

MAJOR DRAINAGEWAY ANALYSIS

S3-Robb Drive

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1.0 Introduction

Although the RMC does not define specific findings for major drainageways, it does contain a number of drainageway protection standards. Furthermore, the Master Plan Conservation Element contains five objectives related to greenway corridors and eleven objectives for major drainageway conservation. The goal of the Master Plan is to achieve “Major Drainageway Enhancement”, which is defined as the improvement of a major drainageway that results in a treatment that is better than the condition of the existing drainageway. The objectives of the Master Plan which the Peavine Employment Center intends to meet are as follows:

Greenway Corridor Objectives¹:

C-GC.1: Protection of Natural Features

Tailor the layout and design of adjacent development so as to protect the natural features contained within and along the edge of the greenway corridor.

C-GC.2: Orientation to Greenway Corridors

Orient structures and public spaces to maximize and frame views to the adjacent greenway corridor. Avoid lining greenway corridors with surface parking, walls or fencing, garages, or the backs of buildings.

C-GC3: Access to Greenway Corridors

Maintain or provide public pedestrian and bicycle access to greenway corridors and associated outdoor recreational amenities as part of future development. Incorporate signage, gateway markers, or other cues that increase the visibility of greenway corridor access points.

C-GC5: Public Spaces

Incorporate active and passive public spaces, such as outdoor plazas and seating, and pocket parks, as part of future development along greenway corridors.

Major Drainageway Conservation Objectives²:

- 1) To ensure the safety of people and property by providing for drainage of storm waters and maintaining natural attenuation of peak flows;
- 2) To maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins, and to promote continued natural infiltration of storm runoff;
- 3) To maintain or improve wildlife habitats, native vegetation, and natural terrain;
- 4) To reduce the need for the expenditure of public funds to remedy or avoid flood hazards, erosion, or other situations caused by inappropriate alteration of natural water courses;
- 5) To provide open space land and easements for conservation or access, especially environmentally sensitive areas where development requires new approaches and attention to open space needs;
- 6) To improve or enhance wildlife corridors in urban areas to maintain the quality of life and the ecological balance of the community;

¹ The City of Reno Master Plan. 12/13/2017. Page 131. Greenway Corridors.

² The City of Reno Master Plan. 12/13/2017. Page 73. City Objectives for Major Drainageways.

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- 7) To ensure that major drainageways are used for public access and recreational facilities, where appropriate;
- 8) To reduce major drainageway erosion;
- 9) To prevent sediments (man-caused or occurring naturally) from reaching the Truckee River;
- 10) To provide for open fencing adjacent to major drainageways to maintain aesthetic continuity, encourage community pride, and encourage self-policing; and
- 11) To identify critical drainage areas in the City of Reno and its Sphere of Influence and present strategies for their care, enhancement, protection, and treatment, both for function and appearance.

2.0 Project Area

The proposed S3-Robb Drive Property Master Plan (the Project) project area consists of 1 parcel located south of the Robb Drive/Interstate Highway 80 interchange (APN Number: 039-161-10) (Exhibit 1). The project area consists of ±85 acres located immediately south and east of the I80 right-of-way. The parcel is currently undeveloped and has had prior extensive disturbance. A drainage running adjacent to the northern property boundary forms a significant topographic feature. The property slopes away from I-80 at an approximate 4:1 (H:V) to reach the bottom of the drainage, roughly located 70 to 80 feet below I-80. From the bottom of the drainage, the property slopes upward at an approximate gradient of 4:1 to the upper reaches of Chalk Bluff, approximately 200 feet above the drainage bottom. Chalk Bluff forms a wide plateau which overlooks the Truckee Meadows. The of the project area is ± 4,800 feet.

The project area occurs within one watershed containing one drainage feature. (Exhibit 2). The Drainageway A is perennial with flows supported by upslope development nuisance water and stormwater drainage that is directed to the drainageway.

Soils vary from deep alluvium in the lower elevations to shallow soils over bedrock in the upper elevations in the project area (Exhibit 3). The subject drainageway occurs in Map Unit 994. Soils of the project area inclusive of the major drainageways as mapped by the Natural Resources Conservation Service (Washoe County, Nevada, South Part) are summarized below.

