KLAND CIVIL ENGINEERS

Preliminary Drainage Report

Megerdichian Assisted Seniors Center (MASC)
8849 E CHOLLA ST, SCOTTSDALE, AZ 85260
25-ZN-2018

Kland# K15153

Prepared for:

AAk Architecture & Interiors, Inc.
7585 E. Redfield Rd., Suite 106
Scottsdale, AZ 85260-6937
Contact: Artin Knadjian

Prepared by:

Kland Civil Engineers, L.L.C.
7227 North 16th Street, Suite 217
Phoenix, Arizona 85020
Contact: Leslie Kland, P.E.

Submitted to:

City of Scottsdale
200 W. Washington, 2nd Floor
Phoenix, AZ, 85003

Revised September 11, 2020
August 24, 2018

Table of Contents

Appendix

Revised September 11, 2020
August 24, 2018

1. Introduction

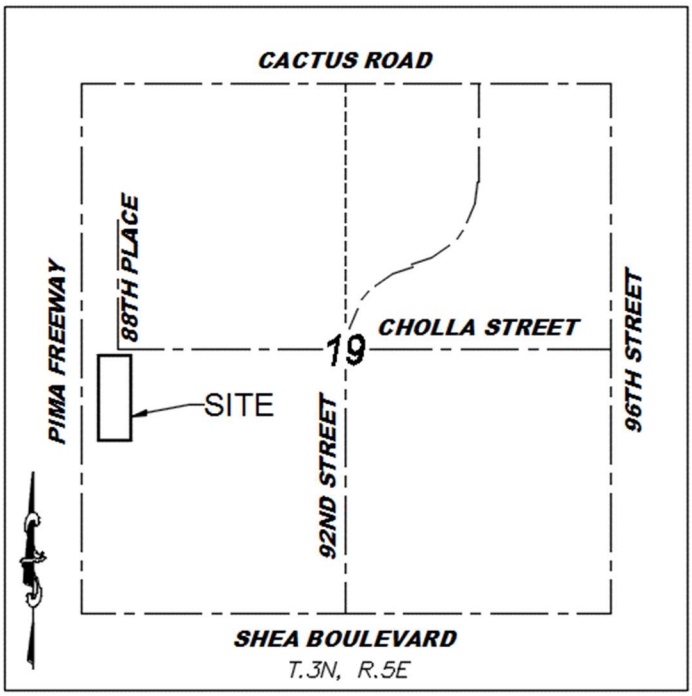
The purpose of this report is to compare the existing and proposed drainage for the Megerdichian Assisted Seniors Center (MASC) project. The proposed site is located at 8849 E Cholla Street in Scottsdale, AZ 85260.

This report consists of description of existing condition, proposed condition, methods of analysis and conclusion. The drainage report serves to confirm that the proposed project does not affect the existing drainage pattern in a significant way, and has been designed in accordance with our understanding of known applicable City of Scottsdale criteria, requirements and design standards for storm water management.

2. Site Description

The Megerdichian Assisted Seniors Center (MASC) is located within a portion of Lot 3 in the Southwest Quarter of Section 19, Township 3 North, Range 5 East of Gila and Salt River base and Meridian, Maricopa County, Arizona. The site is bordered on the west by Pima Freeway, on north by Cholla Street, and on the east and south by previously developed properties. The current zoning of the site is R1-35 according to Maricopa County Assessor's Office.

Please see Vicinity Map below.



VICINITY MAP
N.T.S.

Currently, the site includes several parking lots and paved driveways, three single story buildings which are connected by a dirt road, and a retention area. The remaining portion on the south of the site is open space area which the proposed development will occur on. The proposed development includes a senior center building (21,800 sf), and the required parking spaces.

Please see Appendix G for Master Plan.

Federal Emergency Management Agency (FEMA) Designation

The subject site lies within Zone X according to on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Map Number 04013C1760L, dated 10/16/2013.

The FIRM Panel defines a Zone X designation as follows:

Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1-foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

See Appendix A for FEMA Exhibit.

3. Existing Drainage

Offsite Drainage

There is an existing drainage channel along the north site of the site in the developed portion of the site. This drainage channel collects storm water from the existing residential neighborhood and discharges to the existing ADOT channel along the west side of the site. The north channel was designed and sized per the Armenian Apostolic Church Drainage Report prepared by Speedie and Associates, Dated 10/27/1989. According to the Drainage report the 100-year peak flow was calculated to be 74 cfs and the 10-year peak flow to be 39 cfs. The drainage channel was designed to have a capacity over 80 cfs. The ADOT channel plans show that the channel was sized for the 100-year peak flow. The profiles show that the channel generally provides 1-foot of freeboard to the 100-yr hydraulic grade line. There is a hydraulic jump at the far south end of the site that appears to be due to a maintenance access ramp into the bottom of the drainage channel. At this point the freeboard is reduced approximately 0.25-feet which provided approximately 1.7-feet of free board to the existing building.

Onsite Drainage

The site slopes from the north to the east with an approximately 5 feet of fall. For the portion of the site that is developed there is an existing retention basin that accept most the storm water runoff.
Per the engineering documents for the developed part, the retention volume required for the 100-year-2-hour storm event is 28,770 cft and the volume provided in the retention basin is 30,400 cft. Per our modeling with Civil 3d using survey data, we calculated the retention volume provided in this basin about 17,602 cft. We are proposing expansion of this basin to provide about 37,000 cft and three drywells for water dissipation in less than 36 hours per 0.1 cfs dissipation rate. The volume provided will be adequate for this phase of development and any potential future ones.
The historic outfall for this basin is via a catch basin provided at the proposed highwater elevation, which connects to an existing 12" storm drain pipe that continues to the west. This pipe will be removed in our proposed plans, and the outfall will be from the parking lot to the east of the basin to the next tributary area and eventually to the ultimate outfall of the site.
There is a small portion of access drive and the trash encloser that drains directly to the ADOT drainage channel on the west side of the site. In addition, the retention basin has a pipe connection to the ADOT channel that allows excess storm water to overflow to the channel. The south portion of the site that is undeveloped discharges directly to the ADOT channel through a spillway located approximately 250-feet north of the south property line.

Please see Appendix C for Drainage Channel Report and ADOT plans and Appendix E for Existing Drainage Map.

4. Proposed Drainage

Offsite Drainage

No offsite drainage changes are planned with this development. The new development will provide 100-year 2-hour retention which will reduce the current storm water discharge to the ADOT channel. In addition, the overflow pipe from the existing retention basin will be removed. For storm events great than the 100-year storm the site outfall will remain to the ADOT drainage channel as it has historically.

Onsite Drainage

For the purpose of the stormwater management the required retention will be provided in surface basins and underground retention tanks. The existing retention basin will be enlarged with this development as narrated above in the Existing Drainage/Onsite. In addition there are 4 proposed surface basins along the east and south side of the new development The 10' diameter underground retention tanks are located in the southeast corner of the site.

All existing and new finished floors are set to be at least 1' above the original high

water elevations of the retention basins. In order to maintain the existing drainage pattern, we are providing catch basins to catch the storm water flow through the drives. The catch basins are connected to the underground storage tanks via storm drain pipes. The underground retention tanks are in the parking area on the east side of the southern portion of the property to not impact the ability to plant trees or water easement. Storm water in excess of the retention tank volume will back up the storm pipe and overflow at the ultimate outfall/ historic out fall for the site.

The Ultimate out fall for the site is located on the west site and drains into an existing drainage channel.

See Appendix F for Proposed Drainage Map and Appendix G for Master Plan.

5. Methodology

The onsite storm drain system was modeled using Haestad Methods, StormCAD v5.5. The anticipated 100-year peak flows contributing to the storm drain inlets and building roof drains were calculated using the Rational Method. To study the effect of this development on the natural drainage characteristics, the weighted runoff coefficient was calculated to be 0.81. The 100-year intensity was also determined using NOAA Atlas 14, Volume 1, Version 5 for a 5 minute time-of-concentration.

$$Q_{100} = CIA$$

Q_{100} = Peak Flow in cubic feet for the selected storm reoccurrence interval

C = Runoff Coefficient

I = Rainfall Intensity (7.55 in/hr per NOAA Atlas 14, Volume 1, Version 5)

A = Drainage Area in Acres

The weighted runoff coefficient for the site is calculated based on the runoff coefficients used by the City of Scottsdale which are 0.5 for Landscape and permeable surfaces and 0.95 for Impermeable surfaces:

$$C = (C_p \times A_p + C_i \times A_i) \div (A_p + A_i)$$

A_p = 112,810 sft (Landscape and permeable surfaces)

A_i = 209,680 sft (Impermeable surfaces)

C_p = 0.5

C_i = 0.95

C = 0.79

The required retention volume for precipitation depth for 100-year-2-hour storm event was determined by using the following equation:

$V_r = (P/12) \times (C \times A)$

V_r = Volume of storm water retention in cubic feet for the selected storm reoccurrence interval

C = 0.81 Runoff Coefficient

P = Rainfall Depth, in inches (2.22″ per NOAA Atlas 14, Volume 1, Version 5)

A = Drainage Area is square feet

The required retention for this site will be provided in 282 linear feet of 10' diameter underground retention tanks (retention volume = 22,148 cf) and four retention basins (retention volume = 40,452 cf) providing a total volume equal to 62,425 cf.

See Appendix B for Drainage Calculations and Appendix for Weighted 'C' Exhibit.

6. Summary

Based on KLAND's understanding of the applicable City of Scottsdale criteria, requirements and design standards associated with drainage, it can be concluded that:

- The onsite storm drain system will be modeled using Haestad Methods, StormCAD v5.5 at the time of final design.
- The anticipated 100-year peak flows contributing to the storm drain inlets and building roof drains will be calculated using the Rational Method.
- The retention will be provided through both the surface basins and underground storage tanks for the anticipated runoff from the 100 year 2 hour storm event.
- The retention tank will be designed to dewater in less than 36 hours via drywells.
- The proposed conditions of the site do not significantly alter runoff pattern from the existing condition.
- Offsite flows are not impacting the site.
- The finish floor is set at 1 foot above the 100 year 2 hour retention high water.

REFERENCES

1. Drainage Design Manual for Maricopa County, Arizona – Volume I Hydrology, Flood Control District of Maricopa County 2003

2. Drainage Design Manual for Maricopa County, Arizona – Volume II Hydraulics, Flood Control District of Maricopa County, 2003

3. Drainage Policies and Standards for Maricopa County, Arizona, Flood Control District of Maricopa County, 2007

APPENDIX A

FEMA Exhibit

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1760L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1760 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1760	L
PARADISE VALLEY, TOWN OF	040049	1760	L
PHOENIX, CITY OF	040051	1760	L
SCOTTSDALE, CITY OF	045012	1760	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
04013C1760L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

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

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

APPENDIX B

Drainage Calculations

Below is shown the impervious and pervious areas, plus the runoff coefficient factor for each type of area
We have calculated the total weighted ruonoff coefficient based on numbers below.

$C = (C_p \times A_p + C_i \times A_i) \div (A_p + A_i)$

A_p = 112,810 sft (Landscape and permeable surfaces)

A_i = 209,680 sft (Impermeable surfaces)

C_p = 0.5 (Landscape and 0ermeable coefficient)

C_i = 0.95 (Impermeable runoff coefficient)

WEIGHTED C FACTOR BASED ON SURFACE TYPE		
Surface Type	C Factor	Area (sft)
Impervious	0.95	209680
pervious	0.5	112810
C Weighted	0.79	

total AREA	322490
impervios	209680
pervious	112810

Below is a summary of tributery areas that sum to the total site area. Also shown is the retention volume required for each area and volume provided in surface or underground retention basins.

RETENTION BASIN CALCULATIONS											
Sub-Area (onsite)	Area (sf)	Area (acre)	C100	P100 YR, 2 HR (in)	Vol. Req. (cf)	Surface Vol. Prov. (cf)	Total Tank Length Provided (LF)	Underground Vol. Prov. (cf)	Total Vol. Prov. (cf)	Excess Volume (%)	DRYWELLS
A	7,796.00	0.18	0.79	2.22	1,139.39	1,442.0	0.0	0.0	1,442.0	26.6	0
B	150,929	3.465	0.79	2.22	22,058.3	0.0	282.0	22,148.2	22,148.2	0.4	2
C	15,776	0.362	0.56	2.22	1,634.4	1,757.0	0.0	0.0	1,757.0	7.5	0
D	147,935	3.396	0.79	2.22	21,620.7	37,078.0	0.0	0.0	37,078.0	71.5	3
Total	314,640.0	7.4	-	-	46,452.8	40,277.0	282.0	22,148.2	62,425.2	34.4	5

PROPOSED SURFACE BASINS INFORMATION					
BASIN	HWE	BOT	VOL (P)	VOL (R)	TOTAL VOL (P)
A	80.6	79.6	1,442	1,139	1,442
C1	81.4	81.0	803	1,634	1,757
C2	82.5	82.0	106		
C3	82.6	82.1	848		
D	82.3	79.3	37,078	21,620	37,078

EXISTING SURFACE BASIN INFORMATION					
BASIN	HWE	BOT	VOL (P)	VOL (R)	TOTAL VOL (P)
D	82.3	80.2	17,602	30,400	17,602

We have determined most critical inlets per engineering judgment and calculated Q100 for each sub-area.

RATIONAL METHOD- MOST CRITICAL INLETS						
INLET LABEL	Area (sf)	Area (acre)	C (weighted)	Tc (min)	i_{100} (in/hr)	Q_{100} (cfs)
A1	7,796	0.18	0.95	5	7.55	1.28
B1	14,712	0.34	0.95	5	7.55	2.42
B2	14,153	0.32	0.95	5	7.55	2.33
B3	18,213	0.42	0.95	5	7.55	3.00
B4	14,596	0.34	0.95	5	7.55	2.40
B5	11,496	0.26	0.95	5	7.55	1.89
B6	9,650	0.22	0.95	5	7.55	1.59
B7	28,434	0.65	0.95	5	7.55	4.68
B8	32,102	0.74	0.95	5	7.55	5.29
B9	7,560	0.17	0.95	5	7.55	1.24
C1	2,273	0.05	0.95	5	7.55	0.37

