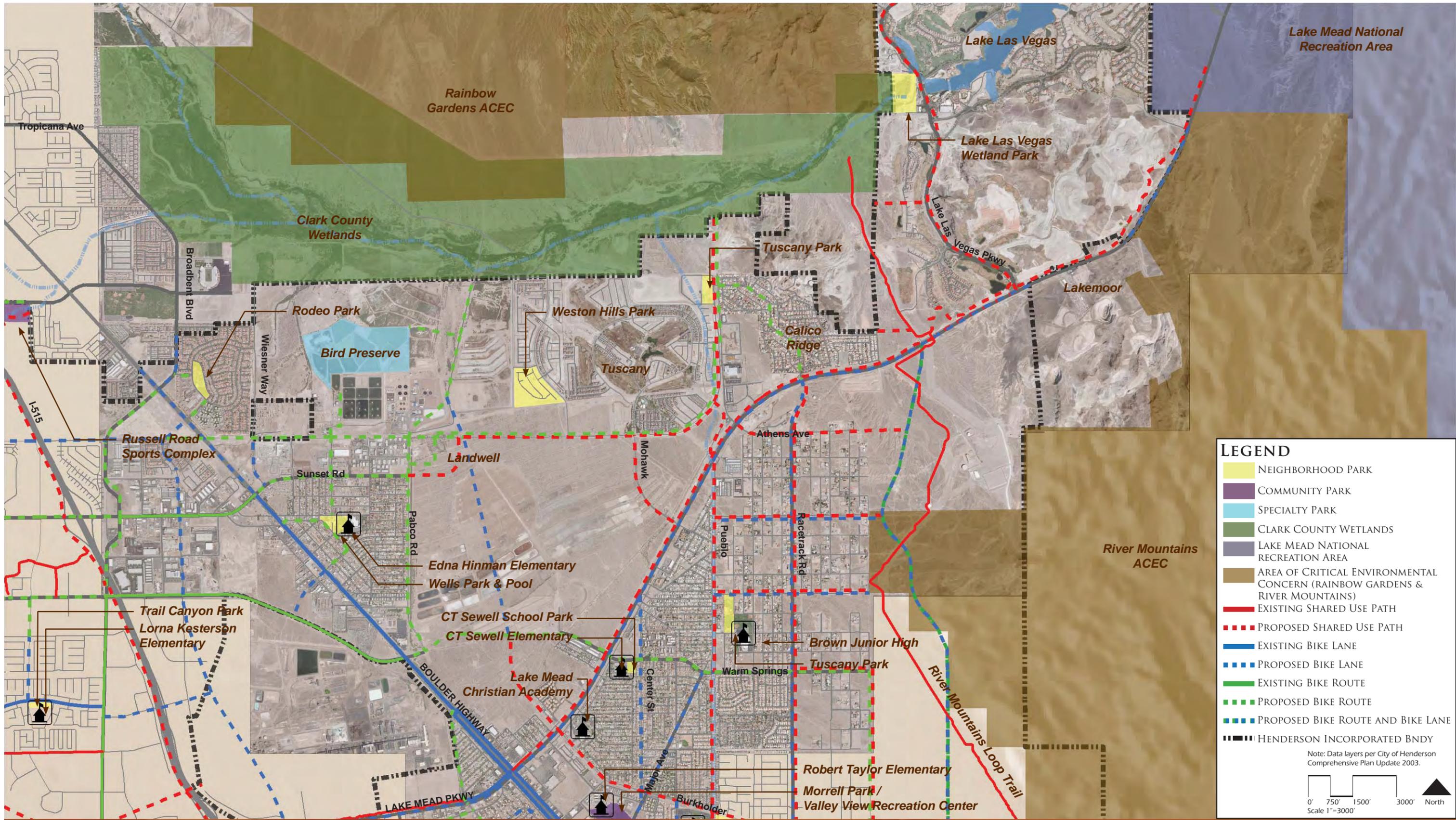
- 5' CONTOUR
- MAJOR WASH AREA
- WETLANDS TRAIL PHASE I (EXISTING)
- HENDERSON INCORPORATED BNDY
- TRAILHEAD STUDY LOCATIONS

Note: Topography provided by City of Henderson for planning purposes only.

0' 750' 1500' 3000' North
Scale 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