NRCS Soil Survey – Washoe County, South Part

Soil Survey Map Unit	Map Unit Name	Description
554	Leviathan very stony sandy loam, 2 to 8 percent slopes	Fan remnants, mixed alluvium more than 80 inches to restrictive layer, high runoff, Hydric Soil - No
557	Leviathan very stony sandy loam, 30 to 50 percent slopes	Fan remnants, mixed alluvium, more than 80 inches to restrictive layer, very high runoff, Hydric Soil - No

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994	Badland-Chalco-Verdico complex, 8 to 30 percent slopes	Pediments, mixed alluvium, 1 to 4 inches to paralithic bedrock, very high runoff, Hydric Soil - No
1054	Waspo gravelly clay, 2 to 8 percent slopes	Pediments, 20 to 39 inches to paralithic bedrock, high runoff, Hydric Soil - No

The vegetation within the drainage feature consists of a single cottonwood tree (*Populus trichocarpa*) and a single coyote willow (*Salix exigua*). Grasses include cheatgrass (*Bromus tectorum*), Sandberg bluegrass (*Poa secunda*), and Great Basin wildrye (*Leymus cinerius*) (Exhibit 5).

The surrounding upland to the north of the drainageway and below I80 is seeded grass species on the south facing slope. The north facing slope supports Wyoming big sagebrush (*Artemisia tridentata ssp. vaseyana*), rubber rabbitbrush (*Ericameria nauseosa*), antelope bitterbrush (*Purshia tridentata*), green ephedra (*Ephedra viridis*), cheatgrass (*Bromus tectorum*), Sandberg bluegrass (*Poa secunda*), and Great Basin wildrye (*Leymus cinerius*). The western portion of the project area is void of vegetation because of prior disturbance (Exhibit 5).

3.0 Subject Drainageway

A major drainageway drains an area of 100 acres or more and is thus comprised of the width of the 100-year event water surface elevation plus a minimum 15-foot-wide buffer on both sides of the drainage. This Major Drainageway Analysis has been prepared to respond to Master Plan Objectives. It is the goal of Project PEC to assist the City of Reno achieve the Master Plan implementation strategies IMP-7.1a and 7.1b.

3.1 Drainageway A

In the project area, there is one major drainageway that drains ±123 acres (Exhibits 2 and 5). Flows enter Drainageway A from the west emanating from surface runoff from the adjacent I80 corridor and from the north via two culverts that collect stormwater drainage from upslope development and from the I80 corridor (Exhibit 2).

In 2010, the Heiser Property Fill Site Project included mass grading intended realignment and rock line the upper reach of the drainageway with road construction materials from a nearby project. Historically, prior to I80 be constructed, the drainageway existed collecting flows from the north, northwest and west (Exhibit 4). It appears that the construction of I80 and development north of I80 resulted in increased flows to this drainage.

The drainageway is in a significantly disturbed condition in the upper reach and moderately disturbed condition in the lower reach. The western extent has been rock lined to avoid accelerated erosion from offsite drainage. In addition, the I80 fill slope is immediately adjacent to the north side of the drainageway. Channel downcutting is limited by shallow depth to paralytic bedrock (Map Unit 994, Exhibits 3 and 5) and significant rock armoring.

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3.2 Sensitive Vegetation Species

A data request for the Nevada Natural Heritage Program (NNHP), U.S. Fish and Wildlife Service (FWS) and the Nevada Department of Wildlife (NDOW) was submitted in November 2022.

Correspondence was received in a GIS shape file from NNHP in response to a request for at-risk taxa habitat within the vicinity of the project (Exhibit 6). The NNHP database query indicated that there are no at-risk taxa or habitat in the project area.

The FWS (Exhibit 6) has indicated that there are no critical habitats within the project area. The FWS has indicated that the following species may be present in the vicinity of the project area: Sierra Nevada yellow-legged frog (*Rana sierrae*), Carson wandering skipper (*Pseudocopa eodes eunus obscurus*), monarch butterfly (*Danaus plesippus*), Webber's ivesia (*Ivesia webberi*), Cui-ui (*Chasmists cujus*) and Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*).

The elevation of project area occurs in the lower extent of the range in which the Sierra Nevada yellow-legged frog is generally found in high mountain streams, lakes and wetlands at 4,495 to 12,000 feet elevation. Although, unlikely, there is potential for this species to occur within the Truckee River corridor to the south of the project area.

The Carson wandering skipper (endangered) occurs on alkali flats. The project area does not support alkali flats therefore, it is unlikely that it occurs within the project area.

The monarch butterfly is a species of concern and although still quite common, their numbers have declined recently. This species may be associated with the Truckee River corridor.

Webber's ivesia are associated with heavy clay soils and has been found on Peavine Mountain and the lower elevations of the Sierra Nevada Mountains. The project area does not contain heavy clay soils and therefore it is unlikely that it occurs in the project area.

Cui-ui (*Chasmists cujus*) and Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) both require a perennial source of water. The subject drainageway only flows in response to precipitation events and runoff from upslope development and highway stormwater runoff. Therefore, these species are not supported within the subject drainageway.

