HIDDEN VALLEY REGIONAL PARK MASTER PLAN

Washoe County, Nevada

Adopted by the Washoe County Board of County Commissioners June 21, 2022

Prepared for:
Washoe County, Nevada

Prepared by:
Stantec Consulting Services Inc.

ACKNOWLEDGEMENTS

WASHOE COUNTY BOARD OF COUNTY COMMISSIONERS

Vaughn Hartung – Chair
Alexis Hill – Vice Chair
Bob Lucey
Kitty Jung
Jeanne Herman

WASHOE COUNTY OPEN SPACE AND REGIONAL PARKS COMMISSION

Chris Nenzel - Chair
Doug Doolittle-Vice Chair
Stephanie Chen
Timothy Dake
Maxwell DiNatale
Kevin Joell
Nicholas-Martin Kearney
Darla Lee
Lisa Rode

WASHOE COUNTY COMMUNITY SERVICES DEPARTMENT

Washoe County Regional Parks and Open Space
Sophia Kirschenman/Project Manager-Park Planner
Colleen Wallace-Barnham, Parks Operations Superintendent
Eric Crump, Operations Division Director
Joanne Lowden, Natural Resource Planner
Jeff Patterson, South District Manager
Jennifer Conlan-Thomson, Parks Maintenance Supervisor

Engineering and Capital Projects
Dwayne Smith, PE, Division Director of Engineering and Capital Projects
Alan Jones/PE, Senior Licensed Engineer, Utilities

CONSULTANT TEAM

Stantec
Barb Santner, Project Manager, Senior Associate/Landscape Architect
John Buzzone, Principal, Water Resources Engineer
Dalton Lavoie, Senior Associate, Landscape Architect
Mathew Wolf, Civil Engineer-Trails
Josh Vittori, Wildlife Biologist
April Sorenson, Designer
Daryl Zerfass, Traffic Engineer

Western Botanical Services
Julie Etra

TABLE OF CONTENTS

01 INTRODUCTION

Hidden Valley Regional Park is a 480-acre park located in southeast Reno, close to the Storey County border, approximately 6 miles from Downtown Reno. At present, approximately 65 of the total 480 acres are developed. The park parcel, currently identified as Assessor's Parcel Number 051-330-01, was acquired from the Bureau of Land Management through three separate Recreation and Public Purposes (R&PP) Act patents in 1966, 1968 and 1969.

Master Plan Update

Several master plans have been prepared for Hidden Valley Regional Park, one in the early 1990s and the most recent adopted in 2004. Prior to the 1990 master plan a horse arena, practice arena, parking, retention pond and drainage interceptor channels were constructed. Some of the improvements from the master plans were constructed including the playground, tennis courts, restroom, dog park, small group picnic area, trailhead parking and trails in the northern portion of the park. In the southern portion of the park a small group picnic area, playground and parking area were built. The park contains an extensive trail system. Other improvements described on the plan have never been constructed.

Additionally, the park hosts two water tanks that are owned and managed by the Truckee Meadows Water Authority and a special use permit application was approved in 2021 for the construction of an additional water tank on the property to store treated effluent water from the South Truckee Meadows Water Reclamation Facility (STMWRF). With the approval, the park's existing potable water irrigation system would be converted to a reclaimed water irrigation system, opening up potential opportunities for the development of additional landscaping and park development options that can utilize effluent water and add value to the community. Initial ideas for these types of facilities included the creation of constructed wetlands and ponds with a public access trail system. This would create wildlife habitat and natural resource value, provide an aesthetically pleasing recreational amenity, align with the goals of the CSD Sewer Utility, and be consistent with the Regional Open Space and Natural Resource Management Plan.

With the desire to program park amenities that can utilize effluent and due to the significant amount of time passed since the last master plan was adopted and improvements were made, the County required an updated master plan to ensure conformity with the community's current recreational needs. In July of 2021, Washoe County approved an agreement with Stantec, Consulting, Inc. for professional consulting services to prepare a master plan for the park.

The Hidden Valley Master Plan update was informed by stakeholder and community input that identifies the collective vision for: enhancing the user experience, maximizing public safety and site use; employing best management practices to conserve natural resource values and open space qualities; balancing community needs with the need to support the distribution of treated effluent; and improving ADA accessibility.

Context

The park is split into a northern section, accessed via Parkway Drive and a southern section, accessed via Mia Vista Drive. The northern section of the park has a horse arena, group picnic area, tennis and pickleball courts, a volleyball court, a playground, and an incredibly popular dog park. The southern section of the park has a group picnic area and playground. The park also has an extensive trail system. The trail system is primarily used by hikers and mountain bikers but is also open to equestrian use. The trail system connects these two areas, but there is no roadway connectivity through the park. The undeveloped portions of the park are characterized by native upland shrub communities and pinyon-juniper woodland. Several areas near the eastern and southeastern border of the park are made up of altered andesite soil where the special status plant species altered andesite buckwheat (Eriogonum robustum) may be found.

History of Hidden Valley and the Park

Hidden Valley

Hidden Valley resides on Wa She Shu (Washoe) Indigenous land. It was surveyed by the Bureau of Land Management (BLM) General Land Office (GLO) in 1863. Minimal settlement was recorded in the area until 1950, when several roads and gold/silver mines were constructed to the east of the present-day park (USGS Virginia City, NV 1950).

The concept of the Hidden Valley neighborhood was originally created by four young business executives in 1956: Emmett Saviers, Link Piazzo, Del Machabee and William Kottinger Sr. Knowing that the "Biggest Little City in the World" was growing quickly, they dreamed of building a golf course and country club. Soon others got on board with the idea and it gained momentum. After initial feasibility studies were completed, the Birbeck Ranch was selected as the site location, consisting of 900 acres of land. A down payment held the land until they were able to raise enough to purchase the property. Articles of Incorporation were filed with the

secretary of state in Carson City on Feb. 27, 1956 under the name of Hidden Valley Properties Inc. Soon the clubhouse and golf course would be completed along with several homes. The development struggled with water quality issues and eventually the Washoe County Health Department imposed a building moratorium lasting eight years. New wells were drilled under different ownership and were eventually bought by the Truckee Meadows Water Authority (TMWA), who operates them today. (Hidden Valley Homeowner's Association).

Hidden Valley Properties sold its last large tract of land in the late 1990s to the firm Braddock & Logan. The western part of this tract was developed into the Hidden Valley Highlands and the eastern part was sold to the Seno Corporation who built The Bluffs development. Hidden Valley has grown to a total of more than 1,300 private homes.

Hidden Valley Regional Park

Shortly after the construction of a portion of the Hidden Valley neighborhood, Hidden Valley Regional Park was built. Hidden Valley Regional Park was constructed on 480-acres deeded to Washoe County from the Bureau of Land Management (BLM) and was completed in 1969. Hidden Valley Park was constructed by the County using funds allocated from park bond issues approved by voters in 1962 and 1967.

The dog park is named after one of the original founders of the neighborhood, Lincoln "Link" Piazzo. Born in 1918, Link served as a pilot in WWII. After the war, he took up philanthropy which benefited several local organizations including Hidden Valley Park. Piazzo passed away in 2014 at the age of 95 at his home in Hidden Valley.

The horse arena complex is named after Clarence K. Bath, who came to Reno in 1922. He was an avid horseman and helped to form the Nevada White Hats in the 1940s, a group that strived to keep traditions of the Old West alive through education, camaraderie, and horsemanship. He was Nevada's first American Horse Show steward and a life member of the Nevada State Horsemen's Association. Bath spent much of his time helping youth become good horse owners until his death in 1967 (Washoe County Parks).

The original park featured riding and hiking trails, picnic areas, restroom facilities, and the horse arena. In 1978, the County added tennis courts, jogging paths, and additional picnic areas. New playground equipment, lawn and a picnic shelter were added in 2007. A new dog park was added in 2008 (Truckee Meadows Parks Foundation).

Washoe County Planning Policies

Southeast Truckee Meadows Area Plan

A Washoe County Planning Document that directly addresses the Hidden Valley area is the Southeast Truckee Meadows Area Master Plan (SETM). This document was created in response to "a citizen-based desire to identify, implement and preserve the community character that has evolved throughout the diverse communities in the Southeast Truckee Meadows over time." A series of public workshops were hosted by the Department of Community Development and Planning Commission to identify the unique characteristics of Southeast Truckee Meadows communities and how to preserve them. The purpose of this plan is to implement and preserve this community vision and character. According to the plan, this purpose can be accomplished by managing development in a way that:

- "Respects the scenic, and suburban character of the area by encouraging architectural and site design standards that are responsive to this heritage.
- Respects private property rights.
- Preserves the composition of mature neighborhoods in the planning area.
- Provides additional open space and recreational opportunities.
- Addresses the conservation of natural, scenic and cultural resources.
- Ensures that infrastructure is coincident with development and appropriate in scale and character to the community character.
- Coordinates resource availability with the construction of infrastructure through the implementation of facilities and resources plans".

Much of the land in the Southeast Truckee Meadows (SETM) was once ranches and agricultural land. Now it consists mostly of subdivisions and other accessory land uses. The SETM planning area is different than most others in the county because it consists of mostly private property and does not contain large tracts of public lands. The most scenic aspect of this area is the Virginia Range that forms the eastern boundary of the planning area. These mountains are the backdrop to the SETM and are entirely privately owned and divided into 40-acre parcels. There are concerns about the visual impacts to the land if development occurs.

The area contains a number of perennial streams and water channels: Boynton Slough, Dry Creek, Steamboat Creek, Thomas Creek, Whites Creek, and many unnamed intermittent streams. Steamboat Creek is the natural feature that provides a common bond for the entire planning area as it winds its way from south to north eventually emptying into the Truckee River. Steamboat Creek holds a huge potential as a natural, scenic, and recreational amenity for the area and the county should plan cooperatively with all interested parties to restore and enhance this natural feature of the area.

Below is the description of Hidden Valley in the SETM Master Plan:

"Hidden Valley is a semi-rural community within the unincorporated county that borders Reno to the West, University of Nevada (UNR) Farms and the Truckee River to the north, the Virginia Range and Storey County to the East, and the Huffaker Narrows area to the south. Wild horses have grazed on this land for many years. They graze in the hills to the East of Hidden Valley Regional Park and also roam into the areas south of the park. Hidden Valley was a part of the Emigrant Trail taken by pioneers who were California bound in the mid-19th century. The infamous Donner party was known to have traversed through Hidden Valley following Steamboat Creek and passing to the south of Huffaker Hills before resuming their north and westward movement. In places their wagon ruts can still be seen. The hills surrounding Hidden Valley are home to coyotes, rabbits, raccoons, birds of all kinds, including the Mountain Bluebird and Golden Eagles. The wetlands are home to herons, ducks, geese, and the occasional wildfowl visitor as a resting place when migrating on the Nevada flyway."

Other important aspects of Hidden Valley Park include:

- The roads that encompass the Valley are local access roads, which provides a quiet atmosphere free from traffic noises.
- There are no streetlights in Hidden Valley which provides a view of the night stars that is not available to others closer into the city. There is an astronomy club that uses the accessible areas of Hidden Valley Regional Park to view the stars with telescopes because the darkness of the surrounding neighborhood permits better viewing.

- Hidden Valley has a desert climate typical of arid western valleys, ranging from extended drought to flood conditions and is extremely sensitive to prevalent environmental conditions. Steamboat Creek provides essential water to sustain wildfowl life and marshland along its borders.
- The Rosewood Lakes marshlands and nature center (former public golf course) that is owned by the city of Reno and operated by the Truckee Meadows Parks Foundation borders the valley also serve as water retainers in times of floods, providing important acreage for floodwaters to spread out. While some Hidden Valley homes have been affected by floodwaters, this has been relatively rare.
- Residents of this semi-rural area create and maintain homes consistent with a lifestyle which values privacy and peacefulness combined with nearness to the city.
- Housing density is low, with homes being built on a minimum of 1/3 acre lot sizes, with many more being larger.
- Some residents in Hidden Valley maintain their own wells and septic systems, while others have water and sewer service.
- There is no commercial or industrial activity in the area. The residents believe that there is no need for further commercial or industrial activity in the area. Such non-residential development would serve to destroy the rustic feel of the Valley.
- While available to be used by others in the community at large, Hidden Valley Regional Park is modest in its recreational features and fits well within the semirural nature of the community. Residents prefer that any future development of any type take into consideration the serene nature of the area and be designed with consideration of the impact such development would have on the character and charm of Hidden Valley. Residents believe in the necessity to preserve their natural resources for the benefit of present and future generations of residents.

The following Goals and Policies are identified in the SETM Master Plan:

Goal Two: Establish development guidelines that will implement and preserve the community character commonly found within the individual communities of the Southeast Truckee Meadows planning area.

SETM.2.1

a. Minimize disruption to natural topography.
b. Utilize natural contours and slopes.
c. Complement the natural characteristics of the landscape.
d. Preserve existing vegetation and ground coverage to minimize erosion.
e. Minimize cuts and fills.

Goal Four: Hidden Valley Suburban Character Management Area (HVSCMA). Establish a land use pattern, site development guidelines, and architectural guidelines that will implement and preserve the Hidden Valley community character as described in the Southeast Truckee Meadows Vision and Character Statement.

SETM.4.5 Approval for uses that generate noise will require full mitigation to equal or exceed Washoe County noise standards (Article 110.414).

SETM.4.8 Additional standards specific to Hidden Valley are located in Article 212 of the Washoe County Development Code. These standards are applicable to grading, slope stabilization, revegetation, residential buffers, sidewalks, allowed uses, building materials and heights and setbacks.

Goal Eight: Maintain open vistas and minimize the visual impact of hillside development.

SETM.8.2 The Washoe County Departments of Community Development and Public Works will establish and oversee compliance with standards for grading that minimize the visual impact of all residential and non-residential hillside development.

SETM.8.3 The grading design standards referred to in Policy SETM.8.2 will, at a minimum, ensure that disturbed areas shall be finished and fill slopes will not exceed a 3:1 slope, and that hillside grading will establish an undulating naturalistic appearance by creating varying curvilinear contours.

SETM.8.4 Washoe County will support the acquisition/dedication of private land with prominent ridgelines, rock outcroppings, canyons, and the steeper sloped portions of the Virginia Range in order to preserve the scenic backdrop to the area and provide for wildlife habitat and recreational opportunities.

SETM.8.6 New water storage tanks will be sited on hillsides in such a way as to be shielded from view by the natural topography as much as possible and will not be located within areas designated as Open Space or near trails.

Goal Nine: Public and private development will respect the value of cultural and historic resources in the community.

SETM.9.1 Prior to the approval of master plan amendments, tentative subdivision maps, or public-initiated capital improvements in the Southeast Truckee Meadows planning area, the Nevada Department of Conservation and Natural Resources will be contacted and can require that an archaeological investigation be conducted.

SETM.9.2 Washoe County will cooperate and participate with Tribes and State, Federal agencies in the planning and conservation activities of those agencies related to cultural and historic resources.

Goal Ten: The Southeast Truckee Meadows planning area will contain an extensive system of trails that integrates with trails in adjacent jurisdictions, recreational facilities, the Regional Trail System, public lands and schools, and transit facilities; and contributes to the preservation and implementation of the community character.

SETM.10.2 New trails will be designed to accommodate primarily pedestrian and bicycle traffic and equestrian when appropriate, unless technical or severe environmental or economic hardships warrant consideration of a more limited use.

SETM.10.3 Trails that provide links to the facilities listed in Goal 10 should receive priority for funding, planning, and construction.

SETM.10.6 Access to existing trails will be protected and improved whenever possible. During the process of development review, the Washoe County Departments of Community Development and

Regional Parks and Open Space will request dedication of property and/or easements when appropriate trail alignments have been identified that link significant nodes within the Southeast Truckee Meadows planning area or connect existing trails or otherwise implement Goal 10.

SETM.10.9 The Washoe County Department of Regional Parks and Open Space shall plan for an “Eastern Skyline Trail” that will run from Hidden Valley in the north to SR 341 in the south along the higher elevations of the Virginia Range.

SETM.10.10 The Washoe County Department of Regional Parks and Open Space shall coordinate with Reno in an effort to construct a continuous multi-purpose trail from Toll Road traveling north to link up with Hidden Valley. The trail will pass through both, unincorporated county and the City of Reno and link parks, schools, open space, and residential areas along the way.

<u>Washoe County Master Plan- Public Services and Facilities Element - Parks and Recreation</u>

Included in the Washoe County Master Plan is a section dedicated to parks and recreation. Parks and recreation opportunities are an invaluable part of the County's lifestyle and significantly contribute to the quality of life in Washoe County. Citizens are asking for more parks and undisturbed open space. A primary goal of Washoe County's parks and recreation program is to meet the identifiable regional park and open space needs for County residents. This is achieved, to a large extent, by conserving and enhancing the County's unique features through preservation of lands with scenic, natural, historic, and recreational value.

Facility Design Standards for Regional Parks

Regional parks should be designed and developed for diversified use by large numbers of people. Because of its size, the regional park can accommodate facilities that cannot be accommodated in a community park. The regional park should provide urban and suburban residents a pleasing natural environment where they can engage in a variety of recreational activities. These activities should include both passive and active recreation uses. Desirable features of a regional park include:

- Large open spaces with natural landscape and landscaping
- Individual and group picnic and camping areas
- Nature trails
- Restrooms
- Off street parking
- Regional parks should be a minimum of 100 acres. Regional parks should be located at strategic locations to provide access to the entire population.
- Regional trails should be designed with consideration for all user groups. Trail width of multiple use trails should be four to ten feet wide or wider where necessary.
- Passing areas with tread of 10 to 15 feet wide should be provided at frequent intervals.
- Trails should be constructed of natural material. Asphalt or other pavement should be avoided, except in urban areas where the trail will have high use. In most cases, it is desirable for the trail to be simple compacted earth. The trail may be treated or surfaced where dust presents a problem, to prevent erosion, or to improve areas that are slick or muddy.
- The type of material chosen for surfacing (bark, gravel, oil coat, etc.) must be compatible with the environment and must not create severe runoff or erosion problems.
- Drainage is the most important consideration in trail construction. Erosion problem areas should be identified in the trail resource evaluation and management planning stage. The method used to drain the trail tread will depend on the quantity and speed of water and the type of soils in the area. The best and simplest drainage method is to build a one percent to three percent slope from the side of the tread outward.
- Bridges or culverts should be used where trails cross streams, whether permanent or intermittent.

02 EXISTING CONDITIONS

Site Inventory and Site Analysis

The process to develop the master plan update began in 2021 first by understanding the context of the previous master plans and built improvements. A site visit was conducted with Washoe County Community Services parks, utility, and maintenance staff to observe and document how the public is using the park, how improvements are holding up, and to review the undeveloped areas in relation to the adjacent developments. The results were documented as existing conditions and then as a site analysis.

Park Amenities and Features Northern Section

The northern section of the park accessed from Parkway Drive contains the majority of amenities. Amenities Include:

- horse arena
- practice arena
- parking lots
- small group picnic area
- volleyball court
- horseshoe
- tennis and pickleball courts
- playground
- restroom
- dog park
- open lawn
- ornamental trees, shrubs, and drip irrigation
- trailhead parking
- extensive soft trails in upper reaches
- natural open space
- retention pond and stormwater conveyance (ditch) system
- manual entrance gate

Park Amenities and Features Southern Section

The southern section of the park accessed via Mia Vista Drive contains a smaller number of amenities. Amenities include:

- small group picnic area
- playground
- enclosure for restroom (no restroom)
- dog park
- open lawn
- ornamental trees, shrubs, and drip irrigation
- parking lot
- connections to soft trails
- natural open space
- detention pond
- manual entrance gate

The extensive trail system consists of gravel roads and soft trails popular with hikers and mountain bikers. The park is also open to equestrian use although the popularity of the park by this group has fallen over the years. Trails connect the northern and southern portions of the park however there is no vehicular connection between these areas.

The two potable water tanks are owned and managed by the Truckee Meadows Water Authority. The proposed effluent storage tank will store treated effluent water from the South Truckee Meadows Wastewater Reclamation Facility (STMWRF) with the plan to convert the existing potable irrigation system to a reclaimed water irrigation system and utilize effluent for new park amenities.

- The park is well maintained overall, however some features require repair and maintenance, including trails
- fencing
- retention ponds and stormwater conveyance ditches
- natural surface parking lots

Several aspects of the park were studied in detail to address conditions that were considered important in programming and park management.

Soils and Vegetation

See Appendix A Soils and Vegetation for expanded information.

Soils

According to the Natural Resource Conservation Service (NRCS), seven soil map units occur within the project boundary. They vary in texture from gravelly sandy loam, very stony sandy loam and stony sandy loam at the higher elevations and steeper slopes, to sandy loams at the lower elevations and lower percent slopes, typical for Truckee Meadows upland sites. They are characterized by slow permeability, rapid runoff, and moderate to high susceptibility to erosion by water.

Sensitive Plant Species

According to the Nevada Division of Natural Heritage (NDNH) there are two rare plant species that have the potential to occur within the park due to their association with unique soils (mainly of the Smallcone Series): altered andesite buckwheat (Eriogonum robustum), and altered andesite popcorn flower (Plagiobothrys glomeratus). Both species are found on altered andesite soils and rock outcrops. Neither plant is protected under the Endangered Species Act, nor by the State of Nevada (Nevada Administrative Code 527.010).

Eriogonum robustum has the following status:

STATUS: Heritage Program SENSITIVE LIST, ranks: G2G3Q S2S3

USFWS/ESA: species of concern. STATE OF NEVADA: none. BLM: Special Status Species. USFS: none. NNNPS: watch list.

