

April 25, 2023

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Project Quail Mesa Subdivision – Drainage Study
Project No. 21070.019

To whom it may concern,

The Quail Mesa Subdivision in Virgin, Utah presents a plan that analyzes and conveys storm water around and through the proposed subdivision. The proposed project site is contained between several parcels V-2-1-26-4421 and V-2-1-26-4431. The project proposed 22 residential lots with the total 35.28 acres. The property access is near the intersection of Luna De Oro and Entrada Drive. The proposed access will utilize the alignment of the existing dirt road to the top of the mesa.

Existing conditions for the site show a single existing residence with a disconnected garage and a dirt road for access to the residence. The rest of the land appears undisturbed in natural conditions with small dry washes and gradually sloping land covered in sparse desert shrubs. Larger desert shrubs appear sparkly at the edge of washes.

Existing conditions appear to show the proposed lots not to be graded. They gradually slope to the northwest. Existing drainage patterns convey flow from a small offsite drainage area, through the site to Cornelius Wash, then to the Virgin River. There is a shallow natural channel to the east that captures and conveys runoff northward along the proposed project access road. The total drainage area including offsite and onsite area is approximately 53.6 acres. This area drains to a channel adjacent to the dirt road that conveys runoff water down from the mesa to Entrada Drive. Zion's Edge Subdivision installed a culvert pipe that is in a storm drain and utility easement on the south side of Entrada Drive that conveys runoff water to Cornelius Wash, then to the Virgin River.

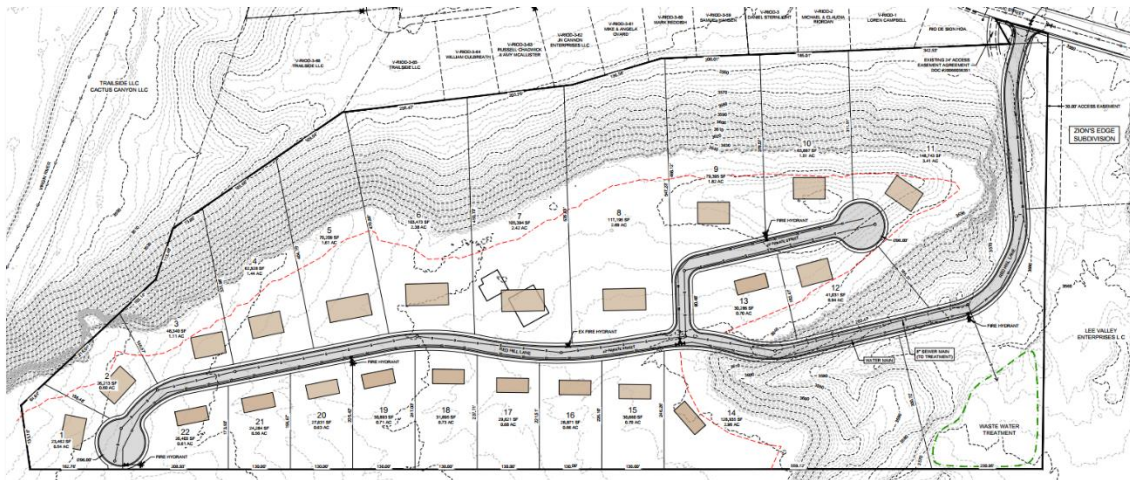


Figure 1: Preliminary Site Plan



Figure 2: Site Watershed Area

The proposed plan accounts for the onsite and the offsite flows. Offsite flows will be conveyed in roadside ditches along the street. Roof drains should be collected and discharged to the roadside ditches. Grading for the project will be minimal to match the existing topography and slope as much as possible. Lots will drain to the street then be conveyed to the existing ditch. The transition to the natural ditch will be armored to project against erosion.

Developing the lots and installing landscaping to the proposed properties will adjust the path of storm water runoff and reduce the peak runoff from the site. It is suggested that any roadside ditches be lined with riprap or have rock check dams approximately every 50' to reduce the risk of erosion.

The following calculations illustrate the volume of runoff from the developed site during a 100-year, 24-hour storm event. Existing conditions have a curve number value of 88 for natural desert land use and being a soil group category "D". The proposed conditions have a curve number values between 84 and 85 for developed lots depending on the lot size and being a soil group category "D". Curve Numbers were used or derived from NRCS/SCS TR-55. The runoff calculations are provided as an attachment.

Existing Conditions

Combined Storm Depth=	2.97	[in]
Pervious Area=	26,136	[sf]
Pervious Area CN=	88	
S=	1.364	[in]
Impervious Area Runoff Volume		
la = 0.2*S=	0.273	[in]
Q=	1.792	[in]
Volume=	3,902	[cf]

Proposed Conditions

Combined Storm Depth=	2.97	[in]
Pervious Area=	26,136	[sf]
Pervious Area CN=	85	
S=	1.765	[in]
Impervious Area Runoff Volume		
la = 0.2*S=	0.353	[in]
Q=	1.563	[in]
Volume=	3,405	[cf]

Storage Volume Req.= -497 [cf]

Existing Conditions

Combined Storm Depth=	2.97	[in]
Pervious Area=	43,560	[sf]
Pervious Area CN=	88	
S=	1.364	[in]
Impervious Area Runoff Volume		
la = 0.2*S=	0.273	[in]
Q=	1.792	[in]
Volume=	6,504	[cf]

Proposed Conditions

Combined Storm Depth=	2.97	[in]
Pervious Area=	43,560	[sf]
Pervious Area CN=	84	
S=	1.905	[in]
Impervious Area Runoff Volume		
la = 0.2*S=	0.381	[in]
Q=	1.492	[in]
Volume=	5,415	[cf]

Storage Volume Req.= -1,089 [cf]

The results show that developing the land will capture the decrease the runoff volume. The two comparisons are for a 0.5 acre lot and a 1.0 acre lot. These are representative of the lots that will be developed for the project. There will be pass through flows from the offsite area that will need to be conveyed to the existing natural channels. Our proposed stormwater mitigations are for offsite flow conveyance and erosion. We are not proposing a storage basin to mitigation storm water runoff because the act of residential development will reduce the runoff from the lots. Lot runoff will be conveyed to the street and to the natural channel adjacent to the access road.

Respectfully,

Kelvin C. Smith, P.E.
Project Engineer
Civil Science

