DRAINAGE REPORT

6400 E Cactus Wren Road, Paradise Valley, Arizona

LDG PROJECT #1706069

Prepared for:
Mr. Bluebirds Shoulder, LLC
6061 E Caballo Drive,
Paradise Valley, Arizona 85253

Submitted to:
Town of Paradise Valley
Engineering Department
6401 E Lincoln Dr.
Paradise Valley, Arizona 85253

Prepared by:
Land Development Group, LLC
8808 N Central Ave., Ste 288
Phoenix, Arizona 85020
Contact: Nick Prodanov, PE, PMP
P: 602 889 1984

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
41005
NICKOLA
J.
PRODANOV
Date Signed 7/29/19
ARIZONA, U.S.A.

July 26, 2019

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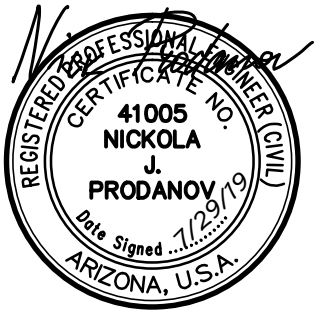


July 26, 2019

1. INTRODUCTION

This drainage report and related design have been developed in accordance with the current Maricopa County and Town of Paradise Valley drainage ordinances, standards and policies. It provides engineering analysis and assessment of the current drainage conditions that affect parcels 174-53-008K, 174-53-010C, 174-53-009A, located at 6400 E Cactus Wren Road, Paradise Valley, AZ 85253 and also being a portion of the NW ¼ of Section 10, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Appendix A-1 – Vicinity Map.

The subject property is currently not a part of a subdivision and consists of three separate parcels: APN 174-53-008L, 174-53-010C, 174-53-009A. The parcels are being a part of the SW ¼ of the NW ¼ of the NW ¼ of Section 10, T2N, R4E. The property is bounded by Invergordon Road (west), Cactus Wren (south), Cactus Wren Place (east), and residential properties from north and southeast. The 5.667-acre lot is zoned R-43, which in accordance with the Town of Paradise Valley Zoning Ordinance allows for one dwelling unit per acre density. There are no existing buildings or walls on the property except an existing driveway, which is a remanence of the old home construction. A new 4-lot subdivision and cul-de-sac is proposed for this development.

A field survey and inspection were conducted in June, 2017 and July 2019 to collect important information regarding the existing topographic characteristics, drainage conditions, and to verify and confirm the extent of the tributary areas, local disturbances to the historic flows, and location and condition of existing storm drainage structures. A topographic map was developed with a one-foot contour interval for the site and adjacent streets. The elevation contours and survey spot elevations are tied to the GDACS monuments and are based on the Town of Paradise Valley vertical datum (NAVD 88).

Aerial and topographic maps were collected from the Maricopa County GIS and USGS web sites to facilitate further and clearly delineate the limits of each drainage tributary area and conveyance corridors for historic and current conditions. Maricopa County, FCDMC and USGS maps, aerial photography and surveyed topographic map for the site were reviewed and used to establish the tributary areas.

The analysis presented herein focuses on evaluating existing and proposed drainage conditions, as well as stormwater runoff resulting from a statistical evaluation of storm events of particular frequency, up to and including 100-year event as required by the Governing Agency. A storm event exceeding the 100-year will most likely cause or create the risk of a greater storm impact than is presented and addressed herein.

2. DESCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

The site is currently a vacant land, disturbed from the original construction and demolition and it is covered with native desert vegetation. The overall terrain is sloping southeasterly at an average slope of 6.5%. There are no evidence of offsite flows entering the project site. On-site generated runoff exits the parcel at south property line (Cactus Wren Road) and southeast property line (Cactus Wren Place).

Soils in the watershed are indicated in the NRCS report as:
0.5% of *Laveen loam, 0 to 1 percent slopes;* 62.0% of *Pinamt very gravelly loam, 3 to 5 percent slopes;* 37.4% *of Rock land.* Soils in the watershed fall under Hydrologic Group C (for the project site), which is classified as: "*Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.*", however soils of the upstream tributary area are considered to have negligible infiltration rate, thus having higher runoff contribution. The above data was used to adjust the runoff coefficient values of the hydrologic model.

Computations have been performed to estimate the 100-year design peak discharges for each sub-basin that contributes offsite flows. Computer program DDMSW provided by the Flood Control District of Maricopa County was utilized to generate a Rational model and to estimate the 100-year peak discharges. Since the total drainage area is less than 160 acres, the Rational Method has been used in accordance with the Flood Control District of Maricopa County (FCDMC) Drainage Design Manual Volume I – Hydrology. FCDMC Drainage Design Management System software was utilized for calculating the Rational Method parameters and the peak discharge of each contributing drainage areas. Precipitation data was derived from the NOAA Atlas 14, Volume 1, Version 4.

The Major Basin is 16.6 acres and consists of two Sub-basins. Sub-basin 10 is 10.7 acres and generates 57.1 cfs. This flow runs along Invergordon Road. Sub-basin 11 is 5.9 acres and generates 31.2 cfs.

3. FEMA FLOOD ZONE CLASSIFICATION

Site is located in FEMA Flood Zone "X" according to Flood Insurance Rate Map (FIRM) #: 04013C, Panel 1765 of 4425, Suffix L, dated October 16th, 2013, as published by FEMA. The FIRM Panel defines Zone "X" as follows: "*Areas determined to be outside the 0.2% annual chance floodplain"*.

See Appendix A-3 for FEMA Flood Insurance Rate Map exhibit.

4. PROPOSED DRAINAGE PLAN

Four single family residences could be built after the subdivision is approved and recorded. Each lot will provide for 100-year, 2-hour on-site storm water retention in accordance with the current TPV Storm Water Design Manual. This would significantly reduce the drainage impact to downstream homes.

Each lot's buildings finish floor elevations shall be set 12" min. above the 100-year storm water elevation. Retention basins will be provided for each onsite tributary area and will have the capacity to retain the required volume. Rip-rap shall be placed at each point of discharge in order to mitigate the soil erosion and dissipate the water energy. It is recommended to add riprap along the eastern edge of Invergordon Road. Any driveway entrances along this street will have to provide for unobstructed conveyance of the offsite flows running to the south.

Summary printouts of the drainage calculations are enclosed in Appendix A-7.