Plagiobothrys glomeratus has the following status:

STATUS: Heritage Program SENSITIVE LIST, ranks: G2G3 S2S3

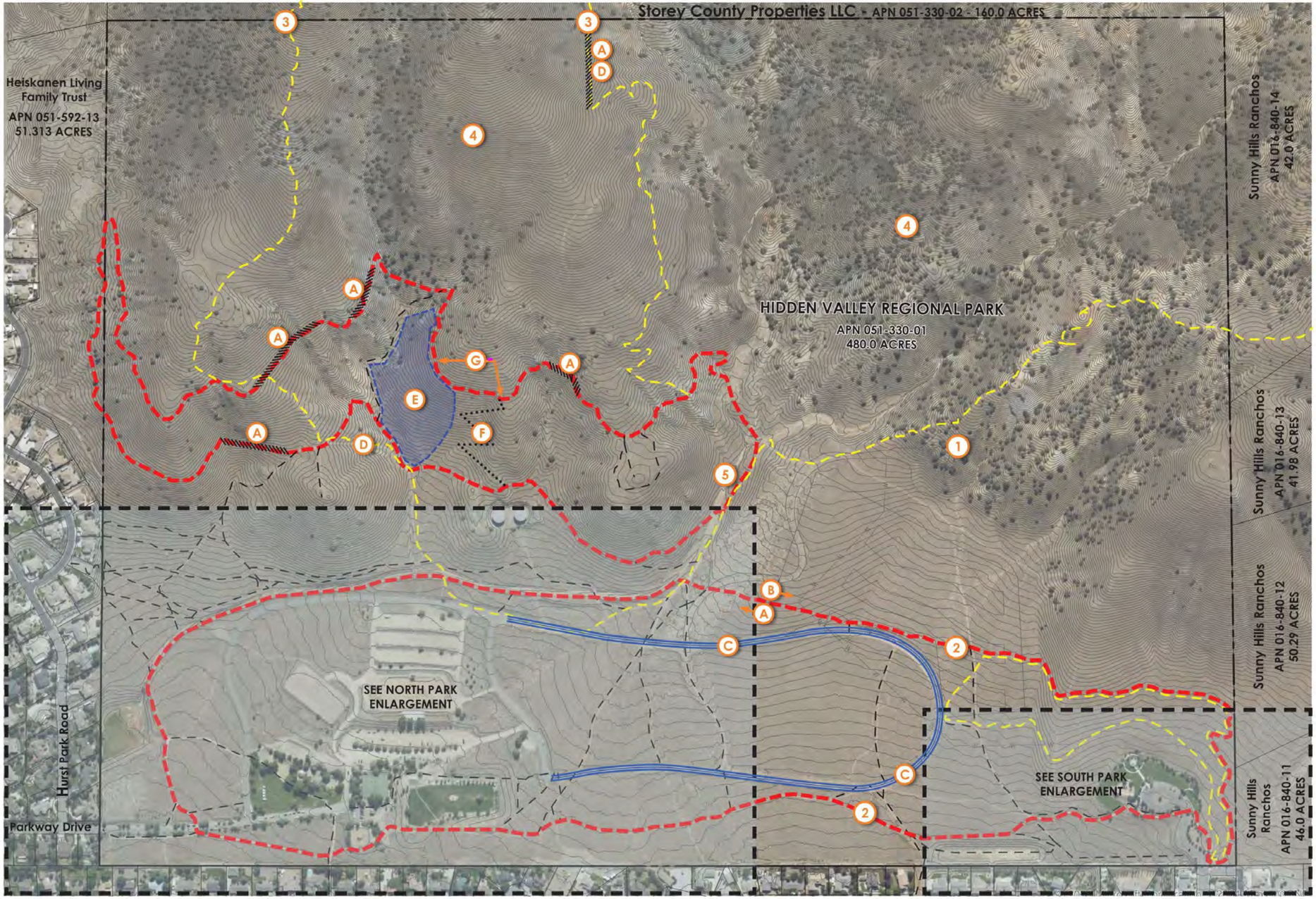
USFWS/ESA: none. STATE OF NEVADA: none. BLM: none. USFS: none. NNNPS: watch list.

Plant Communities

According to the United States Geological Survey SWReGAP analysis, there are ten vegetation communities within the project area. By far the dominant plant community is the Inter-Mountain Basins Big Sagebrush Shrubland (365.2 acres). This plant community, widespread in the semi-arid Western United States where it may vary considerably, is dominated by Wyoming sagebrush (Artemisia tridentata ssp. wyomingensis). Other dominant shrubs may include bitterbrush (Purshia tridentata), horsebrush (Tetradymia canescens), and rabbitbrush (Ericameria nauseosa). Native graminoid species may include squirreltail (Elymus elymoides), Indian ricegrass (Achnatherum hymenoides) and Great Basin wildrye (Elymus cinereus). Graminoids are typically not dominant in native plant communities in the Truckee Meadows and surroundings unless they include introduced species such as crested wheatgrass (Agropyron cristatum) and hard fescue (Festuca brevipila) or unless the site is riparian or wetland. Common forbs may include slivery lupine (Lupinus argenteus), sulfur buckwheat (Eriogonum umbellatum) and tapertip hawksbeard (Crepis acuminata).

The second most dominant community within the project area is the Great Basin Pinyon-Juniper Woodland association (61.5 acres). This occurs at the higher elevations, steeper slopes, and rockier soils within the park boundary. The overstory is dominated by Pinyon pine (Pinus monophylla) and Utah Juniper (Juniperus osteosperma). The understory is typically poorly vegetated due to skeletal soils and low average precipitation. The third most dominant plant community is the Inter-Mountain Basins Mixed Salt Desert Scrub (17.9 acres), which is typically dominated by species in the Chenopodiaceae family such as 4-wiing saltbush (Atriplex canescens). The Rocky Mt. Montane Mesic Mixed Conifer Forest and Woodland, in the southeast corner of Park consists of just 0.6 acres.

Site Inventory and Analysis-Overall



LEGEND

1. **Future Effluent Tank**
   - Develop park amenities using effluent from tank
2. **Trail – Perimeter**
   - Moderate condition
   - Improve wayfinding
3. **Potential Future Trail Connection to Storey County**
4. **Trail Expansion**
   - Opportunity for future trails into hills
5. **Off Road Trails**
   - No longer used – decommission where not a part of new trail system

Trail Observations:
General comment - all trail cross slopes, width, and drainage could be improved to feel more comfortable for mountain bikers

- A Trail needs regrading
- B Trail turns to single track
- C Add/Finish a paved bike loop
- D Steep Section
- E Potential jump line / Park MTB
- F Jump line switch back access
- G Fan flow trail section

Existing Trail Legend:
- Existing High-use Trail
- Existing Moderate-use Trail
- Existing Low-use Trail

1"=225'-0" 0' 225' 450'

Project Size: 480 Acres

Site Inventory and Analysis-North

Site Inventory and Analysis- North Legend

LEGEND

1. **Picnic Pavilion and Parking**
   - Good condition
   - Reservable for 100 people
   - Horseshoe court is sometimes used
2. **Turf**
   - Good condition
   - On potable water
   - Attracts feral horses – dangerous to park visitors
3. **Pickleball Courts – 4**
   - Good condition – very popular
4. **Tennis Court – 1**
   - Good condition
5. **Restroom**
   - Good condition
   - 4 Stalls
6. **Playground**
   - Fair condition
   - Needs upgraded equipment and surfacing
7. **Dog Park**
   - Good condition
   - Large and small dog areas, extremely popular
   - Replace water fountain with bottle fill station
   - Replace Astro turf with different material, hold odor
   - Consider adding agility, flyball, and other features
   - Enlarge dog park
   - Dog bowl with fills need repair, drainage problem
   - Taller fence recommended for larger dogs - 4' to 6' fence - repurpose old 6' practice arena fence
8. **Parking**
   - Natural surfaces are maintenance problem, soil shifts/erodes during storm events – pave
   - Post and wire fencing, upgrade
9. **Volleyball – Sand**
   - Seldom used, could be removed
10. **Park Circulation**
    - Improve for ADA - repair/replace path surface
11. **Arena**
    - Poor condition, seldom used or requested, weeds
    - Consider repurpose – concerts, pump track, bike park, or removal
12. **Grandstands**
    - Good condition, seldom used or requests
    - Consider repurpose with arena
13. **Announcers Booth**
    - Moderate condition, seldom used
    - Consider repurpose with arena or removal
14. **Electric Box**
    - For announcers booth – maintain or remove
15. **Practice Arena**
    - Poor condition, seldom used or request, weeds – remove
    - Repurpose existing fence
16. **Irrigation Backflow**
    - Maintain or replace to irrigate trees in upper area
    - All irrigation valves need replacement/upgrade
17. **Former Caretaker Site (Pad Only)**
    - Good trees and level pad
    - Repurpose into picnic area or other use
18. **Detention Basin**
    - Steep slopes in some areas – need restorations
    - Weeds accumulate and require removal
19. **Trail – Natural Surface**
    - Moderate condition, requires maintenance
20. **Road – Natural Surface**
    - Moderate condition
    - Popular with dog walkers
    - Adjacent ditches in poor condition, heavily eroded and blocked culverts, need maintenance
    - Analyze connecting north/south portions of park

Gate

21.
    - Good condition
    - Spring loaded
    - Annually tumble weeds blow and accumulate here and at NW corner of park

North Entrance

22.
    - Good condition
    - Monuments, manual gate
    - Feral horses enter here, install cattleguards to prevent

Road – AC

23.
    - Fair condition
    - Popular for dog walking
    - Paved loop has potential for bicycle racing (Reno Wheelman) – consider entire loop

Trail – Natural Surface

24.
    - Very difficult, poor condition, erodible
25. **Road – AC**
    - Fair condition
    - Odd termination
26. **Tanks**
    - TMWA, 200,000 gallons each, potable
27. **Horse Trails**
    - Gray colored from feral horses, consider decommission
28. **Unofficial Park Entrance / Neighborhood Access**
    - Horses can enter here, install cattleguards to prevent
29. **Main Road – AC**
    - Fair condition
    - Trees line road on drip – good condition
    - End road lacks wayfinding to facilities
30. **Soil Piles**
    - Soil piles from ditch cleanout activities – relocate and use for park facilities, revegetate
31. **Culverts**
    - Many clogged with sediment - maintenance needed
32. **Gate – Vehicular**
    - Swing gate – good condition
33. **Fence – 6' Tall, Typ.**
    - Perimeter fence at residential lots, check to ensure solid from feral horses
34. **Trees**
    - Moderate to dead condition – remove dead trees
    - Replace irrigation to improve watering
35. **Ditch**
    - Drains parking lots – eroding
    - Reconstruct with parking lot upgrades
    - Fill and accumulate with tumble weeds
    - Large drop offs
36. **Sanitary Sewer**
    - Maintain with improvements
37. **water**
    - Good condition
38. **Hose Bib**
    - Maintain for cleaning dog park
39. **Water Fountains – Human & Pet**
    - Dog fountain – bowls leak
    - Human fountain – replace with water bottle fill stations
40. **Split Rail Fence**
    - Could be removed, cars hit
41. **Fences**
    - Poor to moderate condition
    - Extensive maintenance needed
    - Feral horses can get under fences at ditches – need special gate
42. **Trail – Informal**
    - Not defined, needs construction
43. **Trail Connection**
    - Motorcycles are using, needs controlled access
44. **Dog Park Walkway**
    - Congested with occasional dog fights – consider fencing to parking lot (separating small and large dogs)
45. **Trail Markers and Wayfinding**
    - Poor wayfinding to trail parking and trailheads
    - Trail markers very small print
46. **Landscaping Encroachment**
    - Encroachment from off-site neighbors
47. **Trail – Perimeter**
    - Moderate condition
    - Improve wayfinding
48. **Slopes**
    - Formerly turf, restore if grandstands are used

Site Inventory and Analysis- South

Site Inventory and Analysis – South Legend

LEGEND

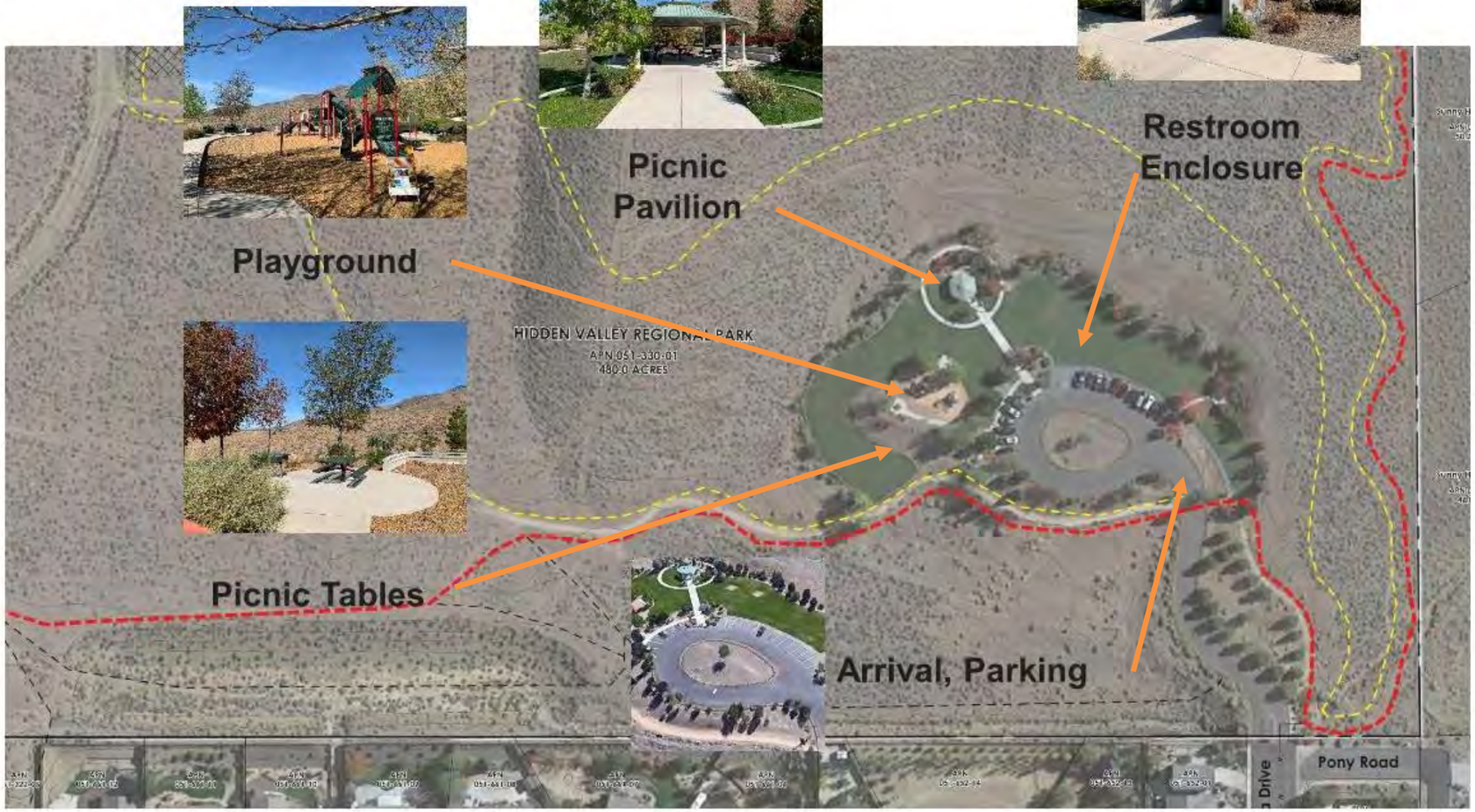
1. **Picnic Pavilion**
   - Good condition – moderate use
2. **South Entrance**
   - Good condition, monuments, manual gate
   - Feral horses enter here – install cattleguards to prevent
3. **Parking Lot – AC**
   - Good condition
4. **Restroom Enclosure**
   - No restroom
5. **Turf**
   - Good condition, on potable water
   - Attracts feral horses – dangerous to park users
6. **Playground**
   - Playground in good condition
   - Needs upgraded equipment and surfacing over time
7. **Picnic Table**
   - Good condition
8. **Road – AC**
   - Good condition
9. **Fence**
   - Poor to moderate condition
   - Extensive maintenance needed
10. **Road – Natural Surface**
    - Moderate condition, maintenance needed
11. **Detention Basin**
    - Weeds accumulate and require removal
12. **Maintenance Road Connection to North**
    - Moderate condition, maintenance needed, not open to public
13. **Trail – Natural Surface**
    - Moderate condition, maintenance needed
14. **Drainage from turf**
    - Deep rill forming, require maintenance
15. **Hillside**
    - Denuded hillside requires revegetation

North Park Facilities

- Arrival, Parking, Restroom
- Picnic Pavilion, Parking
- Dog Park
- Arenas, Grandstands
- Pickleball/Tennis
- Playground

South Park Facilities

- Arrival, parking
- Picnic Tables
- Playground
- Picnic Pavilion
- Restroom
- Trails



Overall Park

- Trailheads
- Trails
    - Highland Loop (purple)
    - Inner Loop (blue)
    - Perimeter Loop (red)
    - South Park Loop (yellow/brown)
    - Mia Vista Trail (green)
    - Upper Hidden Valley Trail

        (not shown on this plan- found on the All Trails App)

Opportunities and Constraints

Opportunities

- There is ample parking in the north that can support new amenities that are used daily although parking is filled when the site is used for special events such as mountain bike races.
- The existing arenas are level and are seldom used offering the opportunity for repurposing them for new amenities.
- The large size of the park with existing natural areas provides the opportunity to conserve ecologically/ aesthetically important areas and to provide new facilities to meet the needs of the developing community.
- Future effluent water provides the opportunity to invigorate the existing landscaping and turf while providing the opportunities for new amenities such as wetlands, turf, pastures, and additional landscaping.
- Taking advantage of the entire site, the Master Plan should create a circulation network to facilitate movement throughout the park for bicyclists and pedestrians and encourage walking and biking.
- The park has panoramic views of the Sierra Nevada and Downtown Reno looking west and scenic overlooks should be provided with seating and possibly shade.
- The site has a wide variety of wildlife and plants that can be interpreted in panels within the park so users can understand the natural fauna.
- Views of the hills on the east side of the park with pinion juniper landscape and geothermally altered rock are high quality and should be captured with strategically located seating areas and interpretation of the natural features.
- North picnic pavilion is in good condition and is well used, another pavilion in the north would likely be supported.
- Few weeds were observed with healthy, native vegetation which should be maintained through a weed management plan for existing and new development.
- The site is occasionally used for competition trail running and mountain biking and additional amenities to support these uses should be provided such as shade structures and restrooms.
- The trail system is extensive and can connect to regional trails north, east and south through coordination with neighboring property owners.
- The trail system on site can be modified to provide loops where users can stay onsite.
- Paths and trails should be upgraded to provide ADA compliant access.
- The site has moderate slopes in large areas where new amenities can be placed.

Constraints

- Due to the location on the edge of developed lands, the park tends to attract vandalism and unauthorized uses including motorized, off-road vehicles. Vehicular/motorized access should be restricted and a greater mix of uses provided to activate the park throughout the day.
- Entrance gates are open during the day and even after hours with visitors staying after hours when they should not be in the park.
- Feral horses can enter the park through the primary and pedestrian entrances resulting in damage to facilities, droppings that require pick up and potential danger to park users. Automatic gates and cattleguards should be placed at the entrances and self-closing gates at pedestrian entrances to preclude horses from entering.
- Fences are in poor condition and in need of repair allowing feral horses to enter the park (see above notes).
- The existing playground in the north area lacks equipment for small children and should be upgraded.
- Existing natural surface parking areas have erosion and/or rills from stormwater and require maintenance and/or paving.
- Primary access is through existing residential neighborhoods. New amenities should be chosen with fewer traffic impacts.
- The neighborhoods adjacent to the project site will be the most impacted by new development. Proper landscape buffers and adequate distances between development and the neighborhood should be maintained.
- Existing stormwater conveyance ditches are highly eroded and require reconstruction and more frequent maintenance.
- Existing stormwater conveyance ditches and basins fill with weeds and need more frequent maintenance.
- The trails need more frequent maintenance. Many have overly steep cross slopes and variable grades, and they lack markers for direction and level of difficulty. Trails should be designed for more consistent difficulty levels, modified to meet USFS standards and trail markers provided to better navigate the system.
- The trail network should be defined, and the large number of informal trails should be decommissioned.
- Fire is a risk due to dry conditions, high winds, and an accumulation of tumbleweeds, particularly along the western and northern boundary fence lines. Greater maintenance and tumbleweed removal is needed.
- The site contains steep slopes which are undevelopable, and which should be protected from erosion.

03-PUBLIC INVOLVEMENT

While analyzing existing conditions at the park, public outreach was conducted through meetings with stakeholder groups, community workshops, public meetings and surveys to ask what existing amenities they would like to see improved and also what new improvements they would like to see built in the park.

Stakeholders Invited to Community Workshop #1:

Park Users:

- Vaughn Middle School (they've hosted races at the park before)
- Wild Horse Connection
- Hidden Valley HOA
- Backcountry Horsemen
- We also posted flyers at the pickleball courts and the dog park to engage those two active user groups

Environmental/Wetlands Groups:

- UNR Engineering
- Truckee Meadows Parks Foundation
- Keep Truckee Meadows Beautiful
- Lahontan Audubon Society
- Wild Sheep Foundation

Sports Leagues:

- Great Basin Youth Soccer League
- Nevada Select Soccer
- Sierra Youth Football
- High Sierra Lacrosse
- Washoe Little League

Trail Groups:

- Biggest Little Trails Stewardship
- Sensus RAD Trails
- Sierra Trail Works
- Truckee Meadows Trails
- Nevada Interscholastic Mountain Bike Association
- Reno Races 5,000
- Reno Wheelman
- Momentum Trails

Washoe County Maintenance staff and others identified by County

Bureau of Land Management

Public Outreach Meetings and Surveys Conducted:

Community Workshop #1, Virtual:	10/21/2021
Trails Stakeholder Meeting#1, In Person:	10/22/2021

- Sierra Trailworks

Survey Online #1	10/22 to 11/16/2021

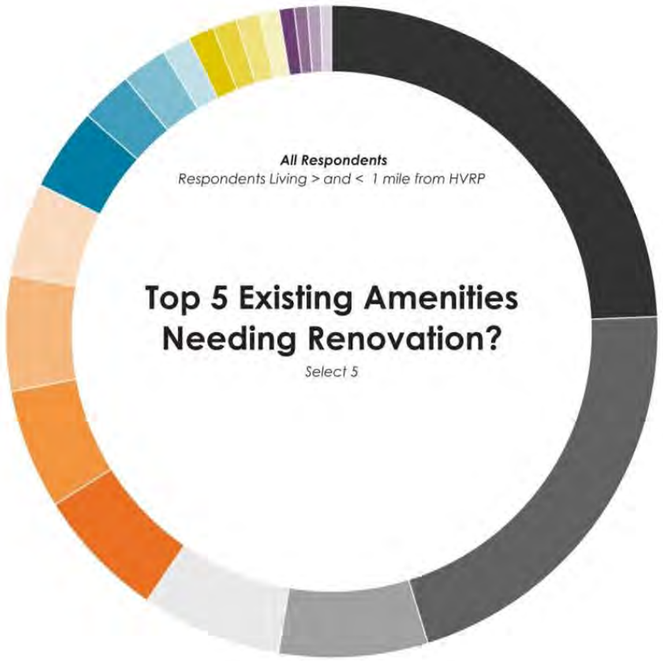
- General
- Trails

Public Meeting #1, In Person:	12/16/2021
Survey Online #2:	12/17/2021-1/24/2022
Trails Stakeholder Meeting#2: Virtual:	1/27/2022

- Truckee Meadows Parks Foundation'
- Biggest Little Trails Stewardship
- Sierra Trail Works

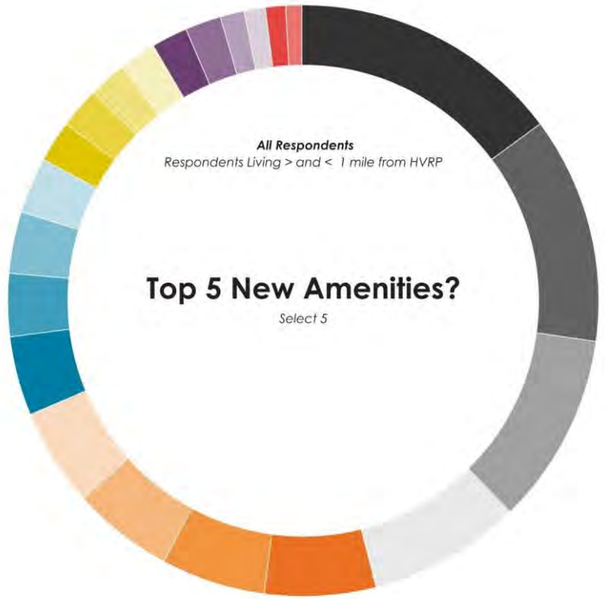
Public Meeting#2, Virtual:	3/2/2022
Survey at Meeting #3	3/2/2022

Results of the Surveys were used to prepare Concept Plan Alternatives and for the Draft Master Plan which are shown in the following Figures.