Q_{100} = CIA

C = Runoff Coefficient

I = Rainfall Intensity for 10-minute time-of-concentration

A = Area is acres

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.5885°, Longitude: -111.8902°
Elevation: 1384.44 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.189** (0.157-0.231)	**0.246** (0.206-0.302)	**0.332** (0.275-0.406)	**0.399** (0.329-0.486)	**0.489** (0.396-0.593)	**0.558** (0.447-0.672)	**0.629** (0.495-0.756)	**0.700** (0.542-0.840)	**0.797** (0.601-0.957)	**0.870** (0.643-1.05)
10-min	**0.287** (0.238-0.351)	**0.375** (0.313-0.459)	**0.506** (0.419-0.618)	**0.607** (0.501-0.739)	**0.744** (0.603-0.903)	**0.849** (0.681-1.02)	**0.957** (0.754-1.15)	**1.07** (0.825-1.28)	**1.21** (0.915-1.46)	**1.33** (0.979-1.59)
15-min	**0.356** (0.295-0.436)	**0.464** (0.388-0.569)	**0.627** (0.519-0.766)	**0.753** (0.621-0.917)	**0.922** (0.748-1.12)	**1.05** (0.844-1.27)	**1.19** (0.935-1.43)	**1.32** (1.02-1.59)	**1.50** (1.13-1.81)	**1.64** (1.21-1.97)
30-min	**0.479** (0.397-0.587)	**0.625** (0.523-0.767)	**0.844** (0.699-1.03)	**1.01** (0.836-1.23)	**1.24** (1.01-1.51)	**1.42** (1.14-1.71)	**1.60** (1.26-1.92)	**1.78** (1.38-2.13)	**2.03** (1.53-2.43)	**2.21** (1.64-2.66)
60-min	**0.593** (0.492-0.726)	**0.774** (0.647-0.949)	**1.05** (0.865-1.28)	**1.25** (1.03-1.53)	**1.54** (1.25-1.87)	**1.75** (1.41-2.11)	**1.98** (1.56-2.38)	**2.20** (1.70-2.64)	**2.51** (1.89-3.01)	**2.74** (2.02-3.29)
2-hr	**0.694** (0.584-0.830)	**0.897** (0.759-1.08)	**1.20** (1.00-1.43)	**1.42** (1.18-1.70)	**1.74** (1.43-2.06)	**1.97** (1.60-2.33)	**2.22** (1.77-2.61)	**2.46** (1.94-2.90)	**2.80** (2.15-3.30)	**3.06** (2.29-3.62)
3-hr	**0.772** (0.650-0.945)	**0.989** (0.836-1.22)	**1.29** (1.09-1.58)	**1.53** (1.27-1.86)	**1.87** (1.53-2.26)	**2.14** (1.73-2.57)	**2.42** (1.92-2.90)	**2.71** (2.11-3.24)	**3.11** (2.36-3.72)	**3.44** (2.54-4.12)
6-hr	**0.930** (0.798-1.11)	**1.17** (1.01-1.40)	**1.50** (1.28-1.77)	**1.76** (1.49-2.07)	**2.11** (1.76-2.48)	**2.39** (1.96-2.79)	**2.68** (2.17-3.12)	**2.97** (2.36-3.47)	**3.37** (2.61-3.93)	**3.68** (2.79-4.31)
12-hr	**1.03** (0.891-1.22)	**1.30** (1.12-1.53)	**1.64** (1.41-1.93)	**1.91** (1.63-2.23)	**2.27** (1.92-2.65)	**2.55** (2.13-2.97)	**2.84** (2.33-3.30)	**3.13** (2.54-3.63)	**3.51** (2.78-4.10)	**3.81** (2.96-4.48)
24-hr	**1.21** (1.06-1.39)	**1.53** (1.35-1.77)	**1.97** (1.73-2.28)	**2.32** (2.03-2.68)	**2.81** (2.44-3.23)	**3.20** (2.75-3.67)	**3.60** (3.07-4.13)	**4.01** (3.39-4.60)	**4.59** (3.82-5.26)	**5.04** (4.15-5.80)
2-day	**1.30** (1.13-1.49)	**1.65** (1.45-1.91)	**2.16** (1.89-2.49)	**2.57** (2.23-2.95)	**3.13** (2.70-3.59)	**3.57** (3.06-4.10)	**4.04** (3.44-4.64)	**4.53** (3.82-5.21)	**5.21** (4.33-6.00)	**5.75** (4.71-6.64)
3-day	**1.39** (1.22-1.59)	**1.77** (1.56-2.04)	**2.33** (2.04-2.67)	**2.78** (2.43-3.18)	**3.41** (2.96-3.90)	**3.92** (3.37-4.47)	**4.45** (3.81-5.09)	**5.01** (4.25-5.74)	**5.81** (4.85-6.65)	**6.45** (5.33-7.41)
4-day	**1.48** (1.31-1.69)	**1.89** (1.67-2.17)	**2.50** (2.20-2.85)	**2.99** (2.62-3.41)	**3.69** (3.22-4.20)	**4.26** (3.68-4.84)	**4.86** (4.18-5.53)	**5.50** (4.68-6.27)	**6.41** (5.38-7.30)	**7.15** (5.94-8.17)
7-day	**1.66** (1.46-1.91)	**2.13** (1.86-2.44)	**2.82** (2.46-3.23)	**3.37** (2.94-3.87)	**4.16** (3.60-4.76)	**4.80** (4.13-5.48)	**5.48** (4.68-6.26)	**6.20** (5.25-7.11)	**7.23** (6.04-8.28)	**8.05** (6.66-9.25)
10-day	**1.80** (1.58-2.06)	**2.30** (2.02-2.63)	**3.04** (2.67-3.47)	**3.64** (3.18-4.15)	**4.47** (3.89-5.09)	**5.15** (4.45-5.84)	**5.86** (5.03-6.66)	**6.61** (5.63-7.53)	**7.67** (6.45-8.73)	**8.52** (7.09-9.72)
20-day	**2.22** (1.96-2.53)	**2.86** (2.52-3.25)	**3.78** (3.32-4.29)	**4.47** (3.92-5.07)	**5.41** (4.73-6.13)	**6.13** (5.34-6.95)	**6.87** (5.95-7.80)	**7.62** (6.56-8.66)	**8.63** (7.37-9.84)	**9.41** (7.97-10.7)
30-day	**2.60** (2.29-2.96)	**3.35** (2.95-3.80)	**4.42** (3.89-5.01)	**5.23** (4.59-5.92)	**6.32** (5.53-7.15)	**7.16** (6.24-8.10)	**8.03** (6.96-9.07)	**8.91** (7.67-10.1)	**10.1** (8.62-11.4)	**11.0** (9.33-12.5)
45-day	**3.02** (2.67-3.42)	**3.89** (3.44-4.40)	**5.13** (4.53-5.80)	**6.05** (5.33-6.84)	**7.26** (6.38-8.21)	**8.18** (7.16-9.24)	**9.10** (7.93-10.3)	**10.0** (8.69-11.4)	**11.3** (9.68-12.8)	**12.2** (10.4-13.9)
60-day	**3.33** (2.97-3.76)	**4.31** (3.83-4.87)	**5.67** (5.03-6.39)	**6.67** (5.90-7.51)	**7.96** (7.02-8.97)	**8.92** (7.84-10.1)	**9.88** (8.64-11.1)	**10.8** (9.43-12.2)	**12.1** (10.4-13.7)	**13.0** (11.2-14.8)

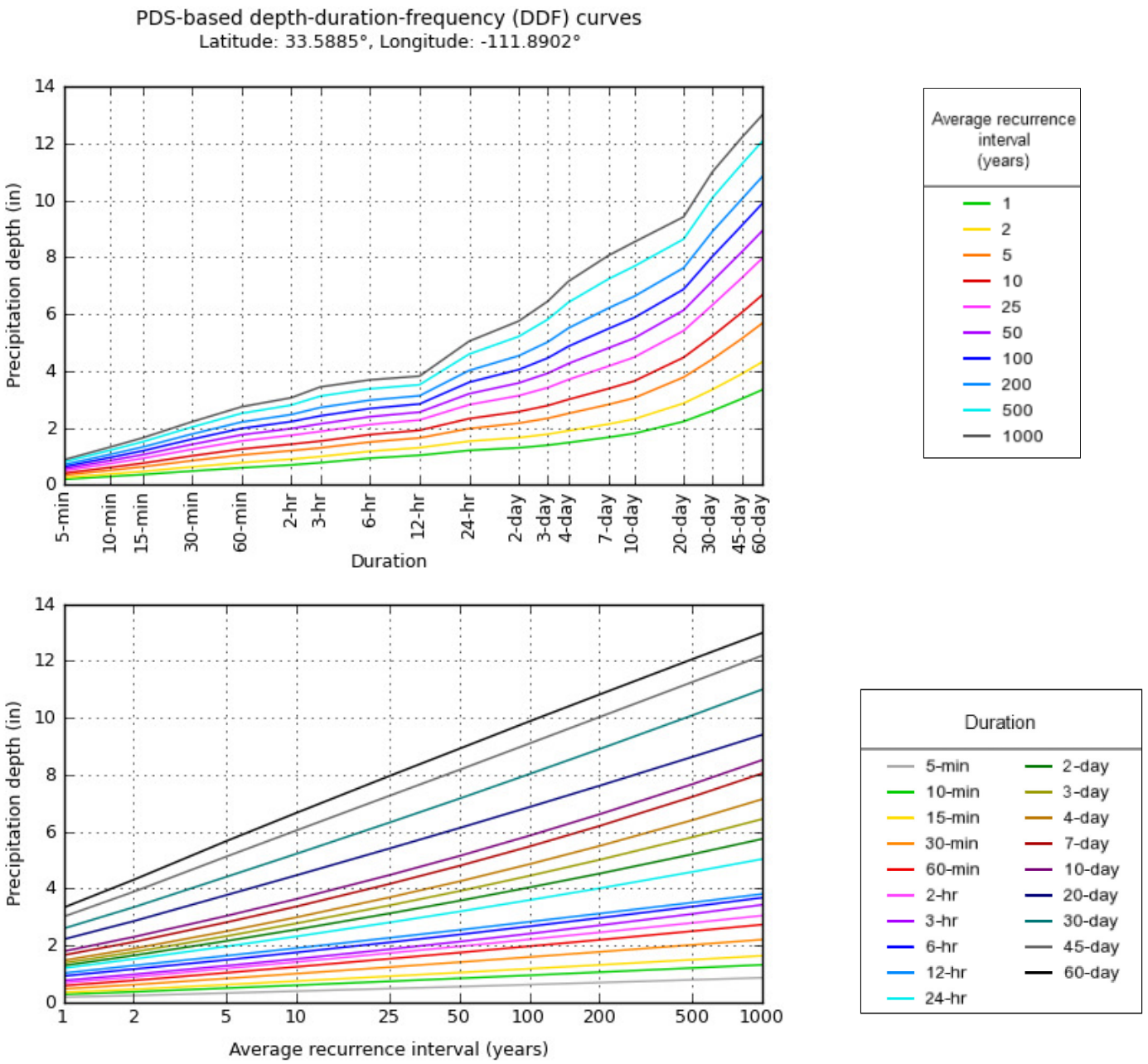
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



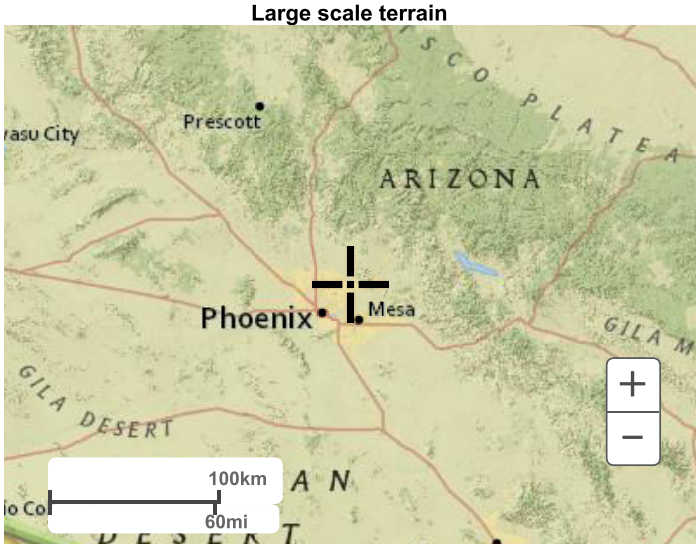
NOAA Atlas 14, Volume 1, Version 5 Created (GMT): Fri Nov 10 19:12:37 2017

Back to Top

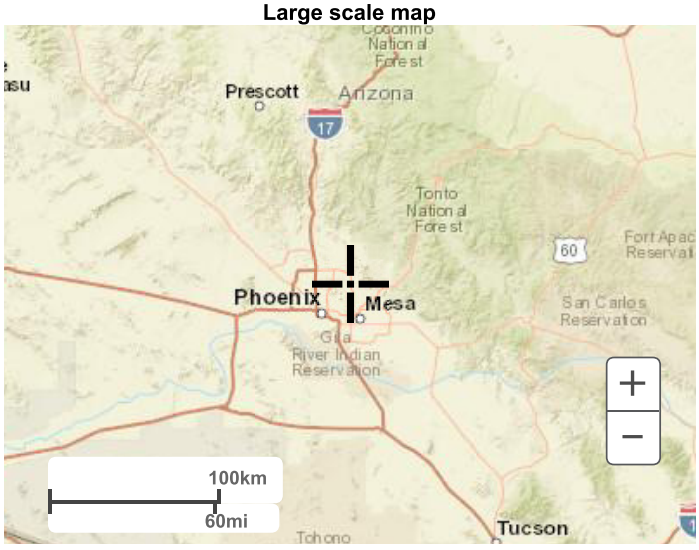
Maps & aerials

Small scale terrain

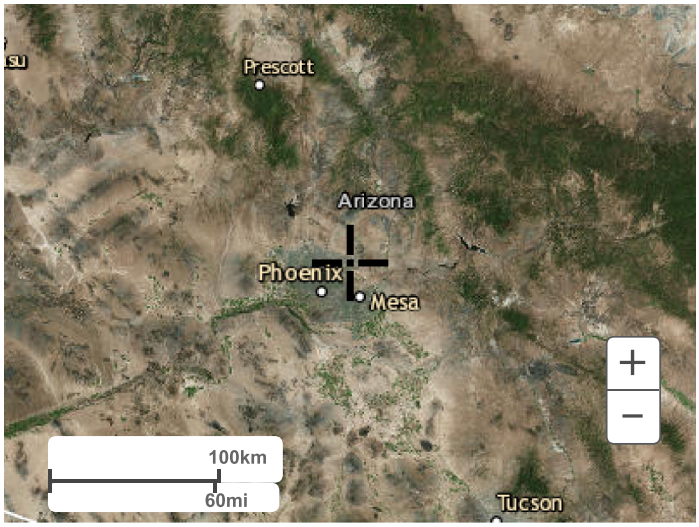
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.5885°, Longitude: -111.8902°
Elevation: 1384.44 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**2.27** (1.88-2.77)	**2.95** (2.47-3.62)	**3.98** (3.30-4.87)	**4.79** (3.95-5.83)	**5.87** (4.75-7.12)	**6.70** (5.36-8.06)	**7.55** (5.94-9.07)	**8.40** (6.50-10.1)	**9.56** (7.21-11.5)	**10.4** (7.72-12.6)
10-min	**1.72** (1.43-2.11)	**2.25** (1.88-2.75)	**3.04** (2.51-3.71)	**3.64** (3.01-4.43)	**4.46** (3.62-5.42)	**5.09** (4.09-6.13)	**5.74** (4.52-6.91)	**6.40** (4.95-7.67)	**7.28** (5.49-8.74)	**7.95** (5.87-9.56)
15-min	**1.42** (1.18-1.74)	**1.86** (1.55-2.28)	**2.51** (2.08-3.06)	**3.01** (2.48-3.67)	**3.69** (2.99-4.48)	**4.21** (3.38-5.07)	**4.75** (3.74-5.71)	**5.28** (4.09-6.34)	**6.02** (4.54-7.22)	**6.57** (4.86-7.90)
30-min	**0.958** (0.794-1.17)	**1.25** (1.05-1.53)	**1.69** (1.40-2.06)	**2.03** (1.67-2.47)	**2.48** (2.01-3.01)	**2.83** (2.27-3.41)	**3.20** (2.52-3.84)	**3.56** (2.75-4.27)	**4.05** (3.05-4.86)	**4.42** (3.27-5.32)
60-min	**0.593** (0.492-0.726)	**0.774** (0.647-0.949)	**1.05** (0.865-1.28)	**1.25** (1.03-1.53)	**1.54** (1.25-1.87)	**1.75** (1.41-2.11)	**1.98** (1.56-2.38)	**2.20** (1.70-2.64)	**2.51** (1.89-3.01)	**2.74** (2.02-3.29)
2-hr	**0.347** (0.292-0.415)	**0.448** (0.380-0.538)	**0.598** (0.502-0.713)	**0.712** (0.592-0.848)	**0.868** (0.716-1.03)	**0.986** (0.802-1.17)	**1.11** (0.886-1.31)	**1.23** (0.968-1.45)	**1.40** (1.07-1.65)	**1.53** (1.15-1.81)
3-hr	**0.257** (0.216-0.315)	**0.329** (0.278-0.405)	**0.430** (0.362-0.526)	**0.510** (0.425-0.620)	**0.623** (0.510-0.752)	**0.712** (0.576-0.855)	**0.805** (0.639-0.966)	**0.903** (0.704-1.08)	**1.04** (0.784-1.24)	**1.14** (0.845-1.37)
6-hr	**0.155** (0.133-0.185)	**0.196** (0.168-0.233)	**0.250** (0.213-0.296)	**0.294** (0.248-0.346)	**0.353** (0.294-0.414)	**0.399** (0.327-0.466)	**0.447** (0.362-0.520)	**0.496** (0.394-0.579)	**0.563** (0.435-0.656)	**0.615** (0.465-0.719)
12-hr	**0.086** (0.074-0.101)	**0.108** (0.093-0.127)	**0.136** (0.117-0.160)	**0.159** (0.135-0.185)	**0.189** (0.159-0.220)	**0.212** (0.176-0.246)	**0.235** (0.193-0.273)	**0.259** (0.210-0.301)	**0.291** (0.230-0.340)	**0.317** (0.246-0.372)
24-hr	**0.050** (0.044-0.058)	**0.064** (0.056-0.074)	**0.082** (0.072-0.095)	**0.097** (0.085-0.112)	**0.117** (0.102-0.135)	**0.133** (0.115-0.153)	**0.150** (0.128-0.172)	**0.167** (0.141-0.192)	**0.191** (0.159-0.219)	**0.210** (0.173-0.242)
2-day	**0.027** (0.024-0.031)	**0.034** (0.030-0.040)	**0.045** (0.039-0.052)	**0.053** (0.046-0.061)	**0.065** (0.056-0.075)	**0.074** (0.064-0.085)	**0.084** (0.072-0.097)	**0.094** (0.080-0.109)	**0.109** (0.090-0.125)	**0.120** (0.098-0.138)
3-day	**0.019** (0.017-0.022)	**0.025** (0.022-0.028)	**0.032** (0.028-0.037)	**0.039** (0.034-0.044)	**0.047** (0.041-0.054)	**0.054** (0.047-0.062)	**0.062** (0.053-0.071)	**0.070** (0.059-0.080)	**0.081** (0.067-0.092)	**0.090** (0.074-0.103)
4-day	**0.015** (0.014-0.018)	**0.020** (0.017-0.023)	**0.026** (0.023-0.030)	**0.031** (0.027-0.036)	**0.038** (0.033-0.044)	**0.044** (0.038-0.050)	**0.051** (0.043-0.058)	**0.057** (0.049-0.065)	**0.067** (0.056-0.076)	**0.074** (0.062-0.085)
7-day	**0.010** (0.009-0.011)	**0.013** (0.011-0.015)	**0.017** (0.015-0.019)	**0.020** (0.017-0.023)	**0.025** (0.021-0.028)	**0.029** (0.025-0.033)	**0.033** (0.028-0.037)	**0.037** (0.031-0.042)	**0.043** (0.036-0.049)	**0.048** (0.040-0.055)
10-day	**0.007** (0.007-0.009)	**0.010** (0.008-0.011)	**0.013** (0.011-0.014)	**0.015** (0.013-0.017)	**0.019** (0.016-0.021)	**0.021** (0.019-0.024)	**0.024** (0.021-0.028)	**0.028** (0.023-0.031)	**0.032** (0.027-0.036)	**0.036** (0.030-0.041)
20-day	**0.005** (0.004-0.005)	**0.006** (0.005-0.007)	**0.008** (0.007-0.009)	**0.009** (0.008-0.011)	**0.011** (0.010-0.013)	**0.013** (0.011-0.014)	**0.014** (0.012-0.016)	**0.016** (0.014-0.018)	**0.018** (0.015-0.020)	**0.020** (0.017-0.022)
30-day	**0.004** (0.003-0.004)	**0.005** (0.004-0.005)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.009** (0.008-0.010)	**0.010** (0.009-0.011)	**0.011** (0.010-0.013)	**0.012** (0.011-0.014)	**0.014** (0.012-0.016)	**0.015** (0.013-0.017)
45-day	**0.003** (0.002-0.003)	**0.004** (0.003-0.004)	**0.005** (0.004-0.005)	**0.006** (0.005-0.006)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.008** (0.007-0.010)	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.011** (0.010-0.013)
60-day	**0.002** (0.002-0.003)	**0.003** (0.003-0.003)	**0.004** (0.003-0.004)	**0.005** (0.004-0.005)	**0.006** (0.005-0.006)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.008)	**0.008** (0.007-0.010)	**0.009** (0.008-0.010)

