

Drainage Report
“LEGACY CROSSING”

T.B.D.
SCOTTSDALE, ARIZONA

APN #217-12-00E



Prepared By
Keogh Engineering, Inc.
650 N. 137TH Avenue
Goodyear, Arizona 85338

Job No. 21816
DECEMBER 2020

TABLE OF CONTENTS

	COVER SHEET	1
	TABLE OF CONTENTS	2
1.0	INTRODUCTION	3
1.1	Description and Purposes of Report.....	3
1.2	Location.....	3
1.3	Topography	3
2.0	DESCRIPTION OF EXISTING DRAINAGE	3
2.1	Offsite Drainage and Runoff Management	3
2.2	Onsite Drainage and Runoff Management.....	4
2.3	Context To Adjacent Projects and Improvements	4
2.4	Flood Hazard Zones on the Property FIRM maps	4
2.3	Erosion Protection and Scour Calculations	5
3.0	PROPOSED DRAINAGE PLAN	5
3.1	Keogh Engineering, Inc. Grading and Drainage Plan for Legacy Crossing..	5
4.0	WARNING and DISCLAIMER of LIABILITY	5
5.0	CONCLUSION	5
6.0	REFERENCES (Excerpts)	6
	<ul style="list-style-type: none"> • “DC Ranch Offsite Improvements” • “Archstone Apartments Final Off-Site Drainage Report-Terrascape Consulting <ul style="list-style-type: none"> ○ “Offsite Drainage Remediation Report for Archstone DC Ranch Apartments By Laredo Engineering 	

FIGURES

- Figure 1** Vicinity Map
- Figure 2** Flood Insurance Rate Map

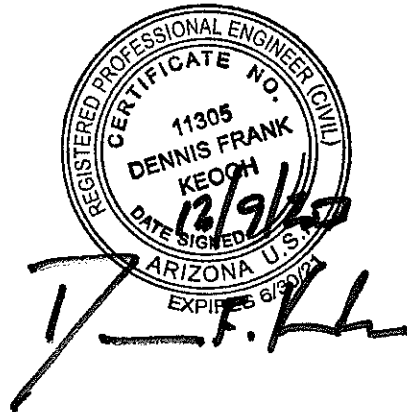
EXHIBITS

- Exhibit A** Topography Map of Existing On-site Conditions with 2-foot Contour Mapping
- Exhibit B** Proposed On-site Drainage Plan per Keogh Engineering, Inc. “Grading and Drainage Plan for legacy Crossing”

(cont.)

APPENDICES

- Appendix A** Offsite Drainage Area Peak Discharges per Excerpts From the Archstone Apartments at DC Ranch Final Off-Site Drainage Report and accompanying Offsite Drainage Remediation Report by Laredo Engineering
- Appendix B** "Warning and Disclaimer of Liability"
- Appendix C** Section 404 Certification
- Appendix D** Erosion Setback Limit Calculations per Arizona Department of Water Resources State Standard 5-96 (SSA-5-96)
- Appendix E** Retention Requirement Calculations



1.0 INTRODUCTION

1.1 Description and Purpose of Report

This project consists of the construction of (1) two-story and (2) single-story office buildings. The project will also consist of the installation of parking lot. Concrete flatwork and water, sewer, and fire services.

The purpose of this report is analyze existing and proposed conditions and document the effect that this proposed project would have on stormwater runoff. This report also provides data that supports the design of drainage and flood control facilities. This report furthermore will document that stormwater runoff has been considered in the planning of this project and that the public and its property will be protected from damage by runoff and flooding to the extent of the 100-year flood event.

1.2 Location

The project is named the "Legacy Crossing" and is located at intersection of Legacy Blvd. (Union Hills Road) and 91st Street approximately 1100 feet east of Pima Road in Scottsdale Arizona (see Figure 1-Vicinity Map).

1.3 Topography

The topography of the site is barren ground that slopes southerly with an elevations difference of approx. 5.0 feet from the north property to south property line.

2.0 DESCRIPTION OF EXISTING DRAINAGE

2.1 Offsite Drainage and Runoff Management

The offsite peak discharges and base flood elevations utilized in this report were taken from the DC Ranch Apartment Off-site Improvement plans found in the Appendix A of this report.

A large wash enters the site along the east property line with a peak discharge of 545 c.f.s. and Base Flood Elevations taken from the (see Appendix A for excerpts).

A second wash enters the site at the northwest corner of the site with a peak discharge of 480 c.f.s. taken from the approved DC Ranch Apartments plans.