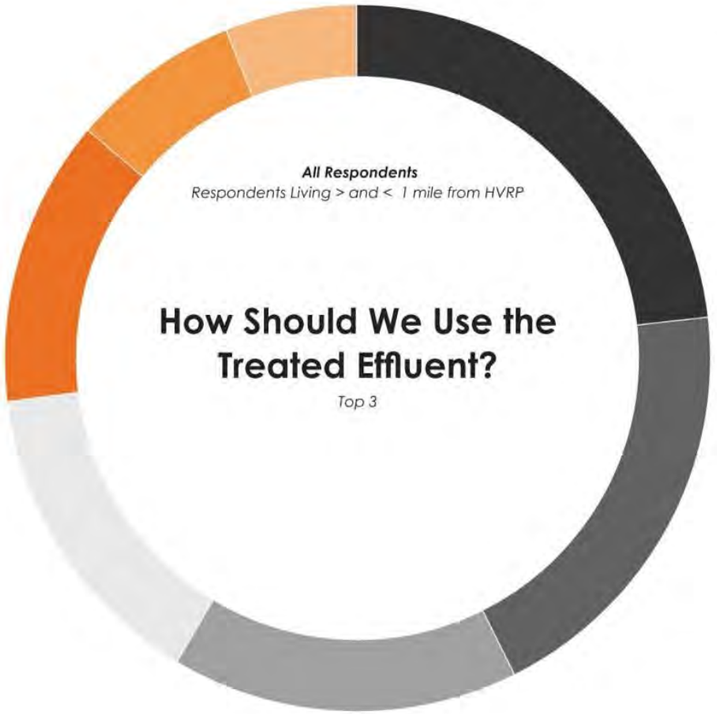


RANK	# VOTES		% VOTES	% VOTERS
1	225	Dirt Trails (East Side/High Terrain)	24.4	69.4
2	193	Gravel Roads and Dirt Trails (West Side/Low Terrain)	20.9	59.6
3	68	Parking (North Side/Parkway Dr)	7.4	21.0
4	64	Dog Park (North Side/Parkway Dr)	6.9	19.8
5	60	Restroom (North Side/Parkway Dr)	6.5	18.5
6	56	Playground (North Side/Parkway Dr)	6.0	17.0
7	53	Playground (South End/Mia Vista Dr)	5.7	16.4
8	43	Portable Restroom Enclosure (South Side/Mia Vista Dr)	4.7	13.3
9	38	Other	4.1	11.7
10	24	Pickleball Courts (North Side/Parkway Dr)	2.6	7.4
11	21	Volleyball Court (North Side/Parkway Dr)	2.3	6.5
12	13	Parking (South End/Mia Vista Dr)	1.4	4.0
13	12	Covered Picnic Structure (North Side/Parkway Dr)	1.3	3.7
14	11	Tennis Court (North Side/Parkway Dr)	1.2	3.4
14	11	Covered Picnic Structure (South End/Mia Vista Dr)	1.2	3.4
16	9	Equestrian Arena Grandstands (North Side/Parkway Dr)	1.0	2.8
17	7	Equestrian Warm-Up Area/Pen (North Side/Parkway Dr)	0.8	2.2
18	6	Horseshoe Pit	0.6	1.9
18	6	I'm Really Not Sure, I've Never Been to the Park	0.6	1.9
20	5	Equestrian Arena (North Side/Parkway Dr)	0.5	1.5

Results of the Survey Online #1
(Circulated from October 21 to November 16, 2021- Used for Concept Plans)



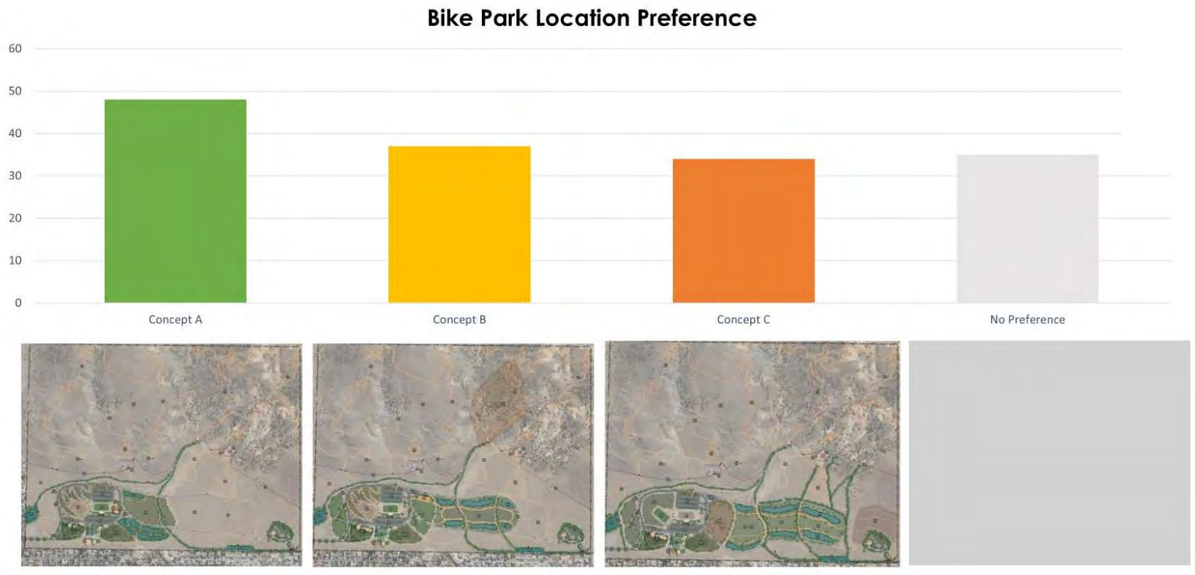
RANK	# VOTES		% VOTES	% VOTERS
1	203	Bike Park (similar to Truckee Bike Park)	14.9	62.7
2	168	Pump Track	12.4	51.9
3	141	Trail Signage System (type, location, length, difficulty)	10.4	43.5
4	113	Wetlands with Nature Trail	8.3	34.9
5	82	Park Wayfinding Signs/Kiosks	6.0	25.3
6	77	Scenic Overlooks along Trails	5.7	23.8
7	75	Large Pasture for Off-Leash Dog Use	5.5	23.1
8	73	Undeveloped/Open Space Preservation	5.4	22.5
9	59	Wildlife Enhancement Features (Habitat and Viewing)	4.3	18.2
10	47	Additional Minor Shade Elements Throughout Park	3.5	14.5
11	46	Paved Jogging/Walking Loop	3.4	14.2
12	42	Disc Golf	3.1	13.0
13	31	Additional Landscaping (Trees and Shrubs)	2.3	9.6
13	31	Formal Recreational Turf/Practice Field	2.3	9.6
15	28	Fitness Nodes	2.1	8.6
15	28	Interpretive Signage on Trails	2.1	8.6
17	27	Bocce Ball Court/s	2.0	8.3
17	27	Additional Informal Turf Area with Trees	2.0	8.3
19	18	Additional Picnic Pavilion (North Side)	1.3	5.6
20	16	Public Art	1.2	4.9
21	15	Other	1.1	4.6
22	12	Additional Picnic Pavilion (South SIde)	0.9	3.7



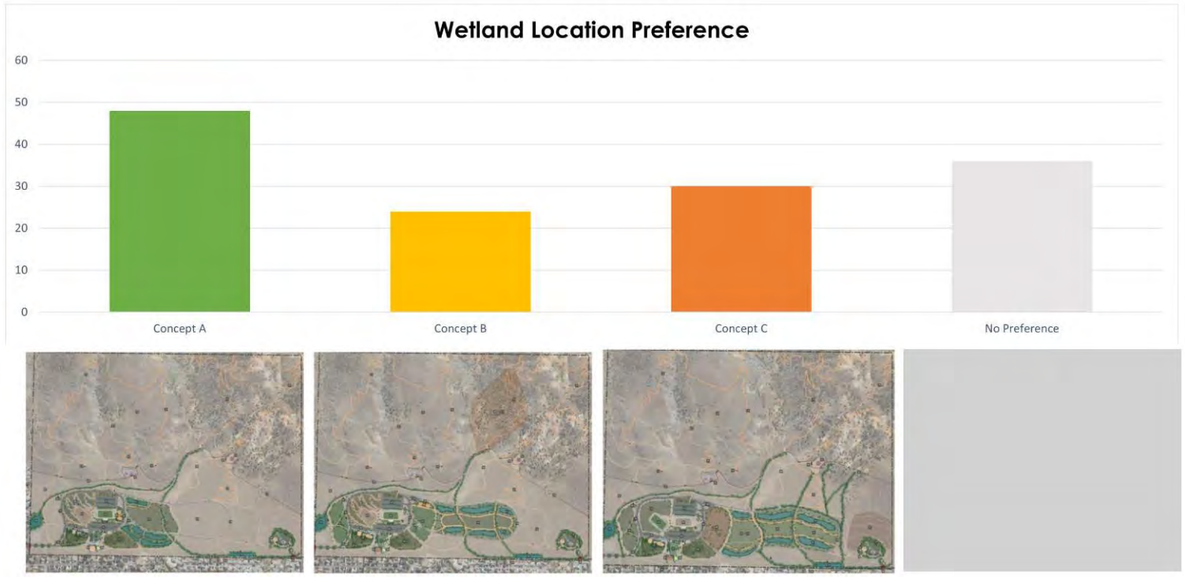
RANK	# VOTES		% VOTES	% VOTERS
1	226	Wetland with Nature Trail	23.2	69.8
2	189	Improved Irrigation to Existing Landscaping	19.4	58.3
3	154	Additional Landscaping (Trees and Shrubs)	15.8	47.5
4	141	Large Pasture for Off-Leash Dog Use	14.5	43.5
5	128	Additional Informal Turf Area with Trees	13.2	39.5
6	76	Formal Recreational Turf/Practice Field	7.8	23.5
7	59	Other	6.1	18.2

RANK	SCORE		% SCORE
1	614	Provide more advanced/difficult trails	13.7
2	596	Improve the maintenance of the trails	13.3
3	570	Provide connections to adjacent trails and public lands	12.7
4	558	Have more looped trails	12.4
5	475	Improve signage	10.6
6	439	Have better maps available	9.8
7	437	Provide more beginner/easy trails	9.7
8	416	Improve trailhead areas	9.3
9	380	Provide closer restrooms	8.5

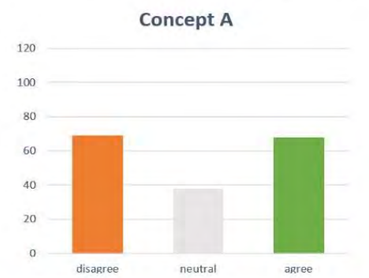
Results of the Survey Online #2

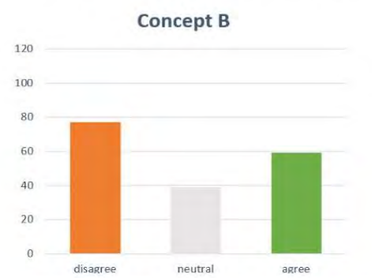


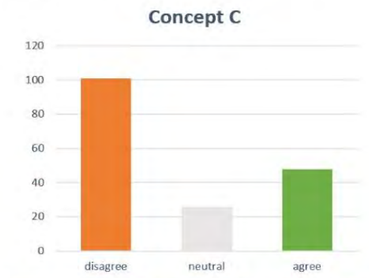
Results of the Survey Online #2
(Circulated from December 17, 2021 to January 24, 2022. Used for Preliminary Master Plan



Overall, do you agree with the location and extent (size) of park features shown?

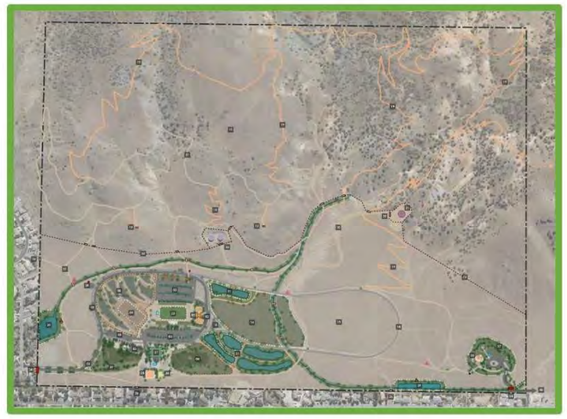






Other Amenity Preferences All Pointed to Concept A

- Pump Track – Concept A
- Large Pasture for Off-Leash Dog Use – Concept A
- Undeveloped Open Space Preservation – Concept A
- Formal Recreation Turf/Practice Field – Concept A
- Additional Picnic Pavilion – Concept A
- Additional Turf and Trees – Concept A



The Preliminary Master Plan was Presented at the March 2, 2022 Public Meeting. Following the presentation, a survey was conducted during the meeting with the below results:

Hidden Valley Regional Park Poll

1. Do you support the tree buffer at the edges of the park near existing residential development? (Single Choice) *

Yes	(14/35) 40%
No	(21/35) 60%

You did not answer this question

2. Do you support adding pickleball courts? (Single Choice) *

Yes	(22/35) 63%
No	(13/35) 37%

You did not answer this question

3. Do you support adding bocce ball courts? (Single Choice) *

Yes	(13/35) 37%
No	(22/35) 63%

You did not answer this question

4. Do you support the plan as presented? (Single Choice) *

Strongly support	(11/35) 31%
Moderately support	(11/35) 31%
Neither support nor oppose	(1/35) 3%
Do not support	(12/35) 34%

5. What are your highest priorities for new/improved amenities? (select all that apply) (Multiple Choice) *

Trail improvements	(27/35) 77%
Bike park/pump track	(8/35) 23%
Wetlands/recharge basins with nature trail	(12/35) 34%
Dog amenities (pasture and/or park)	(13/35) 37%
Playgrounds	(8/35) 23%
Recreational turf/practice field	(3/35) 9%

You did not answer this question

84% OF POLL RESPONDENTS WERE HIDDEN VALLEY RESIDENTS

04 MASTER PLAN

Having completed the study of the original master plan documents, existing conditions, site analysis, and community engagement, the master plan conveys changes to the park amenities based on goals for the project along with community input. The information collected from the County and the community informs the types and locations of proposed amenities located throughout the park.

Goals

Goals for the Master Plan include:

- Preserve open space,
- Update existing amenities,
- Develop new amenities,
- Support distribution of treated effluent,
- Respond to the concerns and needs of the community,
- Improve accessibility
- Improve public safety

Process

A program list was developed that laid the foundation for preparation of a new master plan. First, three master plan concepts were prepared to convey program alternatives for park development. The concept plans were then shared with stakeholders and community members to solicit feedback, both in-person and virtual meetings. A public survey was conducted online from 12/17/2021-1/24/2022.

Following stakeholder input and community feedback, one preliminary master plan was developed with character imagery to convey the design intent. The preliminary master plan was shared with community members in a virtual public meeting on 3/2/2022. An online poll was conducted at the virtual public meeting.

Based on the virtual public meeting, the poll and other written and oral comments received the final master plan was then developed. The master plan update addresses the entire site and considers the current needs of both stakeholders and the community identified through the public outreach effort.

Several aspects of park development and management were addressed including:

Feral Horse Management

Purpose

Management strategies associated with feral horses were developed to address ongoing issues occurring in the park including safety concerns with horses and humans, damage to turf and maintenance associated with horse droppings. Goals for feral horse management include keeping feral horses out of the park while letting deer and small mammals in to achieve a higher level of human health and safety and reduced maintenance at the park than is existing today.

Existing fencing in the park consists primarily of 2 strand wire approximately 4-1/2 feet high with T posts. In areas where this fencing has been vandalized by cutting, horses can enter the park. Additionally, horses can enter the park through both vehicular entrances because gates are open during the day as well as through 3 pedestrian openings from the neighborhoods which are ungated.

Management Strategies

This section outlines several management strategies (MS) designed to address the issues. These strategies are primarily focused on perimeter fencing and gates but also include a public education and awareness component. A heavy emphasis has been placed on fence and gate specifications due to the current associated structures at the park being insufficient, as demonstrated by current feral horse management issues within the park.

MS-1: Install new or repair existing perimeter fences around the entire park property to exclude feral horses. Fencing recommendations vary by organization and include:

Wild Horse Connection Group: Fences should be 4 feet high, 4 strands of smooth wire, bottom wire maximum 12 inches from finished grade and metal T posts 10 - 12 foot on center.

Bureau of Land Management: Fences should be 6 feet minimum, V Mesh or 2” X 4” square mesh, metal T posts.

Southeast Connector: Recently installed fencing is 6 feet high, chain link at right-of-way. Sections of 8 feet high fencing with square wire mesh were placed near UNR farms for deer exclusion.

Approximately every 1 mile, one-way escape gates should be installed to allow feral horses to safely leave the park should they inadvertently get trapped within. Photo 1 (below) illustrates an example of effective one-way gate recently installed at the UNR Main Station Farm and throughout the Southeast Connector Roadway.

Photo 1 –One-Way Escape Gate Example

MS-2: Install appropriate structures to ensure feral horses are excluded at vehicular entrances/exits. The most appropriate application for primary vehicle entrances/exits is likely a double cattle guard, to be cost effective. Cattle guards should be fit with rebar between the tubes to preclude leg injury. Automatic gates could also be considered, though they are more expensive and would require constant opening and closing during park hours to preclude horses. An example of an existing double cattle guard located at the UNR Main Station is

provided as Photo 2. Additionally, a manually operated metal panel gate design can be installed for emergency vehicles and to remove horses that inadvertently get trapped where one-way horse gates are not being utilized. These events are assumed to be low frequency, which is why the manual panel gate is thought to be appropriate. Photo 3 illustrate an example of an existing manually operated, vehicular metal panel gate in Hidden Valley Regional Park.

Photo 2 – Double Cattle Guard Example

Photo 3 – Manually Operated Metal Panel Gate Example

MS-3: Install swinging water gates where perimeter fences intersect drainages. This design allows for water to flow through during high flow events while blocking horses below. The swinging water gates can also be easily accessed and cleaned if debris accumulates but will successfully exclude feral horses. Illustration 1 and Photo 4 provide examples of the swinging water gate design.

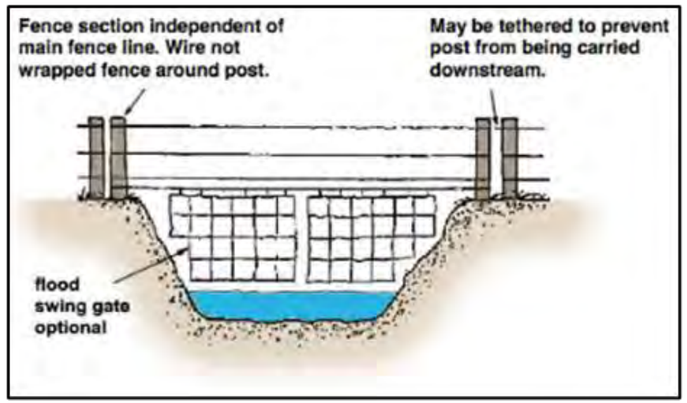


Illustration 1 – Swinging Water Gate Example

Photo 4 – Swinging Water Gate Example

MS-4: Install self-closing pedestrian gate structures at entrances/exits that consist of either small gap gates or manually operated, one-way panel gates. At the same time, minimizing the number of horse gates that could be left open and concentrating equestrian use to a few access points will help mitigate issues related to park users leaving gates open. Manual panel gates would also allow for equine users to access the trail systems within the mountain block above the park. Examples of an existing small gap gate and a small manually operated pedestrian/equestrian panel gate existing in the park are shown on Photo 5.

Photo 5 – Human Gap Gate and Small Manually Operated Panel Gate Examples

MS-5: Install information kiosks and public educational materials (e.g., pamphlets) throughout the park so users can better understand responsible feral horse management. These materials should focus on not only health and safety of humans, canines, and equids, but also the importance of healthy ecological systems. Emphasis within the kiosk and pamphlets should describe why horses are not desired in the park and why they should not encourage horses to enter the park. Furthermore, users should be informed of the maintenance issues and damage that is caused by the horses, as well as noxious and invasive

weeds management. A kiosk example has been provided as Illustration 2.

Photo 6 – Existing 2 Wire Fence in Park

Illustration 2 – Kiosk Example

Summary

The five strategies outlined above are intended to guide the re-design of the park. Reasonable flexibility within the parameters of the strategies is anticipated during the re-design, while keeping in mind the goals associated with each. Specific design specifications and locations of fencing, gates, and information kiosks will be developed in final design phases.