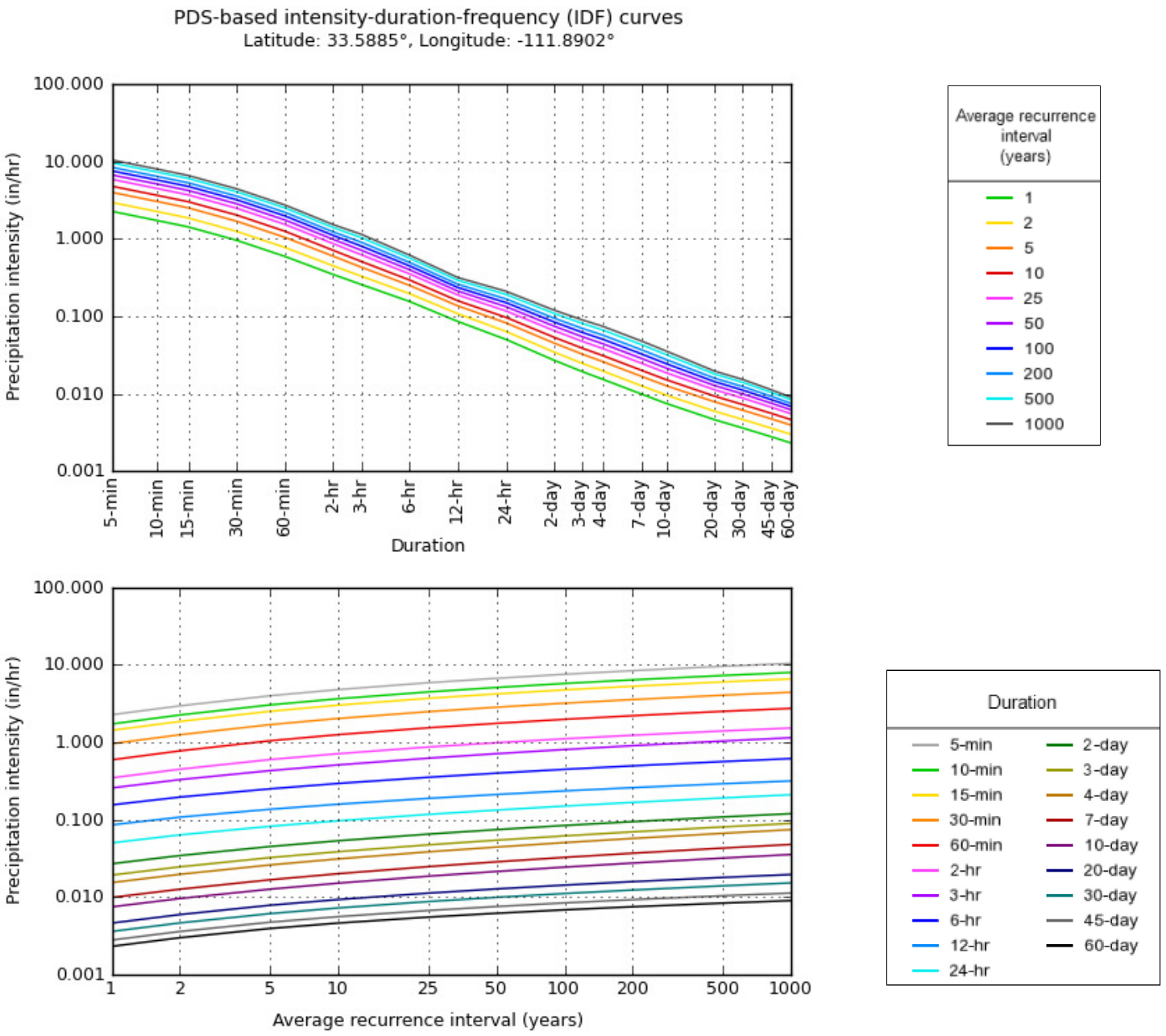
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Fri Nov 10 19:13:56 2017

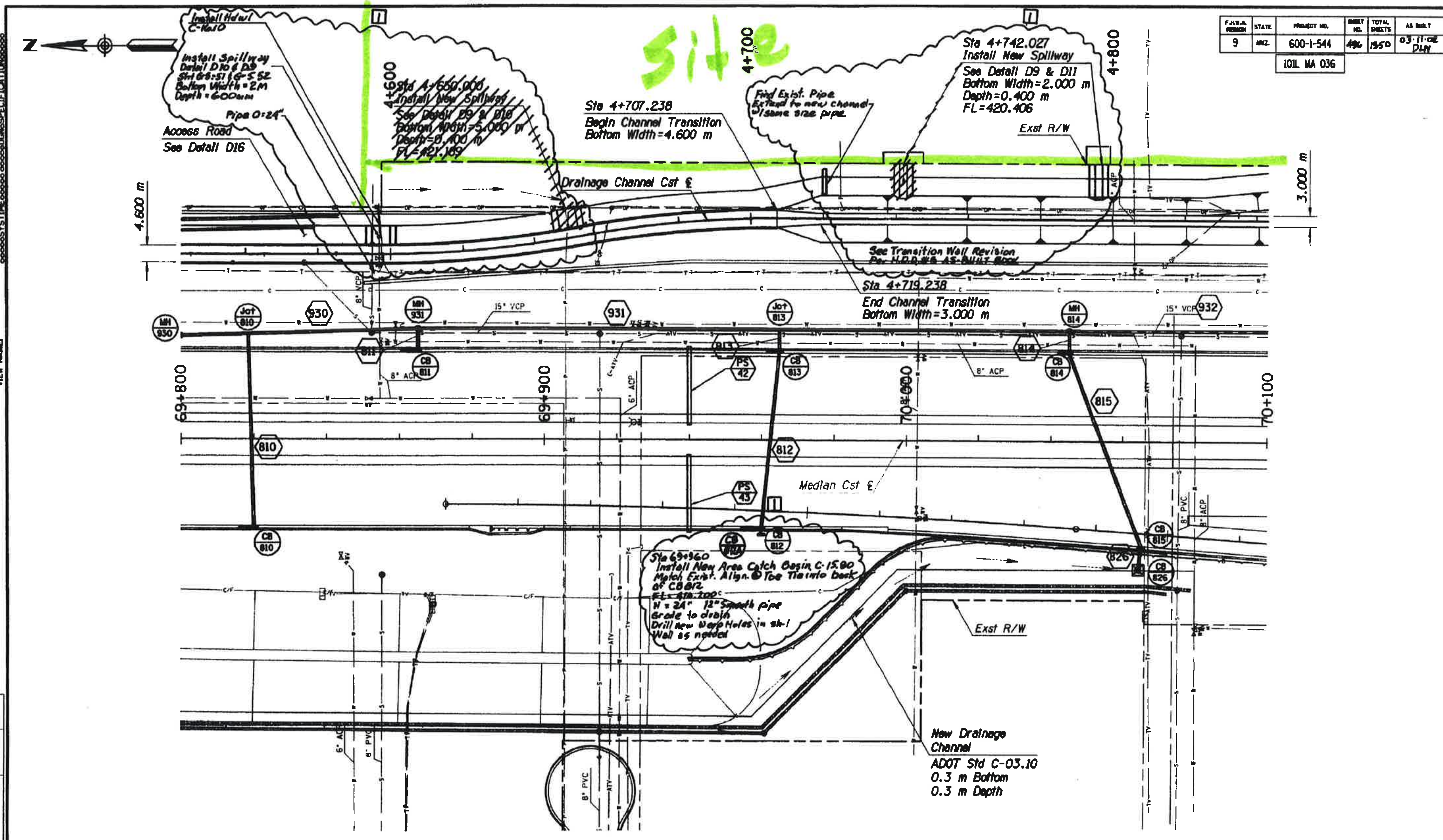
Back to Top

Maps & aerials

Small scale terrain

APPENDIX C

Drainage Channel Report and ADOT Plans



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	600-1-544	436	1350	03-11-02 DLW

101L MA 036

	NAME	DATE
DESIGN	RSR, RLH	4/98
DRAWN	AEL	4/98
CHECKED	JPM, ACP	4/98

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

DRAINAGE PLAN
Sta 69+800 to 70+100

ROUTE 101L
LOCATION PIMA FREEWAY - PIMA TO SHEA

DWG NO. D-1.22

TRACS NO. H 4083 01C

600-1-544

436 OF 1350

Metric

Two working days before you dig
263-1100
1-800-STAKE-IT

FILE: V:/960711/95SUB/DRPLAN16.DGN
DATE: 04/23/98

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

F.A.H.S.A. PROJECT	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	600-1-544	497	1950	03-11-02 DKM
		101L MA 036			

site

Install Access Ramp
See Detail D12

Access Road
See Detail D16

Sta 4+983.984
End Project
Match Downstream
Channel

Exst R/W

Drainage Channel Cst ℄

3.000 m

8" PVC

8" ACP

24" SCP

15" VCP

8" PVC

SHEA RAMP A

SHEA RAMP B

Median Cst ℄

8" RCP

8" ACP

ACP

70+100

70+200

70+300

70+400

933 932 822 821 817 819 818 820 816

MH 822 · MH 821 · Jct 817 · CB 817 · CB 822 · CB 823 · Jct 823 · PS 44 · PS 45 · PS 116 · CB 819 · CB 820 · CB 818 · CB 816

	NAME	DATE
DESIGN	RSR, RLH	4/98
DRAWN	AEL	4/98
CHECKED	JPM, ACP	4/98

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

DRAINAGE PLAN
Sta 70+100 to 70+400

ROUTE: 101L
LOCATION: PIMA FREEWAY - PIMA TO SHEA

DWG NO. D-1.23

TRACS NO. H 4083 01C | 600-1-544 | 437 OF 1950

Two working days before you dig
263-1100
1-800-STAKE-IT

AS-BUILT

FILE: V:/960711/95SUB/DRPLAN17.DGN
DATE: 04/23/98

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	600-1-544	448	1350	03-11-02 DLW
		101L MA 036			

VIEW NAME: ccccccSYSTIME:cccccc,cccccc:DGN:SPECIFICATION:cccccc

Sta 4+200.000 Wall Elev=424.740

100-yr HGL

Exst Ground at Channel ℄

Channel ℄ Grade

Sta 4+490.000 Wall Elev=422.768

Sta 4+493.500 Grade Break

Sta 4+500.000 Wall Elev=422.453

Inv Elev=421.940

Exst 7"(Tel)

S=0.0068 m/m

Inv Elev=419.900

S=0.0056 m/m

Inv Elev=419.853

4+200 4+300 4+400 4+500

→ site

Sta 4+500.000 Wall Elev=422.453

Exst 8" ACP (W)

Exst (P)

Exst Ground at Channel ℄

Exst (P)

100-yr HGL

Channel ℄ Grade

Sta 4+800 Top Elev=420.773

Inv Elev=419.853

S=0.0056 m/m

Inv Elev=418.173

Interim 760 mm DIP W

Inv Elev=417.950

Interim 610 mm PVC SS

Inv Elev=416.099

VCP (SS)