A third watershed area enters the mid point of the site and runs to a low point of an existing catch basin just north of the bus bay.

The site appears to have three outfall points: Southeast Outfall Elevation=1643.23, Mid-Outfall Elevation=1643.38, and Southwest Outfall Elevation=1640.10.

2.2 Onsite Hydrology and Runoff Management

2.2.1 Retention Requirements

Onsite runoff historical point of outfall is to an existing grate inlet located at the south property line (see Onsite Drainage Exhibit). The amount of runoff has been greatly reduced by the underground retentions provided. Retention requirement calculations are provided in Appendix E. The site will provide 100-yr. 2-hr. storm requirements for only the developed area. Areas beyond the developed area that drain within existing washes will not be retained (see Exhibit "A").

2.2.2 Finish floor Determination

The proposed finish floor of the proposed building adjacent to the existing wash that enter the site along the east property line was set 1.0 foot above the Base Flood Elevation of 1651.50. The Base Flood Elevations shown and utilized in this report are per the "Off-Site Drainage Mediation Report by Laredo Engineering Therefore the building is free from inundation from the 100-yr. storm event.

2.2.3 Erosion Protection and Scour Depth Calculations

Erosion protection calculation are provided per the See Appendix D. The erosion protect calculation are with regards to the new building west and adjacent to the existing East Property Wash. The peak discharge utilized in this section is 545 c.f.s. and taken from the Off-Site Drainage Mediation Report by "Laredo Engineering" (see Appendix A). Retaining stem wall is provided here.

3.0 PROPOSED IMPROVEMENTS

This project consists of the construction of (1) two-story and (2) single-story office buildings. The project will also consist of the installation of parking lot. Concrete flatwork and water, sewer, and fire services. a 48' wide driveway entrance off of Legacy Blvd., and landscaping with a native plant inventory plan. The proposed improvements also include 2-inch domestic water, 4-inch fireline, (see Exhibit "A").

4.0 Special Conditions

There are not special stipulations for this project. A Section 404 Certification by the "Laredo Engineering" (except from Laredo Engineering Remediation Report) for the General area is provided in Appendix B.

4.0 Warning and Disclaimer

"Warning and Disclaimer of Liability" completed form, per the City of Scottsdale Design Standards and Policies and Manual, is provided in Appendix B.

5.0 CONCLUSION

- Offsite runoff enters the site along the east property line and exits at the southeast corner of the site undisturbed.
- The proposed finish floor elevation of of the new building adjacent to the existing wash is 1652.00 and 1-foot above the Base Flood Elevation and is free from inundation from a 100-year storm event.

6.0 REFERENCES

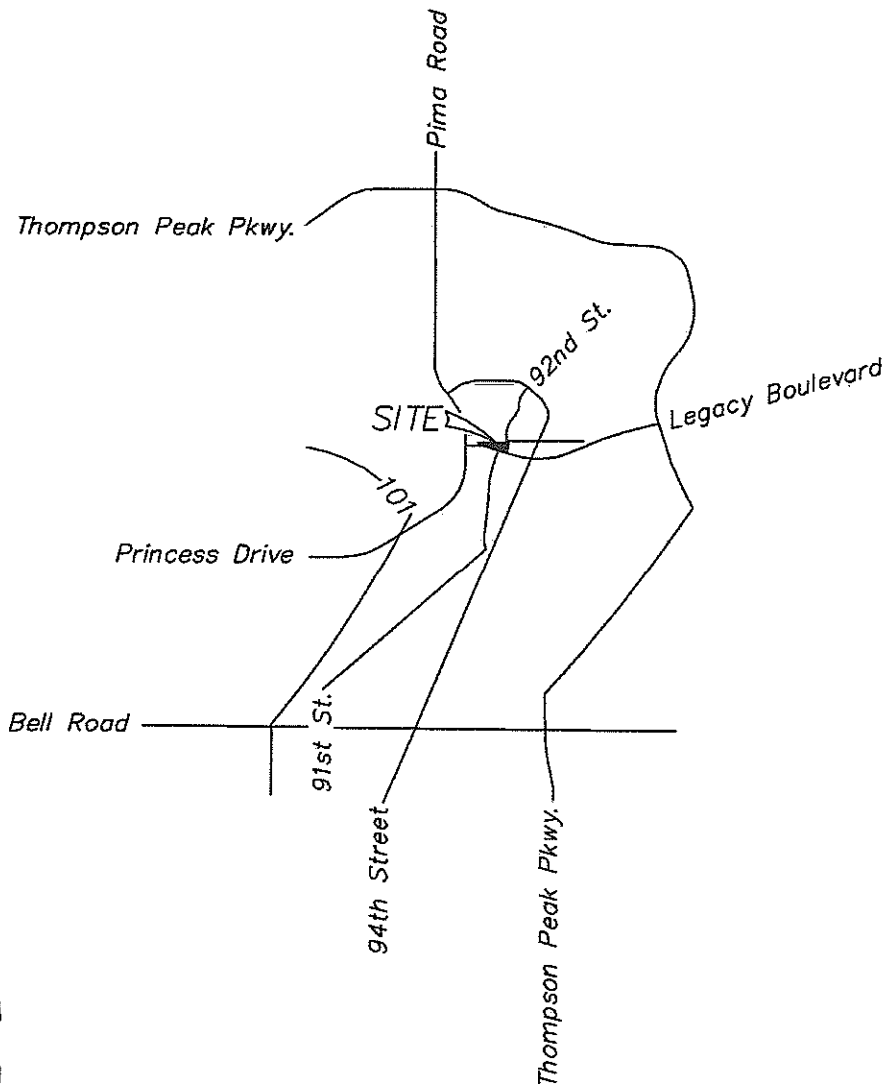
- Archstone Apartments DC Ranch Final Off-site Drainage Report
Tarrascope Conculantns
- Off-site Drainage Remediation Report For Archstone DC Ranch Apartments
By Lerado Engineering
- DC Ranch Scottsdale-Union Hills Drive Extension to Pima Road Plans
By Wood/Patel