Weed Management

This plan consists of several elements that include prevention methodologies, predesign considerations, and recommendation for specifications that should be included in the final construction documents for site improvements.

Weed Prevention During Construction

These methodologies are addressed in The Truckee Meadows Construction Site BMP Handbook (Farr West, 2015) and should be included in a site-specific Stormwater Pollution Prevention Plan (SWPPP). All SWPPPs can include additional language that address quality of materials used in the construction process and that they be weed free. They include the following Best Management Practices (BMPs):

1. Straw Bale Barriers: Use weed free straw and straw bales;
2. Native Materials Reuse: Use weed free salvageable materials including topsoil and duff;
3. Employee Training: Include discussion of Noxious and Invasive weeds; and
4. Detailed Site Map: Location of State-listed Noxious Weeds

Pre-design Surveys

Determine what is currently on site. This would consist of surveying the entire 480-acre parcel. Survey and identify Noxious and invasive species, occurrences, and quantification (approximate percent cover, stem counts). After species occurrence have been mapped, identify treatment methodologies, including frequency of treatments(s). Nuisance aka invasive weeds are addressed in the following document: Nuisance weeds UNR 1399_2019_01.pdf (Hefner and Kratsch 2018).

Landscape and Revegetation/Erosion Control Designs (Special Provisions)

As part of any site improvements such as construction of the effluent tank, associated infrastructure, and development of new trails that would require revegetation and erosion control specifications, the following should be included:

1. Specify weed free materials, particularly seed and straw;
2. Specify weed treatments; and
3. Specify temporary erosion control (don't leave bare surfaces including subsoil and topsoil stockpiles (they may become colonized by weeds). Although this specification may be included in the SWPPP, it should also be included in the site-specific Special Provisions.

Sustainable Park Design and Maintenance Practices

A sustainable park or landscape is one where human uses and maintenance cause minimal harm to the environment. Sustainable park design protects natural resources, improves wildlife habitat, and focuses on native vegetation instead of traditional turfgrass and ornamental plants. Designing a park sustainably means designing it to last. A sustainable park should integrate with the natural landscape so that it remains for the long term. This involves retaining as much of the pre-existing landscape as possible in its original state, including soils, native vegetation, and slopes. Minimizing disturbance also helps to keep invasive species out and lowers the volume of stormwater runoff and risk of flooding.

Many traditional parks harm the environment due to maintenance practices that involve high-water use, pollution, herbicides, and pesticides. Traditional maintenance practices are typically costly, as well as labor and resource intensive. For example, gasoline and diesel-powered mowing equipment emits high amounts of carbon dioxide, as there are often no emission controls on this type of equipment. Minimizing the need for mowing can cut down on emissions, as well as maintenance costs. Below is a list of sustainable design principles that can offset the negative impacts of traditional parks.

Key principles to designing a sustainable park include:

- Minimize habitat fragmentation. Roads and parking lots break up existing habitat into small fragments that are unsuitable to wildlife.
- Use good quality soil with compost to reduce the need for fertilizers. Leave topsoil as undisturbed as possible.
- Use natural storm water management and green infrastructure like rain gardens and bioswales with native grasses to encourage infiltration.
- Use integrated pest management (IPM) to minimize chemical pesticides.
- Minimize non-porous pavement such as roads, parking lots and paved pathways. These prevent infiltration, fragment habitat and cause run off of pollutants into water bodies.
- Use green building practices in any buildings such as LED lights with motion sensors, low flow toilets, recycled materials, etc.
- Minimize the use of turfgrass. Turfgrass attracts non-native plants and animals such as geese, which disturb native species. Turf also does not offer erosion control benefits like native plants.
- Use native plants and trees around riparian or wetland areas to help filter pollutants before they reach water bodies. Roots from these plants also helps control erosion around embankments. Planting trees near water bodies provides shade and acts as temperature control in shallow areas which increases the habitat quality for aquatic species.
- Create a natural resource management and maintenance plan. Plan for drought and climate change.
- Identify and remove non-native plant species when possible, as they will choke out native plants.
- Use mulch to retain moisture, moderate soil temperature, and prevent washing away of nutrients.
- Create educational awareness about sustainable parks through interpretive signage.

Traffic

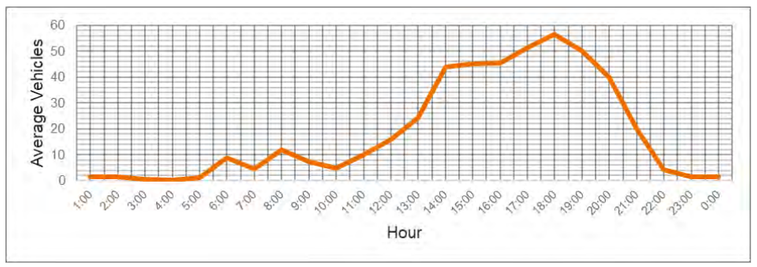
This memorandum summarized the existing traffic conditions at Hidden Valley Regional Park (HVRP), provides an estimate of future traffic volume increases resulting from implementation of the draft HVRP Master Plan, and provides recommendations for traffic calming treatments for Parkway Drive and within HVRP.

Hourly Count Data

On March 9, 2022, Stantec received traffic volume and speed data from Washoe County consisting of counts collected between February 14, 2022, and March 6, 2022 (02/14/2022-03/06/2022). The location where the data was collected was approximately 750 feet south of the north HVRP entrance, just south of the first intersection of the Parkway Drive loop road. The recorded traffic data includes hourly and average traffic, as well as statistics on minimum speeds, maximum speeds, average speeds, and 85th percentile speeds.

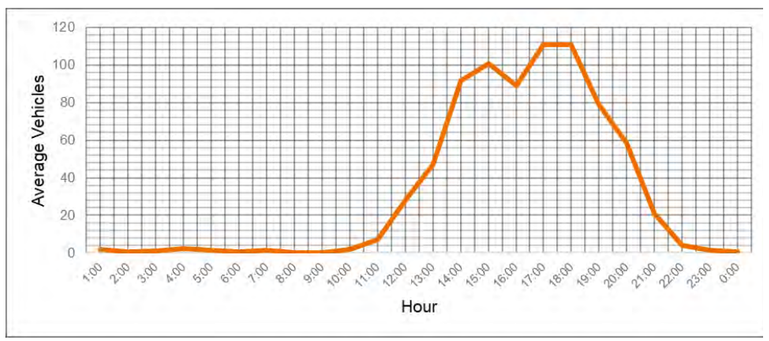
Traffic count data near the HVRP north entrance was collected for all hours in the collection period. Table 1 shows the average hourly traffic for the entire collection period. As shown in the table, for the period between mid-February to early March, peak hourly park traffic (57 vehicles) is experienced at 6:00 PM (18:00). The park opens at 8:00 AM, and average hourly traffic is relatively negligible prior to 10:00 AM. Traffic then increases and remains at its most elevated levels from approximately 2:00 PM until the park's posted closing hours at 7:00 PM. After 7:00 PM, HVRP experiences a sharp decline in hourly traffic until negligible levels are reached at approximately 10:00 PM.

Table 1 Total Average Hourly Traffic Data – On-Site



Average hourly traffic data is also aggregated below in Table 2 for Sundays only. For a conservative estimate of peak hour traffic, Sunday data is shown since its average hourly traffic is highest of all days recorded during the collection period. Similar to the data collection period average, peak hour traffic for Sundays is experienced around 5:00 PM (17:00) to 6:00 PM (18:00).

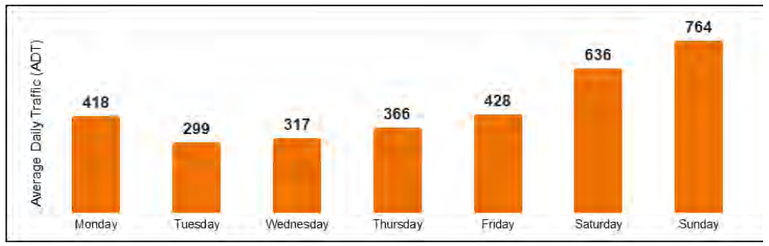
Table 2 Sunday Average Hourly Traffic Data – On-Site



Daily Count Data

Average daily traffic (ADT) estimates near the HVRP north entrance had previously been prepared based on monthly vehicle counts, but ADT counts recorded during the data collection period gives greater insight into the changes in traffic from weekdays to weekends, as HVRP experiences significantly higher traffic during the latter time. Table 3 shows ADT for weekdays and weekends in the data collection period.

Table 3 Average Daily Traffic by Day – On-Site



As shown in Table 3, and as mentioned above, peak ADT was experienced on Sundays in the data collection period, and the average ADT for all weekend days is approximately 700 vehicles. The highest weekday ADT was recorded on Fridays, and the average ADT for all weekdays is 366 vehicles.

Revised HVRP Traffic Forecasts

Previous ADT estimates near the HVRP north entrance prepared by Stantec were calculated to be 250 vehicles and 760 vehicles for weekdays and weekends, respectively. These estimates have been revised based on the new HVRP ADT counts and seasonally adjusted to represent peak use during summer months. With this new information and a seasonal adjustment factor of 1.92, peak ADT is anticipated to be approximately 480 vehicles on weekdays and 1,460 on weekends.

The HVRP Master Plan is anticipated to add, on average, 100 weekday trips and 310 weekend trips. The analysis is based on the area of park expansion shown in the master plan. Therefore, with the Preferred Plan, HVRP is estimated to attract 580 average weekday trips and 1,770 average weekend trips as summarized in Table 4.

Table 4 ADT – Peak Summer Period (North Entrance)

Time Period	Revised Existing ADT	Increase with Preferred Plan	Total ADT with Preferred Plan
Weekday	480	100	580
Weekend Day	1,460	310	1,770

Speed Survey

Vehicle speed data was collected south of the north entrance at the same location noted above, where the posted speed limit is 15 miles per hour (mph). The 85th percentile speed for the entire data collection period, which recorded 9,675 data points, was 22 mph, which indicates that 85 percent of the vehicles were driving at a speed of 22 mph or less. However, speeds were recorded as low as 3 mph and as high as 75 mph (which could have been an erroneous reading), with an overall average speed of 18 mph. The mode speed (most frequently occurring) was 18-19 mph.

Traffic Calming Recommendations

Parkway Drive and Pembroke Drive are each designated by the City of Reno as a Primary Emergency Vehicle Route (PEVR), which means that City policy generally prohibits traffic calming treatments for those roadways so as to not impede emergency vehicle response times. Increases in traffic volume on Parkway Drive resulting from the HVRP improvements (discussed above) may result in residents requesting traffic calming treatments for Parkway Drive, therefore potential treatments that would not impede emergency vehicles are recommended. Examples of such treatments include installation of speed feedback signs, roadway striping to define the centerline and narrow vehicle lanes, and/or pavement edge treatments such as concrete pavers or textured concrete to narrow the traveled way. Use of the County's mobile radar speed feedback trailer could be supplemented with 25 mph pavement legends installed at each permanent speed limit sign. The attached exhibit illustrates potential treatment types and locations for use along Parkway Drive.

Within the HVRP, traffic calming is recommended. For the interior roadways, it is important to maintain slow vehicle speeds for the safety of the park users. Lane widths in the range of 10-11 feet are recommended, and long stretches of roadways should be broken up with deflection (vertical and/or horizontal) to discourage speeding. At heavily utilized crosswalks or locations where trails cross the roadway, consideration should be given to using raised crosswalks with the appropriate warning signs. Raised crosswalks provide a dual benefit of slowing traffic and improved safety for the trail users.

To address reported conditions of vehicles using the park after hours, the gates at each entrance should be locked at night.

Effluent Management

The extension of the County's reclaimed water system to the Hidden Valley Regional Park (HVRP) offers a water resource that can be utilized to enhance the recreational and aesthetic experience for park visitors. The reclaimed water system will provide more water to the park than what is available today, allowing for more irrigation and other uses. One of the other uses considered in the master plan is the development of wetlands and recharge basins. The master plan includes two wetlands and three recharge basins. The primary difference between the wetland and recharge basins, is that the center of the recharge basins will periodically dry out and have less vegetation than the wetlands but will be ringed with a more permanent wetland. The locations of the wetlands/recharge basins were selected for their proximity to soils more conducive to this type of improvement and the overall park plan and movement within the park. The sloping topography will dictate the general shape of the features (longer and narrower) and will require significant grading to construct (most soil will need to be exported). The wetland and recharge basins are developed to the conceptual level and further design is required. The design will necessarily be preceded by a thorough investigation of soil and groundwater conditions to determine specific soil properties needed to complete the design.

The wetland/recharge basin design will include features to facilitate maintenance and operation of the basins. The designs will include wetland planning plans that are consistent with local wetland habitat types and that provide wildlife habitat for native species (notably birds). The design will include elements that assist in the control of noxious and invasive vegetation (e.g., tall white top) and mosquitos. Controlling the water level in wetlands has been an effective strategy for controlling mosquitos and unwanted plants and will be a key management strategy. The only supply of water to the basins will be reclaimed water and precipitation that falls directly on the basins. The basins will include "freeboard" to accommodate precipitation and provide flexibility for margin of safety for operations. The exact amount of freeboard will be determined during final design. The basins will be hydraulically disconnected from the site drainage so that no runoff from other parts of the park can flow into the wetlands and possibly create a new flood hazard.

Walking paths and placed viewpoints will be strategically constructed around the perimeter of the basins to provide the park user the opportunity to observe the wetlands and visiting wildlife. Plantings and fencing will be strategically placed to discourage park visitors from entering the basins.

The reclaimed water meets the Nevada Division of Environmental Protection (NDEP) requirements for a Category A treated effluent. NDEP regulations allow Category A effluents be used for irrigation, non-contact recreation, and infiltration through a permitting process. The use of reclaimed water at the park would require approval from NDEP through permits issued to the County for irrigating and developing wetlands and recharge basins using reclaimed water. The County currently maintains an effluent management permit that allows the County to irrigate parks, schools, and golf courses with reclaimed water. The County could request NDEP authorize the addition of HVRP to this permit for irrigation. As a requirement of the NDEP reclaimed water irrigation permit, the County developed and implemented an Effluent Management Plan that describes how treated effluent is to be used at parks, golf courses, and schools. The plan was reviewed and approved by NDEP and has been implemented for many years. This plan includes various engineering and operational controls intended to help prevent inadvertent ingestion of the reclaimed water. These controls include requiring identifying features (such as purple pipe, purple valve boxes, etc.) on reclaimed water infrastructure to help prevent cross connections (inadvertent connection of drinking water piping to reclaimed water piping). The plan includes requirements on placing signage to indicate to the public where reclaimed water is used and provide warnings against drinking the irrigation water. The plan places restrictions on when and where reclaimed water can be used for irrigation, particularly with regard to spray irrigation. Spray irrigation is restricted in areas adjacent to picnic tables, drinking fountains, and other areas where reclaimed water could potentially come in to contact with consumable items. These limitations include restricting application methods, irrigation times (e.g., irrigation only at night), and using a high wind shut-off to limit wind drift of spray irrigation. The use of reclaimed water at HVRP would need to comply with the requirements of the approved Effluent Management Plan and the NDEP permit.

NDEP Permitting

To develop wetlands and recharge basins, the County would need to apply for a separate effluent management permit from the NDEP. This permit application would require the County conduct a detailed investigation and analysis of area soils and subsurface conditions to demonstrate that the project would not have a significant adverse effect on other properties or to the local groundwater. The permitting process would include demonstrating how the reclaimed water would be used; how much water would be used through evaporation, evapotranspiration, and infiltration; how the public would be restricted from recreating in the wetlands and recharge basins; and how the wetlands and recharge basins would operate (site design and engineering details). The permitting process will include the development of an operations and maintenance plan that describes the practices necessary to operate and maintain the facilities in good working order. This plan would be similar in scope to the Effluent Management Plan described above and will require approval by NDEP.

Both types of permits require annual reporting to NDEP. The annual reports must include water quality test results (conducted on a monthly basis), the amounts of reclaimed water used, and summaries of major operations and maintenance activities. Failure to submit these reports to NDEP can result in the suspension of the permits and are a key element for the long-term operation of these facilities.

Master Plan

The following pages contain exhibits portraying the Hidden Valley Park Master Plan. Exhibits include:

- Overall Master Plan
- North Park Enlargement
- South Park Enlargement
- Trails Master Plan
- Trails Decommissioning Plan
- New Amenities - Wetlands
- New Amenities - Wetlands/Basins
- New Amenities - Bike Park
- Reference Imagery

The locations of wetlands and basins shown in the master plan were selected based on preliminary geotechnical and soils analysis and public input. Additional geotechnical and soils analysis will be conducted during the final design phase and as a result the final locations of wetlands and basins could shift from that shown in the master plan exhibit. A buffer between existing development and the new facilities will be maintained in the final design similar to that shown in the master plan exhibit. Additionally, during the final design of facilities stormwater and groundwater patterns will be studied and mitigation provided, if needed, to prevent impacts to groundwater or surface drainage to adjacent, existing development.

Washoe County has had discussions with the neighboring property owner to the south of the park about a potential road and trail easement through the southwest corner of the park parcel (shown as item #40 on the overall master plan map). Proposed easements on park property need to go through Washoe County's Parkland Easement Application process. An easement through Hidden Valley Regional Park would also require approval by the Bureau of Land Management.

Trails

Hidden Valley Regional Park has an existing, extensive trail system comprised primarily of soft trails. The trails are well-used by the community primarily by hikers and also for mountain bikers and seldom equestrians. Maintenance of the existing trail system has been deferred. Based on extensive community and stakeholder input a wide range of improvements are recommended for the trails. A high priority is for the existing trails to be reconstructed to correct overly steep cross slopes and variable grades and add trail markers for direction and level of difficulty so that users can better navigate the system. Additionally, the trails master plan portrays improvements to develop trail routes that have consistent levels of difficulty by supplementing the existing system with some new trail segments. An accessible trail is planned to provide a wide range of opportunities for users. Below is a summary of existing and new trails shown in the trails plan.

Trail Type	Beginner (Green) Miles	Intermediate (Blue) Miles	Advanced (Black) Miles	Expert (Double Black) Miles
Existing	14.7	15.2	7.8	
Proposed	2.2	1.5	4.4	.8

Finally, many informal trails and roads are identified to be decommissioned. The Trails Decommissioning Plan identifies a total of 6.7 miles.

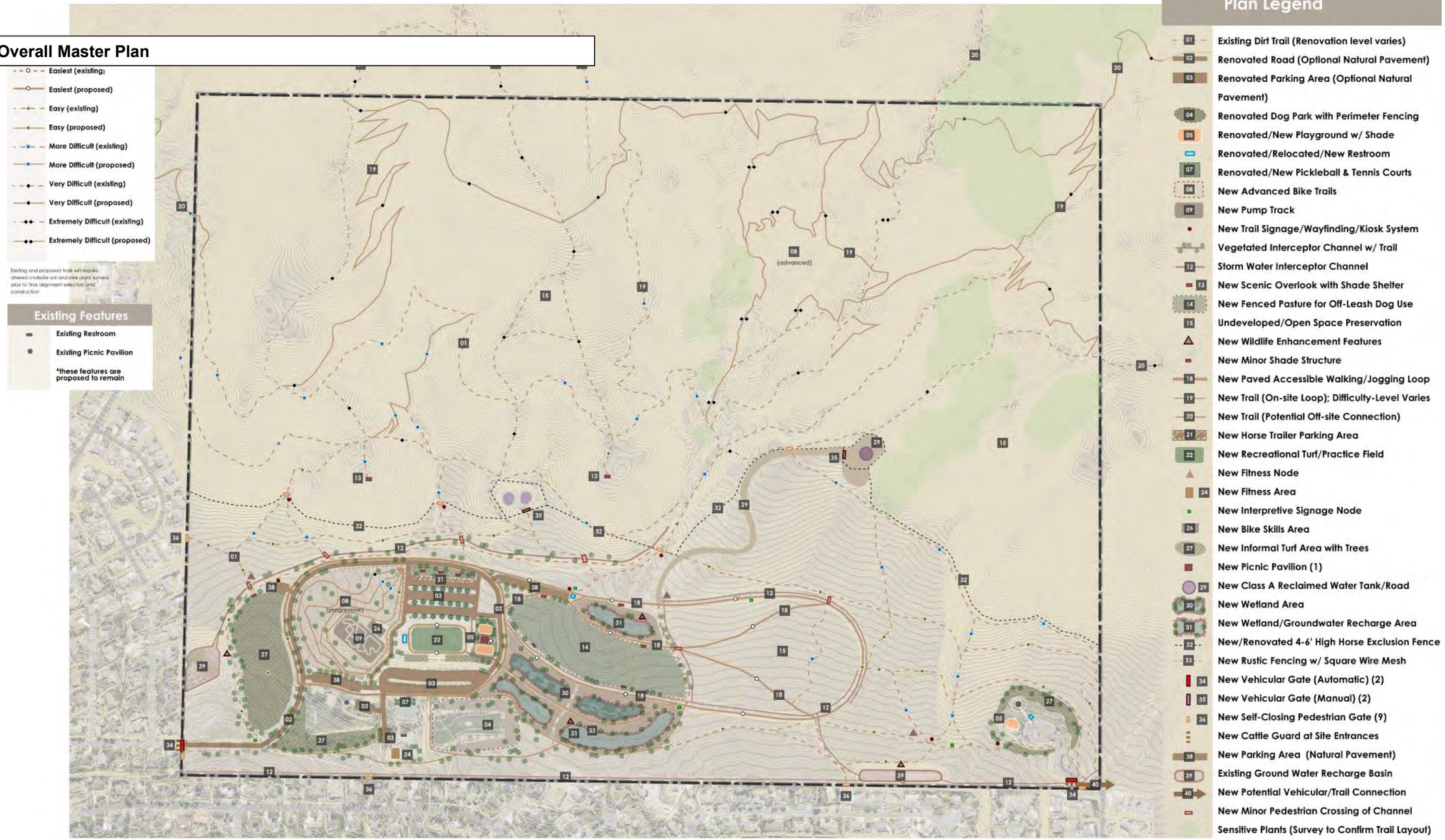
Construction

All trails should be constructed to meet USFS standards. USFS trail construction guidelines, plans, details and specifications are addressed in the following website: https://www.fs.usda.gov/managing-land/trails/trail-management-tools/trailplans.