5. CONCLUSIONS AND RECOMMENDATIONS

Grading and Drainage plans for each individual lot shall be designed in conformance with the recommendations and results presented in this report as well as the Town of Paradise Valley, Maricopa County, Arizona State and Federal requirements and standards.

Regular inspections and maintenance of all wall openings, retention areas and subsurface drainage systems after every major storm must be performed. Any obstructions of flow need to be promptly cleared out in order to keep the performance of the storm drain system functioning as designed. It is the Owner's responsibility to inspect and properly maintain all drainage structures and wash crossings.

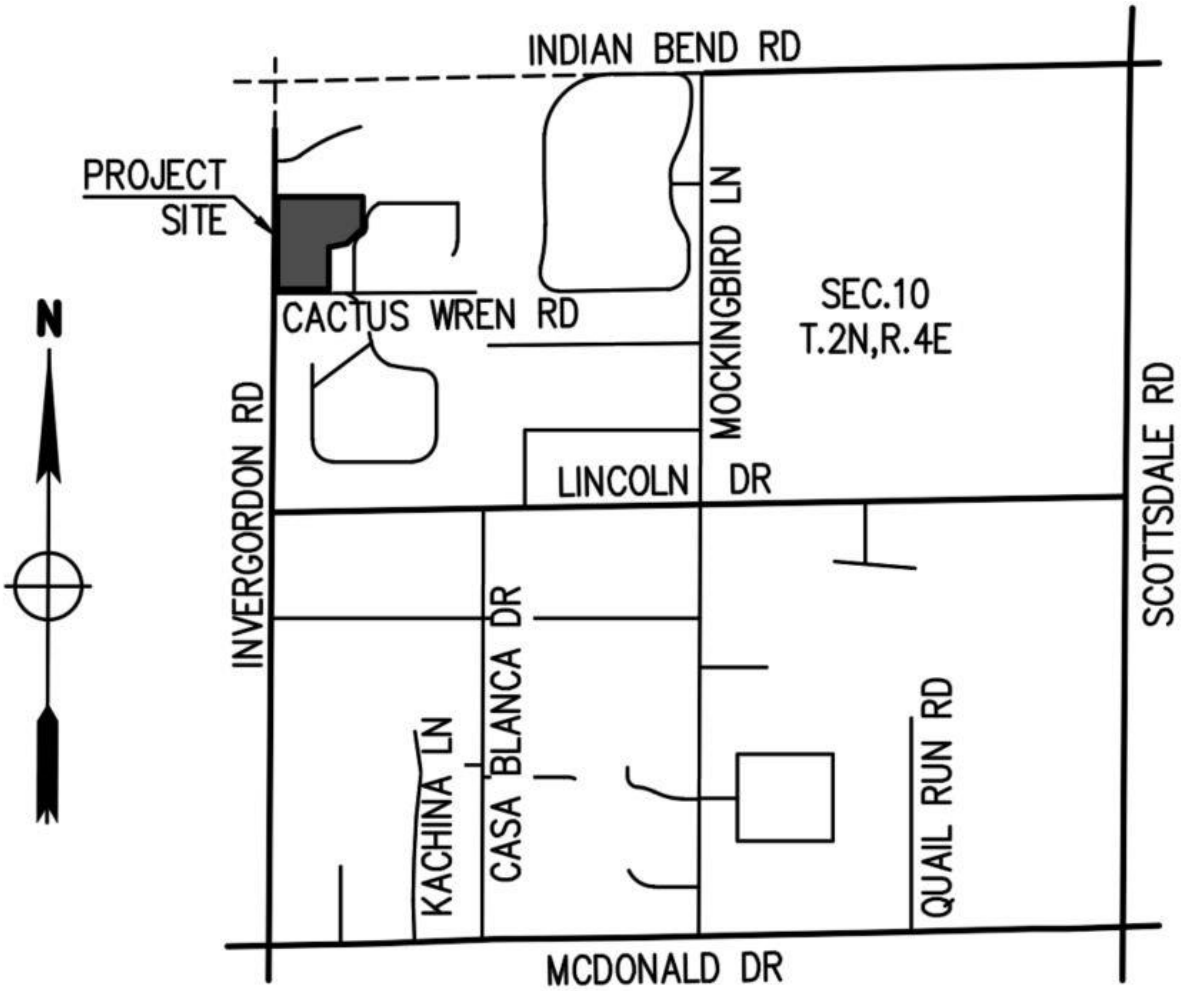
Off-site flows shall be allowed to pass through the driveway entrances in a manner similar to the existing conditions. Grading around the residences shall provide for positive drainage away from the structures as shown on the Grading and Drainage plan.

A Drainage Facilities Agreement will be required for each lot that is developed.

6. REFERENCES

- Drainage Design Manual for Maricopa County, Arizona – Volume I Hydrology, Flood Control District of Maricopa County
- Drainage Design Manual for Maricopa County, Arizona – Volume II Hydraulics, Flood Control District of Maricopa County
- Drainage Policies and Standards Manual for Maricopa County, Arizona, Flood Control District of Maricopa County
- Town of Paradise Valley Stormwater Design Manual

APPENDIX A-1
Vicinity Map



VICINITY MAP

NTS

APPENDIX A-2
Drainage Map

DRAINAGE MAP CURRENT CONDITIONS
6400 E CACTUS WREN RD, PARADISE VALLEY, AZ 85253
PARCEL NO. 174-53-008K

LOCATED IN A PORTION OF THE SW 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 10, T.2N, R.4E OF THE GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

OWNER

MR BLUEBIRDS SHOULDER, LLC
6061 E CABALLO DR
PARADISE VALLEY, AZ 85253

SITE DATA

APN: 174-53-008K, 174-53-010C, 174-53-009A
ADDRESS: 6400 E CACTUS WREN ROAD
PARADISE VALLEY, AZ 85253
ZONING: R-43
LOT AREA: 246,864 S.F. (5.667 AC.)
CONSTRUCTION YEAR: VACANT LOT

BENCHMARK

BRASS CAP IN HAND HOLE AT THE INTERSECTION OF LINCOLN DRIVE AND INVERGORDON ROAD, HAVING AN ELEVATION OF 1342.92, TOWN OF PARADISE VALLEY (NAVD 88) DATUM, GDACS# 24535-1.