FIGURES

Figure 1-Vicinity Map

•

Figure 2-FEMA Flood Insurance Rate Map



C:\VCS\JOBS\10118 - ARS ONE\DRAWING REPORT\21018 - LEGACY CROSSING - VICINITY MAP 12-07-20-26.DWG MODEL (12-07-20 4:48:26PM) R00Y-153

Keogh Engineering, Inc.

650 N. 137TH AVENUE #110 • GOODYEAR, ARIZONA 85338
 PHONE: (623) 535-7260 FAX: (623) 535-7262
 EMAIL: keogh@keoghengineering.com

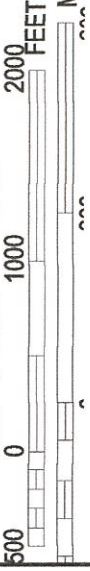
DESIGNED	DATE	JOB NO.
DFK/RMV	11-21-20-07-20	21665

DRAINAGE REPORT
 "LEGACY CROSSING"
VICINITY MAP

EXHIBIT
 T.B.D.
 SCOTTSDALE, ARIZONA



MAP SCALE 1" = 1000'



PANEL 1320L

FIRM FLOOD INSURANCE RATE MAP MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1320 OF 4425
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	NUMBER	PANEL	SUFFIX
COMMUNITY	040037	1320	L
MARICOPA COUNTY	040051	1320	L
PHOENIX, CITY OF	040052	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

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.