The NDOW database query (Exhibit 6) indicated that the project area supports occupied mule deer habitat, various species of raptors and their habitats, which use diverse habitat types, may reside in the vicinity of the project area and various avian species protected under the Migratory Bird Treaty Act may use the project area for nesting.

NDOW states that there is no known greater sage-grouse habitat in the vicinity of the project area and there are no known greater sage-grouse lek sites in the vicinity of the project area.

3.3 Existing Hydrology

Wood Rodgers, Inc. has determined the total current peak flow within Drainageway A is 197.61 cfs from offsite runoff and onsite runoff (Exhibit 8 – Submittal Section 4).

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3.4 Proposed Project

At the time of this writing, it is assumed that the developed areas will have a land use of “Industrial”, though the final land use of projects inside the development area may change prior to final design. Individual drainage elements are to be sized with drainage reports accompanying each phase of the project (Exhibit 7).

Under the proposed development scenario, the peak flows within Drainageway A will be 295.89 cfs. The proposed drainage system will likely consist of curb and gutter to collect and convey runoff produced on-site, drainage inlets to collect runoff from the gutters, storm drain laterals, pipes, manholes, storm drain main, drainage channels, all of which run west to east, to convey collected runoff through the project. The development will utilize storm drain catch basins, manholes, and mains to convey runoff generated on-site and pass off-site flows through the project. This storm drain will be designed with the final design of each project. It is anticipated that all storm drain within streets or common elements will be publicly owned and maintained by the City of Reno, and some storm drain on individual development sites may be privately owned.

As indicated above, developing the Project site will result in an overall net increase in flows prior to detention. It is anticipated that detention ponds will be constructed with final design to mitigate the increase in peak flows to pre-development conditions or below. There is space available on both the east side and west side of the development to construct appropriately sized detention ponds to detain both the 5-year and 100-year peak flows prior to discharge to Drainageway A

The entire site lies within FEMA flood hazard area “unshaded X”, which indicates that the project is outside the 0.2% probability per year flood zone. No special flood hazard considerations are required for the proposed project.

4.0 Greenway Corridor & Major Drainageway Objectives and Applicant’s Responses

Although the RMC does not define specific findings for major drainageways, it does contain several drainageway protection standards. Furthermore, the Master Plan Conservation Element contains five objectives related to greenway corridor protection. Please see below for the Applicant’s responses to these objectives to achieve Major Drainageway Enhancement, which is defined as the improvement of a major drainageway that results in a treatment that is better than the condition of the existing drainageway.

Master Plan Greenway Corridors Objectives:

C-GC.1: Protection of Natural Features

Tailor the layout and design of adjacent development so as to protect the natural features contained within and along the edge of the greenway corridor.

C-GC.2: Orientation to Greenway Corridors

Orient structures and public spaces to maximize and frame views to the adjacent greenway corridor. Avoid lining greenway corridors with surface parking, walls or fencing, garages, or the backs of buildings.

C-GC3: Access to Greenway Corridors

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Maintain or provide public pedestrian and bicycle access to greenway corridors and associated outdoor recreational amenities as part of future development. Incorporate signage, gateway markers, or other cues that increase the visibility of greenway corridor access points.

C-GC5: Public Spaces

Incorporate active and passive public spaces, such as outdoor plazas and seating, and pocket parks, as part of future development along greenway corridors.

City's Objectives for Major Drainageways:

The design approach to any channel improvements should be appropriate to the site and based on maintaining a natural channel, overall aesthetics, and the quality of the natural environment.

- 1) To ensure the safety of people and property by providing for drainage of storm waters and maintaining natural attenuation of peak flows;
- 2) To maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins, and to promote continued natural infiltration of storm runoff;
- 3) To maintain or improve wildlife habitats, native vegetation, and natural terrain;
- 4) To reduce the need for the expenditure of public funds to remedy or avoid flood hazards, erosion, or other situations caused by inappropriate alteration of natural water courses;
- 5) To provide open space land and easements for conservation or access, especially environmentally sensitive areas where development requires new approaches and attention to open space needs;
- 6) To improve or enhance wildlife corridors in urban areas to maintain the quality of life and the ecological balance of the community;
- 7) To ensure that major drainageways are used for public access and recreational facilities, where appropriate;
- 8) To reduce major drainageway erosion;
- 9) To prevent sediments (man-caused or occurring naturally) from reaching the Truckee River;
- 10) To provide for open fencing adjacent to major drainageways to maintain aesthetic continuity, encourage community pride, and encourage self-policing; and
- 11) To identify critical drainage areas in the City of Reno and its Sphere of Influence and present strategies for their care, enhancement, protection, and treatment, both for function and appearance.

