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Plan # _____
Case # 40-DR-2016
Q-S # _____

Accepted
 Corrections

DG
Reviewed By _____ Date 1/10/17

Preliminary Drainage Report

For

Rancho Paraiso

40-DR-2016

Southeast corner of 68th Place and Cactus Road
Scottsdale, Arizona



EXPIRES 6/30/18

December 21, 2016

Prepared for

RANCHO PARAISO, LLC,
3200 EAST CAMELBACK ROAD
NO. 295
PHOENIX, ARIZONA, 85018

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EXPIRES 6/30/18

1.0 INTRODUCTION/LOCATION

The Rancho Paraiso project is a proposed 6-acre ± residential development with associated equestrian facilities located southeast of the intersection of 68th Place and Cactus Road in Scottsdale, Arizona. The development will consist of remodeling the existing residential home, new horse barns, a new tack barn, a new aqua tread, a new covered arena, a new euroxciser, a new hay barn, and new horse pens. For additional detail the site plan has been included at the back of this report in Appendix B. This report documents the offsite and onsite drainage concerns of the 6-acre development.

The site lies within a portion of the NE1/4 of Section 22, Township 3 North, Range 4 East of the Gila and Salt River Base and Meridian. Refer to the Vicinity Map in Appendix A.

The site is bounded by existing residential development to the east, Cactus Road on the north, 68th Place to the west, and Paradise Drive on the south.

2.0 FLOOD PLAIN CLASSIFICATION

This site is located within a shaded Zone "X" designation as identified on Flood Insurance Rate Map (FIRM MAP) #04013C1760 L, dated October 16, 2013, this property is located in flood zone "X" (hatched). This area is defined as, "Areas of the 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood." Refer to Appendix C for a copy of the FIRM map for this area.

3.0 PURPOSE

The purpose of this Drainage Report is to document onsite retention and drainage requirements, offsite drainage, and anticipated improvements required for the development of this project. The proposed development will be designed to meet City of Scottsdale drainage requirements set forth in the Design Standards & Policies Manual. Retention basins will incorporate natural percolation that will dewater the retention volumes within 36 hours and will have maximum side slopes of 6:1 and a maximum ponding depth of 1-foot. Drainage onsite will continue in its natural flow path through a series of small retention basins. The post-construction runoff from this site will not be greater than the pre-construction run-off.

4.0 EXISTING CONDITIONS/DRAINAGE

The existing building has a finished floor elevation of 1383.78, which is 1.59' above the low adjacent pavement elevation on 68th Place. The site outfall occurs at the southwest corner of the property at an elevation of 1379.26. Currently the site is made up of multiple lots and will be re-platted as a single lot. There are currently 2 residences on the property. The southern-most house and associated improvements will be demolished. The other home will remain and will be partially remodeled as a part of this project. There currently retention provided for the property. The existing site consists

of natural desert and equestrian facilities and slopes form north to south at approximately 0.7%. The drainage flows through its natural flow path from north to south in a sheet flow manner. The drainage flows to the rights of way of 68th Pl and Paradise Dr. eventually making its way to the southwest corner of the property where the flow crosses 68th Place and continues west along Paradise Drive.

5.0 OFFSITE DRAINAGE

There are no offsite flows that impact the site. Cactus Road is a fully improved arterial street that has an existing storm drain system. This intercepts any flows from the north. Flows from the west are collected within an existing swale along the east side of 68th Place and directed south. The existing swale in 68th Place conveys flows to Paradise Drive where they are intercepted by an existing drainage swale and conveyed to the west and south. The site is bordered the east by existing residential lots which convey flows away from this property.

6.0 PROPOSED DRAINAGE IMPROVEMENTS

As previously discussed the majority of the site as it exists is of natural desert land features, with two residential homes and associated hardscape. Total stormwater retention will be calculated and will be provided based on the greater of Pre and Post-Developed drainage flow or First Flush calculations. Both these scenarios have been evaluated using the proposed site plan and land value characteristics for the fully developed site. Three C-values are used in this scenario as the proposed improvements included grass areas for landscape areas as well as impervious and desert landscape areas. The C values used are: 0.95 for roofed structures and impervious land features such as hardscape, c-value of 0.45 was used for landscaped and natural desert areas, and a c-value of 0.70 is used for compacted decomposed granite. A weighted C-value was calculated to determine the total storm water runoff. See Appendix's E and F for a delineation of relative areas of each feature.

Calculations:

Pre vs Post Development:

Pre Developed:

$$\begin{aligned} \text{VOLr} &= P/12 * C * A \\ \text{WEIGHTED "C"} &= \\ &= 53,933(0.95) + 218,546(0.45) / 272,479 = 0.54896 \\ A &= 272,479 \text{ SF} \\ P &= 2.2 \text{ (IN/HR)} \\ \text{VOLr} &= 27,423 \text{ CF} \end{aligned}$$

Post Developed:

$$\begin{aligned} \text{VOL} &= P/12 * C * A \\ \text{WEIGHTED "C"} &= \\ &82,830(0.95)+111,212(0.45)+78,437(0.70)/272,479 = 0.673 \\ A &= 272,479 \text{ SF} \\ P &= 2.2 \text{ (IN/HR)} \\ \text{VOLr} &= 33,619 \text{ CF} \end{aligned}$$

$$\text{Retention Required} = 33,619 - 27,423 = 6,196 \text{ CF}$$

First Flush:

$$\begin{aligned} \text{VOL} &= 0.5/12 * C * A \\ \text{VOLr} &= 0.5/12 (0.673) (272,479) = 7,641 \text{ C.F.} \end{aligned}$$

The above calculations show that volume is to be provided via the First Flush option.