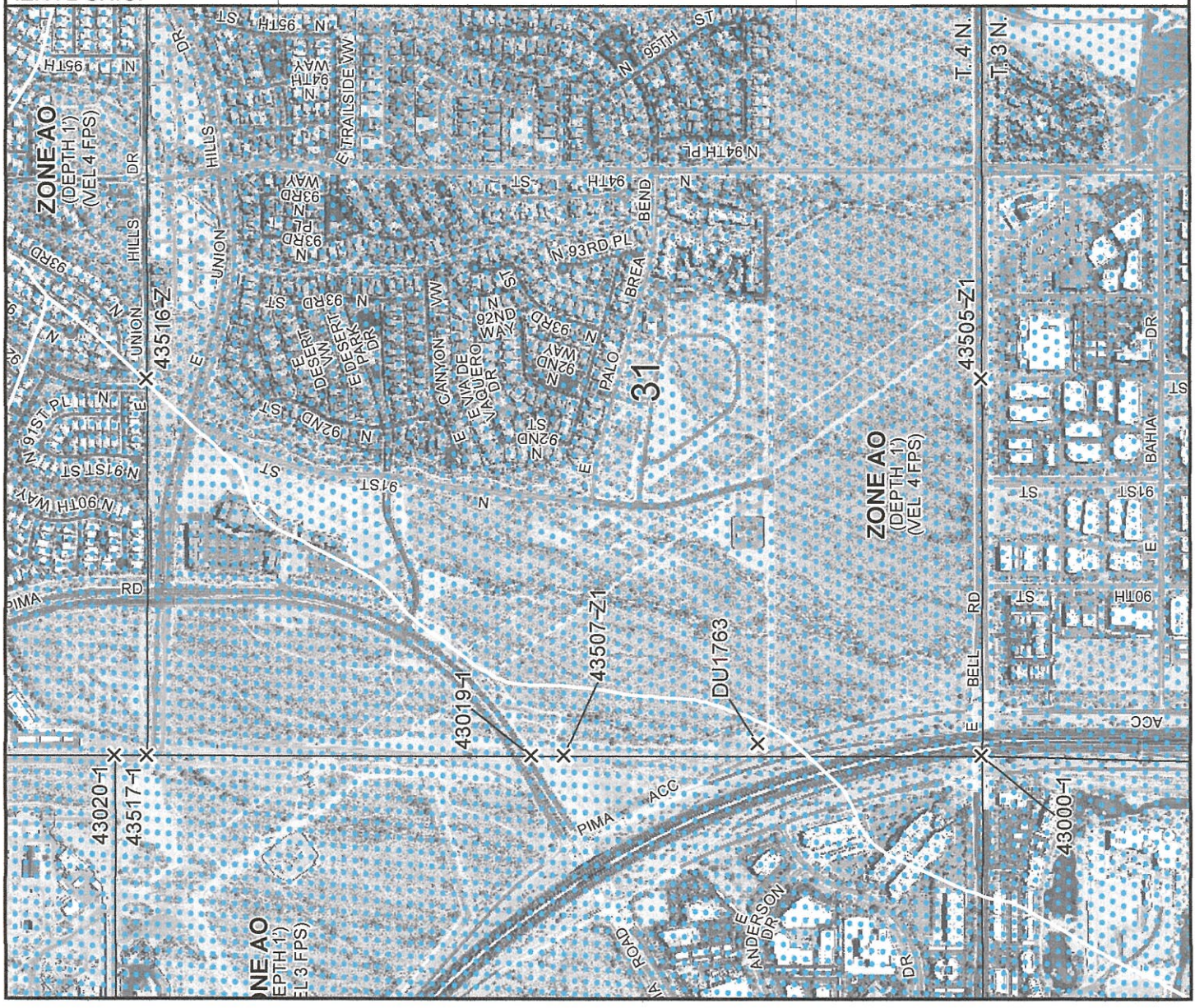


MAP NUMBER
04013C1320L
MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



JOINS PANEL

37 2

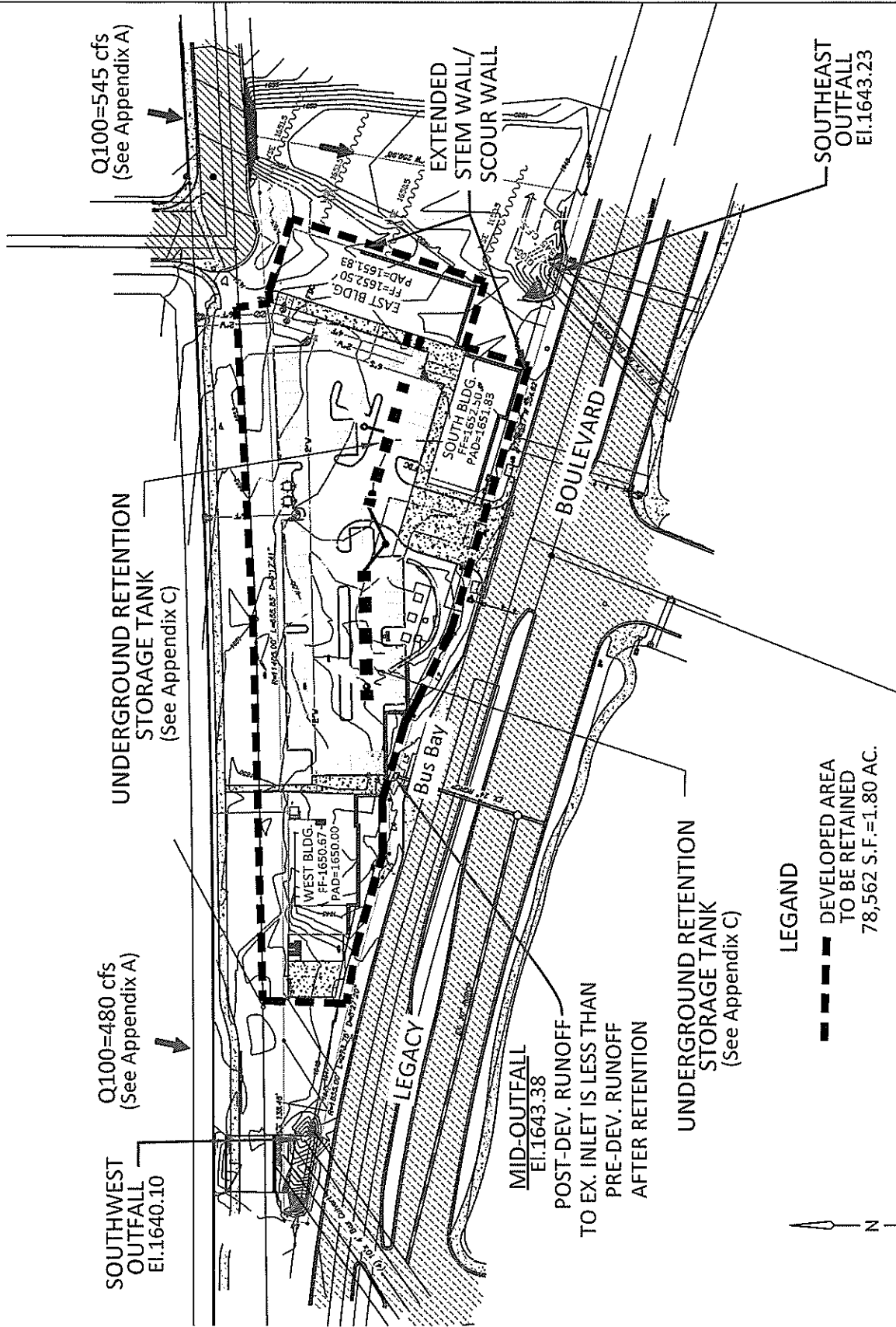
37 2

EXHIBITS

Exhibit A

Onsite Drainage Exhibit

L:\21618\DRAINAGE REPORT\21618- LEGACY CROSSING-ONSITE DRAINAGE MAP 12-07-20.DWG OFFSITE DIBERT (12-08-20 3:23:21PM) RUDY-K



LEGEND
 - - - - - DEVELOPED AREA TO BE RETAINED
 78,562 S.F.=1.80 AC.

N
 N.T.S.

Keogh Engineering, Inc.

650 N. 137TH AVENUE #110 • GOODYEAR, ARIZONA 85338
 PHONE: (623) 535-7260 FAX: (623) 535-7262
 EMAIL: keogh@keoghenengineering.com

DRAINAGE REPORT "LEGACY CROSSING" ONSITE DRAINAGE

EXHIBIT "A"

T.B.D.
 SCOTTSDALE, ARIZONA

DESIGNED	DATE	JOB NO.
DFK/RMV	11-21-20-07-20	21665

APPENDIX A

Offsite Drainage Area Peak Discharges

Per Excerpts From
DC Ranch
Final Off-Site Drainage Report
and Improvement Plans



ARCHSTONE Apartments at DC Ranch