SLOPE ANALYSIS



LEGEND

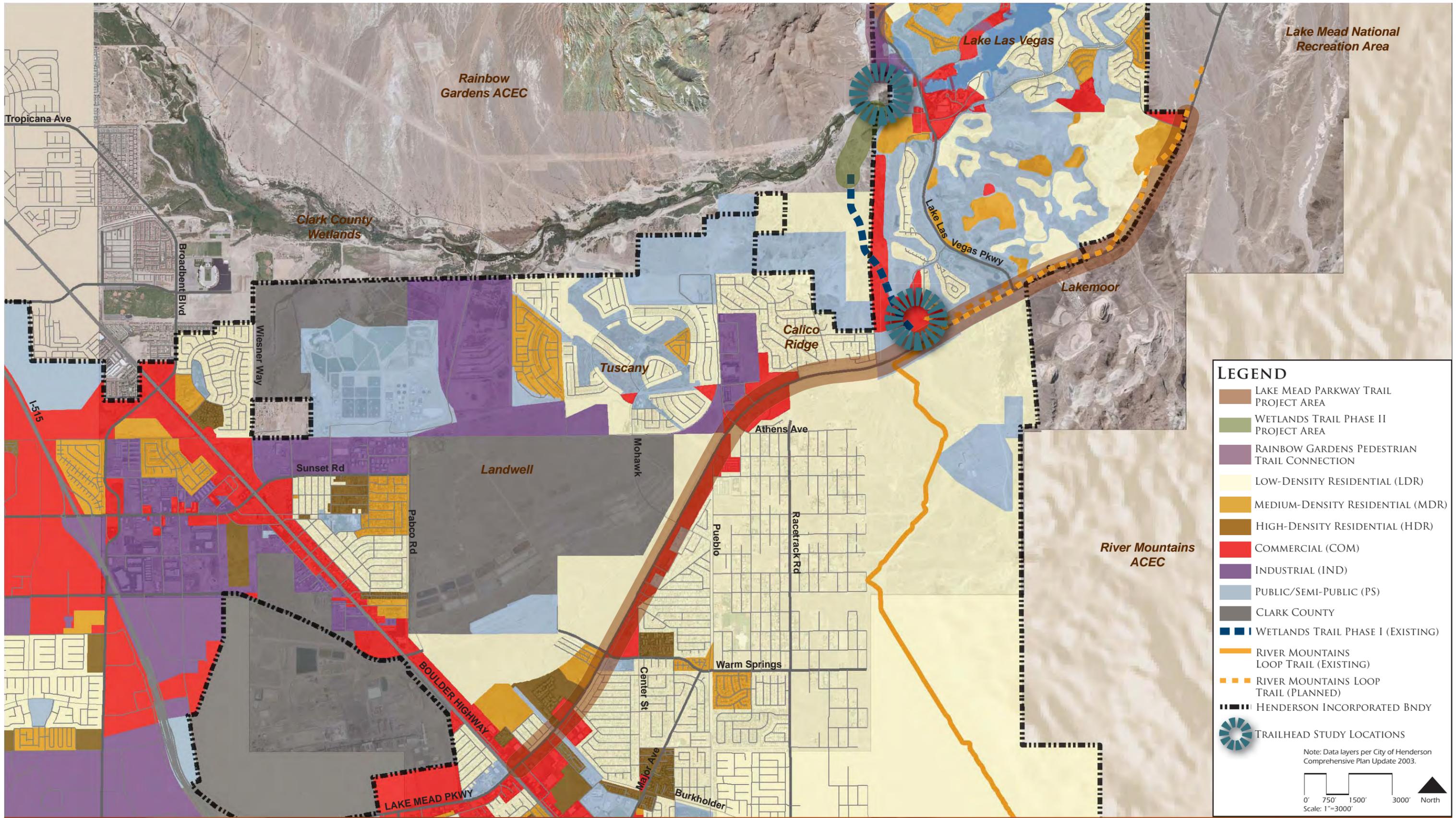
- NEIGHBORHOOD PARK
- COMMUNITY PARK
- SPECIALTY PARK
- CLARK COUNTY WETLANDS
- LAKE MEAD NATIONAL RECREATION AREA
- AREA OF CRITICAL ENVIRONMENTAL CONCERN (RAINBOW GARDENS & RIVER MOUNTAINS)
- EXISTING SHARED USE PATH
- PROPOSED SHARED USE PATH
- EXISTING BIKE LANE
- PROPOSED BIKE LANE
- EXISTING BIKE ROUTE
- PROPOSED BIKE ROUTE
- PROPOSED BIKE ROUTE AND BIKE LANE
- HENDERSON INCORPORATED BNDY

Note: Data layers per City of Henderson Comprehensive Plan Update 2003.

0' 750' 1500' 3000' North
Scale 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

PARKS AND TRAILWAYS



LEGEND

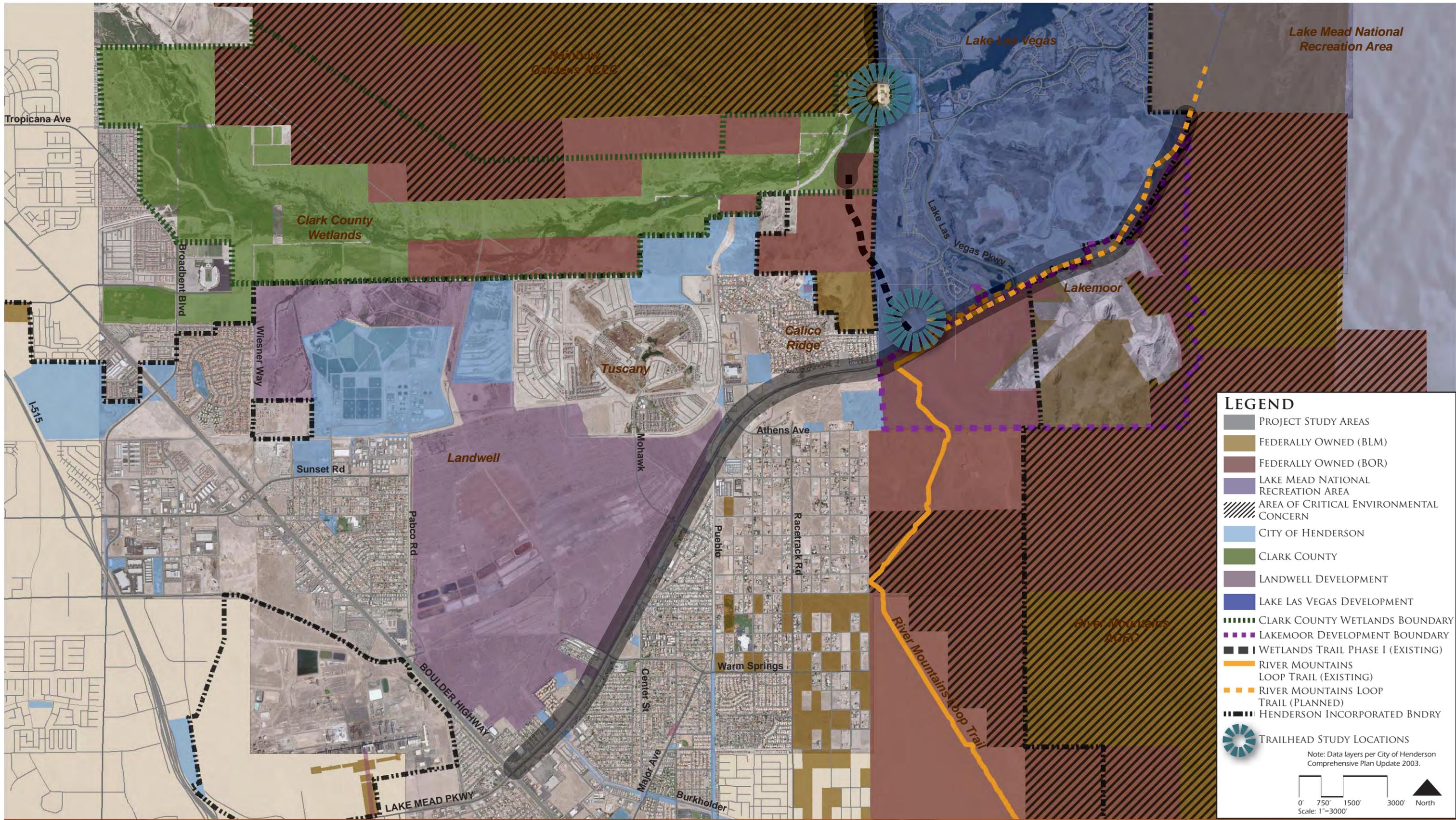
- LAKE MEAD PARKWAY TRAIL PROJECT AREA
- WETLANDS TRAIL PHASE II PROJECT AREA
- RAINBOW GARDENS PEDESTRIAN TRAIL CONNECTION
- LOW-DENSITY RESIDENTIAL (LDR)
- MEDIUM-DENSITY RESIDENTIAL (MDR)
- HIGH-DENSITY RESIDENTIAL (HDR)
- COMMERCIAL (COM)
- INDUSTRIAL (IND)
- PUBLIC/SEMI-PUBLIC (PS)
- CLARK COUNTY
- WETLANDS TRAIL PHASE I (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- HENDERSON INCORPORATED BNDY
- TRAILHEAD STUDY LOCATIONS