Onsite Retention Basins and Drainage

The proposed grading improvements of this project will specify the addition of 3 - 1' deep retention basins. Basin #1 will be the main receiving area located near the low outfall of the site near the southwest corner. Basin # 2 is located in the far northwest corner of the site and will fully contain the stormwater directed to it by its contributing area. Basin # 3 is located in the middle of the project and include the installation of a storm drain system that will help direct storm water from north to south around the proposed site improvements. The storm drain system will outlet into the proposed basin # 1. The Basin # 1 will have its outfall into Paradise Drive as the drainage currently does in its existing condition. The small collection areas as well as the main retention basin will reduce peak flows and not increase the pre-construction site runoff.

Total retention volume provided is as follows:

Retention Basin	Basin Depth	Area Bottom	Area Top	Basin Volume
	(ft)	(ft)	(ft)	(ft ³)
1	1	4621	7614	6118
2	1	1755	4428	3092
3	0.4	290	650	188
			TOTAL	9397

The basin volumes are sufficient to contain the First Flush retention required at a depth of 1 foot or less.

The onsite retention basins will utilize natural percolation, and will be dewatered in 36-hours or less.

Retention basin maximum side slopes will be a minimum 6:1 with a maximum ponding depth of 1 foot.

Full hydrology calculations will be completed at the time of construction document submittals. A revised drainage report will be submitted to the City of Scottsdale at that time.

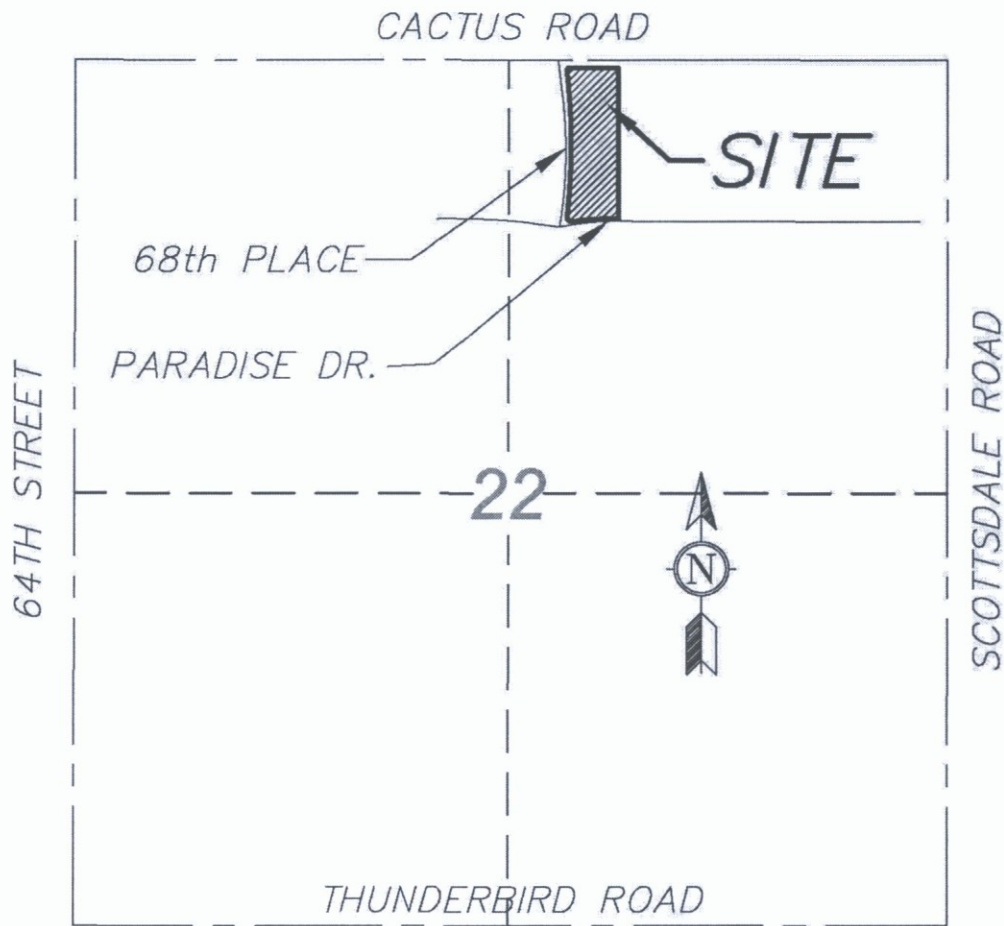
SWPPP

Given that a majority of the site will either be disturbed or re-graded, the area of such disturbance will exceed 1 acre. A Storm Water Pollution Prevention Plan with the accompanying NOI, will be submitted with the construction documents.