Sta 4+707.238 Begin Transition

Sta 4+719.238 End Transition

4+500 4+600 4+700 4+800

1 : 10

Two working days before you dig 263-1100 1-800-STAKE-IT OUTSIDE MARICOPA COUNTY

	NAME	DATE
DESIGN	AJR, RSR	4/98
DRAWN	AEL	4/98
CHECKED	JPM, ACP	4/98

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

OFF-SITE DRAINAGE PROFILES
Sta 4+200 to 4+800

ROUTE 101L LOCATION PIMA FREEWAY - PIMA TO SHEA

DWG NO. D-2.8

TRACS NO. H 4083 01C | 600-1-544 | 448 OF 1350

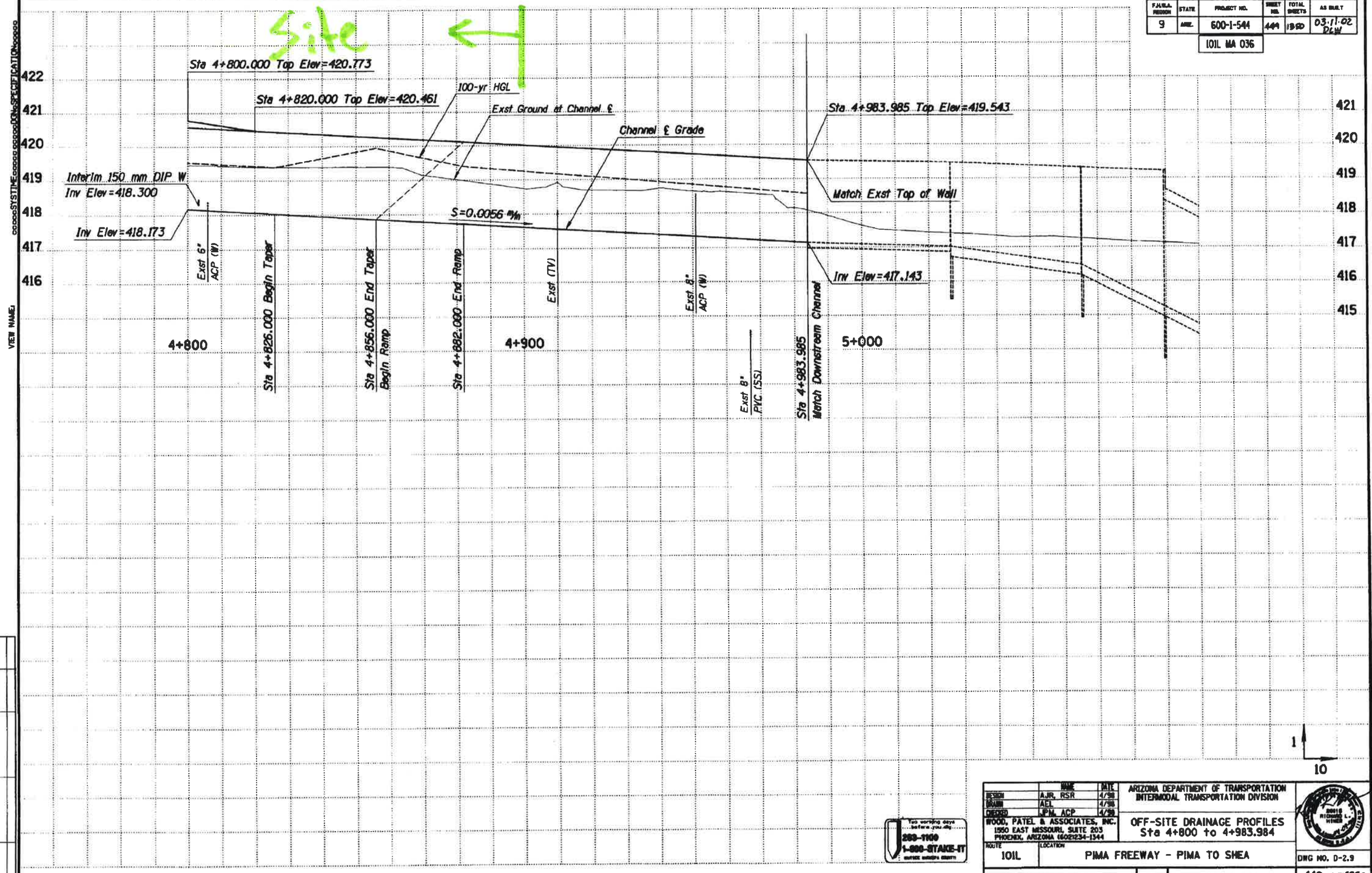
Metric

FILE: v:/960711/95sub/chprf08.dgn
DATE: 04/23/98 13:00

25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	600-1-544	449	1950	03.11.02 PLW
		101L MA 036			

Site



	NAME	DATE
DESIGN	AJR, RSR	4/98
DRAWN	AEL	4/98
CHECKED	JPM, ACP	4/98

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

OFF-SITE DRAINAGE PROFILES
Sta 4+800 to 4+983.984

ROUTE: 101L
LOCATION: PIMA FREEWAY - PIMA TO SHEA

DWG NO. D-2.9

TRACS NO. H 4083 01C | 600-1-544

442 OF 1350

Two working days before you dig
263-1100
1-800-STAKE-IT

REVISIONS: 1) AS-BUILT

FILE: v1/960711/95sub/chpr109.dgn

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
11029 N. 24th AVENUE, SUITE 806 • PHOENIX, ARIZONA 85029 • (602) 997-6301

DRAINAGE REPORT

DESIGNATION:	Armenian Apostolic Church
LOCATION:	Pima Road & Cholla Avenue
CLIENT:	Armenian Apostolic Church
PROJECT NO:	880199CA
DATE:	October 27, 1989

TABLE OF CONTENTS

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
11029 N. 24th AVE., SUITE 605 • PHOENIX, ARIZONA 85029

SPEEDIE AND ASSOCIATES
GEOTECHNICAL / MATERIALS / SITE ENGINEERS
11029 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029

PROJECT NO: 880199CA

PAGE 1 OF 2

PROJECT LOCATION & DESCRIPTION OF SITE:

The proposed church site is located in the Northwest 1/4 of the Southwest 1/4 of Section 19, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is located within the city limits of Scottsdale, Arizona, south and east of where the Cholla Drive alignment intersects Pima Road from the east. The area of the site is approximately 3.0 acres (see Exhibit A).

The subject site slopes generally towards the southwest and contains, as a main drainage feature, a natural wash approximately 18 inches deep, and 20 feet wide which runs across the site from the northeast corner to the southwest corner and continues to the south.

There are no existing structures on the site. Vegetation on the site is at present desert brush with 15 percent density. The soil type is class "B", based upon the SCS map provided in the City of Scottsdale Publication "Drainage Report Preparation", Figure 2-14.

OFFSITE DRAINAGE:

Runoff flows into the wash at the northeast corner of the site where the south end of 88th Place intersects Cholla Drive. The northern limits of the contributing drainage area is considered to be Jenan Drive, approximately 2,100 feet north of the subject property.

Based on the drainage report for the Ricco Villas #2 subdivision which is to the north of the subject site, the drainage area contributing runoff to the wash was to be 21 acres with a drainage length of 1,700 feet (sub area 1b, Ricco Villas #2 Drainage Report). However, the subdivision as constructed varies somewhat from the original preliminary plat which was the basis for design. The drainage area is now considered to be 26 acres with a drainage length of 2,100 feet. The rational method was used for hydrology calculations for a 100-year and 10-year design frequency (see Exhibits B & C).

Present plans for the church site call for the construction of a drainage ditch along the north 16.5 feet of the site which will channel runoff now entering the site from the north towards the west where it will flow into the existing drainage ditch along the east side of Pima Road (see Exhibit D). The west 40 feet of the site is reserved for a drainageway to be installed with the future highway improvements along the Pima Road alignment.

ONSITE DRAINAGE:

A detention basin is to be constructed on the site to retain runoff generated from the proposed development. Total retention volume required for the site is 17,719 cubic feet (see Calculation - Exhibit E). This volume is provided in the proposed basin at a depth of less than two feet. The retained runoff is to be metered into the drainage ditch along Pima Road through a 12-inch pipe (see Grading & Drainage Plan). The maximum level to which water can pond is one foot below the building finish floor.

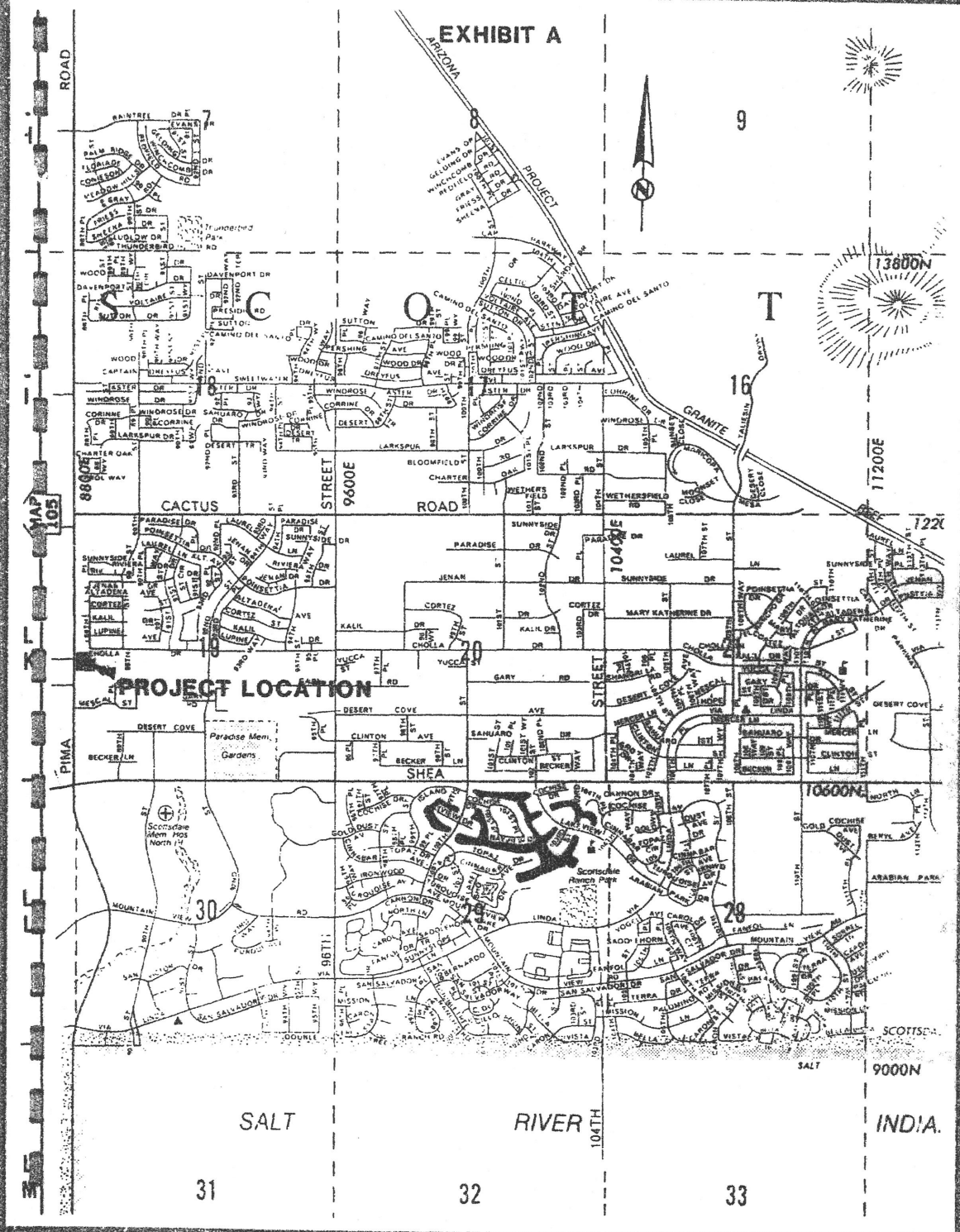
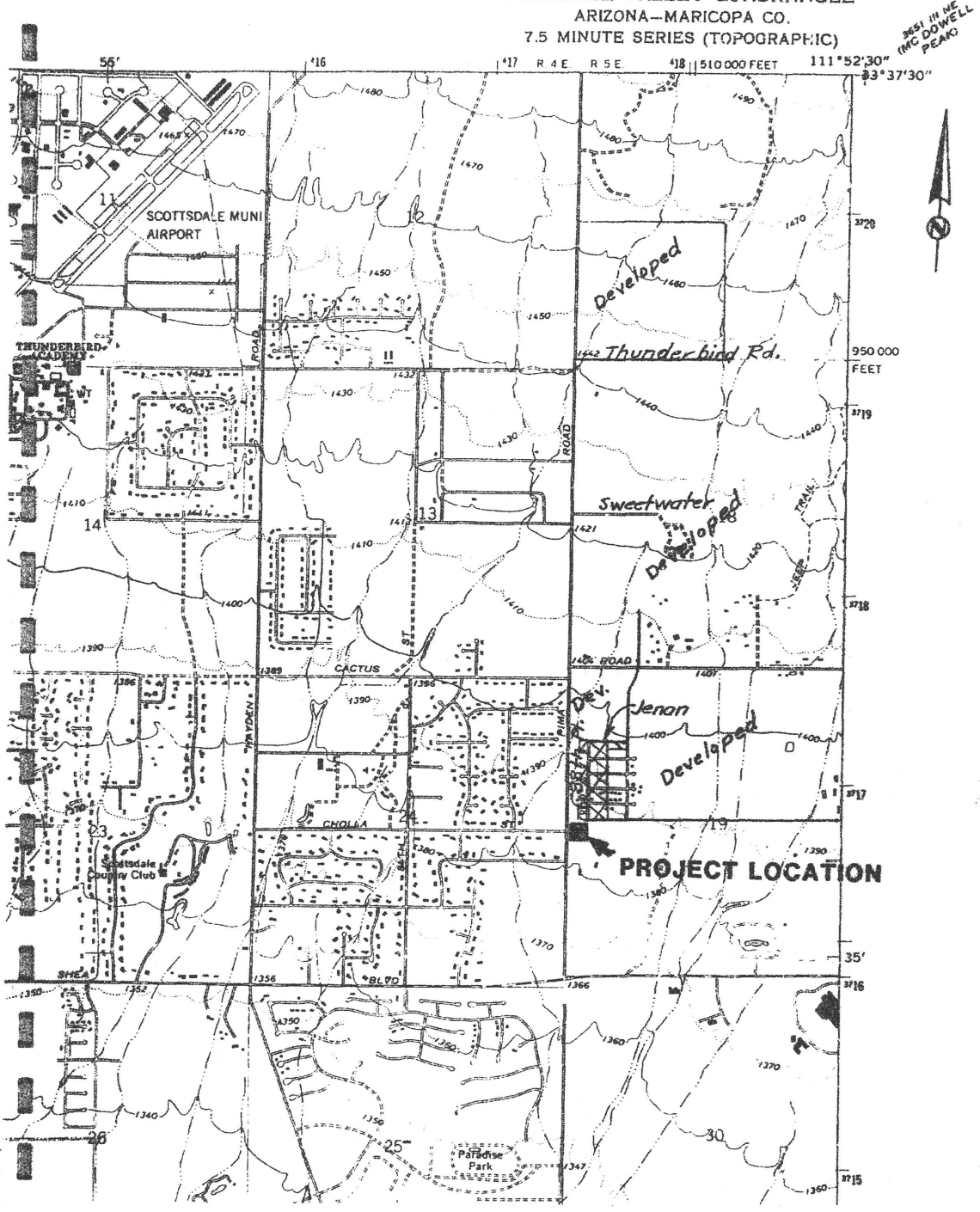


EXHIBIT B

PARADISE VALLEY QUADRANGLE
ARIZONA—MARICOPA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



25-ZN-2018
25_ZN_2018_V3
10/8/2020
12/15/2020

EXHIBIT C

ARIZONA HIGHWAY DEPARTMENT
BRIDGE DIVISION

HYDROLOGIC DESIGN DATA SHEET
RATIONAL METHOD

LOCATION DATA

Highway Pima Road County Maricopa
Location N.E. corner Pima Road & Cholla Drive
Project No. Station
Name of Stream Street Runoff - Ricco Villas #2 Subdivision

DESIGN DATA

Design Frequency		100	10 years
Drainage Area	A_1	26	acres
	A_2		acres
Drainage Length		2,100	feet
Elevation			
Top of Drainage Area			feet
At Structure			feet
Drainage Area Slope		0.76	%
Precipitation			
P = 6-hour			inches
P = 24-hour			inches

DESIGN COMPUTATIONS

Precipitation P_1 = 1-hour		2.41	1.61 inches
Time of Concentration	Tc	18	minutes
Rainfall Intensity	i	5.0	3.4 inches/hour
Curve Numbers	CN_1		
	CN_2		
Weighted Curve Number	CN_W	89	89
Runoff Coefficient	C	0.57	0.44
Peak Discharge Qp = CiA =		74	39 cfs

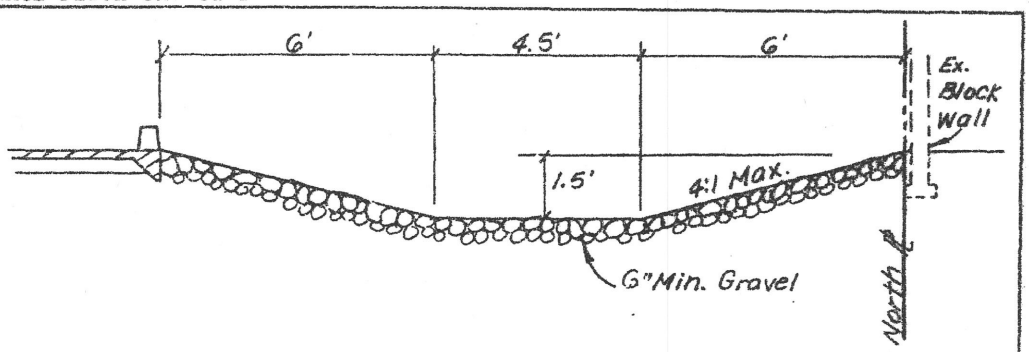
Computed by P. E. Truders Date 10-25-89

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
1020 N. 24th AVE., SUITE 605 · PHOENIX ARIZONA 85029
540 W. IRON AVE., SUITE 109 · MESA, ARIZONA 85202

EXHIBIT D

JOB ARMENIAN APOSTOLIC CHURCH
PROJECT NO. 880199CA
CALCULATED BY P.E.T. DATE 10-25-89
CHECKED BY G.E.S. DATE
SHEET NO. OF

DRAINAGE DITCH CAPACITY



$$Q = \frac{1.49}{n} A R^{2/3} S_o^{1/2} = \text{cfs}$$

n = 0.025 (gravel)

A = (6x1.5) + (4.5x1.5) = 15.75 s.f.

$$R = \frac{A}{P} = \frac{15.75}{16.87} = 0.934$$

$$S_o \frac{2}{250} = 0.008 \text{ ft./ft.}$$

$$Q = \frac{1.49}{0.025} (15.75) (0.934)^{2/3} (0.008)^{1/2}$$

Q = 80.22 cfs

10.35-A

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
1079 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029
40 W. IRON AVE., SUITE 108 • MESA, ARIZONA 85202

EXHIBIT E

JOB ARMENIAN APOSTOLIC CHURCH
PROJECT NO. 880199CA
CALCULATED BY P.E.T. DATE 10-25-89
CHECKED BY G.E.S. DATE
SHEET NO. OF

Detention Basin Calculations: 10 ear, 2-hour storm

$$V = \frac{D \times A}{12} C_w \qquad D = 2.82$$

Area: (excluding drainage ditch along north side and drainage easement east side of Pima Road.)
Total Area = 3 Ac = 130,680 s.f.
A = 130,680 - (17,480 + 3,927) = 109,273 s.f.