Note: Data layers per City of Henderson Comprehensive Plan Update 2003.

0' 750' 1500' 3000' North
Scale: 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

GENERAL PLAN LAND USE



LEGEND

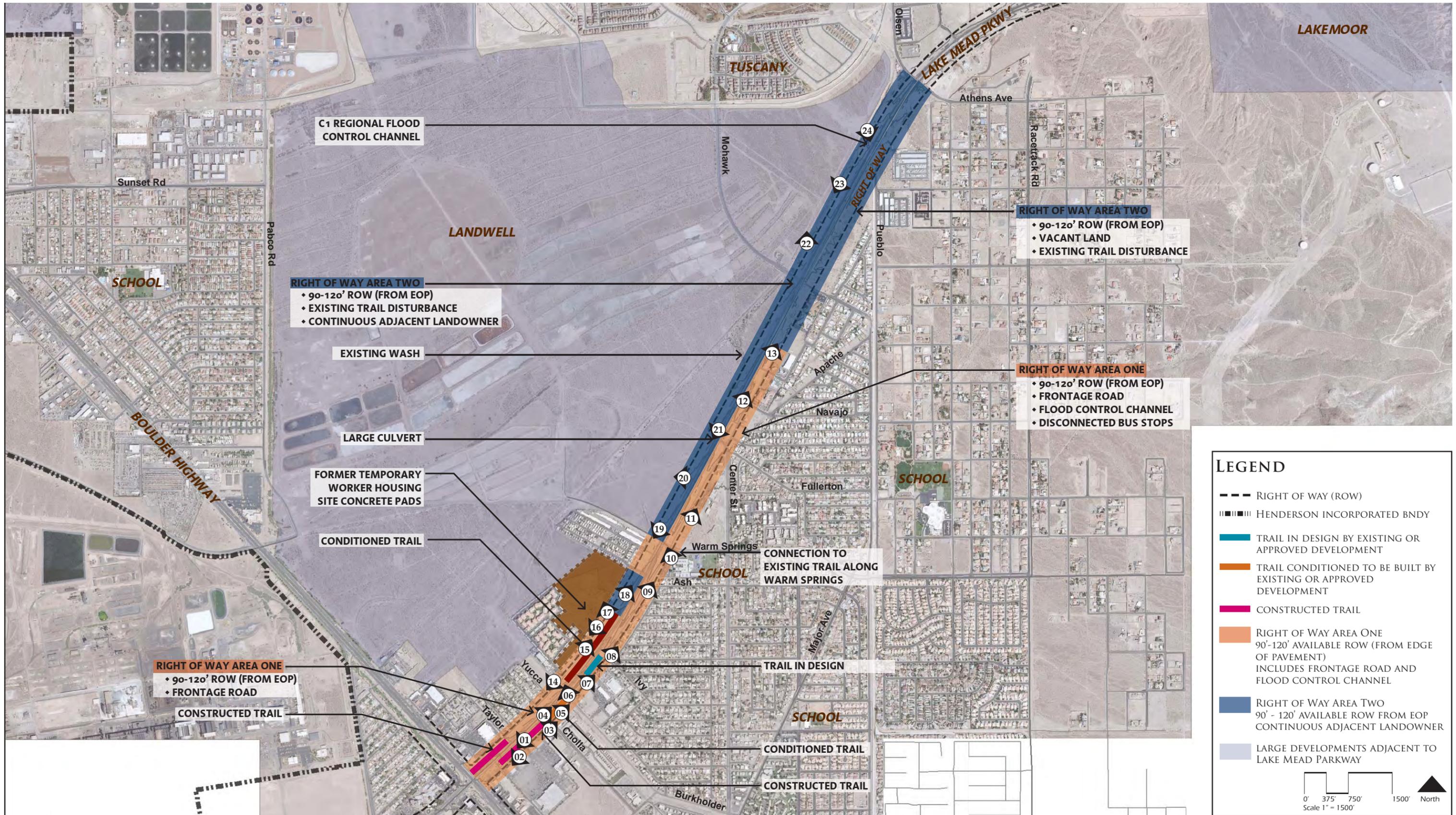
- PROJECT STUDY AREAS
- FEDERALLY OWNED (BLM)
- FEDERALLY OWNED (BOR)
- LAKE MEAD NATIONAL RECREATION AREA
- AREA OF CRITICAL ENVIRONMENTAL CONCERN
- CITY OF HENDERSON
- CLARK COUNTY
- LANDWELL DEVELOPMENT
- LAKE LAS VEGAS DEVELOPMENT
- CLARK COUNTY WETLANDS BOUNDARY
- LAKEMOOR DEVELOPMENT BOUNDARY
- WETLANDS TRAIL PHASE I (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (EXISTING)
- RIVER MOUNTAINS LOOP TRAIL (PLANNED)
- HENDERSON INCORPORATED BNDRY
- TRAILHEAD STUDY LOCATIONS

Note: Data layers per City of Henderson Comprehensive Plan Update 2003.