FINAL OFF-SITE DRAINAGE REPORT

Legacy Boulevard & 91st Street

Plan #	<u>4131-12-3</u>	City of Scottsdale
Case #	_____	
Q-S #	_____	Maricopa County • Arizona
XI	Accepted	
I	Corrections	
Reviewed By	<u>M. Rahman</u>	Date <u>7/12/13</u>

PREPARED FOR:

ARCHSTONE

3 MacArthur Place, Suite 600
Santa Ana, CA 92707

C.O.S. Case No.: 13-DR-2012
Plan Check No.: 4131-12-3

TSC File No.: 0254

Date: September 14, 2012

Revised: November 6, 2012
May 16, 2013
June 30, 2013

Prepared By:

Terrascope Consulting, LLC
1102 E Missouri Avenue
Phoenix, AZ 85014
(602) 297-8732 (P)



[Handwritten signature]

Expires 3/31/15
David M. Soltysik
PE # 44156
dsolytsik@terrascopeconsulting.com

civil engineering • surveying • urban planning

1102 E. Missouri Avenue, Phoenix, Arizona 85014
575 W. Chandler Boulevard, Suite 123, Chandler, Arizona 85225

T: (602) 297-8732 F: (602) 230-8458 W: terrascopeconsulting.com E: info@terrascopeconsulting.com