C_w:

	A	C	
Buildings:	19,675 s.f.	= 0.95	18,691
Concrete:	7,884 s.f.	= 0.90	7,096
Asphalt:	31,980 s.f.	= 0.85	27,183
Landscape:	49,734 s.f.	= 0.45	22,380
	109,273 s.f.		75,350

$$C_w = \frac{75,350}{109,273} = 0.69$$

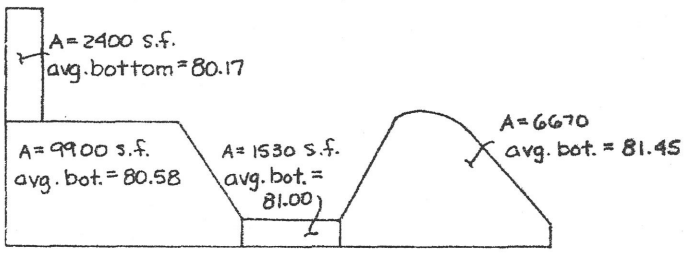
Volume Required:

$$V_r = \frac{2.82 \times 109,273}{12} 0.69$$

V_r = 17,719 cu. ft.

Volume Provided:

Retention Area



Total A = 20,500 s.f. H.W. = 81.80

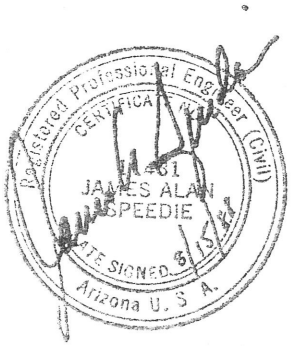
V_p = (0.35 x 6670) + (0.8 x 1530) + (1.22 x 9900) + (1.63 x 2400)

V_p = 19,549 cu. ft.

10.35-A

SPEEDIE
AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
11029 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029 • (602) 997-6391

JAMES A. SPEEDIE, P.E.
GREGG A. CREASER, P.E.
GARY E. STOCKER, P.E.
STEVEN A. GRIESS, P.E.



REPORT ON SOIL INVESTIGATION

DESIGNATION: Armenian Apostolic Church

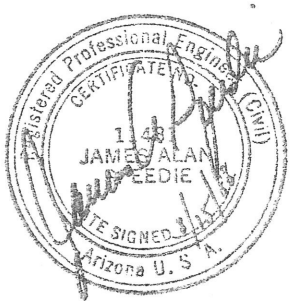
LOCATION: Pima Road & Cholla Road
Scottsdale, Arizona

CLIENT: Armenian Apostolic Church
of Maricopa County

PROJECT NO: 880199SA

DATE: August 15, 1988

TABLE OF CONTENT



INTRODUCTION

This report presents the results of a subsoil investigation carried out at the site of the proposed Armenian Apostolic Church. The site is located on the southeast corner of Cholla and Pima Roads in Scottsdale, Arizona.

Preliminary information calls for the construction of a one or two-story sanctuary, cultural center and gavit (covered outdoor meeting area) to be located generally as shown on the Soil Boring Location Plan, Plate 1. The structures will be slab-on-grade with masonry or wood-frame bearing walls. Structural loads will be light to moderate and no special considerations regarding settlement tolerance are known. Adjacent areas will be landscaped or paved to support moderate passenger and light commercial traffic. Landscaped areas will be utilized for storm water retention and disposal.

GENERAL SITE AND SOIL CONDITIONS

Site Conditions - The rectangularly shaped site is approximately 3.0 acres in size and is bounded on the west by Pima Road, on the north by Cholla Road, and on the south and east by undeveloped desert. At the time of the investigation the site was covered with moderately thick desert vegetation. Several ephemeral drainage channels intersect the site in a generally northeast to southwest direction. Several moderately graded dirt roads pass through the site. There was no evidence of any previous structural fills or foundations.

Soil Conditions - Subsoil conditions at the site are relatively uniform throughout. The upper 3.0 to 8.0 feet consists of firm to very stiff, brown to red-brown silt, sandy silt and clayey silt. Variable trace gravel and cementation is also present in this stratum. Moisture contents range from 3 to 5 percent and plastic limits range from non-plastic to 17 percent. In-place dry densities are on the order of 93 to 102 PCF. These soils exhibit a Standard Penetration Resistance (SPT) of 7 to 18 blows per foot. Swell tests indicate that the surface soils have a low potential for volume increase due to wetting when compacted to moistures and densities expected druing construction.

The upper 3.0 to 8.0 feet is underlain by medium dense to very dense, brown to red-brown clayey sand and gravelly sand and hard, brown to red-brown sandy clay. Moisture contents are on the order of 3 percent and in-place densities are on the order of 108 PCF. This stratum exhibits a Standard Penetration Resistance of 15 to 50-plus blows per foot.

All borings were dry upon completion and groundwater is not reported to be shallow in this area. Therefore, groundwater should not be a factor in the design or construction of shallow foundations.

ANALYSIS AND RECOMMENDATIONS

Analysis - Analysis of the field and laboratory data indicates that subsoils at the site are favorable for the support of the proposed structures, provided that the upper foundation soils are stabilized by overexcavation and recompaction.

Site Preparation - The entire area to be occupied by the proposed construction should be stripped of all vegetation, debris, rubble and obviously loose surface soils. In addition, the native soils should be overexcavated to a depth of 18 inches below proposed footing elevation and extending at least 2.0 feet beyond the footing edges. The native soils may be saved for replacement in these excavations.

Prior to placing structural fill below footing bottom elevation, the exposed subgrade should be scarified to a depth of 8 inches, moisture conditioned to optimum (±2 percent) and compacted to at least 95 percent of maximum dry density as determined by ASTM D-698. Pavement areas should be treated in a similar manner.

All cut areas and areas above footing bottom elevation that are to receive floor slab fill should be scarified 8 inches, moisture conditioned to optimum (±2 percent) and uniformly compacted to 95 percent of maximum dry density.

Foundation Design - It is recommended that the structure be founded on shallow spread footings bearing on properly compacted fill at a minimum depth of 18 inches below finished exterior grade. If site preparation is carried out as set forth herein, a recommended safe allowable bearing capacity of 2,500 psf can be utilized for design. This bearing capacity refers to the total of all loads, dead and live, and is a net pressure. It may be increased one-third for wind, seismic or other loads of short duration. All footing excavations should be level and cleaned of all loose or disturbed materials. Positive drainage away from the proposed buildings must be maintained at all times.

Continuous wall footings and isolated rectangular footings should be designed with minimum widths of 16 and 24 inches respectively, regardless of the resultant bearing pressure. Lightly loaded interior partitions (less than 800 plf) may be supported on reinforced thickened slab sections (minimum 12 inches of bearing width).

Estimated settlements under design loads are on the order of 1/2-inch, virtually all of which will occur during construction. Post-construction differential settlements will be negligible, under existing and compacted moisture contents. Additional localized settlements of the same magnitude could occur if native supporting soils were to experience a significant increase in moisture content. Positive drainage away from structures, and controlled routing of roof runoff should be provided to prevent ponding adjacent to perimeter walls. Planters requiring heavy watering should be considered in this regard. Care should be taken in design and construction to insure that domestic and interior storm drain water is contained to prevent seepage.

Continuous footings and stem walls should be reinforced to distribute stresses arising from small differential movements, and long walls should be provided with control joints to accommodate these movements. Reinforcement and control joints are suggested to allow slight movement and prevent minor floor slab cracking.

Lateral Pressures - The following lateral pressure values may be utilized for the proposed construction:

Active Pressure	
Unrestrained Walls	35 PCF
Restrained Walls	60 PCF
Passive Pressure	
Continuous Footings	350 PCF
Spread Footings	400 PCF
Coefficient of Friction	
With Passive Pressure	0.35
Without Passive Pressure	0.45

All backfill must be compacted to not less than 95 percent (ASTM D-698) to mobilize these passive values at low strain.

Fill and Backfill - Native soils are suitable for use in grading fills. If imported common fill for use in site grading is required, it should be examined by a Soils Engineer to ensure that it is of low swell potential and free of organic or otherwise deleterious material. In general, the fill should have 100 percent passing the 3-inch sieve and no more than 60 percent passing the 200 sieve. For the fine fraction (passing the 40 sieve), the liquid limit and plasticity index should not exceed 30 percent and 10 percent, respectively. It should exhibit less than 1.5 percent swell potential when compacted to 95 percent of maximum dry density (ASTM D-698) at a moisture content of 2 percent below optimum, confined under a 100 psf surcharge, and inundated.

Fill should be placed on subgrade which has been properly prepared and approved by a Soils Engineer. Fill must be wetted and thoroughly mixed to achieve optimum moisture content, ±2 percent (optimum to +3 percent for underslab fill). Fill should be placed in horizontal lifts of 8-inch thickness (or as dictated by compaction equipment) and compacted to the percent of maximum dry density per ASTM D-698 set forth as follows:

A.	Building Areas	
	1. Below footing level	95
	2. Below slabs-on-grade (non-expansive soils)	95
B.	Pavement Subgrade or Fill	95
C.	Utility Trench Backfill	
	1. More than 1.5' below finish S/G	90
	2. Within 1.5' of finish S/G	95
D.	Aggregate Base Course	
	1. Below floor slabs	95
	2. Below asphalt paving	100
E.	Landscape Areas	
	1. Miscellaneous fill	90
	2. Utility trench - more than 1.0' below F/G	85
	3. Utility trench - within 1.0' of F/G	90

Utilities Installation - Trench excavations for utilities can be accomplished by conventional trenching equipment. Trench walls will stand near-vertically for the short periods of time required to install utilities. If trenches are greater than shoulder-height, precautions must be taken to protect workmen.

Backfill of trenches may be carried out with native excavated material. This material should be moisture-conditioned, placed in 8 inch lifts and mechanically compacted. Water settling is not recommended. Compaction requirements are summarized in the "Fill And Backfill" section of this report.

Although backfilling in compacted lifts is preferred to minimize pavement settlements, it is seldom achieved by local contractors. A less desirable, but more expedient process would involve backfill of trenches to 18 inches below finish subgrade, jetting as set forth in Section 601 of the M.A.G. Specification, and allowing time for moisture stabilization. The surface should then be thoroughly wheel-rolled to provide stable conditions. The upper 18 inches should then be placed in two moisture-conditioned lifts and compacted to not less than 95 percent of maximum dry density.

Slabs-On-Grade - To facilitate fine grading operations and aid in concrete curing, a 4-inch thick layer of granular material conforming to the gradation for Aggregate Base Course (A.B.C.) as per M.A.G. Specification Section 702 should be utilized beneath the slab. Dried subgrade soils should be moistened prior to placing the A.B.C.

Asphalt Pavement - If earthwork in paved areas is carried out to finish subgrade elevation as set forth herein, the subgrade will provide adequate support for pavements.

For pavement areas to be used primarily for passenger traffic and parking, our experience in the area indicates that a minimum of 2.0 inches of asphalt over 4.0 inches of aggregate base course will provide satisfactory service; heavy duty areas should be 2.5 inches of asphalt over 6.0 inches of base. This assumes that all subgrades are prepared in accordance with the recommendations contained in the "Site Preparation" and "Fill and Backfill" sections of this report, and paving operations carried out in a proper manner. If pavement subgrade preparation is not carried out immediately prior to paving, the entire area should be proof-rolled at that time with a heavy pneumatic-tired roller to identify locally unstable areas for repair.

Pavement base course material should be A.B.C. per M.A.G. Section 702 Specifications. Asphalt concrete materials and mix design should conform to M.A.G. 710. It is recommended that mix designation C-3/4 be used for the pavements. While this mix has a somewhat rougher texture, it offers more stability. Pavement installation should be carried out under applicable portions of M.A.G. Section 321.

GENERAL

The scope of this investigation and report does not include regional considerations such as seismic activity and ground fissures resulting from subsidence due to groundwater withdrawal, nor any considerations of hazardous releases or toxic contamination of any type.

Our analysis of data and the recommendations presented herein are based on the assumption that soil conditions do not vary significantly from those found at specific sample locations. Our work has been

performed in accordance with generally accepted engineering principles and practice; this warranty is in lieu of all other warranties expressed or implied.

We recommend that a Soils Engineer monitor the earthwork and foundation portions of this project to ensure compliance to project specifications and the field applicability of subsurface conditions which are the basis of the recommendations presented in this report. If any significant changes are made in the scope of work or type of construction that was assumed in this report, we must review such revised conditions to confirm our findings if the conclusions and recommendations presented herein are to apply.

Respectfully submitted,

Stephen J. Smelser, Geologist

Registered Professional Engineer (Civil) CERTIFICATE NO. 11431 JAMES ALAN SPEEDIE DATE SIGNED 8/15/88 Arizona U.S.A.

James A. Speedie, P.E.