0' 750' 1500' 3000' North
Scale: 1"=3000'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

OWNERSHIP (LARGE LANDHOLDINGS)



LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II

HENDERSON, NEVADA

SITE ANALYSIS LAKE MEAD PARKWAY - SOUTH



DESIGNWORKSHOP
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1 June 2009

LAKE MEAD PARKWAY - IMAGES FROM BOULDER HIGHWAY TO ATHENS/OLSEN



01 South Side of Lake Mead Parkway East of Boulder Highway Intersection, Looking West

- Heavily trafficked commercial area with large drainage features separating road from development.



02 South Side of Lake Mead Parkway East of Boulder Highway Intersection, Looking West

- Potential trail corridor area by flood control channel.
- Existing trail parallels parking to the south.



03 Cholla Intersection, Looking East

- Non-signalized intersection in heavily trafficked commercial area. Frontage road bordered by drainage features.



04 South Side of Lake Mead Parkway–Bus Stop Isolated from Pedestrian Circulation

- Typical bus stop disconnected from sidewalks and commercial areas. Flood control channel separates the features.



05 South Side of Lake Mead Parkway Looking East to Burkholder Intersection

- Heavily trafficked commercial area with frontage road and flood control channel. Potential connection to existing trail at Burkholder.



06 Burkholder Intersection, Looking Northeast

- View of drainage features and signalized crossing at Burkholder.



07 South Side of Lake Mead Parkway East of Burkholder Intersection, Looking East

- Commercial area with flood control channel separating Lake Mead Parkway from frontage road and commercial area. Extra on-street parking reduces space available for trail development.



08 Ivy Intersection, Looking East

- Non-signalized intersection bordered by single-family residential development to the south. Frontage road continues and is separated by flood control channel.

LAKE MEAD PARKWAY - IMAGES FROM BOULDER HIGHWAY TO ATHENS/OLSEN



09 Ash Intersection, Looking East

- Non-signalized intersection near Sewell Elementary School. Frontage road and drainage features continue.



10 Warm Springs Intersection, Looking Northeast

- Signalized intersection at Warm Springs. Large culverts and drainage features.



11 South Side of Lake Mead Parkway East of Warm Springs, Looking East

- Dispersed commercial development. Drainage channel separates Lake Mead Parkway from frontage road and development.



12 South Side of Lake Mead Parkway East of Navajo

- Planted drainage channel along south side of Lake Mead Parkway near Navajo.



13 South Side of Lake Mead Parkway, East of Pawnee, Looking East

- Frontage road and drainage channels end. Evidence of existing disturbance in the right-of-way from motorized and non-motorized vehicles.



14 North Side of Lake Mead Parkway, West of Burkholder, Looking West

- Frontage road separated from Lake Mead Parkway by open area. Utility locations to be coordinated. Single-family residential and dispersed commercial areas border north part of corridor.



15 North Side of Lake Mead Parkway, West of Ivy, Looking East

- View of undeveloped right-of-way area approaching the Ivy intersection.



16 Litter Issues

- Culverts and drainage features clogged with litter along the corridor.

LAKE MEAD PARKWAY - IMAGES FROM BOULDER HIGHWAY TO ATHENS/OLSEN



17 Concrete Pads Remaining from Former Temporary Worker Housing Site for BMI

- Concrete pads remain from the former temporary housing site along the north side of Lake Mead Parkway near Ivy.



18 Saguaro Intersection, Looking East

- Non-signalized intersection. Frontage road continues along the north side of Lake Mead Parkway. Large open area separates the frontage road from the parkway.



19 Warm Springs Intersection, Looking West

- Signalized intersection at Warm Springs. Culverts, riprap, and frontage road constrain available trail corridor.



20 View of Las Vegas Strip

- Views of the Las Vegas strip occur throughout the corridor from the Boulder Highway intersection east to Lake Las Vegas Parkway.



21 Large Culvert on North Side of Lake Mead Parkway Between Warm Springs and Mohawk

- View southeast from existing 90-120' right-of-way on north side of Lake Mead Parkway. Large culvert collects runoff from the south side of Lake Mead Parkway and directs it to wash located on Landwell Property.



22 View of Rainbow Gardens From North Side of Lake Mead Parkway

- View north towards Rainbow Gardens within existing 90-120' right-of-way on north side of Lake Mead Parkway. Areas of disturbance from bicycles and pedestrians located 50-60' from Lake Mead Parkway.