**OFF-SITE DRAINAGE REMEDIATION REPORT
FOR
ARCHSTONE DC RANCH APARTMENTS**

**Township 4 North, Range 5 East Sections 4
City of Scottsdale, Arizona**

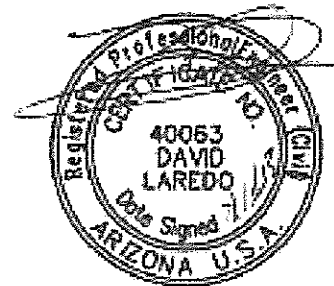
Prepared for:

**Terrascope Consulting LLC
1102 East Missouri Avenue
Phoenix AZ, 85014**

Prepared by:

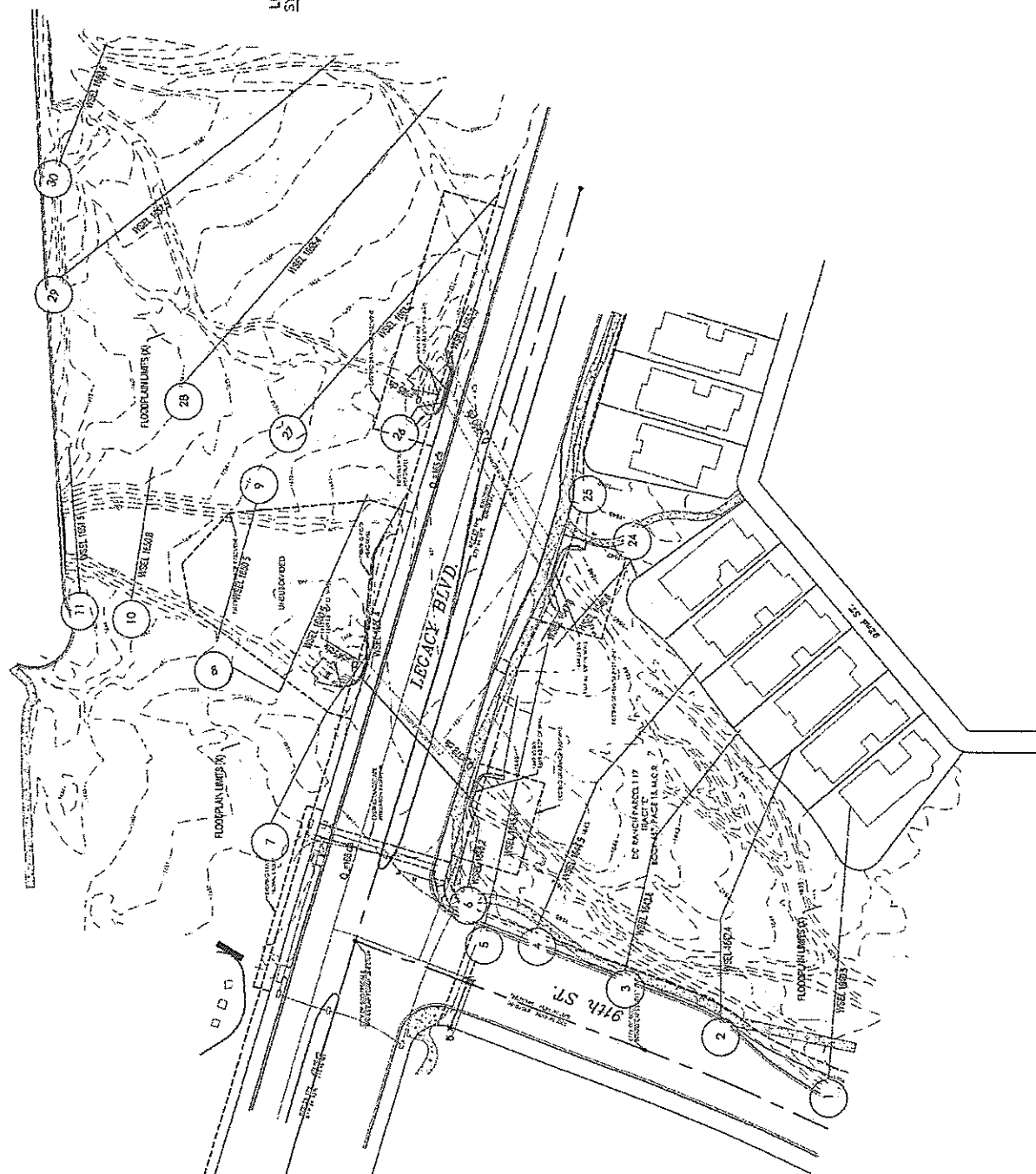
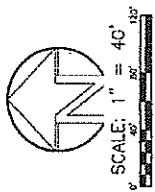
**LAREDO ENGINEERING LLC
PO Box 7245
Nogales, Arizona 85628
(520) 437-2124**