BASIS OF BEARINGS

THE WEST LINE OF THE NW 1/4, SECTION 10, T2N, R4E, THE BEARING OF WHICH IS N00°05'00"E.

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF MARICOPA STATE OF ARIZONA, AND IS DESCRIBED AS FOLLOWS:
BEING A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 10, TOWNSHIP 2 NORTH, RANGE 4 EAST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, AND BEING A PORTION OF LOTS 1 AND 2, VISTA DEL CAMELLO, RECORDED IN BOOK 208 OF MAPS, PAGE 47, RECORDS OF SAID COUNTY, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT A NAIL FOUND AT THE SOUTHWEST CORNER OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 10;
THENCE NORTH 01 DEGREES 26 MINUTES 13 SECONDS EAST ALONG THE WEST LINE OF SECTION 10, A DISTANCE OF 588.38 FEET
THENCE NORTH 89 DEGREES 47 MINUTES 00 SECONDS EAST, A DISTANCE OR 565.93 FEET TO A NAIL FOUND AT A FENCE CORNER, SAID NAIL BEING 15.71 FEET (15.44 FEET RECORD) EAST OF THE WEST LINE OF LOT 2, VISTA DEL CAMELLO (BOOK 208 OF MAPS PAGE 47, RECORDS OF MARICOPA COUNTY, ARIZONA);
THENCE SOUTH 03 DEGREES 44 MINUTES 20 SECONDS WEST, A DISTANCE OF 198.28 FEET (197.70 FEET RECORD) TO AN IRON REBAR;
THENCE SOUTH 46 DEGREES 39 MINUTES 30 SECONDS WEST, A DISTANCE OF 133.34 FEET TO AN IRON REBAR;
THENCE SOUTH 70 DEGREES 44 MINUTES 11 SECONDS WEST, A DISTANCE OF 43.28 FEET (43.24 FEET RECORD) TO AN IRON REBAR AT THE POINT OF CURVATURE;
THENCE SOUTHWESTERLY WITH A 154.50 FOOT RADIUS CURVE TO THE LEFT, HAVING A CENTRAL ANGLE OF 31 DEGREES 01 MINUTES 49 SECONDS, AN ARC DISTANCE OF 83.67 FEET (RECORD AND MEASURED) TO AN IRON REBAR FOUND ON THE WEST LINE OF LOT 1, VISTA DEL CAMELLO, SAID REBAR BEING 45.62 FEET SOUTH OF THE NORTHWEST CORNER OF SAID LOT 1;
THENCE SOUTH 01 DEGREES 34 MINUTES 46 SECONDS WEST ALONG THE WEST LINE OF SAID LOT 1, A DISTANCE OF 238.46 FEET (238.38 FEET RECORD) TO A NAIL FOUND ON THE SOUTH LINE OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER;
THENCE SOUTH 89 DEGREES 48 MINUTES 32 SECONDS WEST A DISTANCE OF 355.46 FEET (355.48 FEET RECORD) TO THE POINT OF BEGINNING.
APN: 174-53-008K, 174-53-010C, 174-53-009A

FLOOD INSURANCE RATE MAP (FIRM) DATA

COMMUNITY #	PANEL #	SUFFIX	BASED FLOOD ELEVATION
040049	1765 OF 4425	L	N/A
MAP #	PANEL DATE	ZONE	
04013C	10/16/2013	X*	

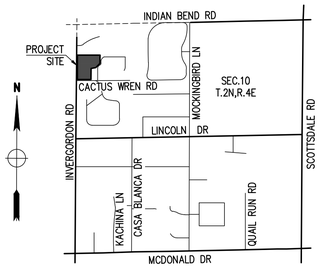
*AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