August 15, 1988

APPENDIX

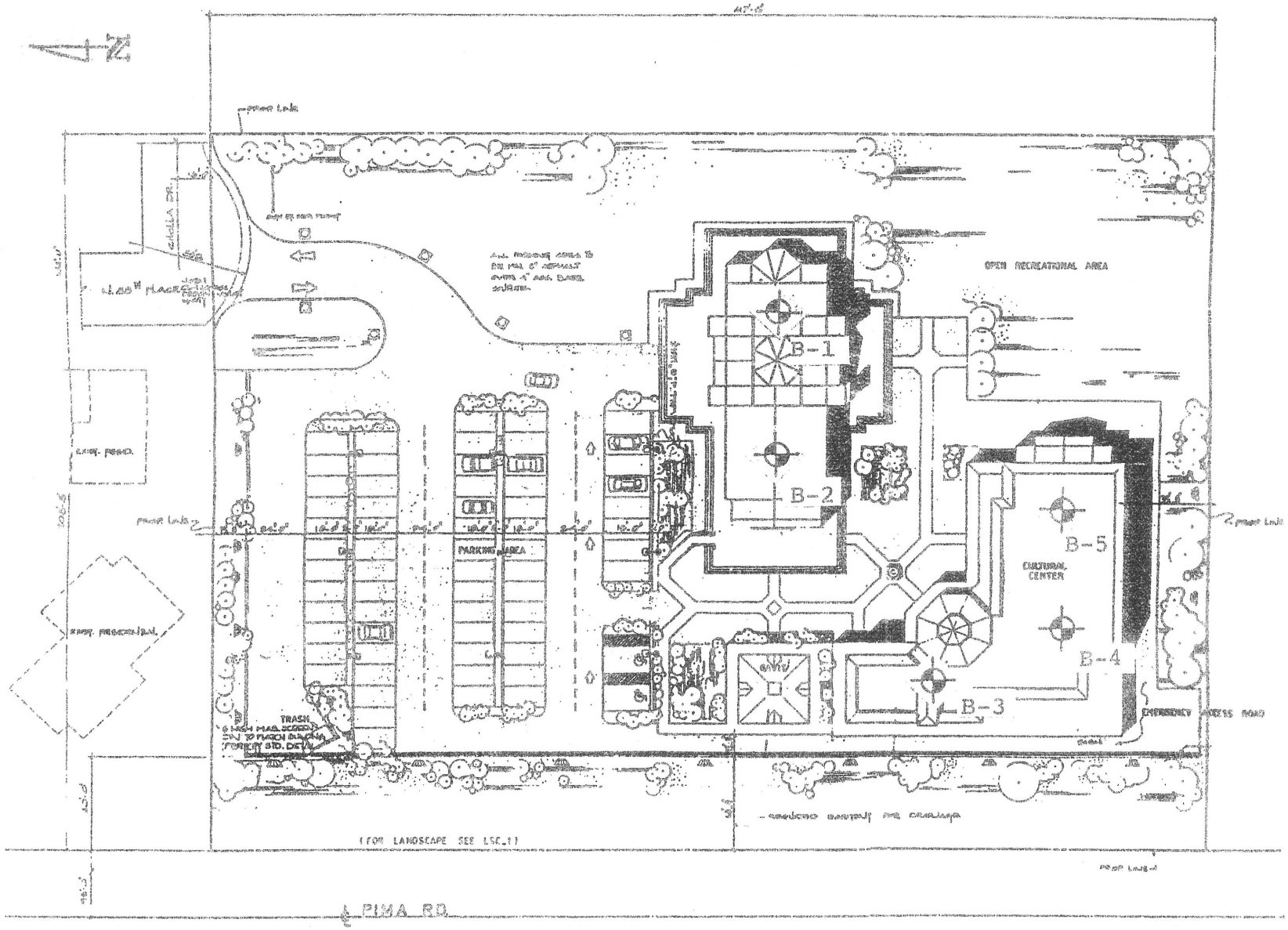
SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE E
11029 N. 24th AVE., SUITE 805 • PHOENI
540 W. IRON AVE., SUITE 109 • MES

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
11029 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029

FIELD AND LABORATORY INVESTIGATION

On July 21, 1988, five soil test borings were drilled at the approximate locations shown on the attached Soil Boring Location Plan, Plate 1. All exploration work was carried out under the full-time supervision of our engineer, who recorded subsurface conditions and obtained samples for laboratory testing. The soil borings were advanced with a truck-mounted Mobile B-61 drill rig utilizing 7.0 inch diameter hollow stem flight augers. Detailed information regarding the borings and samples obtained can be found on an individual Log of Test Boring prepared for each drilling location.

Laboratory testing consisted of moisture content, dry density, grain-size distribution and plasticity (Atterberg Limits) tests for classification and pavement design parameters. Compression tests were performed on a selected ring sample in order to estimate settlements and determine effects of inundation. Remolded swell tests were performed on samples compacted to densities and moisture contents expected during construction. All field and laboratory data is presented in this Appendix as Figures No. 1 through 8.



SOIL BORING LOCATION PLAN
ARMENIAN APOSTOLIC CHURCH
PIMA RD. & CHOLLA RD.
SCOTTSDALE, ARIZONA

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
PROJECT NO. 880199SA

Soil Boring Location

SOILS CLASSIFICATION CHART

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVEL WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, MUCK, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

FOR IDENTIFICATION AND CLASSIFICATION OF FINE GRAINED SOILS

GRADATION CHART

MATERIAL SIZE	PARTICLE SIZE			
	LOWER LIMIT		UPPER LIMIT	
	MILLIMETERS	SIEVE SIZE*	MILLIMETERS	SIEVE SIZE *
SAND				
FINE	.074	#200	0.42	#40
MEDIUM	0.42	#40	2.00	#10
COARSE	2.00	#10	4.76	#4
GRAVEL				
FINE	4.76	#4	19.1	3/4"
COARSE	19.1	3/4"**	76.2	3"
COBBLES	76.2	3"	304.8	12"
BOULDERS	304.8	12"	914.4	36"

*U.S. Standard **Square Openings

PLASTICITY CHART

LIQUID LIMIT

0 10 20 30 40 50 60 70 80 90 100

PLASTICITY INDEX

60 50 40 30 20 10 0

CH

A-LINE

U-LINE

CL

MH & OH

ML & OL

CONSISTENCY			RELATIVE DENSITY	
CLAYS & SILTS	BLOWS/FOOT*	STRENGTH †	SANDS & GRAVELS	BLOWS/FOOT*
VERY SOFT	0-2	0-½	VERY LOOSE	0-4
SOFT	2-4	½-1	LOOSE	4-10
FIRM	4-8	1-2	MEDIUM DENSE	10-30
STIFF	8-16	2-4	DENSE	30-50
VERY STIFF	16-32	4-8	VERY DENSE	OVER 50
HARD	OVER 32	OVER 8		

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

† Unconfined compressive strength in tons/sq. ft. Read from a pocket penetrometer.

SAMPLE DESIGNATION	PENETRATION RESISTANCE SYMBOL	DESCRIPTION
Bag	-	Large Bulk Sample
BS	-	Misc. Grab Sample - Bottle or Bag
AS	-	Auger Sample - A grab sample taken directly from auger flights
S	●	Spoon Sample - Standard Penetration Test (ASTM D-1586)-Driving a 2.0-inch outside diameter, 1 3/8-inch inside diameter, split spoon sampler into undisturbed soil for three sucessive 6-inch increments of penetration by means of a 140-pound weight falling freely through a distance of 30 inches. The cumulative number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).
LS	●	Liner Sample - Standard Penetration Test-Driving a 2.0-inch outside diameter split spoon, equipped with two, 3-inch long by 1 3/8-inch inside diameter brass liners, seperated by a 1-inch long spacer, into undisturbed soil as above.
RS	◎	Ring Sample - Driving a 3.0-inch outside diameter spoon, equipped with a series of 2.42-inch inside diameter, 1-inch long brass rings, into undisturbed soil for one 12-inch increment by means of a 140-pound weight falling freely through a distance of 30 inches. The blows required for the 12 inches of penetration are recorded.
ST	-	Shelby Tube - A 3.0-inch outside diameter thin-walled tube continuously pushed into undisturbed soil by a rapid motion, without impact or twisting. (ASTM D-1587)
-	⊠	Continuous Penetration Resistance (Bullnose) - Driving a 2.0-inch outside diameter "Bullnose penetrometer" continuously into undisturbed soil by means of a 140-pound weight falling freely through a distance of 30 inches. The blows for each successive 12-inch increment are recorded.

NOTE: The stratification lines shown on the Logs of Test Borings and/or Test Pit represent the approximate boundary between soil types, and the transition may be gradual.

SOIL LOG LEGEND

SPEEDIE & ASSOCIATES

GROUND SURFACE ELEVATION: N/A

SOIL DESCRIPTION	SAMPLE NUMBER	ELEVATION OF SAMPLE TIP *	NATURAL WATER CONTENT (%)	IN-PLACE DRY DENSITY (P.C.F.)	STANDARD PENETRATION NUMBER (N) BLOWS PER FOOT
					0 25 50
Stiff Brown SANDY SILT (ML - Dry) With A Trace Of Gravel. 3.0'	RS-1	2.0	4.3	93.9	
Medium Dense Brown SAND (SM - Dry) With A Trace Of Silt And Gravel. 8.5'	S-2	5.5	4.6	-	
Dense Brown CLAYEY SAND (SC - Dry) With A Trace Of Gravel, Air Voids And Weak Cementation. 12.5'	S-3	10.5	-	-	
Dense Light Brown And White Mottled SAND (SP - Dry) With A Trace Of Clay And Gravel And Weak Cementation. 18.5'	S-4	15.5	-	-	
Very Dense Light Brown CLAYEY SAND (SC - Dry) With A Trace Of Gravel And Strong Cementation. 19.8'	S-5	19.8	-	-	95/10" →
END OF BORING					

ELEVATION (FEET)

* Sample Depth

BORING STARTED: 07-21-88
BORING COMPLETED: 07-21-88
FIELD ENGINEER/TECHNICIAN: S. Smelser
DRILLER: D. Ulses
CONTRACTOR: Heber Mining

WATER LEVEL IN HOLE AT Dry

NUMBERS OF HOURS AFTER COMPLETION:

SPEEDIE AND ASSOCIATES

LOG OF TEST BORING NUMBER B-1

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

APPROVED: SSS | DATE: 08-12-88

PROJECT NO 880199SA | FIGURE NO:

GROUND SURFACE ELEVATION: N/A

SOIL DESCRIPTION	SAMPLE NUMBER	ELEVATION OF SAMPLE TIP	NATURAL WATER CONTENT (%)	IN-PLACE DRY DENSITY (P.C.F.)	STANDARD PENETRATION NUMBER (N) BLOWS PER FOOT
Stiff Brown SANDY SILT (ML - Dry) With A Trace Of Gravel. 3.0'	S-1	2.5	3.7	-	
Medium Dense Red-Brown GRAVELLY SAND (SP - Dry). 8.0'	RS-2	5.0	2.8	107.8	
Very Dense Brown And White Mottled CLAYEY SAND (SC - Dry) With A Trace Of Air Voids And Weak Cementation. 10.5'	S-3	10.5	-	-	59/12"
END OF BORING					

ELEVATION (FEET)

0 25 50

* Sample Depth

BORING STARTED: 07-21-88
BORING COMPLETED: 07-21-88
FIELD ENGINEER/TECHNICIAN: S. Smelser
DRILLER: D. Ulses
CONTRACTOR: Heber Mining

▽ WATER LEVEL IN HOLE AT Dry

NUMBERS OF HOURS AFTER COMPLETION:

SPEEDIE AND ASSOCIATES

LOG OF TEST BORING NUMBER B-2

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

APPROVED: SJS DATE: 08-12-88

PROJECT NO: 880199SA FIGURE NO:

GROUND SURFACE ELEVATION: N/A

SOIL DESCRIPTION		SAMPLE NUMBER	ELEVATION OF SAMPLE TIP *	NATURAL WATER CONTENT (%)	IN-PLACE DRY DENSITY (P.C.F.)	STANDARD PENETRATION NUMBER (N) BLOWS PER FOOT 0 25 50
Stiff Brown SILT (ML - Dry) With A Trace Of Sand And Gravel.	3.0'	RS-1	2.0	4.3	92.9	
Very Stiff Red-Brown SANDY SILT (ML - Dry) With A Trace Of Air Voids And Weak Cementation.	8.0'	S-2	5.5	-	-	
Hard Red-Brown SANDY CLAY (CL - Dry) With Moderate Cementation.	10.5'	S-3	10.5	-	-	59/12" →
END OF BORING						

ELEVATION (FEET)

* Sample Depth

BORING STARTED: 07-21-88
BORING COMPLETED: 07-21-88
FIELD ENGINEER/TECHNICIAN: S. Smelser
DRILLER: D. Ulses
CONTRACTOR: Heber Mining

▽ WATER LEVEL IN HOLE AT Dry

NUMBERS OF HOURS AFTER COMPLETION:

SPEEDIE AND ASSOCIATES

LOG OF TEST BORING NUMBER B-3

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

APPROVED: SJS DATE: 08-12-88

PROJECT NO: 880199SA FIGURE NO

GROUND SURFACE ELEVATION: N/A

SOIL DESCRIPTION		SAMPLE NUMBER	ELEVATION OF SAMPLE TIP	NATURAL WATER CONTENT (%)	IN-PLACE DRY DENSITY (P.C.F.)	STANDARD PENETRATION NUMBER (N) BLOWS PER FOOT
Firm Brown SILT (ML - Dry) With A Trace Of Sand And Gravel.	3.5'	S-1	2.5	-	-	
		BS-2	3.0	-	-	
Very Stiff Brown CLAYEY SILT (ML - Dry) With A Trace Of Sand And Gravel.	8.0'	S-3	5.5	-	-	
Dense Light Brown SILTY SAND (SM - Dry).	13.0'	S-4	10.5	-	-	
Very Dense Light Brown CLAYEY SAND (SC - Dry) With A Trace Of Gravel And Caliche.	16.0'	S-5	15.5	-	-	59/12"
Hard Light Brown And White Mottled CLAY (CL - Dry) With A Trace Of Gravel And Air Voids And Moderate Cementation.	19.5'	S-6	19.5	-	-	50/6"
END OF BORING						

ELEVATION (FEET)

0 25 50

* Sample Depth

BORING STARTED: 07-21-88
BORING COMPLETED: 07-21-88
FIELD ENGINEER/TECHNICIAN: S. Smelser
DRILLER: D. Ulses
CONTRACTOR: Heber Mining

▽ WATER LEVEL IN HOLE AT Dry

NUMBERS OF HOURS AFTER COMPLETION:

SPEEDIE AND ASSOCIATES

LOG OF TEST BORING NUMBER B-4

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

APPROVED: SSS	DATE: 08-12-88
PROJECT NO 880199SA	FIGURE NO:

GROUND SURFACE ELEVATION: N/A

SOIL DESCRIPTION		SAMPLE NUMBER	ELEVATION OF SAMPLE TIP	NATURAL WATER CONTENT (%)	IN-PLACE DRY DENSITY (P.C.F.)	STANDARD PENETRATION NUMBER (N) BLOWS PER FOOT 0 25 50
Firm Light Brown SILT (ML - Dry) With A Trace Of Gravel.	3.5'	RS-1	2.0	5.1	101.7	
Very Stiff Red-Brown CLAYEY SILT (ML - Dry) With A Trace Of Sand, Gravel And Air Voids.	8.0'	S-2	5.5	-	-	
Medium Dense Red-Brown GRAVELLY SAND (SP - Dry).	13.0'	S-3	10.5	-	-	
Dense Light Brown GRAVELLY SAND (SP - Dry) With A Trace Of Caliche.	15.5'	S-4	15.5	-	-	
END OF BORING						

ELEVATION (FEET)

* Sample Depth

BORING STARTED: 07-21-88
BORING COMPLETED: 07-21-88
FIELD ENGINEER/TECHNICIAN: S. Smelser
DRILLER: D. Ulses
CONTRACTOR: Heber Mining

WATER LEVEL IN HOLE AT Dry

NUMBERS OF HOURS AFTER COMPLETION:

SPEEDIE AND ASSOCIATES

LOG OF TEST BORING NUMBER B-5

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

APPROVED: SSS | DATE: 08-12-88

PROJECT NO: 880199SA | FIGURE NO

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
11029 N. 24th AVE. • SUITE 805 • PHOENIX, ARIZONA • 85029 • (602) 997-6391

CONSOLIDATION TEST

PROJECT: Armenian Apostolic Church PROJECT NO. 880199SA DATE: 07-27-88
LOCATION: Pima Road & Cholla Road - Scottsdale, Arizona
CLIENT: Armenian Apostolic Church LAB. SAMPLE NO.: 8656
BORING NO.: B-5 FIELD SAMPLE NO.: RS-1 SAMPLE DEPTH: 2.0' SAMPLE ELEV. (TIP): -
TESTED BY: JH DATE: 07-22-88 CHECKED BY: SJS DATE: 07-27-88
REMARKS: Sample inundated at end of test at 2,000 PSF.