Washoe County Regional Parks & Open Space has developed an Integrated Vegetation Management Plan (IVM) (June 2020). The tools and BMPs provided in the IVM plan should be used to develop site specific noxious weed treatment plan as a part of all future development projects and to guide future site restoration needs.

Since there are two rare plant species that have the potential to occur within the park due to their association with unique, altered andesite soils, plant surveys should be conducted prior to any construction within these areas of the park.

Overall Master Plan



Plan Legend

- 01 Existing Dirt Trail (Renovation level varies)
- 02 Renovated Road (Optional Natural Pavement)
- 03 Renovated Parking Area (Optional Natural Pavement)
- 04 Renovated Dog Park with Perimeter Fencing
- 05 Renovated/New Playground w/ Shade
- Renovated/Relocated/New Restroom
- 07 Renovated/New Pickleball & Tennis Courts
- 08 New Advanced Bike Trails
- 09 New Pump Track
- New Trail Signage/Wayfinding/Kiosk System
- Vegetated Interceptor Channel w/ Trail
- 12 Storm Water Interceptor Channel
- 13 New Scenic Overlook with Shade Shelter
- 14 New Fenced Pasture for Off-Leash Dog Use
- 15 Undeveloped/Open Space Preservation
- New Wildlife Enhancement Features
- New Minor Shade Structure
- 18 New Paved Accessible Walking/Jogging Loop
- 19 New Trail (On-site Loop); Difficulty-Level Varies
- 20 New Trail (Potential Off-site Connection)
- 21 New Horse Trailer Parking Area
- 22 New Recreational Turf/Practice Field
- New Fitness Node
- 24 New Fitness Area

- New Interpretive Signage Node
- 26 New Bike Skills Area
- 27 New Informal Turf Area with Trees
- New Picnic Pavilion (1)
- 29 New Class A Reclaimed Water Tank/Road
- 30 New Wetland Area
- 31 New Wetland/Groundwater Recharge Area
- 32 New/Renovated 4-6' High Horse Exclusion Fence
- 33 New Rustic Fencing w/ Square Wire Mesh
- 34 New Vehicular Gate (Automatic) (2)
- 35 New Vehicular Gate (Manual) (2)

- 36 New Self-Closing Pedestrian Gate (9)
- New Cattle Guard at Site Entrances
- 38 New Parking Area (Natural Pavement)
- 39 Existing Ground Water Recharge Basin
- 40 New Potential Vehicular/Trail Connection
- New Minor Pedestrian Crossing of Channel
- Sensitive Plants (Survey to Confirm Trail Layout)

Existing Features

- Existing Restroom
- Existing Picnic Pavilion
- *these features are proposed to remain

Trail Legend

- Easiest (existing)
- Easiest (proposed)
- Easy (existing)
- Easy (proposed)
- More Difficult (existing)
- More Difficult (proposed)
- Very Difficult (existing)
- Very Difficult (proposed)
- Extremely Difficult (existing)
- Extremely Difficult (proposed)

South Park Enlargement

Plan Legend

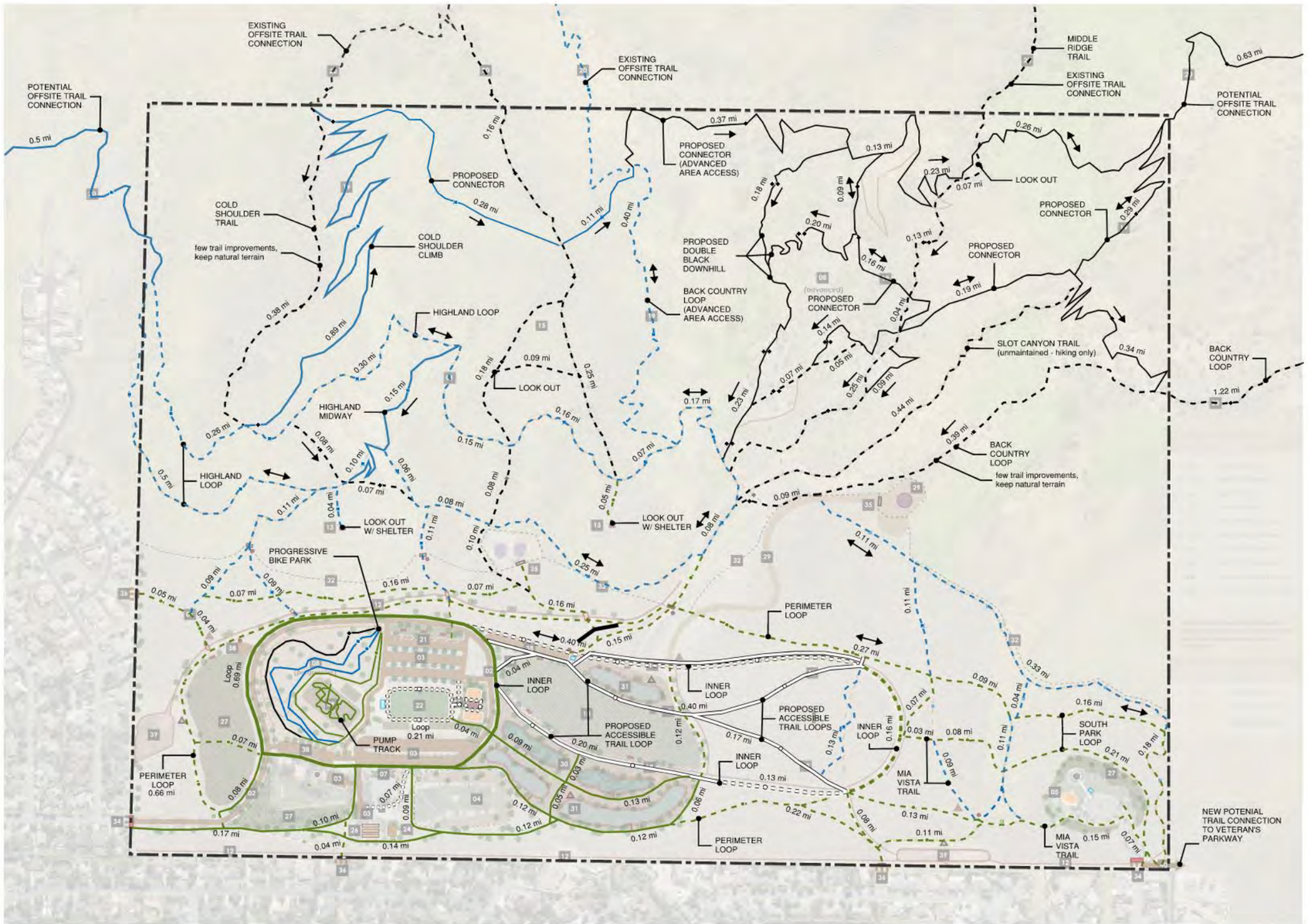
- 01 Existing Dirt Trail (Renovation level varies)
- 02 Renovated Road (Optional Natural Pavement)
- 03 Renovated Parking Area (Optional Natural Pavement)
- 04 Renovated Dog Park with Perimeter Fencing
- 05 Renovated/New Playground w/ Shade
- Renovated/Relocated/New Restroom
- 07 Renovated/New Pickleball & Tennis Courts
- 08 New Advanced Bike Trails
- 09 New Pump Track
- New Trail Signage/Wayfinding/Kiosk System
- Vegetated Interceptor Channel w/ Trail
- 12 Storm Water Interceptor Channel
- 13 New Scenic Overlook with Shade Shelter
- 14 New Fenced Pasture for Off-Leash Dog Use
- 15 Undeveloped/Open Space Preservation
- New Wildlife Enhancement Features
- New Minor Shade Structure
- 18 New Paved Accessible Walking/Jogging Loop
- 19 New Trail (On-site Loop); Difficulty-Level Varies
- 20 New Trail (Potential Off-site Connection)
- 21 New Horse Trailer Parking Area
- 22 New Recreational Turf/Practice Field
- New Fitness Node
- 24 New Fitness Area
- New Interpretive Signage Node
- 26 New Bike Skills Area
- 27 New Informal Turf Area with Trees
- New Picnic Pavilion (1)
- 29 New Class A Reclaimed Water Tank/Road
- 30 New Wetland Area
- 31 New Wetland/Groundwater Recharge Area
- 32 New/Renovated 4-6' High Horse Exclusion Fence
- 33 New Rustic Fencing w/ Square Wire Mesh
- 34 New Vehicular Gate (Automatic) (2)
- 35 New Vehicular Gate (Manual) (2)
- 36 New Self-Closing Pedestrian Gate (9)
- New Cattle Guard at Site Entrances
- 38 New Parking Area (Natural Pavement)
- 39 Existing Ground Water Recharge Basin
- 40 New Potential Vehicular/Trail Connection
- New Minor Pedestrian Crossing of Channel
- Sensitive Plants (Survey to Confirm Trail Layout)

Existing Features

- Existing Restroom
- Existing Picnic Pavilion
- *these features are proposed to remain

Trail Legend

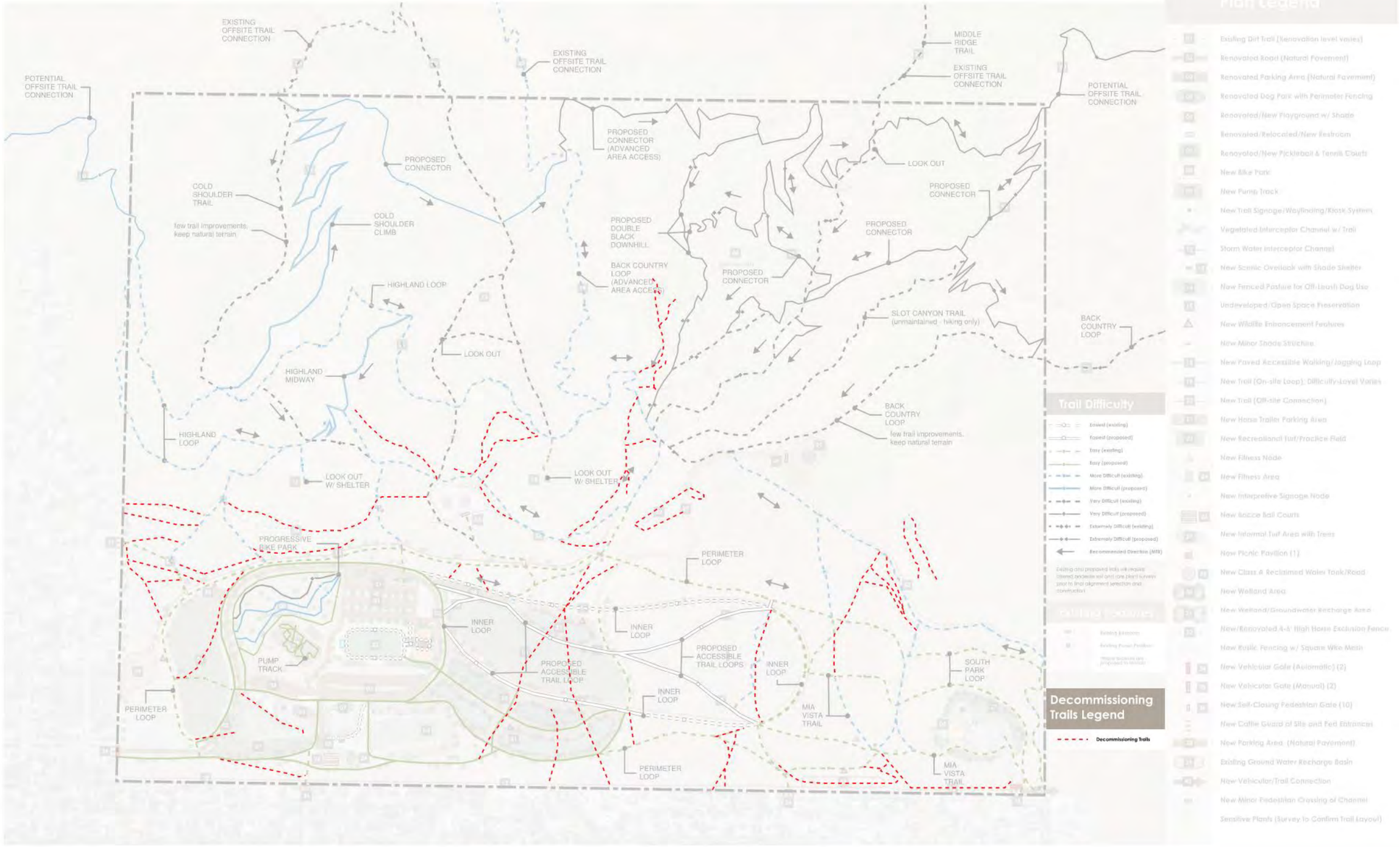
- Easiest (existing)
- Easiest (proposed)
- Easy (existing)
- Easy (proposed)
- More Difficult (existing)
- More Difficult (proposed)
- Very Difficult (existing)
- Very Difficult (proposed)
- Extremely Difficult (existing)
- Extremely Difficult (proposed)



Hidden Valley Regional Park | Master Plan Update
Preliminary Master Plan | Trails Plan Overlay | April 5, 2022

N 50' 250' 500' 1000' Stantec

Trails Decommissioning Plan



New Amenities-Wetlands

View of Proposed Wetland Looking Southwest

New Amenities-Wetlands/Basins

View of Proposed Wetland/Groundwater Recharge Basin Looking Southeast

New Amenities- Bike Park

View of Proposed Bike Park Looking Northwest

Reference Imagery: Note these images are examples. Final amenities may appear different.

05 New Playground

08 New Advanced Bike Trail

09 New Pump Track

New Trail Signage sample

New Vegetated Channel with Nature Trail

31 New Wetland with Nature Trail

13 New Scenic Overlook w/ Shade Shelter

New Trail Marker

15 Open Space Preservation

New Wildlife Enhancement Features

New Minor Shade Structure

14 New Fenced Pasture for Off-Leash Dog Use

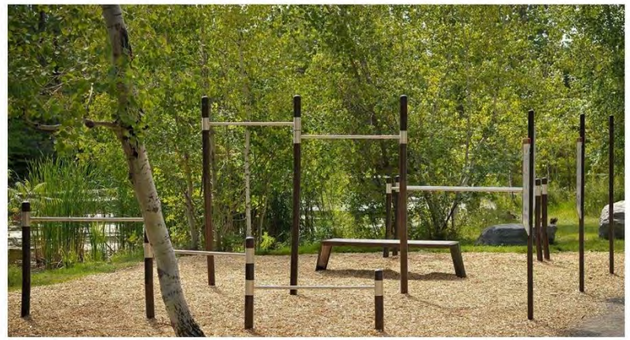
20 New Trail (Off-Site Connection)

21 New Horse Trailer Parking Area

Reference Imagery: Note these images are examples. Final amenities may appear different

22 New Recreational Turf/ Practice Area

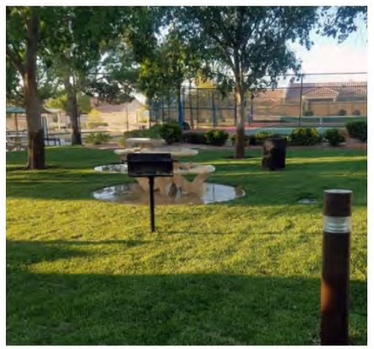
New Fitness Node



24 New Fitness Area

New Interpretive Signage Node

36 New Self Closing Pedestrian Gate



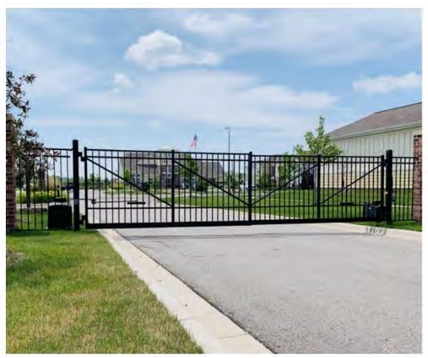
27 New Informal Turf Area with Trees

New Picnic Pavillion

30 New Wetland/Groundwater Recharge Area w/ Nature Trail

32 New/Upgraded Horse Exclusion Fencing

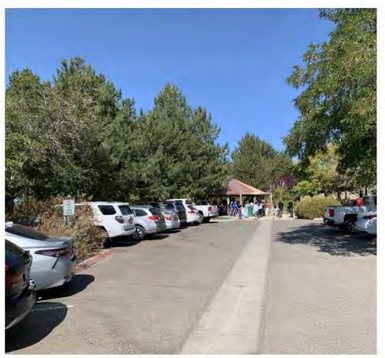
33 New Rustic Fencing



34 New Vehicular Gate (Automatic)

35 New Vehicular Gate (Manual)

New Cattle Guard at Site Entrance



38 New Parking Area

18 New Accessible Paved Walking/Jogging Loop

05 PRIORITIES AND PHASING

Phasing of park improvements is split into packages based on priorities identified by public in meetings, surveys and other communication and also on available funding. The phasing and priorities are described here and the opinion of probable cost is organized into these categories.

Package A- North contains the park elements that are related to effluent reuse as the funding for these is available and the need for effluent disposal is high. With the construction impacts to the existing road system, it is anticipated that the renovated loop road will be required and therefore would be funded in this package. Package A also contains the renovation and decommissioning of existing trails. As it is anticipated this work could be conducted by new Washoe County staff. The Package A features include:

- Existing Dirt Trails Renovation
- Renovated Loop Road
- New Wetlands
- New Wetland/Groundwater Infiltration Basins
- New Rustic Fencing (required for the new groundwater infiltration basins)
- Existing Irrigation System Retrofit
- Sensitive Plant Survey

Package B – North contains park elements where funding is anticipated to be secured by using the Package A expenditures as a match in grant applications. Priorities for this package include those that will secure the site entrances from feral horses since the new wetlands and groundwater infiltration basins could become an attraction to horses. Additionally, the public has expressed the need to secure the vehicular entrances from after-hours use. Package B features include

- New Trail Signage Kiosk System
- New Fenced Pasture for Off-Leash Dog Use
- New Paved Accessible Walking/Jogging Loop
- New Trails
- New Interpretive Signage
- Decommissioned Trails
- New Informal Turf Area with Trees
- New/Renovated 4-6’ Horse Exclusion Fence
- New Vehicular Gate-Automatic
- New Vehicular Gate-Manual
- New Self-Closing Pedestrian Gate
- New Cattle Guard at Site Entrances
- New Minor Pedestrian Crossing of Channels
- Sensitive Plant Surveys

Package C – North contains park elements where funding is anticipated to be secured by using the Package A and B expenditures as a match in grant applications. The Package C features include:

- Renovated Parking Area
- Renovated Dog Park
- New Playgrounds
- New and Renovated Restrooms
- New Pickleball/Tennis Courts
- New Bike Park
- New Pump Track
- Vegetated Interceptor Channel with Trail
- Storm Water Interceptor Channel Weed Removal
- New Scenic Overlook with Shade Shelter
- New Wildlife Enhancement Features
- New Minor Shade Structures
- New Horse Trailer Parking Area
- New Recreational Turf/Practive Field
- New Fitness Node
- New Fitness area Stations
- New Picnic Pavilion
- New Parking Areas
- Existing Groundwater Basin Weed Removal
- New Trees

Package D – South contains park elements where funding is anticipated to be secured by using the Package A, B and C expenditures as a match in grant applications. The Package D features include:

- Renovated Playground
- New Restroom
- New Informal Turf Area

06 OPINION OF PROBABLE COST

Stantec

Washoe County Parks and Open Space
Hidden Valley Regional Park Master Plan Update: Reno, NV
Packages and Probable Construction Costs