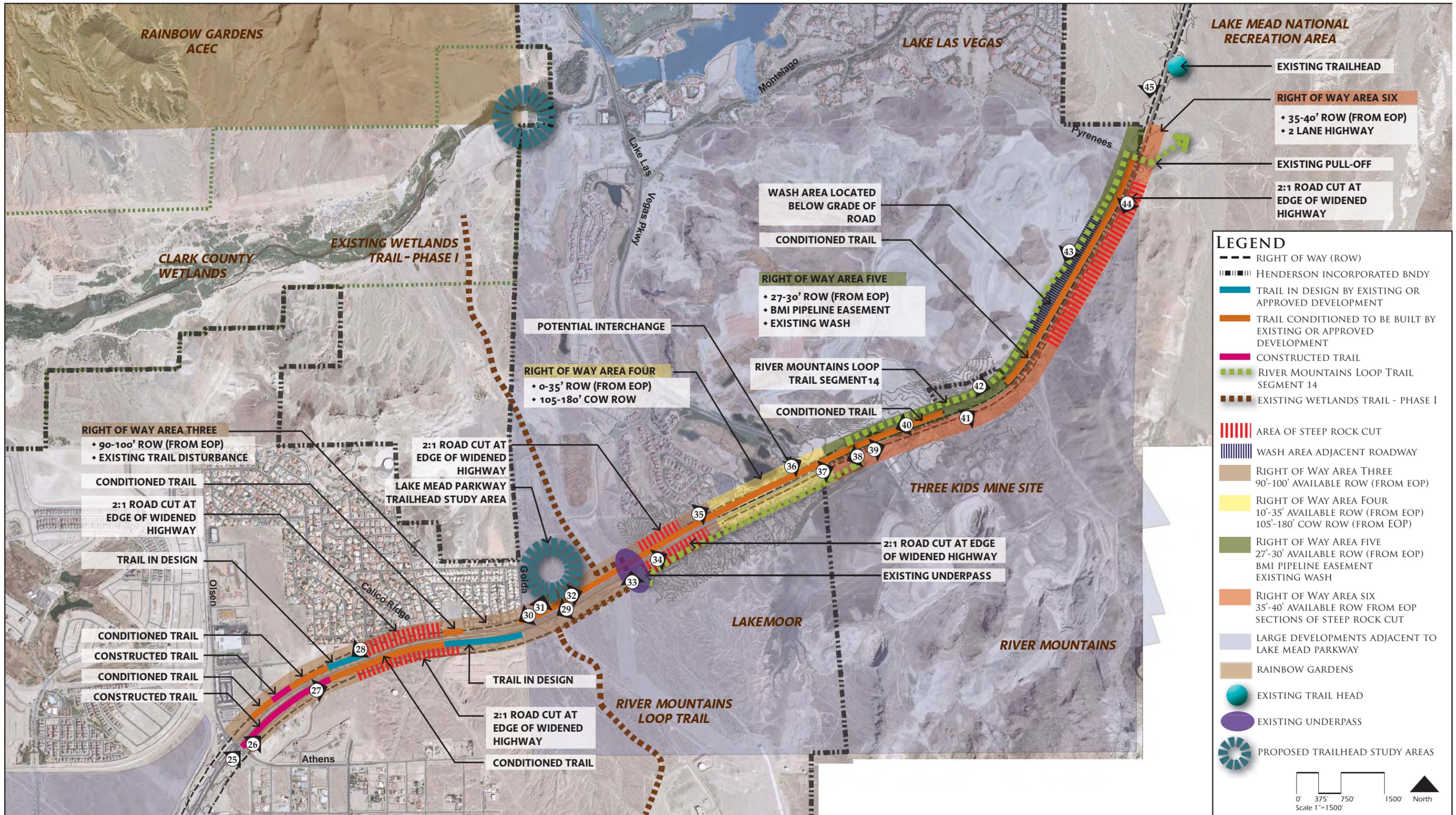
23 Wash Along North Side of Lake Mead Parkway From Southwest of Mohawk Northeast to Olsen

- Wash continues along north side of Lake Mead Parkway from the large culvert west of Mohawk east to Olsen. Depth increases as it nears Olsen and C-1 Channel.



24 Constrained Path between Right of Way and Flood Channel

- Located South of Olsen Drive, flood channel collects runoff in concrete channel on south side of Lake Mead Parkway and disperses into wash on north side of the road. Path clearance not available after NDOT road widening.



LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

SITE ANALYSIS
LAKE MEAD PARKWAY - NORTH



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1 June 2009

LAKE MEAD PARKWAY - IMAGES FROM ATHENS/OLSEN TO LMNRA



25 Athens/Olsen Intersection, Looking East

- Signalized intersection at Athen/Olsen. Section of built trail begins to the east. Culverts, drainage features, and guardrail interrupt easy access to constructed trail.



26 South Side of Lake Mead Parkway, Existing Trail and Flood Control Channel by New Development

- Constructed trail east of Athens.



27 South Side of Lake Mead Parkway, End of Existing Trail, Looking East

- Constructed trail ends near Calico Ridge. Terrain increases variation and grade. Greater grade separation between road and trail.



28 North Side of Lake Mead Parkway, East of Calico Ridge, Looking West

- Commercial development infilling along north side of roadway. Portions of trail constructed as part of the development.



29 South Side of Lake Mead Parkway, Looking West Towards Golda

- Cut slopes flank roadway at Calico Ridge and flatten out at Golda Way.



30 Golda Intersection, Looking West

- Non-signalized intersection at Golda Way looking west. Terrain becomes more level. Residential adjacent north side of roadway.



31 View of Black Mountain and Red Needle from Lake Mead Parkway, East of Golda

- Views of Black Mountain, Red Needle and Rainbow Gardens area become more prevalent east of Golda Way. Large powerlines cut across the landscape from north to south.



32 North Side of Lake Mead Parkway, Looking East Towards Trailhead Area

- East of Golda Way River Mountains Loop Trail connects to the corridor area from the south. Level terrain near the trailhead area with steepening grade and cut slopes east of the existing underpass.

LAKE MEAD PARKWAY - IMAGES FROM ATHENS/OLSEN TO LMNRA



33 River Mountains Loop Trail Underpass - Southern Entry

- Existing underpass connects the River Mountains Loop Trail to the Wetlands Trail - Phase I. Underpass is 10' high and 10' wide. Air ventilation and light opening is provided where a median exists in the road.



34 South Side of Lake Mead Parkway Looking East at River Mountains Loop Trail Underpass

- Cut slopes flank the roadway east of the River Mountains Loop Trail underpass heading towards Lake Las Vegas.



35 North Side of Lake Mead Parkway Looking East to Lake Las Vegas

- Disturbed right-of-way area between trailhead site and Lake Las Vegas.