——— In-situ
- - - - - Inundated

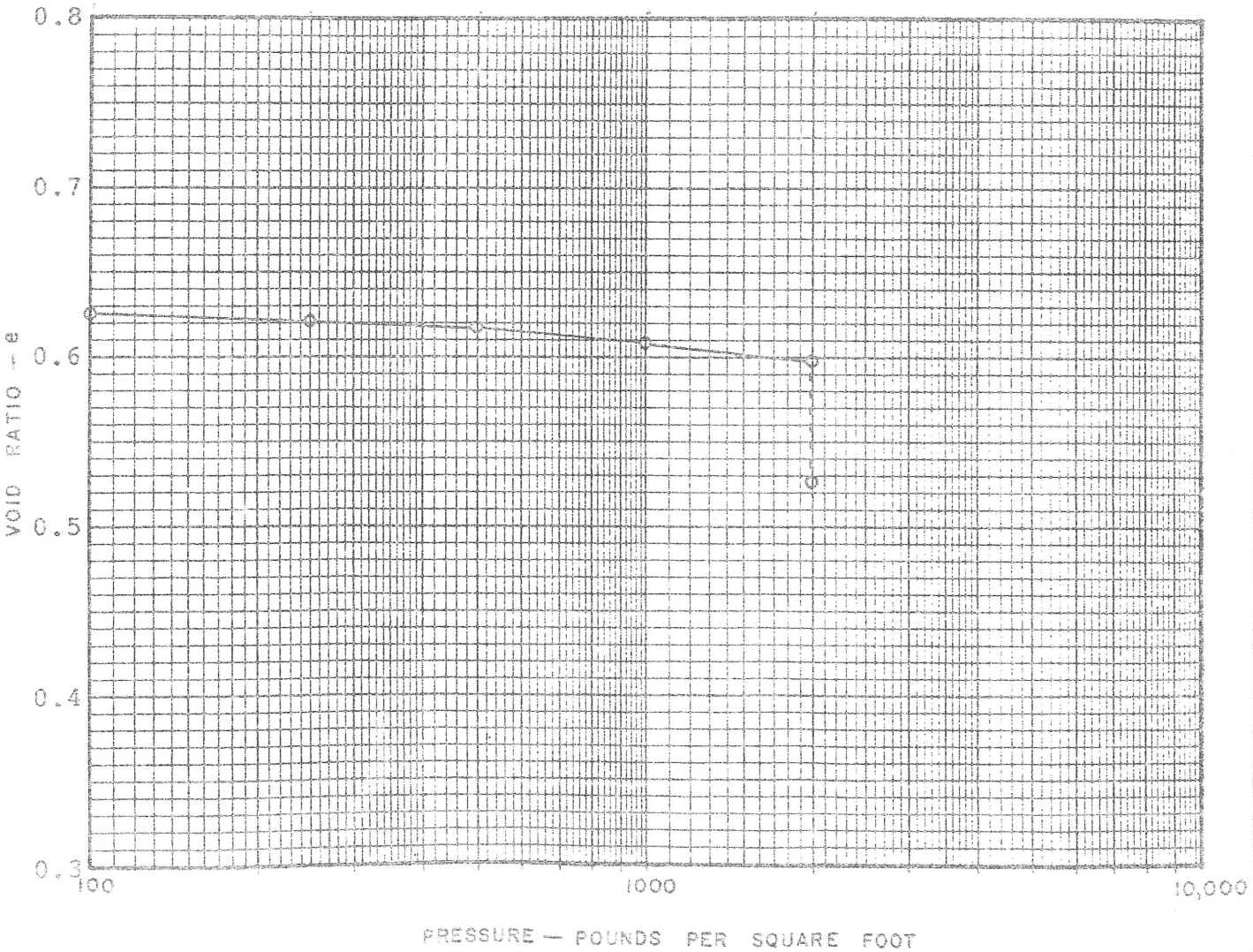


FIGURE 1

SWELL TEST DATA

BORING/ PIT NO.	SAMPLE DEPTH (FT.)	REMOLDED DRY DENSITY (PCF)	INITIAL MOISTURE CONTENT PERCENT	PERCENT * COMPACTION	INITIAL DEGREE OF SATURATION PERCENT	FINAL DEGREE OF SATURATION PERCENT	TOTAL SWELL PERCENT
B-4/BS-2	3.0	110.1	15.3	94.3	81.0	92.6	0.3
B-4/BS-2	3.0	109.2	12.2	93.8	62.9	95.4	1.9

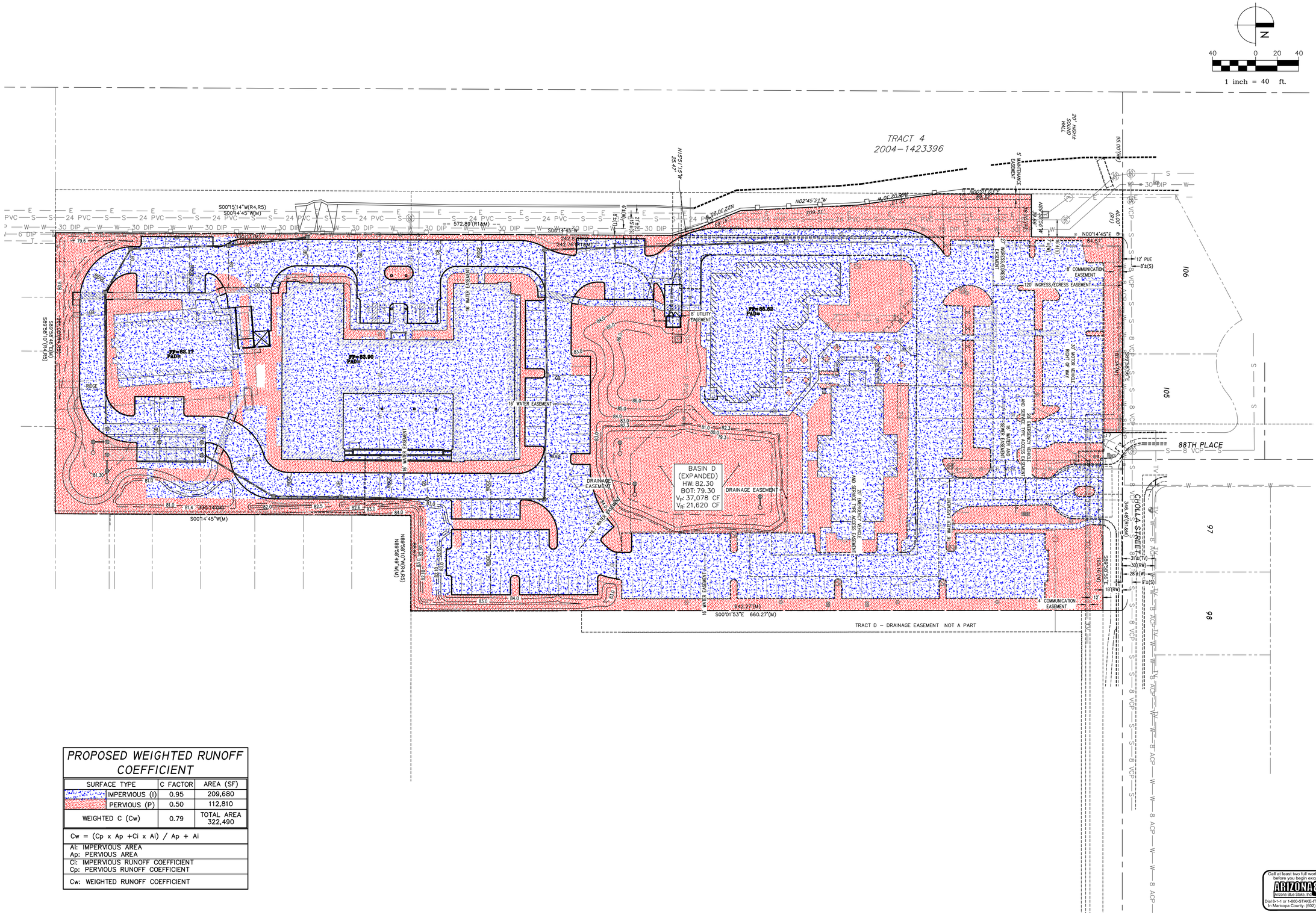
* Based on a maximum dry density of 116.4 PCF at 12.3 percent moisture.

ARMENIAN APOSTOLIC CHURCH
PIMA ROAD & CHOLLA ROAD
SCOTTSDALE, ARIZONA

SPEEDIE AND ASSOCIATES
GEOTECHNICAL AND SITE ENGINEERS
PROJECT NO. 880199SA

APPENDIX D

Weighted ‘C’ Exhibit



PROPOSED WEIGHTED RUNOFF COEFFICIENT

SURFACE TYPE	C FACTOR	AREA (SF)
IMPERVIOUS (I)	0.95	209,680
PERVIOUS (P)	0.50	112,810
WEIGHTED C (Cw)	0.79	TOTAL AREA 322,490

Cw = (Cp x Ap +Ci x Ai) / Ap + Ai

Ai: IMPERVIOUS AREA
Ap: PERVIOUS AREA
Ci: IMPERVIOUS RUNOFF COEFFICIENT
Cp: PERVIOUS RUNOFF COEFFICIENT

Cw: WEIGHTED RUNOFF COEFFICIENT

aakaii architecture + interiors
7305 e mellveti rd #706 scottsdale arizona 85260
480.695.8852
aakaii.com

MEGERDICHIAN SENIOR CENTER
8849 E. CHOLLA ST.
SCOTTSDALE, AZ 85260

PRE-CONSTRUCTION PHASE

NO.	ISSUED FOR:	DATE
	REZONING & C.U.P.	12-13-2018
	REZONING & C.U.P. 2nd Review	08-03-2020

CONSTRUCTION PHASE

REV.	BULLETIN #	DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 31695 LESLIE J. KLAND Date Signed 12-11-20 ARIZONA U.S.A. Expires 09/30/21

KLAND
CIVIL ENGINEERS
CIVIL ENGINEERING
LAND DEVELOPMENT SERVICES
LAND SURVEYING
7227 N. 16th St. Suite 217
Phoenix, Arizona 85020
PHONE: (480) 344-0480
www.klandeng.com

SHEET TITLE

WEIGHTED 'C' EXHIBIT

DATE: 09/11/2020
JOB NUMBER 1727-00
KLAND PROJECT NUMBER: K15153

WCI
OF 1

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

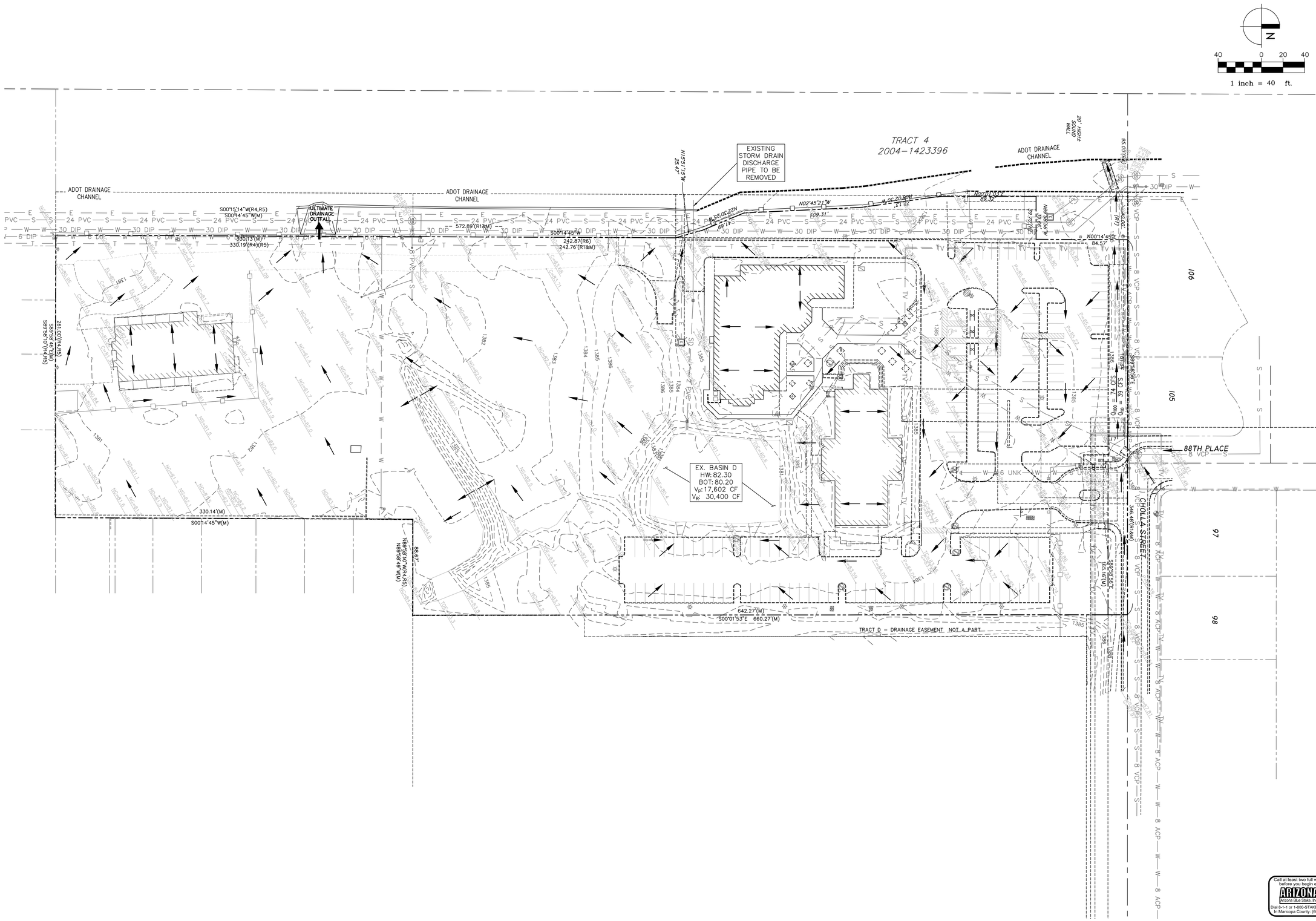
25-ZN-2018

25-ZN-2018
25_ZN_2018_3
12/15/2020

c:\2015\K15153 Megerdichian Senior Center\Dwg\CONCEPT\Concept1\153-Weighted C.dwg

APPENDIX E

Existing Drainage Map



aakaii architecture + interiors
7505 e mcdowell rd #700 scottsdale arizona 85260
480.588.5852
aakaii.com

MEGERDICHIAN SENIOR CENTER
8849 E. CHOLLA ST. SCOTTSDALE, AZ 85260

PRE-CONSTRUCTION PHASE

NO.	ISSUED FOR:	DATE
	REZONING & C.U.P.	12-13-2018
	REZONING & C.U.P. 2nd Review	08-03-2020

CONSTRUCTION PHASE

REV.	BULLETIN #	DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 31695 LESLIE J. KLAND Date Signed 12-15-20 ARIZONA
Expires 09/30/21

KLAND
CIVIL ENGINEERS
CIVIL ENGINEERING
LAND DEVELOPMENT SERVICES
LAND SURVEYING
7227 N. 16th St. Suite 217
Phoenix, Arizona 85020
PHONE: (480) 344-0480
www.klandeng.com