**LE SCF-001
June 30, 2013**



EXPIRE 12/31/2015

21810
(11219189)
Report



LEGEND SYMBOL



ITEM
CONCENTRATION POINT

CONCRETE	ITEM	CONCENTRATION POINT
1	CONCRETE	CONCENTRATION POINT
2	CONCRETE	CONCENTRATION POINT
3	CONCRETE	CONCENTRATION POINT
4	CONCRETE	CONCENTRATION POINT
5	CONCRETE	CONCENTRATION POINT
6	CONCRETE	CONCENTRATION POINT
7	CONCRETE	CONCENTRATION POINT
8	CONCRETE	CONCENTRATION POINT
9	CONCRETE	CONCENTRATION POINT
10	CONCRETE	CONCENTRATION POINT
11	CONCRETE	CONCENTRATION POINT
12	CONCRETE	CONCENTRATION POINT
13	CONCRETE	CONCENTRATION POINT
14	CONCRETE	CONCENTRATION POINT
15	CONCRETE	CONCENTRATION POINT
16	CONCRETE	CONCENTRATION POINT
17	CONCRETE	CONCENTRATION POINT
18	CONCRETE	CONCENTRATION POINT
19	CONCRETE	CONCENTRATION POINT
20	CONCRETE	CONCENTRATION POINT
21	CONCRETE	CONCENTRATION POINT
22	CONCRETE	CONCENTRATION POINT
23	CONCRETE	CONCENTRATION POINT
24	CONCRETE	CONCENTRATION POINT
25	CONCRETE	CONCENTRATION POINT
26	CONCRETE	CONCENTRATION POINT
27	CONCRETE	CONCENTRATION POINT
28	CONCRETE	CONCENTRATION POINT
29	CONCRETE	CONCENTRATION POINT
30	CONCRETE	CONCENTRATION POINT

EXISTING CONDITIONS
OFFSITE DRAINAGE MAP
DC RANCH
APARTMENTS

Lejac and Associates
PO BOX 7245
Nogales, AZ 85626
TEL 520.437.2774
lejac@lejacandassociates.com

BASE FLOOD ELEVATIONS
FROM "OFF-SITE DRAINAGE
MEDIATION REPORT BY Lejac and Eng'rs.

OFF-SITE DRAINAGE REMEDIATION REPORT
ARCHSTONE DC RANCH APARTMENTS

EXISTING OFFSITE
DESIGN FLOWS

	Q100 Flow
I	585
I-Split Flow	165
I-Culvert	420
II	545
II-Culvert	378
II-Road	166

→ #58257

4.2 Floodplain Model

A floodplain model was done to delineate the existing floodplain limits within the area adjacent to the Legacy Boulevard. The hydraulic cross-sections and floodplain limits are depicted on the Existing Drainage Map. The data and results for the existing model are included within Appendix A and are summarized in the following table.

EXISTING
FLOODPLAIN MODEL

Cross-Section	WSEL [-]
1	1,640.5
2	1,642.4
3	1,643.6
4	1,644.5
5	1,645.6
6	1,646.2
6.5	
7	1,650.4
8	1,650.5
9	1,650.5
10	1,650.6
11	1,651.5
24	1,646.6
25	1,647.8
25.5	
26	1,652.5
27	1,653.2
28	1,655.4
29	1,657.5
30	1,660.6

APPENDIX B

Warning and Disclaimer of Liability



Warning and Disclaimer of Liability

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to “minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall” (Scottsdale Revised Code §37-16).

As defined in S.R.C. §37-17, a flood plain or “*Special flood hazard* area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board.” It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22

“The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by manmade or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder.”

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above. If I am an agent for an owner I have made the owner aware of and explained this disclaimer.

Plan Check No.

Owner or Agent

Date

APPENDIX C

Section 404 Permit
Certification



Section 404 Certification

Before the City issues development permits for a project, the developer's Engineer or the property owner must certify that it complies with, or is exempt from, Section 404 of the Clean Water Act of the United States. Section 404, administered by the U.S. Army Corps of Engineers (COE), regulates the discharge of dredged or fill material into a wetland, lake, (including dry lakes), river, stream (including intermittent streams, ephemeral washes, and arroyos), or other waters of the United States.