May 19, 2022

Plan Legend Item		Description	Quantity	Unit	Unit Price	Cost	Subtotal	Package Total
Package A - North								$14,989,944
1		Existing Dirt Trails Renovation	1.0	ls	$1,591,040.72	$1,591,041	$1,591,041	
2		Renovated Loop Road					$715,400	
		3" AC	98,000	sf	$1.10	$107,800		
		6" Agg Base	98,000	sf	$6.20	$607,600		
14		New Fenced Pasture for Off-Leash Dog Use	7	ac			$1,694,000	
	14	Clearing and Grubbing	7	ac	$7,500.00	$52,500		
	14	Fencing- 6' Chain Link	3,500	lf	$80.00	$280,000		
	14	Fencing Natina	17,500	sf	$13.00	$227,500		
	14	Irrigation - Rotors	7	ac	$153,000.00	$1,071,000		
	14	Hydroseeding	7	ac	$9,000.00	$63,000		
30-31		New Wetland-Wetland/Groundwater Recharge Area					$5,437,130	
	30-31	Mass Grading Wetlands and Basins	100,000.0	cy	$40.00	$4,000,000		
	30-31	Mass Grading Dog Park	20,000.0	cy	$20.00	$400,000		
	30-31	Clearing and Grubbing	11.5	ac	$7,500.00	$86,250		
	30-31	Misc(fencing, piping, valving)	1.0	ls	$500,000.00	$500,000		
	30-31	Wetland Plantings	1.6	ac	$218,000.00	$346,620		
	30-31	Basin Wetland Perimeter Plantings	20,852.0	sf	$5.00	$104,260		
33		New Rustic Fencing w/ Square Wire Mesh (7 areas)	9,389.0	lf	$130.00	$1,220,570	$1,220,570	
X		Renovated Irrigation					$410,000	
	X	Retrofit Existing Irrigation for Effluent Use	1.0	ls	$100,000.00	$100,000		
	X	Controller	1.0	ls	$10,000.00	$10,000		
	X	6-8" mainline	3,000.0	lf	$100.00	$300,000		
X		Decommission Trails	1.0	ls	$35,521.50	$35,522	$35,522	
		Project mobilization/bonding @ 5% of subtotal					$555,183	
		Contingency @ 20% of subtotal					$2,220,732	
		Design @ 10% of subtotal					$1,110,366	
Package B - North								$3,499,613
10		New Trail Signage Kiosk System					$75,000	
	10	New Trail Signage Kiosk System	3.0	each	$10,000.00	$30,000		
	10	New Trail Signage/Wayfinding System (approx 30)	30.0	each	$1,500.00	$45,000		
18		New Paved Accessible Walking/Jogging Loop-AC (al natural pavement)	1.0	ls	$3,421.44	$3,421	$3,421	
19		New Trail (On-site Loop): Difficulty-Level Varies	1.0	ls	$250,749.84	$250,750	$250,750	
25		New Interpretive Signage Node	5.0	each	$5,500.00	$27,500	$27,500	
42		Sensitive Plants (Survey to Confirm Trail Layout)	1.0	ls	$8,000.00	$8,000	$8,000	
27		New Informal Turf Area with Trees (trees separate)	8.2	ac			$1,797,400	
	27	clearing and grubbing	8.2	ac	$7,500.00	$61,275		
	27	site grading	8.2	ac	$16,000.00	$130,720		
	27	turf- seeded (soil prep)	8.2	ac	$43,500.00	$355,395		
	27	irrigation rotors	8.2	ac	$153,000.00	$1,250,010		
32		New/Renovated 4-6' High Horse Exclusion Fence	8,647.0	lf	$5.00	$43,235	$43,235	
34		New Vehicular Gate (Automatic) 20' wide - on timer	2.0	each			$200,000	
	34	Gate (Automatic) 20' wide - on timer	2.0	each	$75,000.00	$150,000		
	34	Power	2.0	each	$10,000.00	$20,000		
35		New Vehicular Gate (Manual)	2.0	each	$15,000.00	$30,000		
36		New Self-Closing Pedestrian Gate - spring loaded	7.0	each	$5,000.00	$35,000	$35,000	
37		New Cattle Guard at Site Entrances	2.0	each	$70,000.00	$140,000	$140,000	
41		New Minor Pedestrian Crossing of Channel	6.0	each	$2,000.00	$12,000	$12,000	
		Project mobilization/bonding @ 5% of subtotal					$129,615	
		Contingency @ 20% of subtotal					$518,461	
		Design @ 10% of subtotal					$259,231	
Package C - North								$7,187,667
3		Renovated Parking Area AC (Alt Natural Pavement)	168,200.0	sf			$1,227,860	
	3	3" AC (Alt Natural Pavement)	168,200.0	sf	$1.10	$185,020		
	3	6" base	168,200.0	sf	$6.20	$1,042,840		
4		Renovated Dog Park with Perimeter Fencing	3.3	ac			$396,048	
	4	clearing and grubbing	0.8	ac	$7,500.00	$6,000		
	4	grading	0.8	ac	$16,000.00	$12,800		
	4	turf- seeded (soil prep)	0.8	ac	$43,560.00	$34,848		
	4	irrigation rotors	0.8	ac	$153,000.00	$122,400		
	4	perimeter fencing- chain link 5'	1,500.0	lf	$65.00	$97,500		
	4	natina on fencing	7,500.0	sf	$13.00	$97,500		
	4	renovation allowance-drinking fountains, signs, turf repair	1.0	ls	$25,000.00	$25,000		
5		North New Playgrounds						$512,500
	5	North New Playground 5-12 (6000sf)						
	5	Surfacing and drainage	6,000.0	sf	$25.00	$150,000		
	5	Equipment with integrated shade	1.0	each	$175,000.00	$175,000		
	5	North New Playground 2-5 (2500 sf)						
	5	Surfacing and drainage	2,500.0	sf	$25.00	$62,500		
	5	Equipment with integrated shade	1.0	each	$125,000.00	$125,000		
6		New and Renovated Restrooms						$995,000
	6	New Restroom - 2 Stalls, no lighting/power, w/drinking fountain	2.0	each	$185,000.00	$370,000		
	6	Sewer connection	2,400.0	lf	$100.00	$240,000		
	6	Water line connection to new restroom from ex. meter	2,000.0	lf	$100.00	$200,000		
	6	Renovated Restroom - 2 Stalls, no lighting/power	1.0	each	$185,000.00	$185,000		
7		New Pickleball/ Tennis Courts	1.0	each	$130,000.00	$130,000	$130,000	
8		New bike park	1.0	ls	$604,224.00	$604,224	$604,224	
9		New pump track						$120,000
	9	New pump track	1.0	ls	$60,000.00	$60,000		
	9	Technical bike park	1.0	ls	$60,000.00	$60,000		
11		Vegetated Interceptor Channel w/ Trail						$135,506
	11	Sediment removal	563.0	cy	$100.00	$56,296		
	11	Class 150 riprap	2,030.0	sf	$7.00	$14,210		
	11	Class 300 riprap at entrance to retention basin	3,000.0	sf	$12.00	$36,000		
	11	Trees and Drip Irrigation	58.0	ea	$500.00	$29,000		
12		Storm Water Interceptor Channel- weed removal	4,745.0	lf	$2.00	$9,490	$9,490	
13		New Scenic Overlook with Shade Shelter	2.0	each				$50,280
	13	New Scenic Overlook with Shade Shelter	2.0	each	$25,000.00	$50,000		
	13	clearing and grubbing	400.0	sf	$0.70	$280		
16		New Wildlife Enhancement Features	3.0	each	500	$1,500	$1,500	
17		New Minor Shade Structure	8.0	each	$15,000.00	$120,000	$120,000	
21		New Horse Trailer Parking Area (within other parking)	1.0	each	$0.00	$0	$0	
22		New Recreational Turf/Practice Field	1.0	ac	$218,000.00	$207,100	$207,100	
23		New Fitness Node with tile surfacing	3.0	each	$9,000.00	$27,000	$27,000	
24		New Fitness Area- 5 stations	1.0	each			$165,000	
	24	New Fitness Area- 5 stations	1.0	each	$40,000.00	$40,000		
	24	tile surfacing	5,000.0	sf	$25.00	$125,000		
28		New Picnic Pavilion	1.0	each	$80,000.00	$80,000	$80,000	
38		New Parking Area - AC (Alt. Natural Pavement)	45,960.0	sf			$337,889	
	38	3" AC	45,960.0	sf	$1.10	$50,556		
	38	6" Base	45,960.0	sf	$6.20	$284,952		
	38	Clearing and Grubbing	0.1	ac	$7,500.00	$760		
	38	Site Grading	0.1	ac	$16,000.00	$1,621		
39		Existing groundwater recharge basin - weed removal	1.0	ls	$5,000.00	$5,000	$5,000	
40		New Vehicular/Trail Connection	0.0			$0	$0	
X		Trees- 24" box	333.0	each			$199,800	
	X	Trees- 24" box	333.0	each	$500.00	$166,500		
	X	Drip irrigation each tree	333.0	each	$100.00	$33,300		
15		Undeveloped/Open Space Preservation	0.0			$0		
20		New Trail (Off-site Connection)	0.0			$0		
		Project mobilization/bonding @ 5% of subtotal					$266,210	
		Contingency @ 20% of subtotal					$1,064,840	
		Design @ 10% of subtotal					$532,420	
South - Park Facilities								$1,046,115
5		Renovated South Playground 2-5 and 5-12 (3700 SF)					$217,500	
	5	surfacing and drainage	3,700.0	sf	$25.00	$92,500		
	5	equipment with integrated shade	1.0	each	$125,000.00	$125,000		
6		New Restroom - 2 Stalls, no lighting/power, w/drinking fountain	1.0	each			$323,000	
	6	New Restroom - 2 Stalls, no lighting/power, w/drinking fountain	1.0	each	$185,000.00	$185,000		
	6	Sewer connection	600.0	lf	$130.00	$78,000		
	6	Water line connection to new restroom from ex. meter	600.0	lf	$100.00	$60,000		
27		New Informal Turf Area with Trees	1.0	ac			$234,400	
	27	clearing and grubbing	1.0	ac	$7,500.00	$7,500		
	27	site grading	1.0	ac	$16,000.00	$16,000		
	27	turf- seeded (soil prep)	1.0	ac	$43,500.00	$43,500		
	27	irrigation rotors	1.0	ac	$153,000.00	$153,000		
	27	Trees- 24" box	24.0	each	$500.00	$12,000		
	27	Drip irrigation each tree	24.0	each	$100.00	$2,400		
		Project mobilization/bonding @ 5% of subtotal					$38,745	
		Contingency @ 20% of subtotal					$154,980	
		Design @ 10% of subtotal					$77,490	
Construction Total								**$26,723,339**

NOTES:
1. IT IS RECOGNIZED THAT STANTEC HAS NO CONTROL OVER THE COSTS OF MATERIALS, EQUIPMENT, LABOR, OR THE CONTRACTOR'S METHOD OF DETERMINING BID PRICES. PRICES WILL VARY FROM ANY OPINION OF PROBABLE CONSTRUCTION COSTS. CONSTRUCTION COSTS ARE VOLATILE AT THIS TIME.

07 APPENDIX

TECHNICAL MEMORANDUM

To: Barb Santner, L.A., Stantec

From: Julie Etra, Western Botanical Services, Inc. (WBS)

Date: December 9, 2021

Re: Hidden Valley Regional Park vegetation and soil resources

INTRODUCTION

This Technical Memorandum summarizes vegetation and soil resources issues as they relate to potential new improvements (effluent tank, trails) at the Hidden Valley Regional Park (Park). The analysis included the entire footprint of 480 acres and the following components, consistent with task outlined in our proposal of October 20, 2021, and subsequent Task Order, as follows:

1) Literature Review. This included all relevant documents related to the WBS tasks, including a kmz file of the project area, soils in the vicinity of the proposed effluent tank and treatment area, details and reports provided by Stantec, and other relevant information.
2) Weed Management Plan. This summary is a desktop exercise and includes a general discussion of approach to weed control as well as a list of references of Noxious and invasive weeds with the potential to occur within the project area.
3) Sensitive Plant Species. This is a desktop analysis of species with the potential to occur within the project footprint, based on the database search literature, habitat, and soils.
4) Effluent Tank Disposal Treatment Options. This includes a discussion of possible options based on soil type (permeability), potential meadow or wetland habitat, as well advantages and disadvantages of treatment systems (vectors, wild horses, wildlife habitat).
5) Plant Communities. This is a desktop analysis as a site visit was not possible within the time frame of this deliverable.

LITERATURE REVIEW AND SOIL ANALYSIS

According to the Natural Resource Soils Conservation Service (NRCS), seven soil map units occur withing the project boundary. The soils are described in detail in the Custom Soils Report in Attachment 1. They vary in texture from gravelly sandy loam, very stony sandy loam and stony sandy loam at the higher elevations and steeper slopes, to sandy loams at the lower elevations and lower percent slopes, typical for Truckee Meadows upland sites. Texture and chemistry are the most relevant characteristics when analyzing the potential for effluent water to be used tin detention, retention, infiltration basins, or

5859 Mt. Rose Highway • Reno, NV 89511 • Phone: 775.849.3223 • www.wbsinc.us

treatment wetlands. We have summarized the first 0-15 inches of relevant associations as they relate to revegetation potential. Analysis of deeper profiles may be more pertinent to geotechnical and engineering constructability issues.

The location of the proposed tanks occurs in the Duco-Smallcone-Cagle association (Map Unit 1520). The Duco series can be characterized as '…shallow, well drained soils that formed in colluvium and residuum derived dominantly from volcanic rocks. Duco soils are on structural benches, hills, and mountains. Slopes are 4 to 75 percent.' (https://soilseries.sc.egov.usda.gov/OSD_Docs/D/DUCO.html). The Smallcone series can be characterized as '…very shallow, well drained soils that formed in residuum derived from hydrothermally altered andesitic rock. Smallcone soils are on hills and mountains. Slopes are 15 to 50 percent. (https://soilseries.sc.egov.usda.gov/OSD_Docs/S/SMALLCONE.html. The Cagle series can be described as 'Position on landscape: Lower side slopes of mountains Parent material: Kind-residuum, colluvium; source- volcanic rock Dominant present vegetation: Singleleaf pinyon, Utah Juniper Rock fragments on surface: Kind-gravel, cobbles, stones; percentage of surface covered-85…' and rapid runoff, slow permeability and high erosion hazard by water (*Soil Survey of Storey County Area, Nevada*. USDA SCS.) The Duco-Smallcone-Cagle Association occurs at elevation between 5,400 and 6,300 ft. Ducos soils are very stony sandy loams; Smallcone are very gravelly stony clay loams; Cagles are very stony clay loams.

Other soil map units in the vicinity of the proposed tank that could be impacted by tank construction or other site improvements include Units 585 (Barnard-Trosi association, stony sandy loam), 875 (Xman-Zephan-Mizel association, stony sandy loam with clay and/or cemented layer at greater depth), and 876 (Xman-Oppio-Old Camp association, very stony loam with clay layer at depth, and 961 (Kayo stony sandy loam, 4 to 8 percent slopes, very gravelly sandy loam).

In summary, most of these units or associations consist of very stony fine sandy loam, extremely stony sandy loam, and extremely stony sandy loam. They are further characterized by slow permeability, rapid runoff, and moderate to high susceptibility to erosion by water. Sandy loam would be a more appropriate texture for treatment basins or constructed wetlands.

The delivery system for the tank, including pipes, possible pumps stations, and associated right of way disturbance was not part of this analysis.

WEED MANAGEMENT PLAN

This plan consists of several elements that include prevention methodologies, predesign considerations, and recommendation for specifications that should be included in the Specials Provisions for site improvements.

Weed Prevention During Construction

These methodologies are addressed in *The Truckee Meadows Construction Site BMP Handbook* (Farr West, 2015) and should be included in a site-specific Stormwater Pollution Prevention Plan (SWPPP). All SWPPPs can include additional language that address quality of materials used in the construction process and that they be weed free. They include the following Best Management Practices (BMPs):

1. Straw Bale Barriers: Use weed free straw and straw bales;
2. Native Materials Reuse: Use weed free salvageable materials including topsoil and duff;
3. Employee Training: Include discussion of Noxious and Invasive weeds; and
4. Detailed Site Map: Location of State-listed Noxious Weeds (Attachment 2).

Pre-design Surveys

Determine what is currently on site. This would consist of surveying the entire 480-acre parcel. Survey and identify Noxious and invasive species, occurrences, and quantification (approximate percent cover, stem counts). After species occurrence have been mapped, identify treatment methodologies, including frequency of treatments(s). Nuisance aka invasive weeds are addressed in the following document: *Nuisance weeds UNR 1399_2019_01.pdf* (Hefner and Kratsch 2018).

Landscape and Revegegation/Erosion Control Designs (Special Provisions)

As part of any site improvements such as construction of the effluent tank, associated infrastructure, and development of new trails that would require revegetation and erosion control specifications, the following should be included:

1. Specify weed free materials, particularly seed and straw;
2. Specify weed treatments; and
3. Specify temporary erosion control (don't leave bare surfaces including subsoil and topsoil stockpiles (they may become colonized by weeds). Although this specification may be included in the SWPPP, it should also be included in the site-specific Special Provisions.

SENSITIVE PLANT SPECIES

According to the Nevada Division of Natural Heritage (NDNH) there are two rare plant species that have the potential to occur within the Park due to their association with unique soils (mainly of the Smallcone Series): altered andesite buckwheat (*Eriogonum robustum*), and altered andesite popcorn flower (*Plagiobothrys glomeratus*). Recorded occurrences as mapped in the NDNH database are shown on Figure 1. As their common names indicate, both are found on altered andesite soils and rock outcrops. Neither plant is protected under the Endangered Species Act, nor by the State of Nevada (Nevada Admistrative Code 527.010).

Eriogonum robustum has the following status:

STATUS: Heritage Program SENSITIVE LIST, ranks: G2G3Q S2S3
USFWS/ESA: species of concern. STATE OF NEVADA: none. BLM: Special Status Species. USFS: none. NNNPS: watch list.

Plagiobothrys glomeratus has the following status:

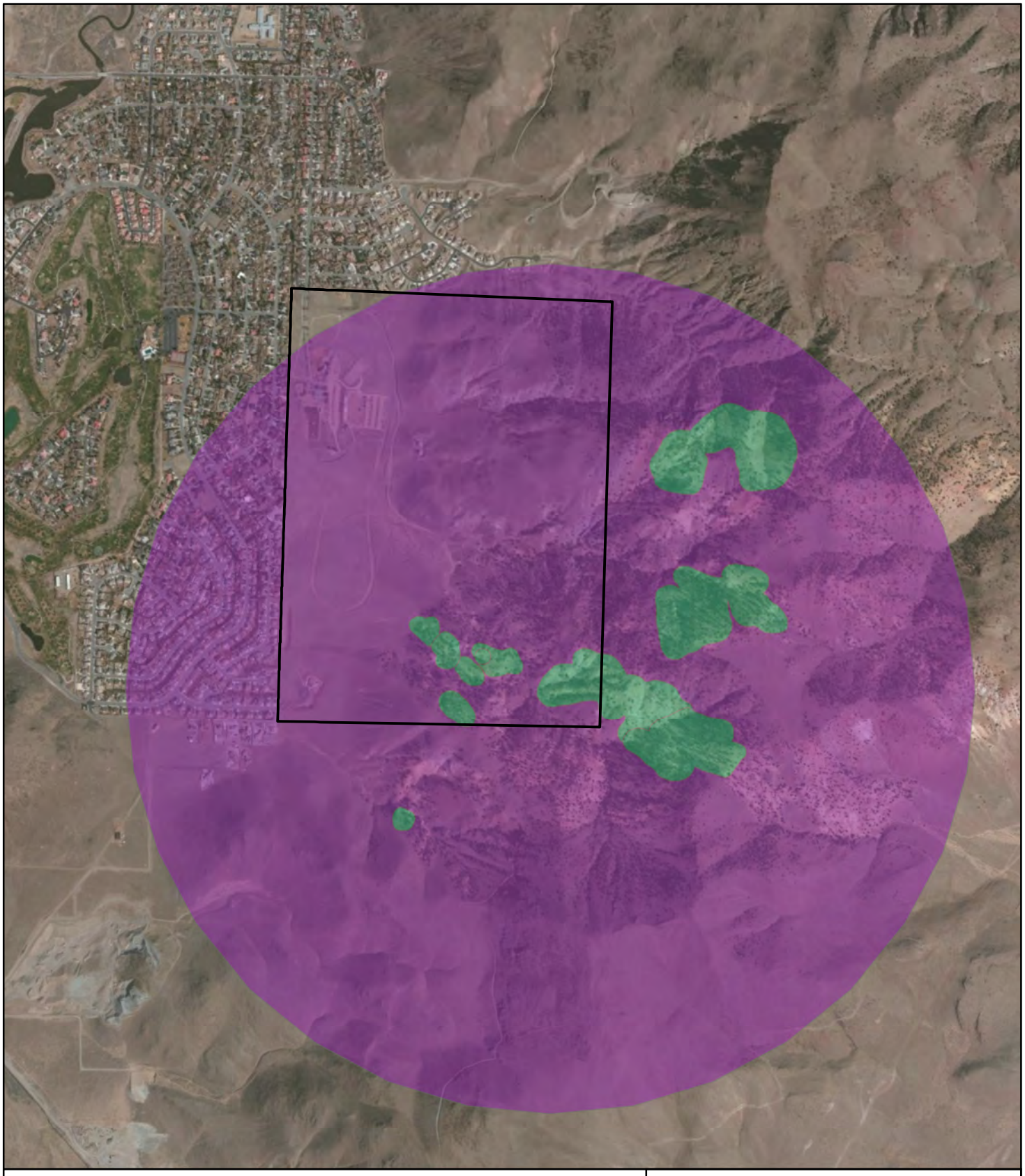
STATUS: Heritage Program SENSITIVE LIST, ranks: G2G3 S2S3
USFWS/ESA: none. STATE OF NEVADA: none. BLM: none. USFS: none. NNNPS: watch list.

Fact sheets containing pertinent information for both species are available from the Nevada Rare Plant Atlas (Morefield 2001).

EFFLUENT TANK DIPOSAL TREATMENT OPTIONS

WBS has been asked to briefly analyze potential uses of this water within the Park, although the volume and availability (water budget) currently remains undetermined.

5859 Mt. Rose Highway • Reno, NV 89511 • Phone: 775.849.3223 • www.wbsinc.us



Explanation

- Project Area (480 acres)
- Altered andesite buckwheat (Eriogonum robustum)
- Altered andesite popcorn flower (Plagiobothrys glomeratus)

0 0.25 0.5 Miles

N

WASHOE COUNTY

HIDDEN VALLEY REGIONAL PARK

NDNH Data

Label: Figure 1	Drawn By: SMH
Date: 11/16/2021	Project No.: ####
Base Map: Basemap	
File Name: 0202H_HVRP_NDNH.mxd	

EM STRATEGIES

Soils down gradient from location of the proposed tank do not appear to be comprised of any constituents that would compromise plant growth such as boron or high/low pH. Following construction, if soils are well drained, maintaining a water feature would require their alteration such as incorporating clay or lining the facility with a geotextile.

Any water feature, be it a treatment basin or constructed wetland, would attract wild horses and other types of wildlife. It could also be subject to colonization by noxious and invasive weeds, increasing the need for a maintenance plan.

Given the above constraints, regardless of the technical and economic challenges of a constructed facility, water for construction use (compaction, dust control) may be the most cost effective and sensible use of stored effluent water.