LEGEND

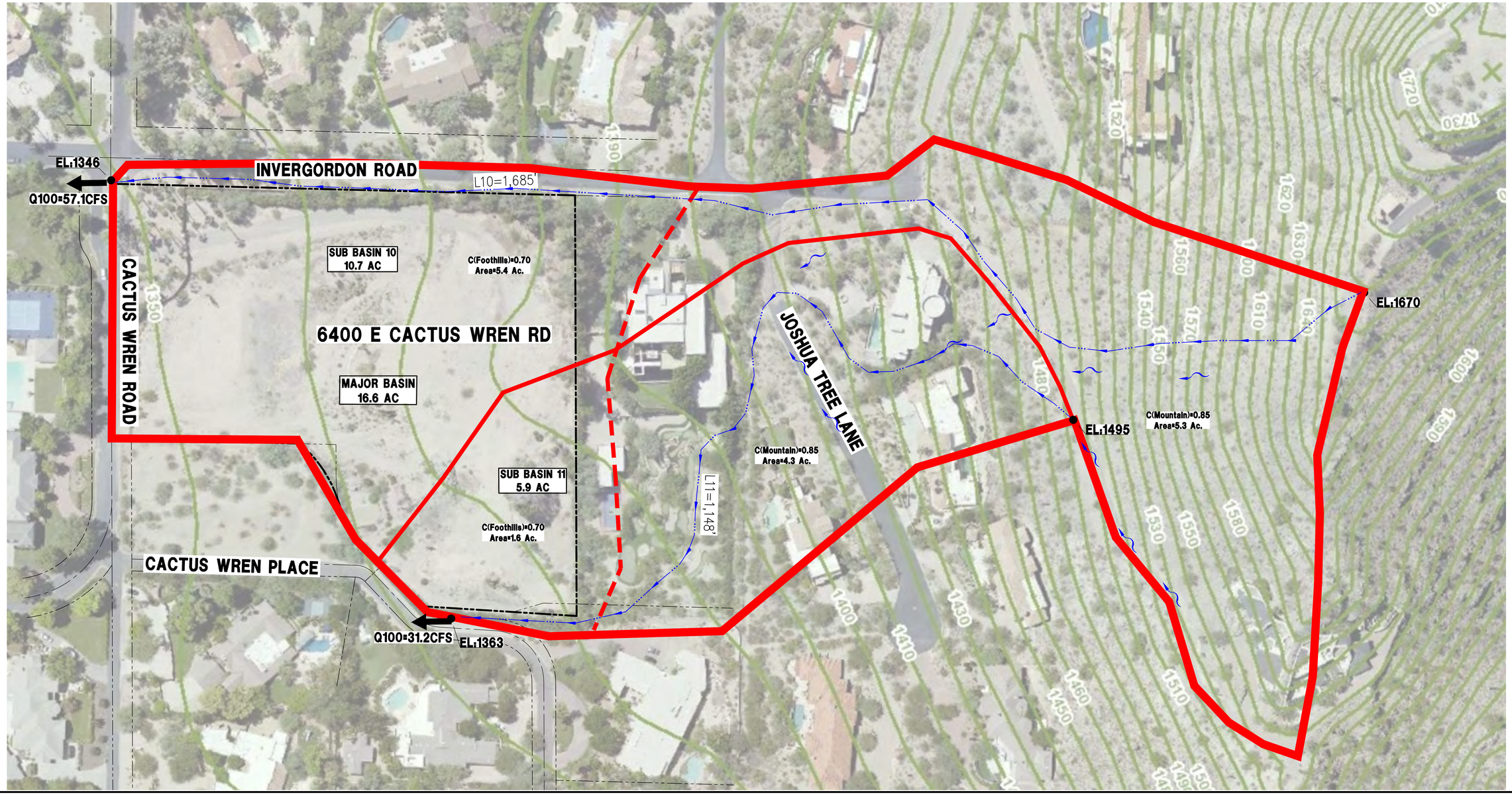
EL.2990

DRAINAGE FLOW
SPOT ELEVATION
TRIBUTARY AREA BOUNDARY
FLOW LINE

60' 30' 0 60' N
SCALE 1" = 60'



VICINITY MAP
NTS



REVISIONS: | DATE: | SCALE: 1"=50' | DATE: 07/24/17
DESIGNED BY: NP | JOB: 1709069
DRAWN BY: DL | VERSION: 1.1
CHECKED BY: NP | PLOT DATE: 07/24/17

DRAINAGE MAP CURRENT CONDITIONS

PARCEL NO. 174-53-008K 6400 E CACTUS WREN RD, PARADISE VALLEY, AZ 85253

P. 602.889.1984 | F. 602.445.9452
8808 N. CENTRAL AVE., SUITE 288
PHOENIX, AZ. 85020
PHOENIX@LDGENG.COM
Land DEVELOPMENT GROUP

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
41005
NICKOLA J PRODANOV
Date Signed 07/24/17
ARIZONA U.S.A.

DM-1
1 OF 1

APPENDIX A-3
FEMA FIRM Exhibit

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1765L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1765 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1765	L
PARADISE VALLEY, TOWN OF	040049	1765	L
PHOENIX, CITY OF	040051	1765	L
SCOTTSDALE, CITY OF	045012	1765	L

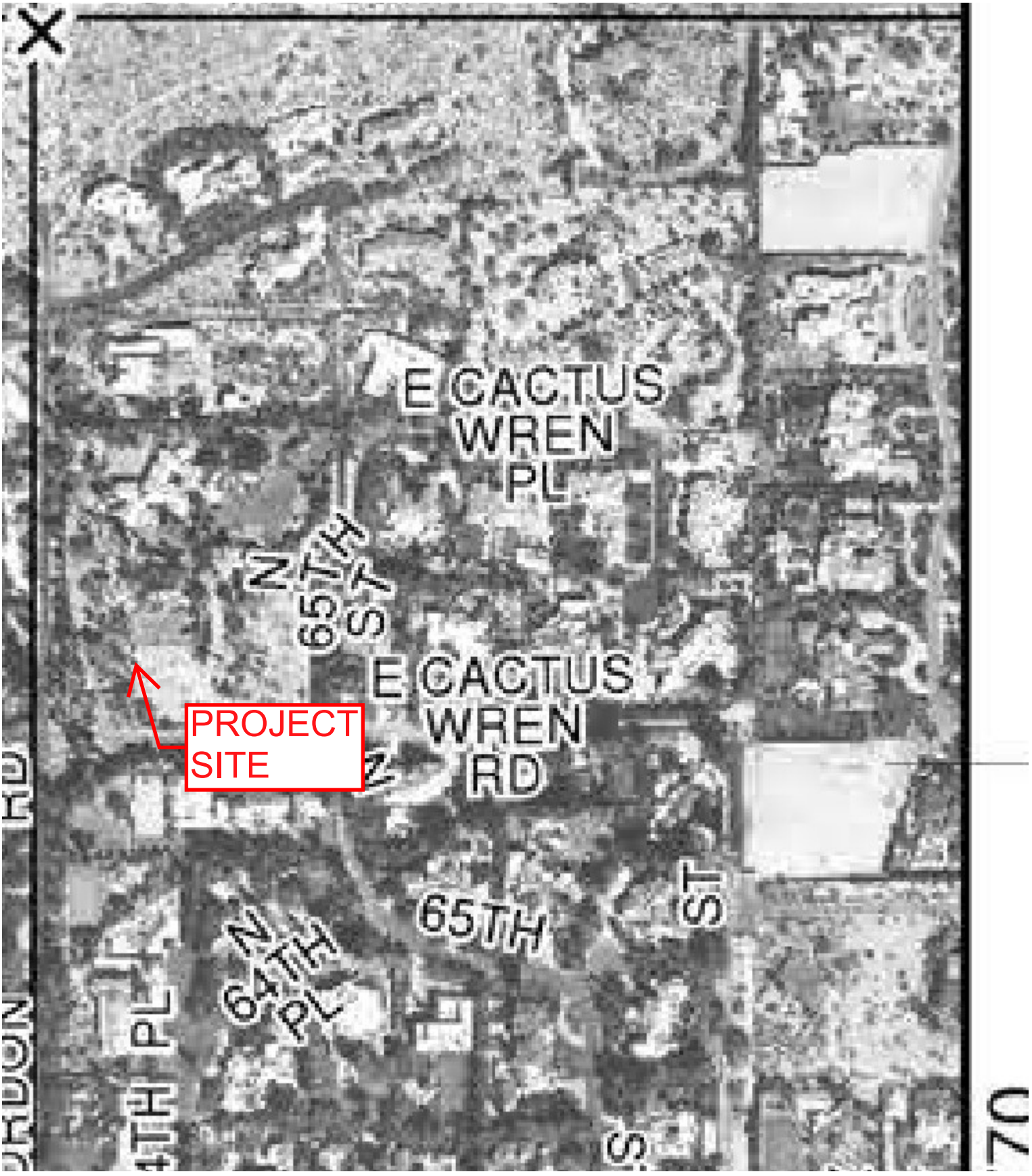
Notice: This map was reissued on July 31, 2015 to make a correction. This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1765L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency


E CACTUS WREN PL
E CACTUS WREN RD
65TH ST
N 64TH PL
PROJECT SITE

APPENDIX A-4
Aerial Map Exhibit


PROJECT
SITE


PROJECT
SITE

APPENDIX A-5
FCDMC Floodplain Viewer

Floodplain Viewer

24.07.2019 г., 17:59:43 ч.