Prior to submittal of improvement plans to Project Review the form below must be completed (and submitted with the improvement plans) as evidence of compliance

Certification of Section 404 Permit Status

Owner's Name: City of Scottsdale Phone No. 480-312-7080
Project Name/Description: Legacy Boulevard Expansion Case No. _____
Project Location/Address: Legacy Boulevard West of 91st Street

A registered Engineer or the property Owner must check the applicable condition and certify by signing below that:

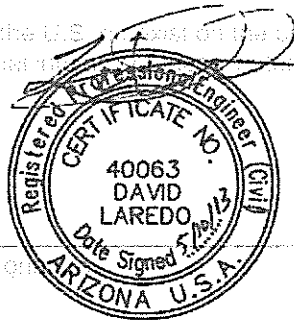
1. Section 404 does apply to the project because there will be a discharge of dredged or fill material to waters of the U.S., and:

- A Section 404 Permit has already been obtained for this project.
- or-
- This project qualifies for a "Nationwide Permit," and this project will meet all terms and conditions of the applicable nationwide permit.

2. Section 404 does not apply to the project because:

- No watercourses or other waters of the U.S. exist on the property.
- No jurisdictional waters of the U.S. exist on the property. Attached is a copy of the COE's Jurisdictional Determination.
- Watercourses or other waters of the U.S. exist on the property, but the project will not involve the discharge of dredged or fill material into the waters.

I certify that the above statement is true.



Engineer's Signature and Seal, or Owner's Signature _____ Date 05/10/2013

Title Company _____ EXPIRE 12/31/2015

Planning & Development Services Department

7447 E Indian School Road, Suite 100, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7088

APPENDIX D

**Erosion Setback Limit
Calculations**

Per

**Arizona Department of Water Resources
State Standard 5-96 (SSA 5-96)**

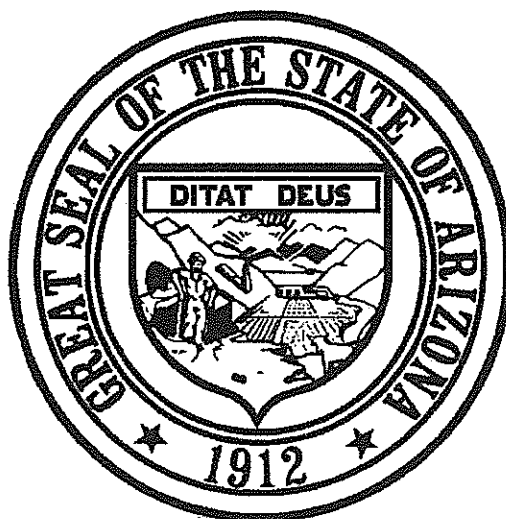
•

Scour Depth Calculations

Per

**FCDMC Drainage Design Management
System for Windows software
(DDMSW)**

ARIZONA DEPARTMENT OF WATER RESOURCES
FLOOD WARNING AND DAM SAFETY SECTION



Watercourse System Sediment Balance

500 North Third Street
Phoenix, Arizona 85004

(602) 417-2445

STATE STANDARD ATTACHMENT
SSA 5-96

SEPTEMBER 1996

For watercourses which have drainage areas of less than 30 square miles, the recommended setback allowances are as follows:

for straight channel reaches or
reaches with minor curvature: setback = $1.0(Q_{100})^{0.5}$

for channels with obvious
curvature or channel bend: setback = $2.5(Q_{100})^{0.5}$

where setback is in feet and Q_{100} is in cubic feet per second.

$$\begin{aligned} \text{SETBACK} &= 1.0(545 \text{ cfs})^{0.5} \\ &= 23.3' \quad (20' \text{ min.}) \end{aligned}$$

APPENDIX E

Retention Requirement
Calculations

RETENTION CALCULATIONS

* DEVELOPABLE AREA = 78,562 S.F. = 1.80 AC.

VOL. REQUIRED = 100YR. 2-HR. STORM

$$= \frac{2.4 (0.95) 78,562}{12} = 14,927 \text{ S.F.}$$

* Developed Area To Be Retained
= 78,562 s.f. = 1.80 ac.

L:\21815\DRAINAGE REPORT\21816- LEGACY CROSSING-RETENTION CALCS- 12-09-20 3:16:54PM RUDY-K

Keogh Engineering, Inc.

650 N. 137TH AVENUE #110 • GOODYEAR, ARIZONA 85338
PHONE: (623) 535-7260 FAX: (623) 535-7262
EMAIL: keogh@keoghengineering.com

DRAINAGE REPORT
"LEGACY CROSSING"
RETENTION REQUIREMENT
CALCULATIONS
T.B.D.
SCOTTSDALE, ARIZONA

DESIGNED
DFK/RMV

DATE
12-10-20

JOB NO.
21816