PLANT COMMUNITIES

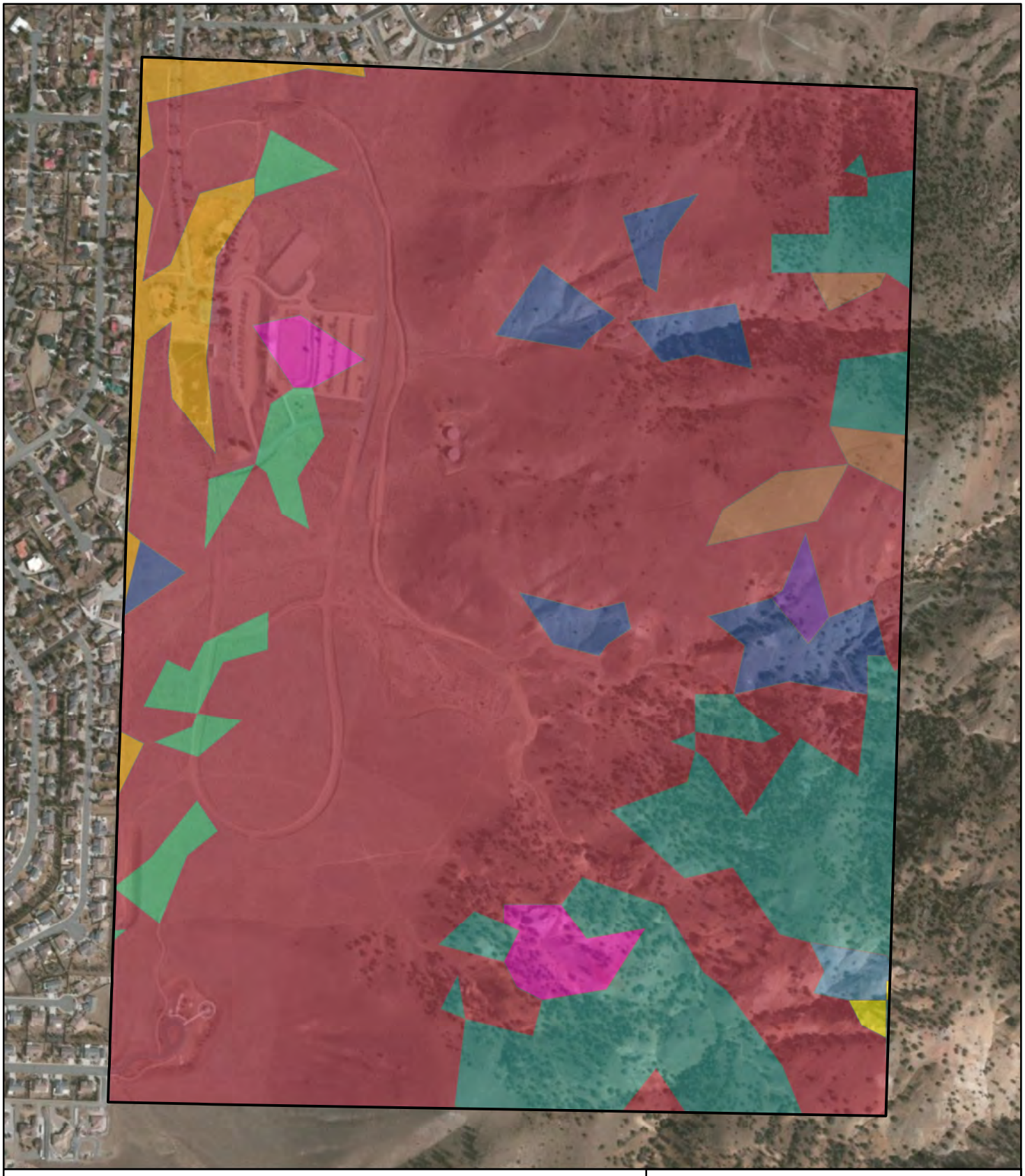
According to the United States Geological Survey SWReGAP analysis, there are ten vegetation communities within the project area, which totals 480 acres (including Developed Open Space - Low Intensity, and Developed Medium - High Density) (Figure 2). SWReGAP is a landscape-scale mapping tool and is not always accurate at the project level. By far the dominant plant community is the Inter-Mountain Basins Big Sagebrush Shrubland (365.2 acres). This plant community, widespread in the semi-arid Western United States where it may vary considerably, is dominated by Wyoming sagebrush (*Artemisia tridentata ssp. wyomingensis*). Other dominant shrubs may include bitterbrush (*Purshia tridentata*) horsebrush (*Tetradymia canescens*) and rabbitbrush (*Ericameria nauseosa*). Native graminoid species may include squirreltail (*Elymus elymoides*) Indian ricegrass (*Achnatherum hymenoides*) and Great Basin wildrye (*Elymus cinereus*). Graminoids are typically not dominant in native plant communities in the Truckee Meadows and surroundings unless they include introduced species such as crested wheatgrass *(Agropyron cristatum*) and hard fescue (*Festuca brevipila*) or unless the site is riparian or wetland. Common forbs may include slivery lupine (*Lupinus argenteus*), sulfur buckwheat (*Eriogonum umbellatum*) and tapertip hawksbeard (*Crepis acuminata*).

The second most dominant community within the project area is the Great Basin Pinyon-Juniper Woodland association (61.5 acres). This occurs at the higher elevations, steeper slopes, and rockier soils within the Park boundary. The overstory is dominated by Pinyon pine (*Pinus monophylla*) and Utah Juniper (*Juniperus osteosperma*). The understory is typically poorly vegetated due to skeletal soils and low average precipitation. The third most dominant plant community is the Inter-Mountain Basins Mixed Salt Desert Scrub (17.9 acres), which is typically dominated by species in the Chenopodiaceae family such as 4-wiing saltbush (*Atriplex canescens*). The Rocky Mt. Montane Mesic Mixed Conifer Forest and Woodland, in the southeast corner of Park consists of just 0.6 acres.

REFERENCES

Hefner, M., Kratsch, H. 2018, Nevada Nuisance Weeds Field Guide, University of Nevada Cooperative Extension SP-18-02.

Morefield, J. D. (editor). 2001. Nevada Rare Plant Atlas. Carson City: Nevada Natural Heritage Program, compiled for the U.S. Department of Interior, Fish and Wildlife Service, Portland, Oregon and Reno, Nevada.



Explanation

- Project Area (480 acres)
- Inter-Mountain Basins Big Sagebrush Shrubland (365.2 acres)
- Great Basin Pinyon-Juniper Woodland (61.5 acres)
- Inter-Mountain Basins Mixed Salt Desert Scrub (17.9 acres)
- Developed Open Space - Low Intensity (13.2 acres)
- Developed Medium - High Intensity (12.5 acres)
- Sierra Nevada Cliff and Canyon (8.0 acres)
- Great Basin Xeric Mixed Sagebrush Shrubland (6.4 acres)
- Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland (2.1 acres)
- Inter-Mountain Basins Semi-Desert Grassland (1.8 acres)
- Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland (0.6 acres)

0 500 1,000 Feet

N

WASHOE COUNTY

HIDDEN VALLEY REGIONAL PARK

SWReGAP Vegetation Communities in the Project Area

Label: Figure 2	Drawn By: SMH
Date: 11/12/2021	Project No.: ####
Base Map: Basemap	
File Name: 0202H_HVRP_SWReGAP.mxd	

EM STRATEGIES

Attachment 1

NRCS Custom Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Washoe County, Nevada, South Part

November 15, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:9,580 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 18, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
250	Cassiro gravelly sandy loam, 2 to 4 percent slopes	55.4	11.3%
585	Barnard-Trosi association	39.2	8.0%
875	Xman-Zephan-Mizel association	24.3	5.0%
876	Xman-Oppio-Old Camp association	110.2	22.5%
961	Kayo stony sandy loam, 4 to 8 percent slopes	68.2	14.0%
971	Aladshi sandy loam, 2 to 4 percent slopes	4.8	1.0%
1520	Duco-Smallcone-Cagle association	186.8	38.2%
Totals for Area of Interest		**489.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washoe County, Nevada, South Part

250—Cassiro gravelly sandy loam, 2 to 4 percent slopes

Map Unit Setting

National map unit symbol: hxhg
Elevation: 4,500 to 5,500 feet
Mean annual precipitation: 8 to 10 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 100 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassiro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassiro

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: gravelly sandy loam
H2 - 15 to 45 inches: very gravelly clay
Cr - 45 to 60 inches: bedrock

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: 39 to 65 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: D
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

Minor Components

Indian creek

Percent of map unit: 5 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex

Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Northmore

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

Oest

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

Aquolls

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R022AY016NV - WET MEADOW
Hydric soil rating: Yes

585—Barnard-Trosi association

Map Unit Setting

National map unit symbol: hxkw
Elevation: 4,600 to 5,200 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Barnard and similar soils: 50 percent
Trosi and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barnard

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: stony sandy loam
H2 - 15 to 26 inches: clay
H3 - 26 to 30 inches: cemented material

Properties and qualities

Slope: 2 to 4 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 20 to 39 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY017NV - LOAMY HILL 10-12 P.Z.
Hydric soil rating: No

Description of Trosi

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 12 inches: very stony sandy loam
H2 - 12 to 19 inches: very cobbly clay
H3 - 19 to 34 inches: cemented material
H4 - 34 to 60 inches: variable

Properties and qualities

Slope: 4 to 8 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 12 to 20 inches to duripan
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY023NV - CLAYPAN 10-12 P.Z.

Hydric soil rating: No

Minor Components

Bieber

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY023NV - CLAYPAN 10-12 P.Z.
Hydric soil rating: No

Galeppi

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

Indian creek

Percent of map unit: 3 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Aquolls

Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R022AY016NV - WET MEADOW
Hydric soil rating: Yes

Oest

Percent of map unit: 2 percent
Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

875—Xman-Zephan-Mizel association

Map Unit Setting

National map unit symbol: hxn4
Elevation: 4,400 to 5,600 feet
Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 90 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Xman and similar soils: 35 percent
Mizel and similar soils: 25 percent
Zephan and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xman

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum derived from volcanic rocks

Typical profile

H1 - 0 to 2 inches: very stony loam
H2 - 2 to 14 inches: clay
Cr - 14 to 29 inches: bedrock
R - 29 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Description of Zephan

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum and colluvium derived from volcanic rocks

Typical profile

H1 - 0 to 8 inches: very stony sandy loam
H2 - 8 to 35 inches: very cobbly clay

Cr - 35 to 42 inches: bedrock
R - 42 to 52 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 25 to 39 inches to paralithic bedrock; 39 to 49 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY017NV - LOAMY HILL 10-12 P.Z.
Hydric soil rating: No

Description of Mizel

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum derived from rhyolitic rocks

Typical profile

H1 - 0 to 3 inches: very gravelly coarse sandy loam
R - 3 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 3 to 10 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 0.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY029NV - ERODED SLOPE 10-12 P.Z.
Hydric soil rating: No

Minor Components

Reywat
Percent of map unit: 4 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY015NV - SHALLOW LOAM 10-12 P.Z.
Hydric soil rating: No

Old camp
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY022NV - STONY SLOPE 8-10 P.Z.
Hydric soil rating: No

Yuko
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY011NV - SOUTH SLOPE 8-12 P.Z.
Hydric soil rating: No

Risley
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY017NV - LOAMY HILL 10-12 P.Z.
Hydric soil rating: No

Rock outcrop
Percent of map unit: 2 percent
Landform: Peaks
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

876—Xman-Oppio-Old Camp association

Map Unit Setting
National map unit symbol: hxn5
Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 8 to 12 inches
Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 100 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Xman and similar soils: 35 percent
Oppio and similar soils: 30 percent
Old camp and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xman

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum derived from volcanic rocks

Typical profile

H1 - 0 to 2 inches: very stony loam
H2 - 2 to 14 inches: clay
Cr - 14 to 29 inches: bedrock
R - 29 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Description of Oppio

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum derived from volcanic rocks

Typical profile

H1 - 0 to 3 inches: very stony fine sandy loam
H2 - 3 to 21 inches: gravelly clay
H3 - 21 to 31 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Description of Old Camp

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum and colluvium derived from volcanic rocks

Typical profile

H1 - 0 to 2 inches: very stony sandy loam
H2 - 2 to 14 inches: very cobbly clay loam
R - 14 to 24 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 23.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R026XY022NV - STONY SLOPE 8-10 P.Z.
Hydric soil rating: No

Minor Components

Skedaddle
Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R023XY030NV - SOUTH SLOPE 8-12 P.Z.
Hydric soil rating: No

Rock outcrop
Percent of map unit: 4 percent
Landform: Peaks
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Yuko
Percent of map unit: 4 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY011NV - SOUTH SLOPE 8-12 P.Z.
Hydric soil rating: No

Reywat
Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY015NV - SHALLOW LOAM 10-12 P.Z.
Hydric soil rating: No

961—Kayo stony sandy loam, 4 to 8 percent slopes

Map Unit Setting
National map unit symbol: hxnt
Elevation: 4,400 to 5,200 feet
Mean annual precipitation: 8 to 10 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 100 to 110 days
Farmland classification: Farmland of statewide importance, if irrigated

Map Unit Composition
Kayo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kayo

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 11 inches: very gravelly sandy loam
H2 - 11 to 22 inches: very gravelly sandy loam
H3 - 22 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 4 to 8 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R026XY024NV - DROUGHTY LOAM 8-10 P.Z.
Hydric soil rating: No

Minor Components

Aladshi

Percent of map unit: 6 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY024NV - DROUGHTY LOAM 8-10 P.Z.
Hydric soil rating: No

Indian creek

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Stumble

Percent of map unit: 3 percent
Landform: Sand sheets

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R027XY009NV - SANDY 5-8 P.Z.
Hydric soil rating: No

Holbrook

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY016NV - LOAMY 8-10 P.Z.
Hydric soil rating: No

971—Aladshi sandy loam, 2 to 4 percent slopes

Map Unit Setting

National map unit symbol: hxnx
Elevation: 4,400 to 5,200 feet
Mean annual precipitation: 7 to 9 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 100 to 110 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Aladshi and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aladshi

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 34 inches: sandy clay loam
H3 - 34 to 60 inches: stratified extremely gravelly loamy sand to very gravelly loam

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare

Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C
Ecological site: R026XY024NV - DROUGHTY LOAM 8-10 P.Z.
Hydric soil rating: No

Minor Components

Kayo

Percent of map unit: 6 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY024NV - DROUGHTY LOAM 8-10 P.Z.
Hydric soil rating: No

Indian creek

Percent of map unit: 4 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY025NV - CLAYPAN 8-10 P.Z.
Hydric soil rating: No

Turria

Percent of map unit: 3 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY016NV - LOAMY 8-10 P.Z.
Hydric soil rating: No

Holbrook

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY016NV - LOAMY 8-10 P.Z.
Hydric soil rating: No

1520—Duco-Smallcone-Cagle association

Map Unit Setting

National map unit symbol: 2t9l9
Elevation: 4,590 to 7,870 feet

Mean annual precipitation: 8 to 16 inches
Mean annual air temperature: 42 to 52 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Duco and similar soils: 40 percent
Smallcone and similar soils: 30 percent
Cagle and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duco

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium derived from volcanic rock and/or residuum weathered from volcanic rock

Typical profile

A1 - 0 to 2 inches: very stony sandy loam
A2 - 2 to 5 inches: gravelly loam
Bt1 - 5 to 10 inches: gravelly loam
Bt2 - 10 to 19 inches: very gravelly clay loam
R - 19 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Surface area covered with cobbles, stones or boulders: 45.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F026XY044NV - Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601
Hydric soil rating: No

Description of Smallcone

Setting

Landform: Mountains
Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Hydrothermally altered residuum weathered from andesite

Typical profile

A - 0 to 3 inches: very gravelly coarse sandy loam
C - 3 to 6 inches: extremely gravelly coarse sandy loam
Cr - 6 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 4 to 10 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F026XY065NV - Very Shallow Sandy Sideslope 12-14 P.Z. PIPO/ERRO10/CAREX
Hydric soil rating: No

Description of Cagle

Setting

Landform: Mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Lower third of mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium derived from andesite and/or colluvium derived from tuff breccia over residuum weathered from andesite and/or residuum weathered from tuff breccia

Typical profile

A - 0 to 4 inches: very stony clay loam
Bt1 - 4 to 12 inches: gravelly clay loam
Bt2 - 12 to 28 inches: gravelly clay
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 0.1 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F026XY044NV - Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601
Hydric soil rating: No

Minor Components

Nosrac

Percent of map unit: 4 percent
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY005NV - LOAMY 12-14 P.Z.
Hydric soil rating: No

Indiano

Percent of map unit: 3 percent
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY010NV - LOAMY 10-12 P.Z.
Hydric soil rating: No

Tunnison

Percent of map unit: 3 percent
Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop, crest
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XY027NV - CHURNING CLAY 8-10 P.Z.
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Ridges
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Reywat

Percent of map unit: 1 percent
Landform: Mountains

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R026XF069CA - Shallow Loam 10-14 P.Z.
Hydric soil rating: No

Settlemeyer

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R026XY003NV - WET MEADOW 10-14 P.Z.
Hydric soil rating: No

Fluvaquentic haploxerolls

Percent of map unit: 1 percent
Landform: Drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R026XY073NV - STREAMBANK
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

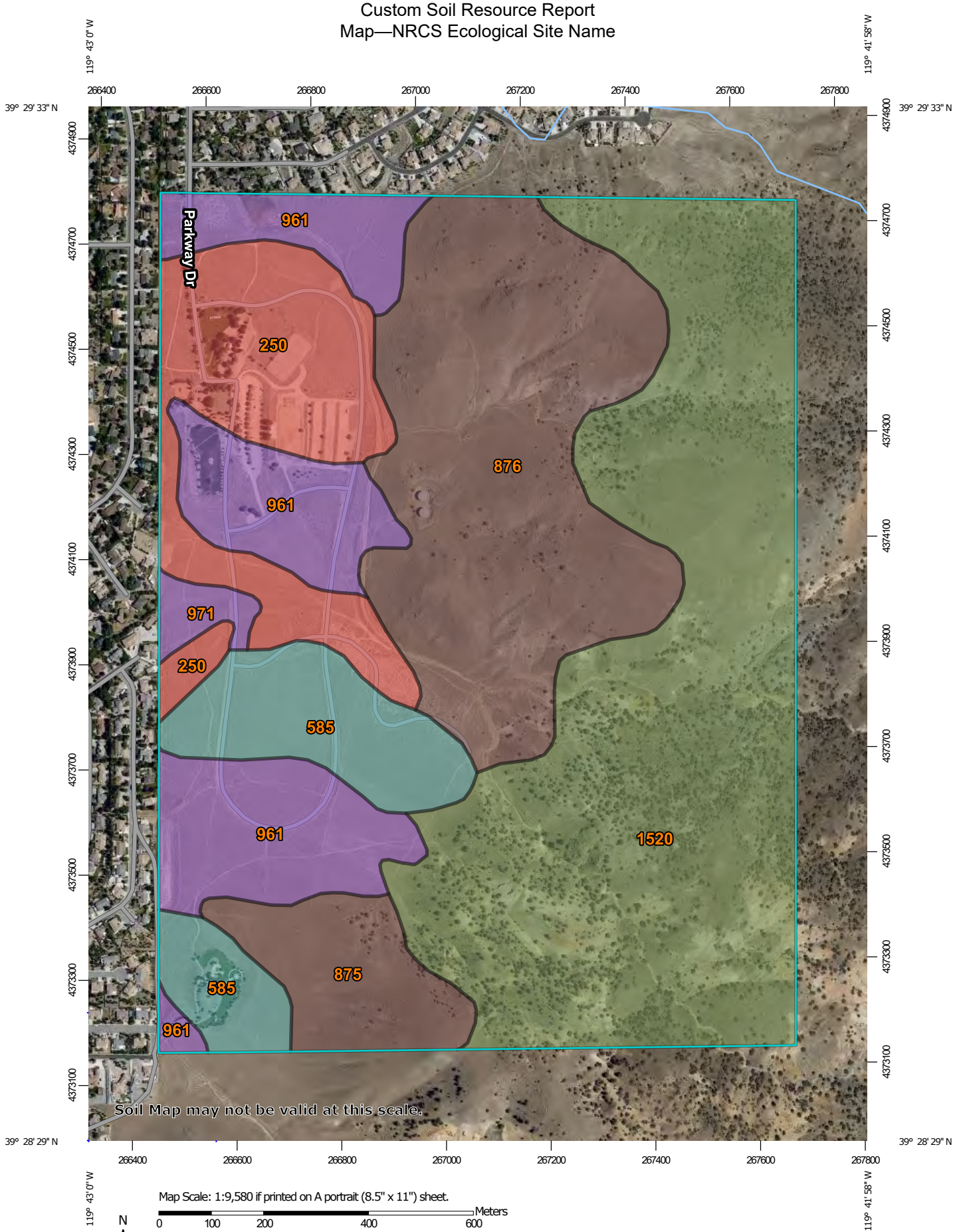
The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

NRCS Ecological Site Name

An "ecological site ID" is the symbol assigned to a specific ecological site. An "ecological site" is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. For example, the hydrology of the site is influenced by development of the soil and plant community. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.