1:2,257

0 0.0175 0.035 0.07 mi

0 0.03 0.06 0.12 km

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Flood Control District of Maricopa County

- Elevation Certificate
- Parcel

Floodplain (Pending FEMA Approval)

- Floodway

- 100-Year Flood Zone

Floodplain (FEMA Effective)

- Floodway
- 100-Year Flood Zone

Highway

- Interstate Highway
- State\US\Other Highway
- Interchange\Ramp
- Arterial
- Local
- Maricopa County

Office of Enterprise Technology/GIS

APPENDIX A-6
Soils Map and Data

Map Scale: 1:2,050 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

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 1:20,000.

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: Eastern Maricopa and Northern Pinal Counties Area, Arizona
Survey Area Data: Version 11, Sep 15, 2018

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

Date(s) aerial images were photographed: Apr 1, 2018—Jun 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LaA	Laveen loam, 0 to 1 percent slopes	B	0.1	0.5%
PvC	Pinamt very gravelly loam, 3 to 5 percent slopes	C	10.0	62.0%
Ro	Rock land		6.0	37.4%
Totals for Area of Interest			**16.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX A-7
Drainage Calculations

Project

Reference	1706069
Title	6400 E Cactus Wren
Location	6400 E Cactus Wren, Paradise Valley, AZ 85253
Agency	Paradise Valley

Project Defaults

Model	Rational
Land Use Agency	FCDMC
Rainfall	NOAA14
Roads Agency	MCDOT
Inlets Agency	MCDOT

Comments

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.244	0.331	0.397	0.487	0.556	0.627
	NOAA14	10 MIN	0.371	0.503	0.605	0.741	0.847	0.955
	NOAA14	15 MIN	0.459	0.624	0.750	0.919	1.050	1.184
	NOAA14	30 MIN	0.619	0.840	1.010	1.237	1.414	1.594
	NOAA14	1 HOUR	0.766	1.039	1.249	1.531	1.749	1.973
	NOAA14	2 HOUR	0.880	1.177	1.403	1.712	1.947	2.193
	NOAA14	3 HOUR	0.957	1.255	1.491	1.822	2.086	2.361
	NOAA14	6 HOUR	1.137	1.457	1.710	2.057	2.329	2.612
	NOAA14	12 HOUR	1.267	1.604	1.866	2.224	2.497	2.781
	NOAA14	24 HOUR	1.514	1.962	2.316	2.808	3.197	3.602

Paradise Valley
Drainage Design Management System
LAND USE
Project Reference: 1706069

Sub Basin	Land Use Code	Area (acres)	Area (%)	Kb	Runoff Coefficient C						Description
					2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	
Major Bas in ID: 01											
10	130	5.30	49.5	0.169	0.50*	0.60*	0.65*	0.70*	0.80*	0.85*	Large Lot Residential - Single Family (1 du per acre to 2 du
	130	5.40	50.5	0.034	0.48	0.48	0.48	0.53	0.65*	0.70*	Large Lot Residential - Single Family (1 du per acre to 2 du
		10.700	100.0								
11	120	4.30	72.9	0.177	0.55*	0.60*	0.65*	0.70*	0.80*	0.85*	Estate Residential (1/5 du per acre to 1 du per acre)
	130	1.60	27.1	0.035	0.48	0.48	0.48	0.53	0.65*	0.70*	Large Lot Residential - Single Family (1 du per acre to 2 du
		5.900	100.0								

* Non default value

Major Basin	Area (acres)	Description
01	16.60	Major Basin 01

Paradise Valley
Drainage Design Management System
SUB BASINS
Project Reference: 1706069

ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
10	10.7	1,685	1,670.00	1,346.00	1,015.3	0.101	Q (cfs)	11.7	18.7	24.4	33.8	46.6	57.1
							C	0.49	0.54	0.56	0.61	0.72	0.77
							CA (ac)	5.24	5.78	5.99	6.53	7.70	8.24
							Volume (ac-ft)	0.2151	0.2992	0.3545	0.4475	0.5827	0.6825
							Tc (min)	10	9	8	7	7	7
							i (in/hr)	2.23	3.24	4.07	5.18	6.05	6.93
11	5.9	1,148	1,495.00	1,363.00	607.1	0.138	Q (cfs)	6.5	10.1	13.3	18.5	25.4	31.2
							C	0.53	0.57	0.60	0.65	0.76	0.81
							CA (ac)	3.13	3.36	3.54	3.84	4.48	4.78
							Volume (ac-ft)	0.1410	0.1894	0.2299	0.2892	0.3737	0.4360
							Tc (min)	12	10	9	9	8	8
							i (in/hr)	2.08	3.00	3.75	4.83	5.67	6.53

* Non default value

WATER SERVICE IMPACT STUDY

6400 E Cactus Wren Road, Paradise Valley, Arizona

LDG PROJECT #1706069

Prepared for:
Mr. Bluebirds Shoulder, LLC
6061 E Caballo Drive,
Paradise Valley, Arizona 85253

Submitted to:
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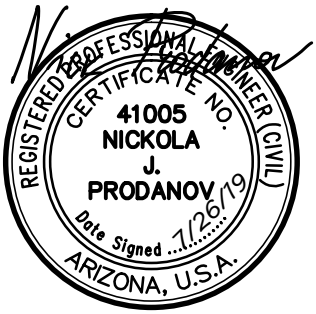

July 26, 2019

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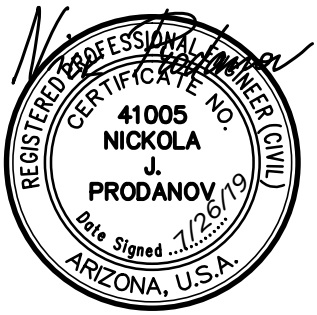


July 26, 2019

1. INTRODUCTION

This Water Service Impact Study and related design have been developed in accordance with the current Town of Paradise Valley Design Standards, Codes and adopted Ordinances. It provides engineering analysis and assessment of the required water services and fire flow demand for the proposed subdivision development - parcels 174-53-008K, 174-53-010C, 174-53-009A, located at 6400 E Cactus Wren Road, Paradise Valley, AZ 85253 and also being a portion of the NW ¼ of Section 10, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Appendix A-1 – Vicinity Map.