7.0 CONCLUSION

The proposed Rancho Paraiso project will adhere to City of Scottsdale drainage criteria. Offsite flows do not affect this site and a pre vs. post storm water run-off methodology will be used to show the fully developed site will not increase the pre constructions run-off amounts. Existing and proposed finished floors will be protected against the 100-year storm event with the site low outfall being a minimum of 1-foot below all finish floors. An onsite retention basin and collection areas will be used to store, reduce, and convey onsite flows through the site.

Appendix A
VICINITY MAP



VICINITY MAP
TOWNSHIP 3 NORTH RANGE 4 EAST
N.T.S.

Appendix C
FEMA FIRM MAP

Appendix D
AERIAL MAP

E CACTUS RD

E CACTUS RD

E CACTUS RD

175-20-008

175-20-007

175-20-002

DESERT ESTATES I
LOTS 14, 21-24

175-20-008

175-20-007

175-20-002

175-20-009

175-20-006

175-20-003A

175-20-010

175-20-005

175-20-004

DESERT ESTATES I
LOTS 14, 21-24

N 68th Pl

N 68th Pl

N 70th St

E Paradise Dr

E Paradise Dr

Inc



Appendix E
PRE DEVELOPMENT COVERAGE EXHIBIT

WEIGHTED "C" FACTOR-EXISTING CONDITIONS

BROWN AREA: COMPACTED DG (0.7) = 59,535 SF

GRAY AREA: IMPERVIOUS SURFACE (0.95) = 37,828 SF

UNHATCHED AREAS: LANDSCAPED(GRASS OR DESERT) (0.45) = 175,116 SF

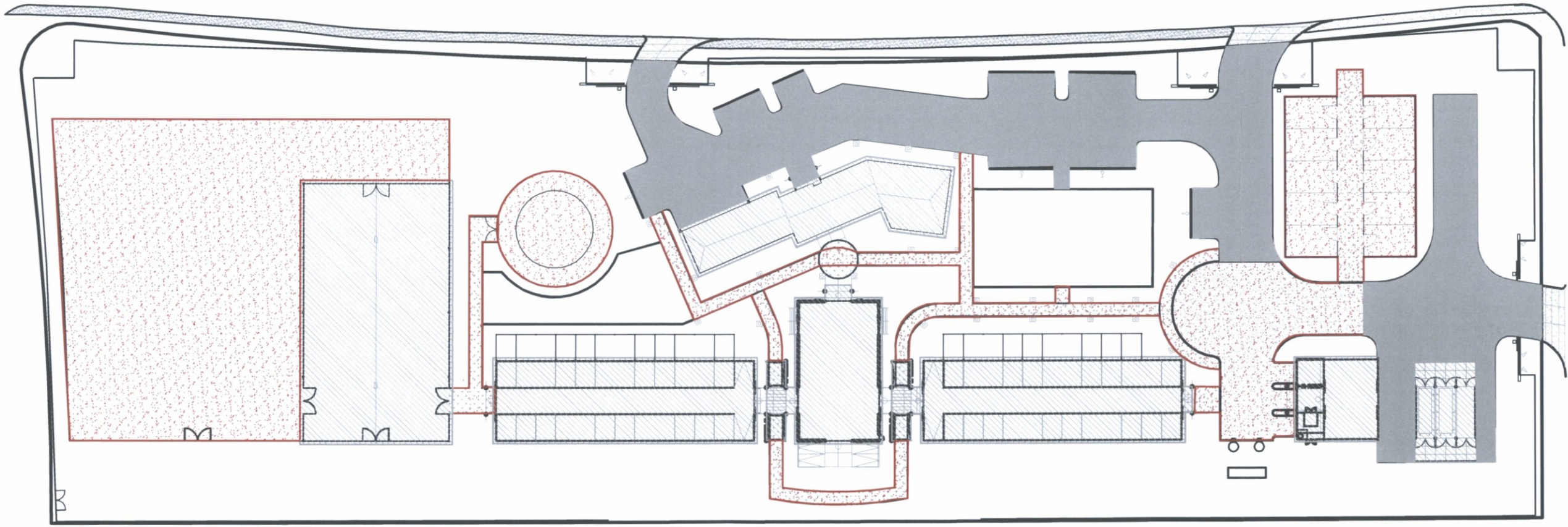
WEIGHTED "C"=0.575



Appendix F
POST DEVELOPMENT COVERAGE EXHIBIT

WEIGHTED "C"		
GRAY SOLID HATCH=CONCRETE PAVING (0.95)	32,290 SF	
GRAY CROSS HATCH=ROOF (0.95)	50,540 SF	
BROWN DOT HATCH=COMPACTED DG (0.70)	78,437 SF	
NON HATCHED AREA=LANDSCAPE DG OR GRASS (0.45)	111,212 SF	

WEIGHTED "C" = 0.673



Appendix G
WATERSHED AREA DELINEATION EXHIBIT

Appendix H
CONCEPT GRADING AND DRAINAGE PLAN