36 North Side of Lake Mead Parkway at Lake Las Vegas Intersection Looking East

- View Southeast toward River Mountains within 35-40' Right of Way along the north side of Lake Mead Parkway at Lake Las Vegas intersection. Coordinate crossing.



37 North Side of Lake Mead Parkway at Lake Las Vegas Intersection Looking East

- View Northeast toward Lake Mead Recreation Area within 35-40' right of way along the south side of Lake Mead Parkway. Constrained right-of-way.



38 South Side of Lake Mead Parkway, East of Lake Las Vegas Parkway, Looking East

- Steady increase in road grade as one travels east of Lake Las Vegas towards Lake Mead National Recreation Area.



39 South Side of Lake Mead Parkway, Looking East at Right-of-Way

- Constrained right-of-way opportunities with drainage features and grade separation with adjacent commercial property.



40 North Side of Lake Mead Parkway Looking West Towards Lake Las Vegas Parkway

- Extent of right-of-way east of Lake Las Vegas Parkway. Construction of new lots to the north.

LAKE MEAD PARKWAY - IMAGES FROM ATHENS/OLSEN TO LMNRA



41 South Side of Lake Mead Parkway Near 3 Kids Mine Site, Looking East

- Adjacent planned development and remediation of 3 Kids Mine Site. As road descends into the Lake Mead National Recreation Area rock cuts begin to become more pronounced on the south side of the roadway.



42 Existing Wash Along North Side of Lake Mead Parkway Between Pyrenees and Lake Las Vegas Parkway

- Wash area becomes more pronounced nearing Lake Mead National Recreation Area.



43 Existing Wash Along North Side of Lake Mead Parkway Between Pyrenees and Lake Las Vegas Parkway

- Grade separation of wash area and roadway east of Lake Las Vegas Parkway. Wash shows signs of heavy use.



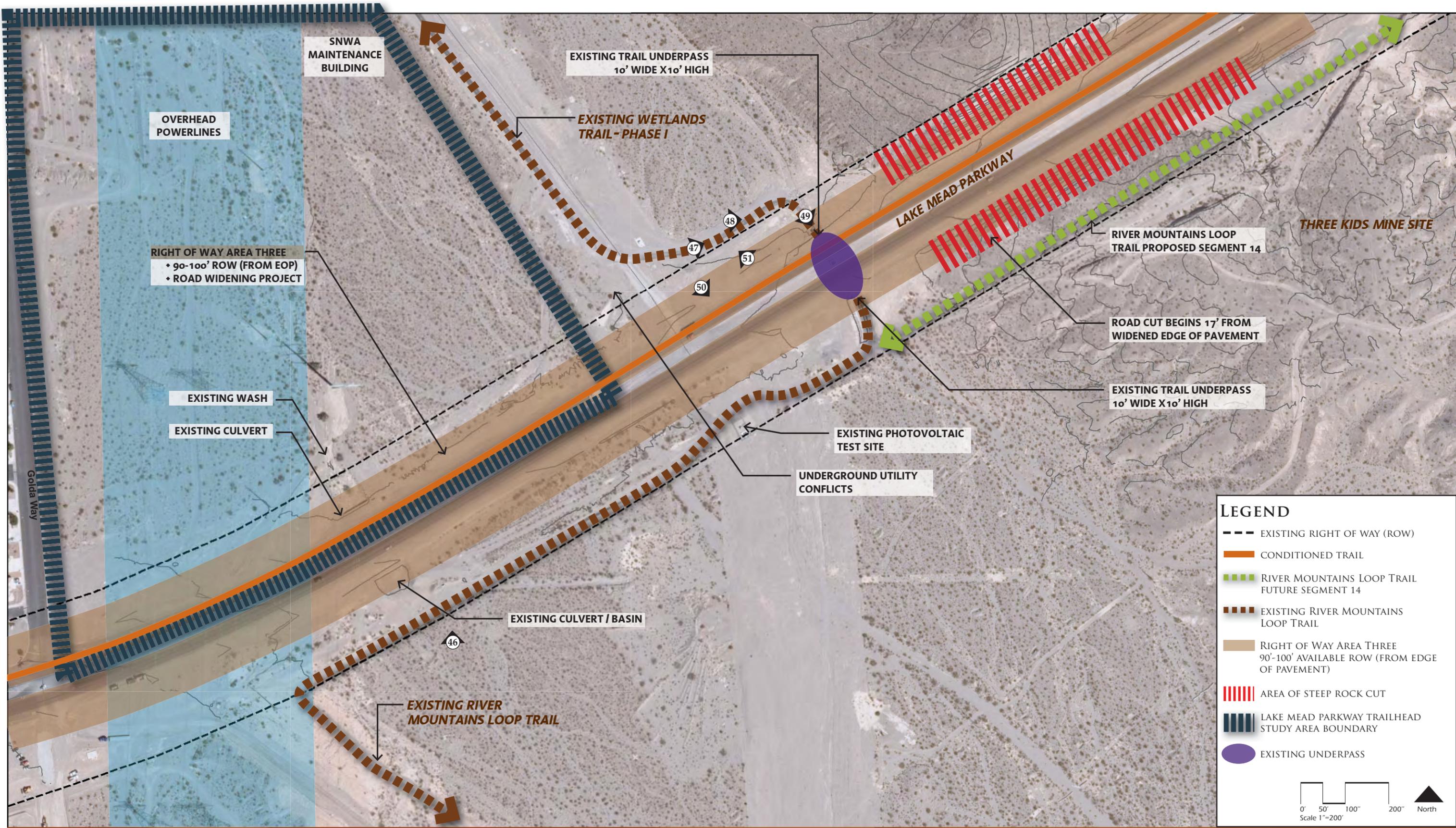
44 South Side of Lake Mead Parkway, Near Lake Mead National Recreation Area Boundary, Looking West

- Rock cuts and rugged terrain along south side of roadway through the River Mountains.