The subject property is currently not a part of a subdivision and consists of three separate parcels: APN 174-53-008L, 174-53-010C, 174-53-009A. The parcels are being a part of the SW ¼ of the NW ¼ of the NW ¼ of Section 10, T2N, R4E. The property is bounded by Invergordon Road (west), Cactus Wren (south), Cactus Wren Place (east), and residential properties from north and southeast. The 5.667-acre lot is zoned R-43, which in accordance with the Town of Paradise Valley Zoning Ordinance allows for one dwelling unit per acre density. There are no existing buildings or walls on the property except an existing driveway, which is a remanence of the old home construction. A new 4-lot subdivision and cul-de-sac is proposed for this development.

As a part of the project development process, a plat map subject to the Town of Paradise Valley review and approval is prepared and enclosed herein. The owner is proposing to split the property into four lots. The proposed plat map defines the new property divider lines, new tract for private roadway, location and distances of new building setback lines and public utility easements. All lots will exceed the minimum required area of 1 acre per Chapter 6 of Town of Paradise Valley Code.

A new cul-de-sac – Joshua Tree Court is proposed with this project to provide ingress/egress to and from Lot 4 as well as Lot 3 and Lot 2. Considering the existing grades on site, it is preferred the construction of the road and utilities to be concurrent with the design and construction of homes on Lots 2, 3, and 4 in order to provide for smooth access from the private road onto the private lots. New water and sewer mains are proposed for in the cul-de-sac to provide services to Lots 2, 3, and 4. Lot 1 could be serviced directly from the streets.

2. DOMESTIC WATER AND FIRE SUPPRESSION SYSTEM

EPCOR Water supplies domestic water in the vicinity. There is a 6” main in Invergordon Road and 8” main in Cactus Wren Road and Cactus Wren Place. There is an existing 2” water meter in the right-of-way near the south property line of Lot 1, which could be utilized for future service.

New water service taps and meters will be required for Lots 2, 3 and 4. There is an existing fire hydrant at the southeasterly corner of Lot 4. There is also an existing fire hydrant in invergordon Road, which is approximately 300’ south of the southwest property corner.

Fire flow test was conducted on July 1st, 2019 by EJ Flow Tests, LLC and witnessed by EPCOR representative. Based on the results of the fire flow test, the existing water infrastructure is

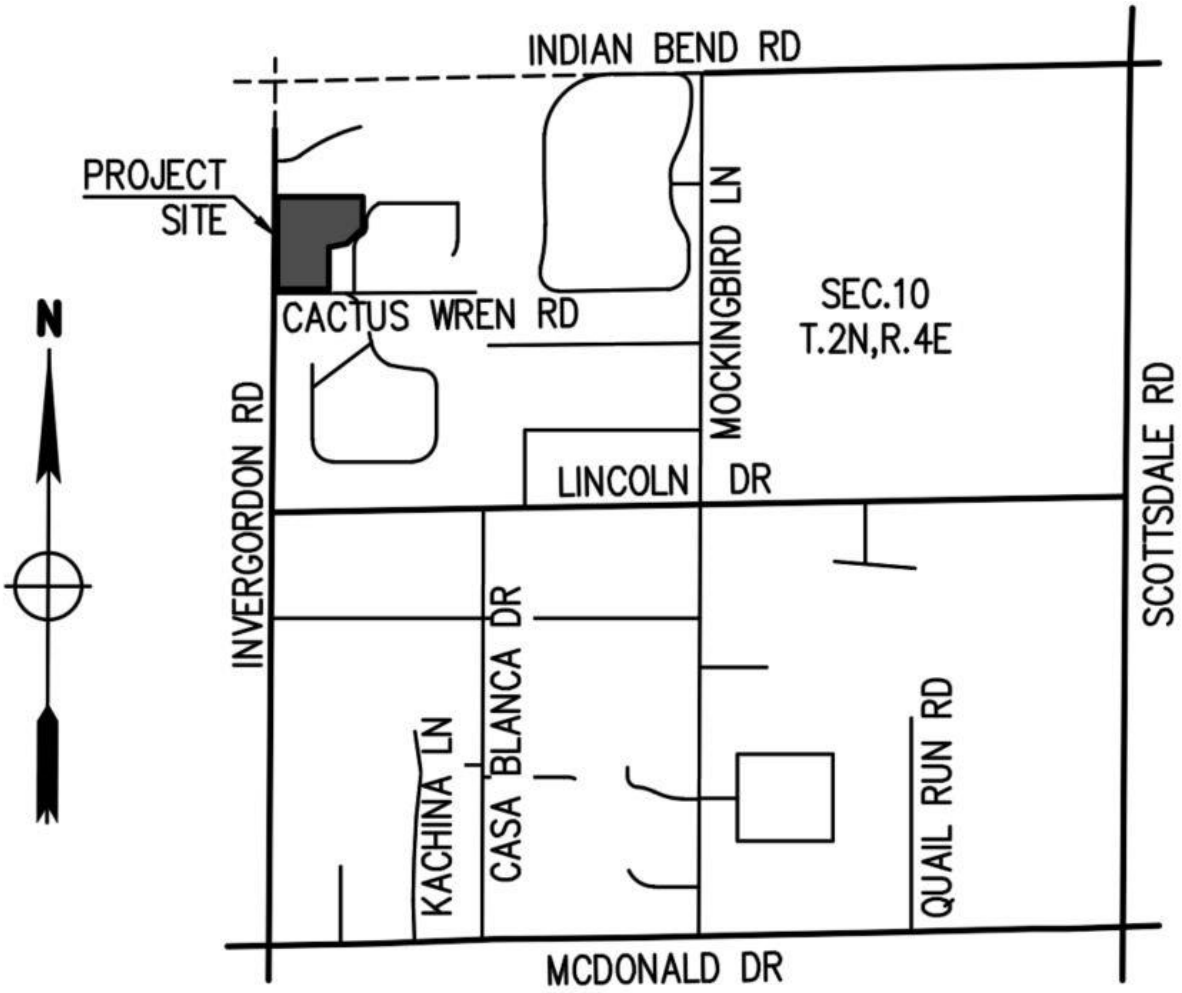
capable of suppling the required fire flow protection per the Town Code 13.1.6 (1,500 gpm at 20 psi). Fire sprinklers for the new residence will be fed off the domestic water service. Per the performed Hydrant Fire Flow Test, the fire hydrant could supply 1,711 gpm at @ 68 psi, and 7,387 gpm at 20 psi, which meets and exceeds the Town of Paradise Valley Code 13.1.6 (1,500 gpm at 20 psi) and Building Code requirements. There is an existing water well on the property, which may be utilized for an on-site irrigation if preferred and if all required permits are obtained.