Responses:

C-GC.1: Protection of Natural Features

Tailor the layout and design of adjacent development so as to protect the natural features contained within and along the edge of the greenway corridor.

- 1) To ensure the safety of people and property by providing for drainage of storm waters and maintaining natural attenuation of peak flows;
- 4) To reduce the need for the expenditure of public funds to remedy or avoid flood hazards, erosion, or other situations caused by inappropriate alteration of natural water courses;

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- 8) To reduce major drainageway erosion;
- 9) To prevent sediments (man-caused or occurring naturally) from reaching the Truckee River; - NOT APPLICABLE

Response:

Pursuant to the findings of the Preliminary Hydrologic and Hydraulic Analysis Report³, with the development of Project PEC, the 100-year 24-hour peak flow will be routed through the proposed storm drain system and attenuated throughout the detention and retention facilities. The resulting increase in flows from onsite development will be mitigated through onsite; therefore, there will not be an increase in discharge or volume to the downstream facilities. Additionally, the storm drain system and proposed engineered channels will be sized appropriately and will be analyzed for peak discharge and velocities to provided adequate erosional protection within the proposed site improvement plans.

Development of the project site will result in an increase in impervious area. The increase in impervious area results in an increase in runoff. Detention facilities are proposed around the project site to capture the additional runoff and meter-out flows matching the existing condition for the 100-year storm event.

The proposed stormwater drainage facilities have been preliminarily designed to capture and perpetuate the design storm event flows with the use of storm drain pipes and detention facilities, which release to the existing downstream drainageway. The conveyance of flows is in conformance with the City of Reno Design Manual and the TMRDM. There will not be negative impacts to the adjacent or downstream properties because of development due to the implementation of the proposed storm water management system.

Objectives:

- 3) To maintain or improve wildlife habitats, native vegetation, and natural terrain;
- 6) To improve or enhance wildlife corridors in urban areas to maintain the quality of life and the ecological balance of the community;

Response:

A reconnaissance survey of the entire site was completed in November 2022 (Exhibit 5). Wildlife species observed during that survey included common urban avian species and mule deer.

Avoiding impact to the currently minor disturbed drainageway will allow for continued use of these areas by resident wildlife species.

No critical habitats occur within the project boundary.

During construction of the project area, wildlife species may be temporarily displaced. These species will most likely be displaced to Truckee River corridor. Post construction, it is anticipated that individuals of these species will continue to use the major drainageway.

³ Odyessy Engineering, Inc. May 2022.

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Objectives:

C-GC.2: Orientation to Greenway Corridors

Orient structures and public spaces to maximize and frame views to the adjacent greenway corridor. Avoid lining greenway corridors with surface parking, walls or fencing, garages, or the backs of buildings.

- 2) To maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins, and to promote continued natural infiltration of storm runoff;

Response:

Site development will invoke maintenance of the drainageway for safe conveyance of flow to the Truckee River basin as well as aesthetic qualities.

The proposed detention facilities will allow for attenuation of potentially sediment laden runoff, natural infiltration, and discharge of improved water quality runoff to the north. The addition of proposed on site drainage improvements and property owner-maintained facilities would serve as permanent water quality Best Management Practice and thus, enhanced water quality for discharge to the Truckee River.

Objectives:

C-GC3: Access to Greenway Corridors

Maintain or provide public pedestrian and bicycle access to greenway corridors and associated outdoor recreational amenities as part of future development. Incorporate signage, gateway markers, or other cues that increase the visibility of greenway corridor access points.

- 5) To provide open space land and easements for conservation or access, especially environmentally sensitive areas where development requires new approaches and attention to open space needs;
- 7) To ensure that major drainageways are used for public access and recreational facilities, where appropriate;
- 11) To identify critical drainage areas in the City of Reno and its Sphere of Influence and present strategies for their care, enhancement, protection, and treatment, both for function and appearance.

Response:

The major drainageway within the area proposed for improvements is currently in a significantly disturbed condition. The lower reach of the drainageway will not be fenced. At present there is no method of access to the drainageway.

Objectives:

C-GC4: Relationship to the Truckee River

Objectives:

C-GC5: Public Spaces

Incorporate active and passive public spaces, such as outdoor plazas and seating, and pocket parks, as part of future development along greenway corridors.

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- 10) To provide for open fencing adjacent to major drainageways to maintain aesthetic continuity, encourage community pride, and encourage self-policing;

Response:

No fencing is proposed adjacent to the major drainageways within the area proposed for improvements or downstream. In addition, no new pedestrian paths or pocket parks are planned.