45 North Side of Lake Mead Parkway Looking West, River Mountains Loop Trail Connection to the South, Lake Las Vegas Development to the West

- Looking west, the connection to the River Mountains Loop Trail is located to the south. Rock cuts and varied terrain along the northern border of the River Mountains. Construction development of Lake Las Vegas to the north.



LEGEND

- EXISTING RIGHT OF WAY (ROW)
- CONDITIONED TRAIL
- RIVER MOUNTAINS LOOP TRAIL FUTURE SEGMENT 14
- EXISTING RIVER MOUNTAINS LOOP TRAIL
- RIGHT OF WAY AREA THREE 90'-100' AVAILABLE ROW (FROM EDGE OF PAVEMENT)
- AREA OF STEEP ROCK CUT
- LAKE MEAD PARKWAY TRAILHEAD STUDY AREA BOUNDARY
- EXISTING UNDERPASS

0' 50' 100' 200' North
Scale 1"=200'

LAKE MEAD PARKWAY TRAIL & WETLANDS TRAIL - PHASE II
HENDERSON, NEVADA

SITE ANALYSIS
LAKE MEAD PARKWAY TRAILHEAD

LAKE MEAD PARKWAY TRAILHEAD IMAGES



46 Looking North at Trailhead Site and View of Black Mountain

- Trailhead site is bounded by Lake Mead Parkway to the south and overhead powerlines to the west. Prominent views of Black Mountain, Red Needle, and River Mountains.



47 Wetlands Trail - Phase I, Looking East Towards Underpass

- Gravel mulch comprises the predominant ground treatment around the wetlands trail.



48 Existing Underpass, Looking Southeast

- Wetlands Trail - Phase I connects to the River Mountains Loop Trail via an underpass beneath Lake Mead Parkway.



49 Existing Underpass, Looking South

- Wetlands Trail - Phase I connects to the River Mountains Loop Trail via an underpass beneath Lake Mead Parkway.



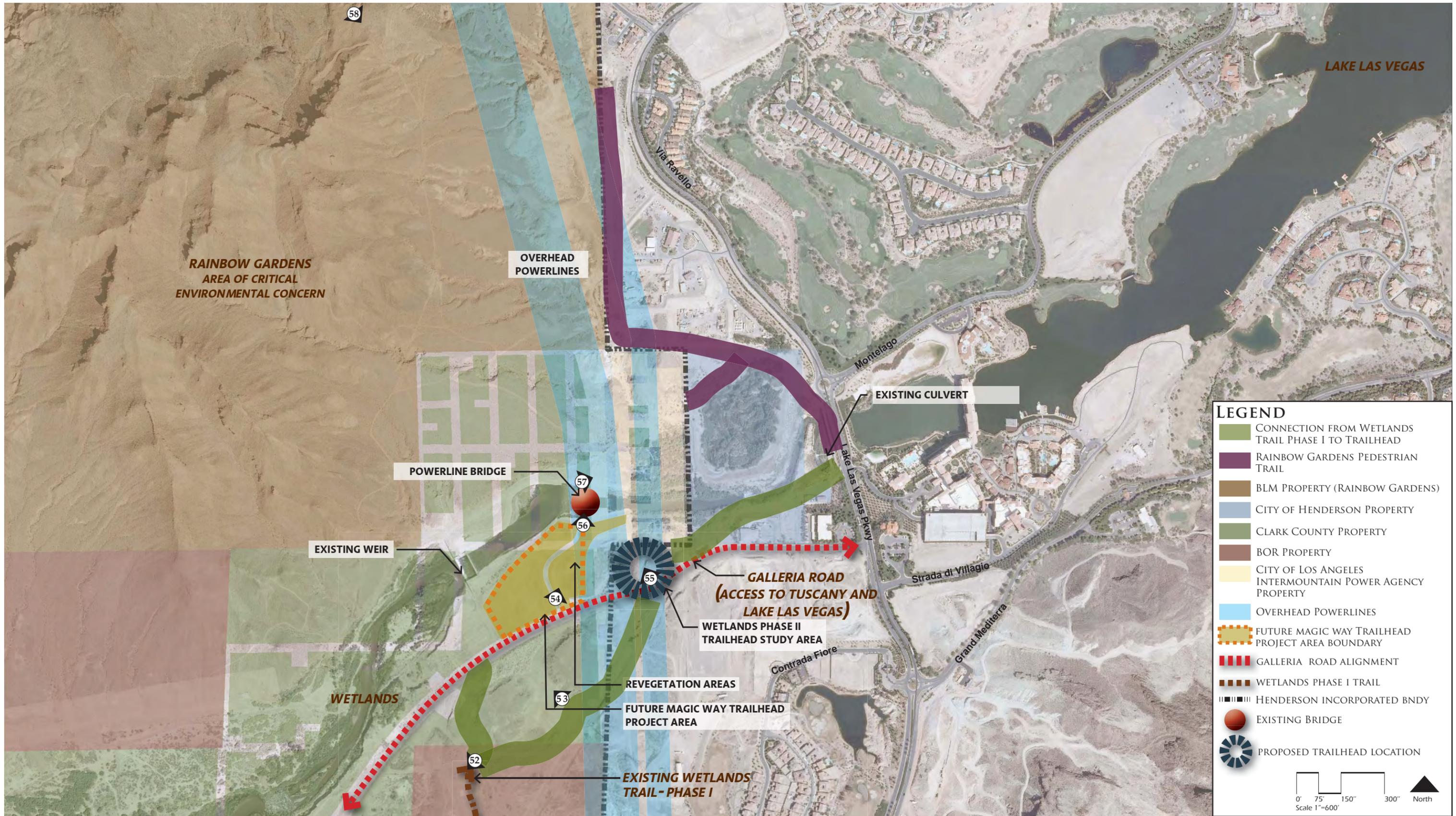
50 North Side of Lake Mead Parkway, Looking Southeast

- Additional paving provides a connection from the Wetlands Trail - Phase I to Lake Mead Parkway bike lanes. This allows for movement onto a bike lane along the road but requires crossing traffic to join eastbound lane.