The Town of Paradise Valley is the sanitary sewer provider for this project. There are 8" sewer mains in Invergordon Road and Cactus Wren Road. New sanitary sewer taps will be constructed to service Lots 1 & 2. Lots 3 and 4 will be serviced by the new sewer main to be installed in Joshua Tree Court.

3. REFERENCES

- Town of Paradise Valley Design Standards & Policies.
- 2015 International Fire Code, Appendix B, Fire Flow Requirements for Buildings.

APPENDIX A-1
Vicinity Map



VICINITY MAP

NTS

APPENDIX A-2
Water Flow Test

Flow Test Summary

Project Name:	EJFT 19130
Project Address:	6400 E Cactus Wren Rd, Paradise Valley, AZ 85253
Date of Flow Test:	2019-07-01
Time of Flow Test:	8:20 AM
Data Reliable Until:	2020-01-01
Conducted By:	Cesar Reyna & Tayler Lynch (EJ Flow Tests) 602.999.7637
Witnessed By:	Garren Willey (EPCOR) 480.450.4670
City Forces Contacted:	EPCOR Water (480.450.4670)

Raw Flow Test Data

Static Pressure:	80.0 PSI
Residual Pressure:	76.0 PSI
Flowing GPM:	1,711
GPM @ 20 PSI:	7,387

Data with a 10 % Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	68.0 PSI
Flowing GPM:	1,711
GPM @ 20 PSI:	6,837

Hydrant F_1

Pitot Pressure (1):	25	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	27	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches

Project Site

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
827 ft (measured linearly)

Static-Residual Elevation
1345 ft (above sea level)

Flow Hydrant (F_1) Elevation
1358 ft (above sea level)

Elevation & distance values are approximate

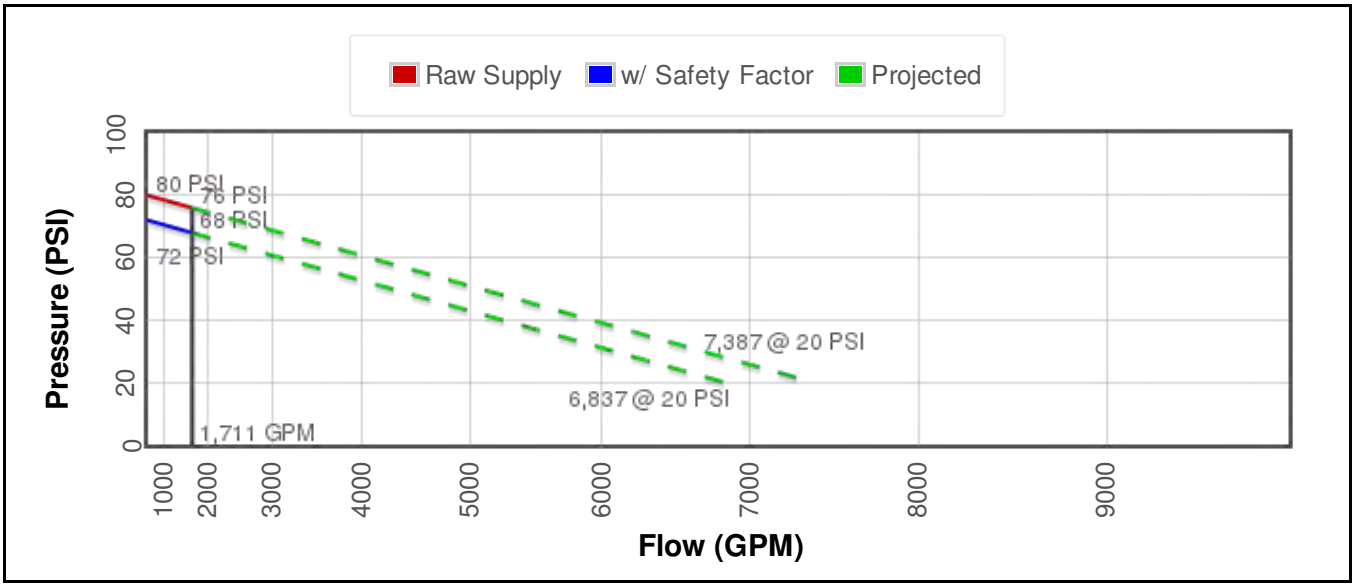
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



APPENDIX A-3
Will Serve Letter

2355 West Pinnacle Peak Road, Suite 300
Phoenix, AZ 85027 USA
epcor.com

August 16, 2019

MR Bluebirds Shoulder LLC
6061 E Caballo Drive
Paradise Valley, AZ 85253

Sent via e-mail to: dustin@ldgeng.com

Re: Will-Serve Letter for Water Service
NEC Invergordon Road and Cactus Wren Road in Paradise Valley
APN 174-53-008K

Dear MR Bluebirds Shoulder LLC;

This letter is in response to LDG's request to EPCOR Water Arizona Inc. ("EPCOR") regarding EPCOR's willingness to provide water service to a parcel of land located at the northeast corner of Invergordon Road and Cactus Wren Road (the "Parcel") in Paradise Valley, AZ, as shown in **Exhibit A**. EPCOR provides the following information for your consideration:

1. EPCOR has confirmed that the Development is located within the area encompassed by EPCOR's Certificate of Convenience & Necessity ("CC&N") for water service as issued by the Arizona Corporation Commission.
2. Water service to the Development by EPCOR may be conditioned upon developer entering into a Main Extension Agreement (an "MXA") with EPCOR in a form acceptable to EPCOR, and upon EPCOR and developer fully performing its respective obligations under the MXA. The MXA, if needed, will provide, among other things, that developer will be responsible for constructing at its cost all water main extensions necessary to distribute water from EPCOR's water system to the individual service line connections in the Parcel. The design and construction of all such main extensions will be subject to EPCOR's approval, and ownership of the main extensions, together with related real property easement rights, must be transferred to EPCOR prior to the initiation of water service in the Parcel.
3. Based on the water service currently provided by EPCOR in the CC&N, EPCOR will have adequate water capacity for normal use in the Parcel upon EPCOR's and developer's fulfillment of its respective obligations under the MXA. Please note that EPCOR does not guarantee the adequacy of its water capacity for fire protection.
4. Developer will also be required, as a condition to EPCOR providing water service to the Parcel, to pay all required fees pursuant to EPCOR's tariffs and as may be provided in the MXA.

This letter assumes that construction of the main extensions within the Parcel will begin within one (1) year after the date of this letter.

If developer begins construction of any water mains in the Parcel or any other water service infrastructure intended to serve the Parcel without, in each instance, the prior written approval of such construction by EPCOR, developer will be proceeding with such construction at its own risk.

This letter does not independently create any rights or obligations in either developer or EPCOR, and is provided for information only. Any agreement between developer and EPCOR for water service in the Parcel must be memorialized in a written agreement executed and delivered by their respective authorized representatives.

For additional information, please contact me at (623) 445-2495 or at jvig@epcor.com.

Sincerely,

Josh Vig
Project Manager

Enclosure: Exhibit A – Location Description of Parcel

EXHIBIT A

Location of Parcel

Water Resources

9379 E. San Salvador
Scottsdale, AZ 85258

PHONE 480-312-5685
FAX 480-312-5615
www.ScottsdaleAZ.gov

October 21, 2019

Maricopa County Environmental Services Department
1001 North Central Avenue, Suite 150
Phoenix, AZ 85004

Re: Sanitary Sewer Extension
Estates on Invergordon
6400 E. Cactus Wren
Town of Paradise Valley

Gentlemen:

This letter is provided to satisfy those submittal requirements under General Aquifer Protection Permit 4.01 for extension of a sanitary sewer collection system as indicated below:

The City of Scottsdale's sanitary sewer collection system has sufficient capacity to accept the flows generated from this project and convey those flows into the City of Scottsdale's sewer collection system.

The City of Scottsdale's sanitary sewer collection system which discharges to the Princess metering station has sufficient capacity to accept the residual waste stream resulting from the treatment of flows generated from this project. Downstream of the Princess metering station, these residual flows enter into the Sub-regional Operating Group (SROG) Salt River Outfall (SRO) trunk line.

The City of Scottsdale has established operational requirements and maintenance procedures to assure efficient conveyance of sanitary sewer flows throughout its collection system.

If you have any questions regarding this information, please contact our office at 480-312-5685.

Sincerely,

Richard Sacks, P.E.
Scottsdale Water

17732244v1

Town of Paradise Valley

9/24/2019, 11:05:13 AM

1:2,257

0 0.01 0.03 0.06 mi

0 0.03 0.05 0.1 km

Sewer Gravity Main

Address Point

Municipal Boundary

Sewer Manhole

Parcels

CenturyLink™ Conflict Memorandum

Date: August 30, 2019

To: Dustin Wagoner (Land Development Group)
dustin@ldgeng.com

From: Kevin Wagner, Terra Technologies LLC

Subject: CenturyLink™ – Conflict Memo – Estates on Invergordon

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Terra Technologies is in receipt of the plans. Below you will see an overview of CenturyLink™ facilities within the project limits, and a brief project overview along with comments regarding any CenturyLink™ facilities with respect to the proposed project.

Inventory of CenturyLink™ Facilities

CenturyLink™ has facilities within the project limits. Terra Technologies anticipates that due to the site improvements that the CenturyLink™ facilities (buried cables & pedestals) may be impacted. Plan markups have been attached showing approximate locations of CenturyLink™ facilities.

Project Overview

The design intent of this project appears to be developing a vacant parcel of land into residential subdivision.

Facility Locations and Impacts

Plans have been reviewed for conflicts with CenturyLink™ facilities based on NDS mapping which show a general location of utility locations. Neither Terra Technologies LLC nor CenturyLink™ makes any representation regarding the completeness or accuracy of vertical and horizontal utility information used to determine conflicts or no conflicts.

Based on CenturyLink™ mapping and the construction drawings provided there appear to be **potential conflicts:**

1. Invergordon Rd – SEC with Proposed Joshua Tree Ct – Potential conflict with pedestal and proposed site improvements. Developer to coordinate with CenturyLink on impact and mitigation of pedestal.

CenturyLink™ Conflict Memorandum

Utility conflicts with this private development project will be 100% reimbursable. Payment for design and mitigation of conflicts is to be coordinated prior to commencing.

In accordance with state law, Blue Staking for location of CenturyLink™ facilities must be completed prior to any construction. When crossing CenturyLink™ facilities you will be required to pothole to determine depth and maintain a minimum of 12 inch vertical and horizontal separation from facilities.

Pursuant to state law, support and protection is required for all CenturyLink™ facilities during construction.

Should the Contractor locate or expose an unknown CenturyLink™ facility, please contact CenturyLink™ as soon as possible.

In the event CenturyLink™ facilities need to be removed/relocated, some or all cost may be at the expense of the sponsoring agency.

If you have any questions or concerns regarding this review feel free to contact me immediately, either by phone or email at the number/address provided below. The contractor is also responsible for contacting CenturyLink™ prior to construction around the CenturyLink™ facilities.

Notification List

Terra Technologies LLC Kevin Wagner, Project Manager kwagner@terratechllc.net 815-245-9640	**Terra Technologies LLC** Jason Jensen, P.E. jjensen@terratechllc.net 801-735-2464
CenturyLink™ (Engineer) Jesus Trevizo Jesus.Trevizo@centurylink.com 5025 N Black Canyon Hwy Phoenix, AZ 85015 Work: 602-512-2605	