Map Scale: 1:9,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- CLAYPAN 8-10 P.Z.
- DROUGHTY LOAM 8-10 P.Z.
- LOAMY 10-12 P.Z.
- LOAMY HILL 10-12 P.Z.
- Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601
- Not rated or not available

Soil Rating Lines

- CLAYPAN 8-10 P.Z.
- DROUGHTY LOAM 8-10 P.Z.
- LOAMY 10-12 P.Z.
- LOAMY HILL 10-12 P.Z.
- Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601
- Not rated or not available

Soil Rating Points

- CLAYPAN 8-10 P.Z.
- DROUGHTY LOAM 8-10 P.Z.
- LOAMY 10-12 P.Z.
- LOAMY HILL 10-12 P.Z.
- Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 18, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—NRCS Ecological Site Name

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
250	Cassiro gravelly sandy loam, 2 to 4 percent slopes	LOAMY 10-12 P.Z.	55.4	11.3%
585	Barnard-Trosi association	LOAMY HILL 10-12 P.Z.	39.2	8.0%
875	Xman-Zephan-Mizel association	CLAYPAN 8-10 P.Z.	24.3	5.0%
876	Xman-Oppio-Old Camp association	CLAYPAN 8-10 P.Z.	110.2	22.5%
961	Kayo stony sandy loam, 4 to 8 percent slopes	DROUGHTY LOAM 8-10 P.Z.	68.2	14.0%
971	Aladshi sandy loam, 2 to 4 percent slopes	DROUGHTY LOAM 8-10 P.Z.	4.8	1.0%
1520	Duco-Smallcone-Cagle association	Shallow Sandy Slope 10-12 P.Z. PIMO WSG:1R0601	186.8	38.2%
Totals for Area of Interest			**489.0**	**100.0%**

Rating Options—NRCS Ecological Site Name

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

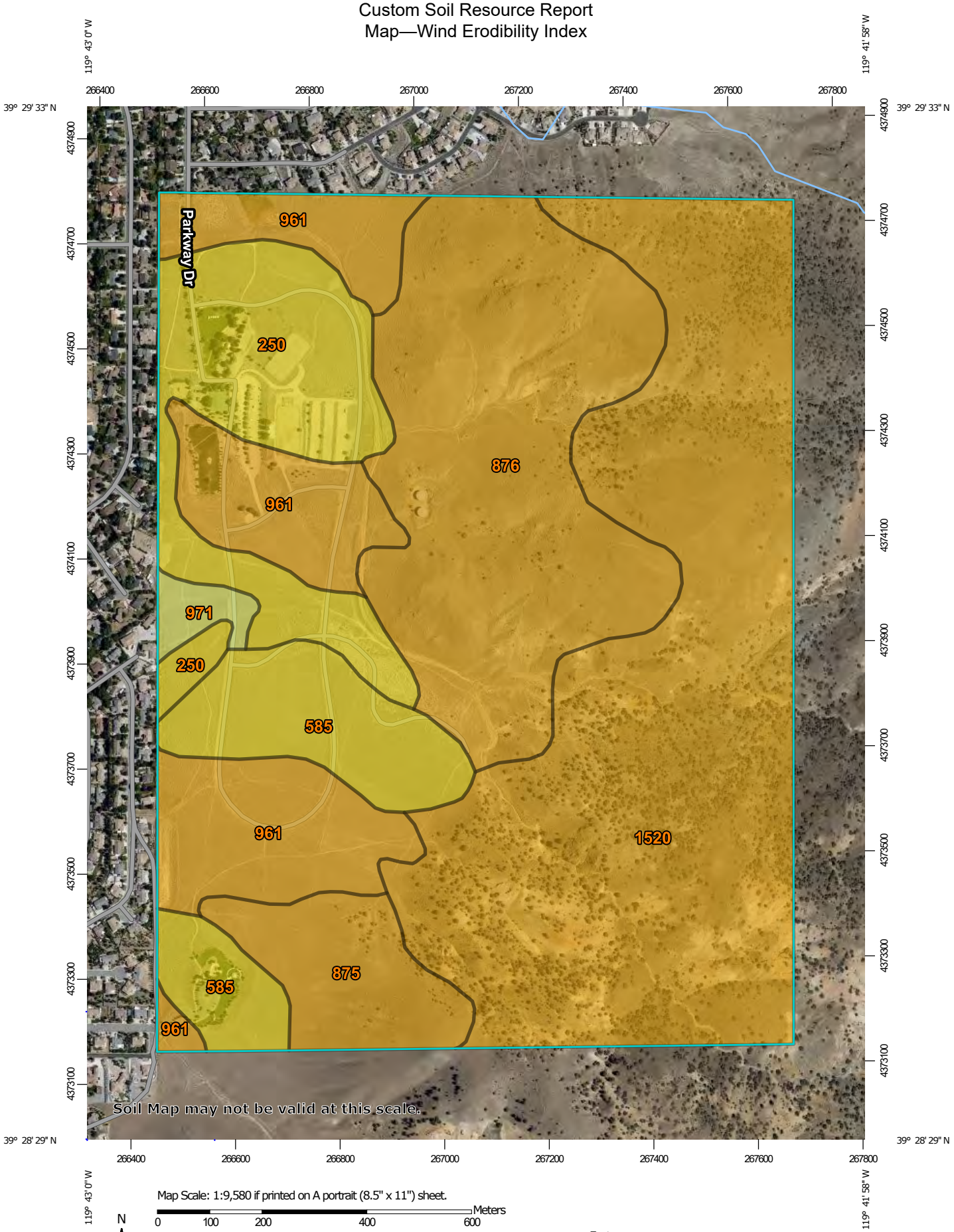
Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

Wind Erodibility Index

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Custom Soil Resource Report
Map—Wind Erodibility Index



Map Scale: 1:9,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

Soil Rating Lines

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

Soil Rating Points

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 18, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Wind Erodibility Index

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
250	Cassiro gravelly sandy loam, 2 to 4 percent slopes	56	55.4	11.3%
585	Barnard-Trosi association	56	39.2	8.0%
875	Xman-Zephan-Mizel association	48	24.3	5.0%
876	Xman-Oppio-Old Camp association	48	110.2	22.5%
961	Kayo stony sandy loam, 4 to 8 percent slopes	48	68.2	14.0%
971	Aladshi sandy loam, 2 to 4 percent slopes	86	4.8	1.0%
1520	Duco-Smallcone-Cagle association	48	186.8	38.2%
Totals for Area of Interest			**489.0**	**100.0%**

Rating Options—Wind Erodibility Index

Units of Measure: tons per acre per year

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

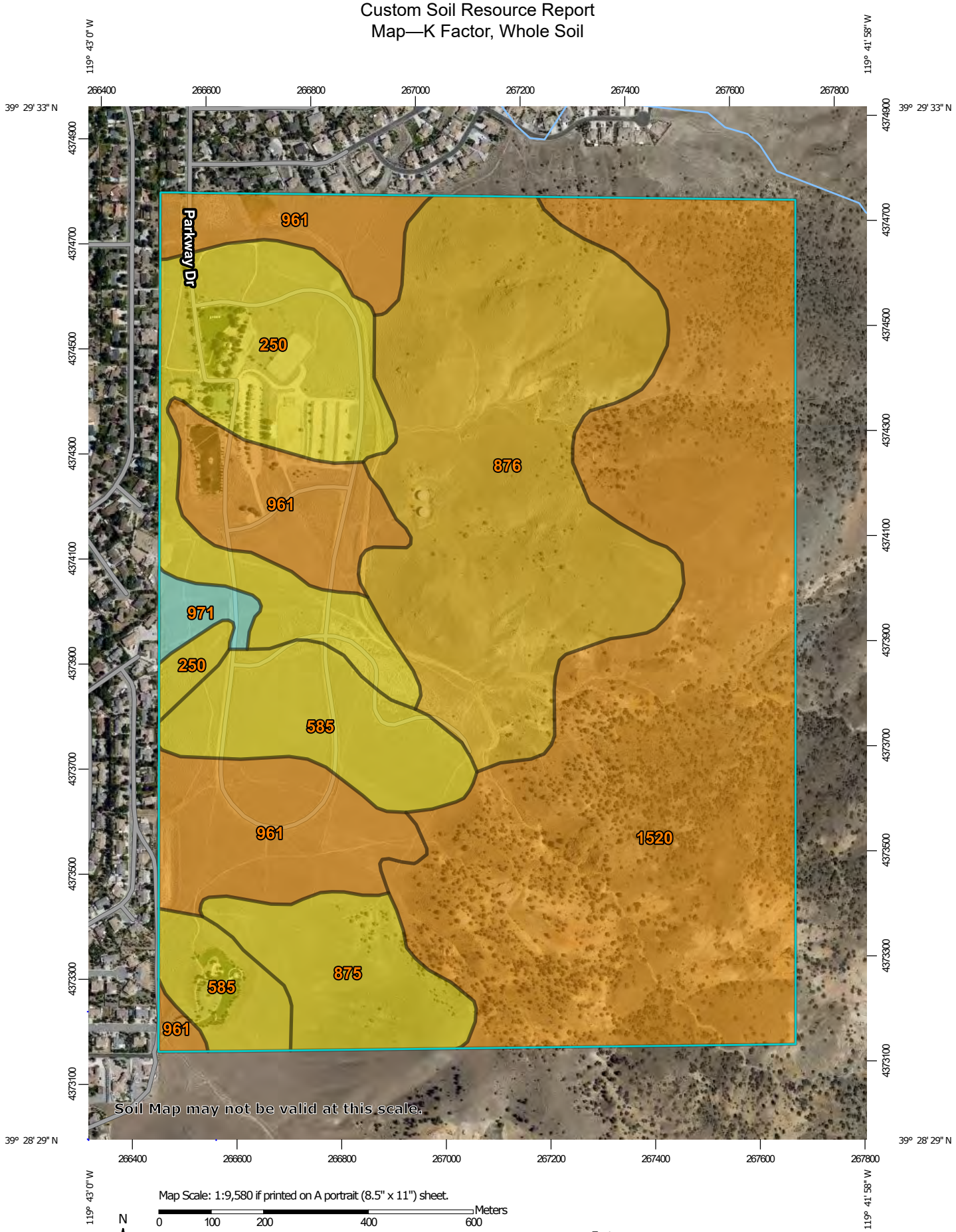
K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Custom Soil Resource Report
Map—K Factor, Whole Soil



Map Scale: 1:9,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 18, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
250	Cassiro gravelly sandy loam, 2 to 4 percent slopes	.17	55.4	11.3%
585	Barnard-Trosi association	.17	39.2	8.0%
875	Xman-Zephan-Mizel association	.17	24.3	5.0%
876	Xman-Oppio-Old Camp association	.15	110.2	22.5%
961	Kayo stony sandy loam, 4 to 8 percent slopes	.10	68.2	14.0%
971	Aladshi sandy loam, 2 to 4 percent slopes	.32	4.8	1.0%
1520	Duco-Smallcone-Cagle association	.10	186.8	38.2%
Totals for Area of Interest			**489.0**	**100.0%**

Rating Options—K Factor, Whole Soil

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Attachment 2

Nevada Noxious Weed List

Nevada Noxious Weed List by Category

Revised 2/2/21

Nevada Department of Agriculture

Category A Weeds:

Category A noxious weeds are weeds that are generally not found or that are limited in distribution throughout the State.

African rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula*
Barbed goatgrass	*Aegilops triuncialis*
Bufflegrass	*Pennisetum ciliare*
Camelthorn	*Alhagi pseudalhagi*
Common crupina	*Crupina vulgaris*
Curly-leaf pondweed	*Potamogton crispus*
Desert knapweed	*Volutaria tubuliflora*
Dyer's woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Flowering rush	*Butomus umbellatus*
Giant salvinia	*Salvinia molesta*
Goats rue	*Galega officinalis*
Green foutain grass	*Pennisetum setaceum*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian starthistle	*Centaurea iberica*
Jointed goatgrass	*Aegilops cylindrical*
Klamath weed	*Hypericum peerforatum*
Malta starthistle	*Centaurea melitensis*
Mediterranean sage	*Salvia aethiopis*
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Squarrose knapweed	*Centaurea virgata*
Sulfur cinquefoil	*Potentilla recta*
Syrian bean caper	*Zygophyllum fabago*
Ventenata	*Ventenata dubia*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*

Category B Weeds:

Category B listed noxious weeds are weeds that are generally established in scattered populations in some counties of the State.

Black henbane	*Hysocyamus niger*
Carolina horse nettle	*Solanum carolinense*
Dalmation toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Giant reed	*Arundo donax*
Leafy spurge	*Euphorbia esula*
Medusahead	*Taeniatherum caput-medusae*
Mayweed chamomile	*Anthemis cotula*
Perennial sowthistle	*Sonchus arvensis*
Sahara mustard	*Brassica tournefortii*
Silverleaf nightshade	*Solanum elaeagnifolium*
Spotted knapweed	*Centaurea maculosa*

Category C Weeds:

Category C listed noxious weeds are weeds that are generally established and generally widespread in many counties of the State.

Canada thistle	*Cirsium arvense*
Hoary cress	*Cardaria draba*
Johnson grass	*Sorghum halepense*
Musk thistle	*Caduus nutans*
Perennial pepperweed	*Lepdium latifolium*
Poison hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Russian knapweed	*Acroptilon repens*
Salt cedar	*Tamarix spp.*
Scotch thistle	*Onopordum acanthium*
Water hemlock	*Cicuta maculata*

Attachment 3

Rare Plant Fact Sheets

Eriogonum robustum (E. Greene) ALTERED ANDESITE BUCKWHEAT

FAMILY: *Polygonaceae*, the buckwheat family. **SYNONYMS:** *Eriogonum lobbii* var. *robustum*

STATUS: **Heritage Program SENSITIVE LIST, ranks: G2G3Q S2S3**
USFWS/ESA: species of concern. **STATE OF NEVADA:** none. **BLM:** Special Status Species. **USFS:** none. **NNNPS:** watch list.

POPULATION CENSUS: 25 extant occurrences mapped at 1.0 km (0.6 mi) separation, OR **130 extant and 2 extirpated occurrences mapped** at 0.16 km (0.1 mi) separation; total estimated **individuals 1,600,000+**, total estimated **area 329 ha (813 ac)**. **TREND:** DECLINING RAPIDLY.

IMPACTS AND MAJOR THREATS: No summary available (see references).

INVENTORY EFFORT: Surveys are substantially complete, with only a minor amount of potential habitat remaining unexamined. Most recent entered survey 1998, average year of last survey 1995.
Years since last entered survey (percent of mapped records at various survey ages)**: 0-5 yrs:** 11.3%; **6-10 yrs:** 87.2%; **21-30 yrs:** .8%; **31-50 yrs:** .8%.

LAND MANAGEMENT in decreasing predominance: private lands, U. S. Bureau of Land Management, Humboldt-Toiyabe National Forest, Nevada state lands, county lands, designated wilderness.

RANGE: Storey and Washoe counties, Nevada. **Nevada endemic.** Maximum **range dimension 40.5 km (25.2 mi)** excluding most disjunct record. **Type specimen** collected in Washoe County.

ELEVATIONS RECORDED: 4410-7325 feet (1344-2233 meters).

HABITAT: Dry, shallow, highly acidic (pH 3.3-5.5) gravelly clay soils mainly of the Smallcone Series, derived from weathering of hydrothermal sulfide deposits formed in andesite, or sometimes in rhyolitic or granitoid rocks, forming mostly barren yellowish to orange brown patches on ridges, knolls, and steep slopes on all aspects, on all but the most xeric sites supporting a sparse, stunted relict woodland of yellow pines (Pinus ponderosa and/or P. jeffreyi) and pinyon pine (P. monophylla), with an equally sparse understory codominated with Arenaria nuttallii fragilis, Ericameria parryi or E. nauseosa, Elymus elymoides, and/or Poa secunda. Other normally mesic-montane conifer taxa, such as white fir, western white pine, and lodgepole pine, are occasionally present.

PHENOLOGY: flowering late-spring to summer. Range of most frequent **survey months:** May-September.

LIFE-FORM AND HABIT: semi-woody long-lived perennial cushion.

DESCRIPTION: Large perennial mound with rounded grayish leaves and large pale-yellow inflorescences.
Distinguishing features: A distinctive and unmistakable species.

PHOTOGRAPHS: Morefield (2000); Nevada Natural Heritage Program images web page (1998-present), slide collection (1986-present), and files.
ILLUSTRATIONS: Mozingo and Williams (1980).
OTHER GENERAL REFERENCES (listed separately): Reveal (1985).
SPECIFIC REFERENCES:

Greene, E. L. 1885. Studies in the botany of California and parts adjacent. Bulletin of the California Academy of Sciences 1: 66-127.

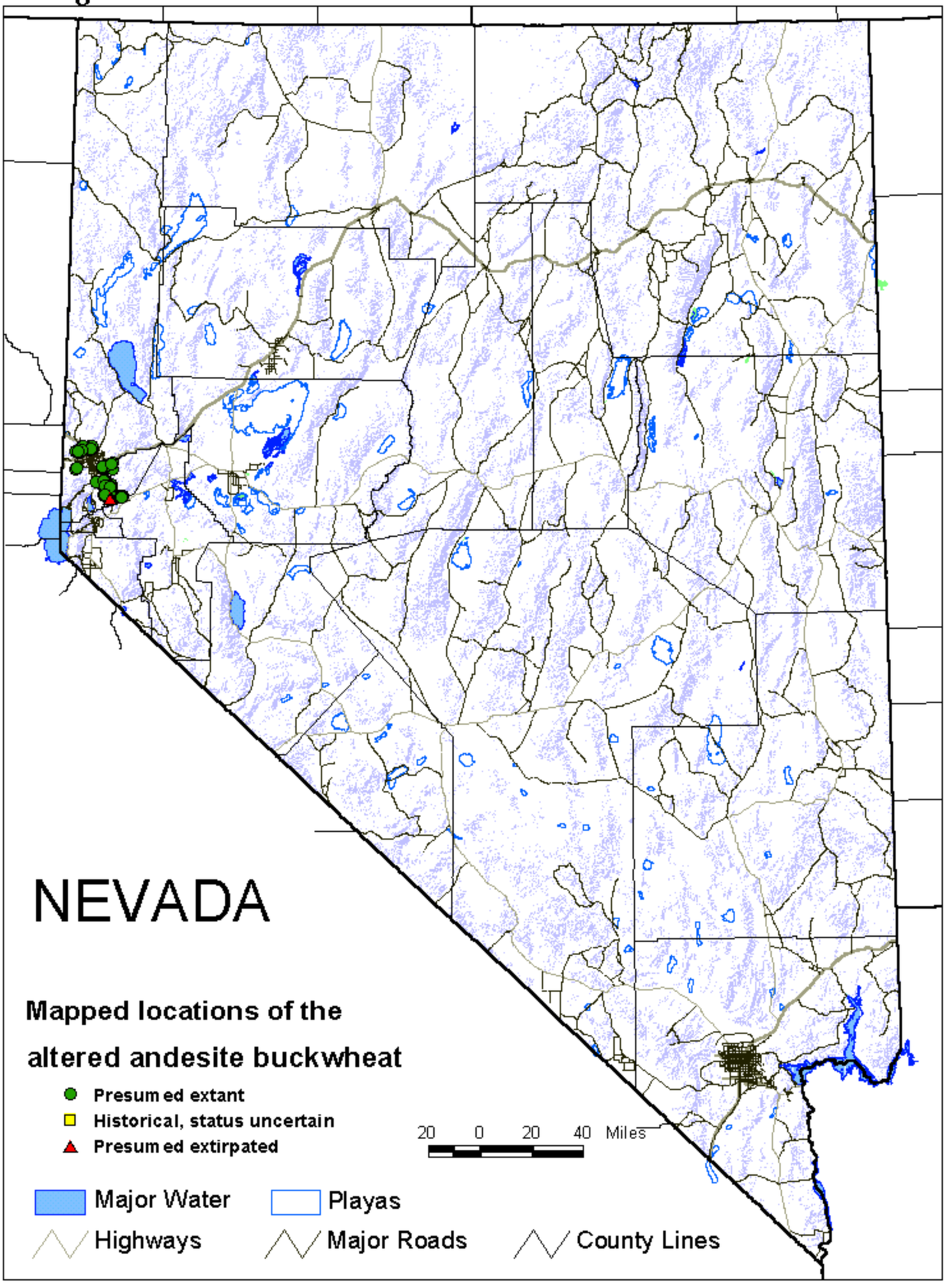
Kuyper, K. F., U. Yandell, and R. S. Nowak. 1997. On the taxonomic status of Eriogonum robustum (Polygonaceae), a rare endemic in western Nevada. Great Basin Naturalist 57: 1-10.

Morefield, J. D. 2000. Current knowledge and conservation status of Eriogonum robustum E. Greene (Polygonaceae), the altered andesite buckwheat. Carson City: Nevada Natural Heritage Program, status report prepared for the U. S. Fish and Wildlife Service, Reno, Nevada.

Reveal, J. L. 1985. New Nevada entities and combinations in Eriogonum (Polygonaceae). Great Basin Naturalist 45: 276-280.

OF FURTHER INTEREST: The Nevada Natural Heritage Program and Kuyper et al. (1997) consider this taxon a good, distinct species, and all ranks are for that taxonomic level.

Eriogonum robustum



Plagiobothrys glomeratus A. Gray (1885) ALTERED ANDESITE POPCORNFLOWER

FAMILY: *Boraginaceae*, the forget-me-not family.

STATUS: **Heritage Program SENSITIVE LIST, ranks: G2G3 S2S3**
USFWS/ESA: none. **STATE OF NEVADA:** none. **BLM:** none. **USFS:** none. **NNNPS:** watch list.

POPULATION CENSUS: 9 occurrences mapped at 1.0 km (0.6 mi) separation, OR **11 occurrences mapped** at 0.16 km (0.1 mi) separation; total estimated **individuals unknown**, total estimated **area unknown**. **TREND:** DECLINING.

IMPACTS AND MAJOR THREATS: Subject to urbanization impacts in the Reno area.

INVENTORY EFFORT: Surveys spotty and incomplete. Most recent entered survey 1999, average year of last survey 1988. **Years since last entered survey** (percent of mapped records at various survey ages)**: 0-5 yrs:** 90.9%; **51+ yrs or unknown:** 9.1%.

LAND MANAGEMENT in decreasing predominance: private lands, U. S. Bureau of Land Management, county lands, Humboldt-Toiyabe National Forest (?).

RANGE: Storey and Washoe counties, Nevada. **Nevada endemic.** Maximum **range dimension 37.2 km (23.1 mi)** excluding most disjunct record. **Type specimen** collected in Storey County.

ELEVATIONS RECORDED: 4850-6650 feet (1478-2027 meters).

HABITAT: Dry, shallow, mostly acidic (pH 3.3-5.5) gravelly clay soils mainly of the Smallcone Series, derived from weathering of hydrothermal sulfide deposits formed in andesite, or sometimes in rhyolitic or granitoid rocks, forming mostly barren yellowish to orange brown patches on ridges, knolls, and steep slopes on all aspects in sagebrush, pinyon-juniper, and montane conifer zones, on all but the most xeric sites supporting a sparse, stunted relict woodland of yellow pines (Pinus ponderosa and/or P. jeffreyi) and pinyon pine (P. monophylla), with an equally sparse understory codominated by Eriogonum robustum, Arenaria nuttallii fragilis, Ericameria parryi or E. nauseosa, Elymus elymoides, and/or Poa secunda.

PHENOLOGY: flowering summer. Range of most frequent **survey months:** June-July.

LIFE-FORM AND HABIT: small annual.

DESCRIPTION: An annual herb, 5-20 cm tall, with hairy leaves and stems and a bushy appearance. Compact clusters of small white flowers bloom June-August. **Distinguishing features:** Can be mistaken for Plagiobothrys hispidus. P. glomeratus has smooth nutlets while P. hispidus has nutlets unevenly tuberculate to pavemented with the roughness always readily discernable.

PHOTOGRAPHS: none known.
ILLUSTRATIONS: Cronquist et al. (1984).
OTHER GENERAL REFERENCES (listed separately): Skinner and Pavlik (1994).
SPECIFIC REFERENCES:

Gray, A. 1885. Contributions to the botany of North America. Proceedings of the American Academy of Arts 20: 257-310.

Morefield, J. D. 2000. Current knowledge and conservation status of Eriogonum robustum E. Greene (Polygonaceae), the altered andesite buckwheat. Carson City: Nevada Natural Heritage Program, status report prepared for the U. S. Fish and Wildlife Service, Reno, Nevada.

Tiehm, A. and W. A. Kelley. 1999. The history, identity, and distribution of Plagiobothrys glomeratus A. Gray (Boraginaceae). Carson City: unpublished manuscript in Nevada Natural Heritage Program files.

OF FURTHER INTEREST: Recognized by A. Tiehm (unpublished data) as a Nevada endemic more or less co-distributed with Eriogonum robustum, and previously confused with Plagiobothrys hispidus in California. Greene (1887), Johnston (1923), and Tidestrom (1925) placed P. glomeratus along with hispidus, jonesii, and kingii in the genus Sonnea. Cronquist (1984) recognized P. glomeratus as a good species.

Plagiobothrys glomeratus