51 Panoramic of Trailhead Location, Looking Northwest to Northeast

- Trailhead site is bounded by Lake Mead Parkway to the south and overhead powerlines to the west. Prominent views of Black Mountain, Red Needle, and River Mountains.



**LAKE MEAD PARKWAY TRAIL &
WETLANDS TRAIL - PHASE II**
HENDERSON, NEVADA

**SITE ANALYSIS
WETLANDS PHASE II
RAINBOW GARDENS CONNECTION**

WETLANDS TRAIL - PHASE II IMAGES



52 Connection to Wetlands Trail - Phase I, Looking North

- View North towards Lake Las Vegas from end of River Mountains Loop Trail.



53 Construction Access Roads within Wetlands Trail - Phase II Area, Looking Northwest

- View of Rainbow Gardens area and the Wetlands to the north. Numerous access roads and disturbed areas provide opportunities for a trail alignment.



54 Panoramic of Trailhead Areas, Looking North to Northeast

- Clark County's Magic Way trailhead site. Wetlands Trail - Phase II trailhead site located just to the east of Clark County's trailhead. Existing revegetation efforts along the wetlands area.



55 Trailhead Area, Looking North at Powerline Bridge and Rainbow Gardens Area

- Numerous powerlines cross the landscape in the trailhead area.



56 Powerline Bridge

- Provides access from Magic Way trailhead to Rainbow Gardens.



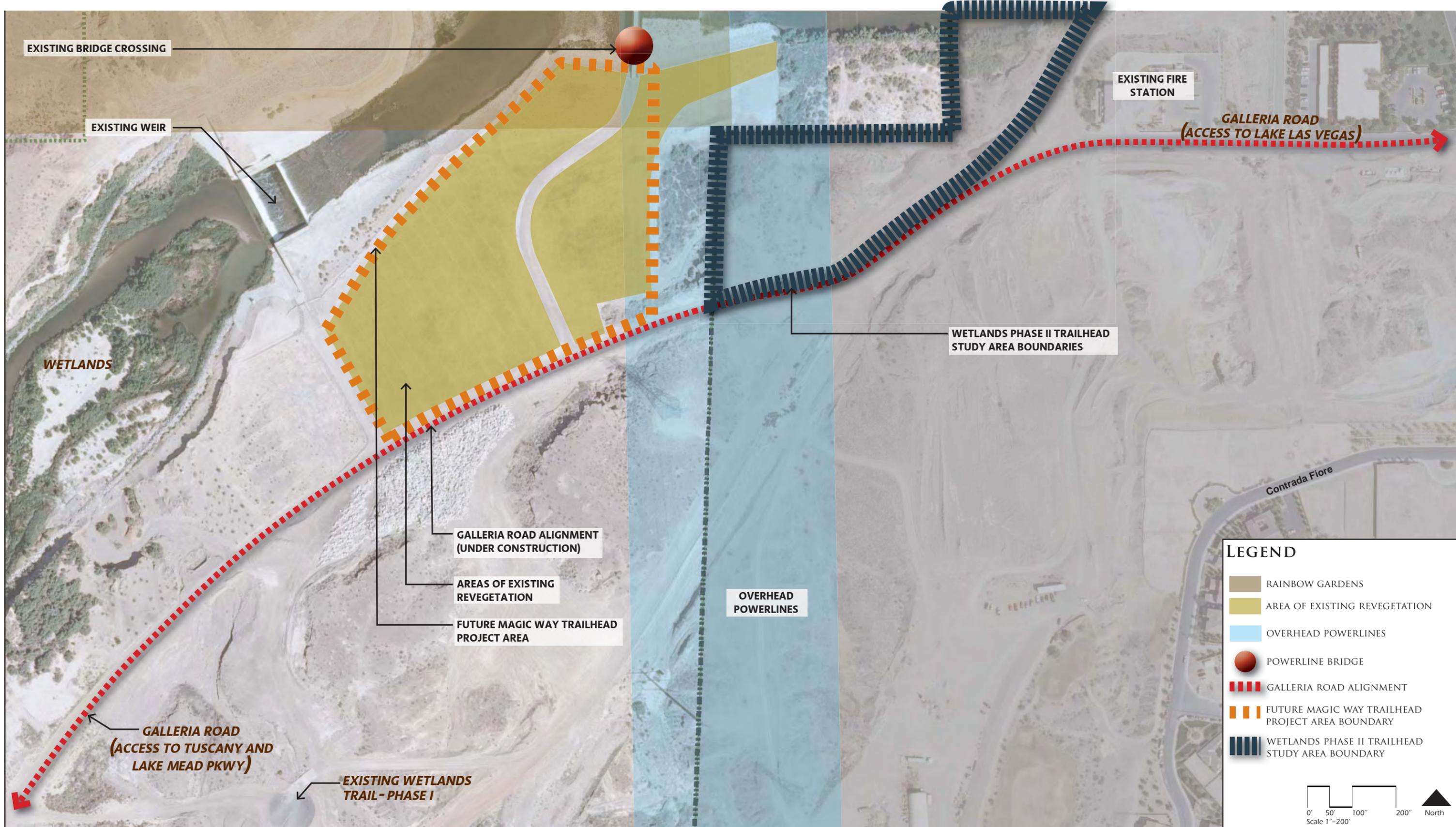
57 View from Powerline Bridge Looking Northeast

- Existing areas of disturbance can be used for the pedestrian connection to Rainbow Gardens.



58 Overall View of Rainbow Gardens Connection

- A non-paved surface pedestrian /hiking connection will be created from the Wetlands (middle right) and continue along Lake Las Vegas development to the existing trail corridor within the Garden.



**LAKE MEAD PARKWAY TRAIL &
WETLANDS TRAIL - PHASE II**
HENDERSON, NEVADA

SITE ANALYSIS
WETLANDS PHASE II TRAIL TRAILHEAD



DESIGNWORKSHOP
Locsha Engineering

1 June 2009