SHEET TITLE

EXISTING DRAINAGE MAP

DATE: 09/11/2020
JOB NUMBER 1727-00
KLAND PROJECT NUMBER: K15153

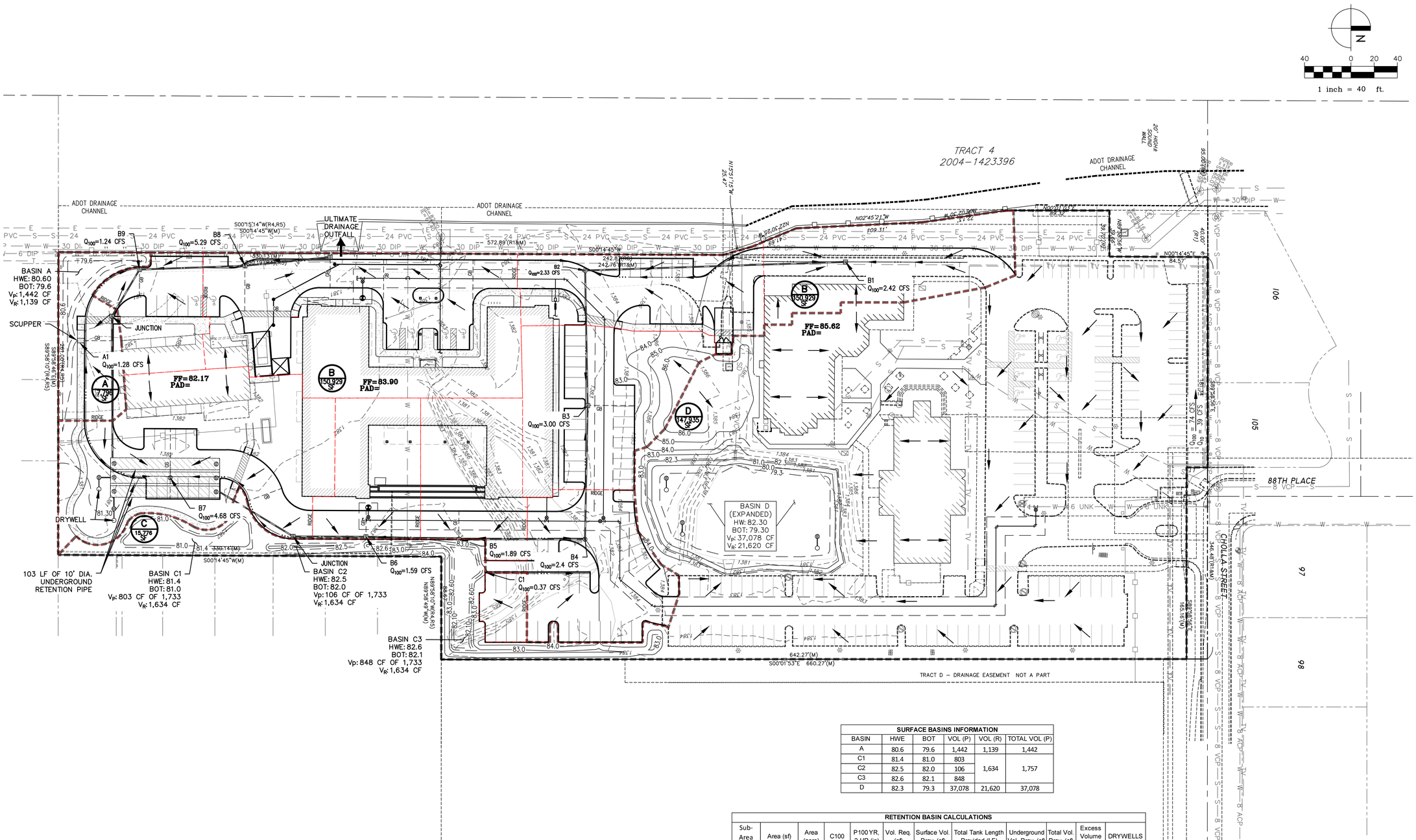
EX DM
OF 1

Call at least two full working days before you begin excavation.
ARIZONA 811 Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

25-ZN-2018

APPENDIX F

Proposed Drainage Map



SURFACE BASINS INFORMATION					
BASIN	HWE	BOT	VOL (P)	VOL (R)	TOTAL VOL (P)
A	80.6	79.6	1,442	1,139	1,442
C1	81.4	81.0	803	1,634	1,757
C2	82.5	82.0	106		
C3	82.6	82.1	848		
D	82.3	79.3	37,078	21,620	37,078

RETENTION BASIN CALCULATIONS											
Sub-Area (onsite)	Area (sf)	Area (acre)	C100	P100 YR, 2 HR (in)	Vol. Req. (cf)	Surface Vol. Prov. (cf)	Total Tank Length Provided (LF)	Underground Vol. Prov. (cf)	Total Vol. Prov. (cf)	Excess Volume (%)	DRYWELLS
A	7,796.00	0.18	0.79	2.22	1,139.39	1,442.0	0.0	0.0	1,442.0	26.6	0
B	150,929	3.465	0.79	2.22	22,058.3	0.0	282.0	22,148.2	22,148.2	0.4	2
C	15,776	0.362	0.56	2.22	1,634.4	1,757.0	0.0	0.0	1,757.0	7.5	0
D	147,935	3.396	0.79	2.22	21,620.7	37,078.0	0.0	0.0	37,078.0	71.5	3
Total	314,640.0	7.4	-	-	46,452.8	40,277.0	282.0	22,148.2	62,425.2	34.4	5

aakaii architecture + interiors
7505 e mcdonald rd #706 scottsdale arizona 85260
480.695.8852
aakaii.com

MEGERDICHIAN SENIOR CENTER
8849 E. CHOLLA ST.
SCOTTSDALE, AZ 85260

PRE-CONSTRUCTION PHASE

NO.	ISSUED FOR:	DATE
	REZONING & C.U.P.	12-13-2018
	REZONING & C.U.P. 2nd Review	08-03-2020

CONSTRUCTION PHASE

REV.	BULLETIN #	DATE

KLAND
CIVIL ENGINEERS
CIVIL ENGINEERING
LAND DEVELOPMENT SERVICES
LAND SURVEYING
7227 N. 16th St. Suite 217
Phoenix, Arizona 85020
PHONE: (480) 344-0480
www.klandeng.com

SHEET TITLE

PROPOSED DRAINAGE MAP

DATE: 09/11/2020
JOB NUMBER 1727-00
KLAND PROJECT NUMBER: K15153

DMI
OF 1

APPENDIX G

Master Plan

BENCHMARK

FOUND BRASS CAP IN HANDHOLE AT THE INTERSECTION OF 92ND STREET AND CHOLLA STREET. CITY OF SCOTTSDALE GPS POINT 8194.
ELEV = 1388.480 (NAVD '88, CITY OF SCOTTSDALE DATUM)

FOUND BRASS CAP IN HANDHOLE AT THE INTERSECTION OF 92ND STREET AND SHEA BOULEVARD. CITY OF SCOTTSDALE GPS POINT 8301.
ELEV = 1372.195 (NAVD '88, CITY OF SCOTTSDALE DATUM)

FOUND BRASS CAP IN HANDHOLE AT THE INTERSECTION OF 84TH STREET AND SHEA BOULEVARD. CITY OF SCOTTSDALE GPS POINT 3251.
ELEV = 1364.811 (NAVD '88, CITY OF SCOTTSDALE DATUM)

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF MARICOPA, STATE OF ARIZONA AND IS DESCRIBED AS FOLLOWS:
LOT 1, A PROPERTY ASSEMBLAGE IN THE CITY OF SCOTTSDALE, ARIZONA ARMENIAN APOSTOLIC CHURCH OF ARIZONA, ACCORDING TO BOOK 971 OF MAPS, PAGE 46, AND THEREAFTER AFFIDAVIT OF CORRECTION IN RECORDING NO. 2008-0228799, RECORDS OF MARICOPA COUNTY, ARIZONA.

BASIS OF BEARING

THE MONUMENT LINE OF 92ND STREET. SAID LINE BEARS SOUTH 00 DEGREES 01 MINUTES 20 SECONDS EAST.

FLOOD ZONE

ACCORDING TO THE FLOOD INSURANCE RATE MAP #04013C1760L, DATED OCTOBER 16, 2013, THIS PROPERTY IS LOCATED IN FLOOD ZONE "X".

ARCHITECT

AAKAII ARCHITECTURE AND INTERIORS
7585 E. REDFIELD RD., STE 106
SCOTTSDALE, AZ 85260
PH: (480) 588-5852
CONTACT:

ENGINEER

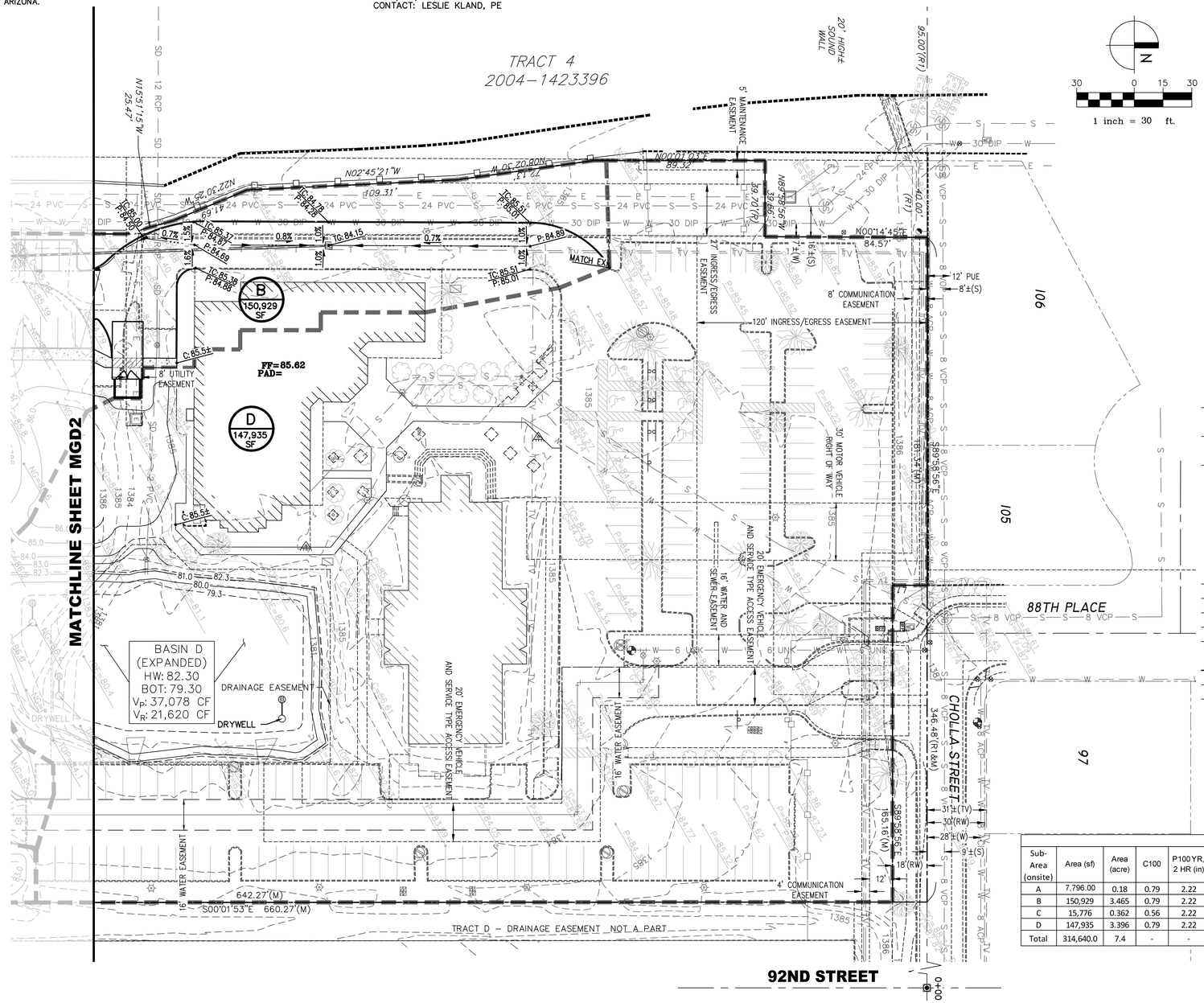
KLAND CIVIL ENGINEERS
7227 N. 16TH ST., STE 217
PHOENIX, AZ 85020
PH: (480) 344-0480
CONTACT: LESLIE KLAND, PE

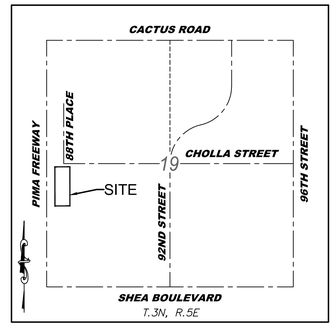
MASTER GRADING AND DRAINAGE PLAN

MEGERDICHIAN SENIOR CENTER

8849 EAST CHOLLA STREET, SCOTTSDALE, ARIZONA 85260

A PORTION OF LOT 3 IN THE SOUTHWEST QUARTER OF SECTION 19, TOWNSHIP 3 NORTH, RANGE 5 EAST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.





VICINITY MAP
N.T.S.

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	SURVEY MARKER	
	CURB AND GUTTER	
	SIDEWALK	
	SINGLE CURB	
NG=64.58	NATURAL GROUND	
TC=64.04 G=64.06	TOP OF CURB AND GUTTER	TC:64.04 G:64.06
C=63.88	CONCRETE ELEVATION	C:63.88
P=64.36	PAVEMENT ELEVATION	P:64.36
	FINISHED GRADE ELEVATION	FG:64.58
R=62.58 E=55.23	RIM AND INVERT ELEVATION	
1242	CONTOURS	51
	WATER FITTINGS	
	WATER METER	
W	WATER LINE	
	FIRE HYDRANT	
S	SEWER LINE	
	SEWER MANHOLE/CLEANOUT	
SD	STORM DRAIN	
	CATCH BASIN	
	UNDERGROUND STORAGE TANK	
	DRY WELL	
	GRADE BREAK/RIDGE	G.B. / RIDGE
	FLOWLINE	
	SLOPE	1.5%
	FINISHED FLOOR	FF=43.81 PAD=
G	GAS LINE/METER/VALVE	
E	ELECTRIC LINE/METER	
TV	CABLE/JUNCTION BOX	
T	COMMUNICATION LINE	
OHE	OVERHEAD ELECTRIC/POLE	
	VEGETATION	
	BOUNDARY LINE	
	CENTER LINE	
	EASEMENT	

SURFACE BASINS INFORMATION

BASIN	HWE	BOT	VOL (P)	VOL (R)	TOTAL VOL (P)
A	80.6	79.6	1,442	1,139	1,442
C1	81.4	81.0	803	1,634	1,757
C2	82.5	82.0	106		
C3	82.6	82.1	848		
D	82.3	79.3	37,078	21,620	37,078

RETENTION BASIN CALCULATIONS

Sub-Area (onsite)	Area (sf)	Area (acre)	C100	P100 YR, 2 HR (in)	Vol. Req. (cf)	Surface Vol. Prov. (cf)	Total Tank Length Provided (LF)	Underground Vol. Prov. (cf)	Total Vol. Prov. (cf)	Excess Volume (%)	DRYWELLS
A	7,796.00	0.18	0.79	2.22	1,139.39	1,442.0	0.0	0.0	1,442.0	26.6	0
B	150,929	3.465	0.79	2.22	22,058.3	0.0	282.0	22,148.2	22,148.2	0.4	2
C	15,776	0.362	0.56	2.22	1,634.4	1,757.0	0.0	0.0	1,757.0	7.5	0
D	147,935	3.396	0.79	2.22	21,620.7	37,078.0	0.0	0.0	37,078.0	71.5	3
Total	314,640.0	7.4	-	-	46,452.8	40,277.0	282.0	22,148.2	62,425.2	34.4	5

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

aakaii architecture + interiors
7585 e redfield • st #106 scottsdale arizona 85260 480.588.5852 aakaii.com

MEGERDICHIAN SENIOR CENTER
8849 E. CHOLLA ST. SCOTTSDALE, AZ 85260

PRE-CONSTRUCTION PHASE

NO.	ISSUED FOR:	DATE
	REZONING & C.U.P.	12-13-2018
	REZONING & C.U.P. 2nd Review	08-03-2020

CONSTRUCTION PHASE

REV.	BULLETIN #	DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 31695 LESLIE J. KLAND Date Signed 09-30-20 ARIZONA U.S.A. Expires 09/30/21

KLAND CIVIL ENGINEERS
CIVIL ENGINEERING
LAND DEVELOPMENT SERVICES
LAND SURVEYING
7227 N. 16th St. Suite 217
Phoenix, Arizona 85020
PHONE: (480) 344-0480
www.klandeng.com

SHEET TITLE

MASTER GRADING AND DRAINAGE PLAN

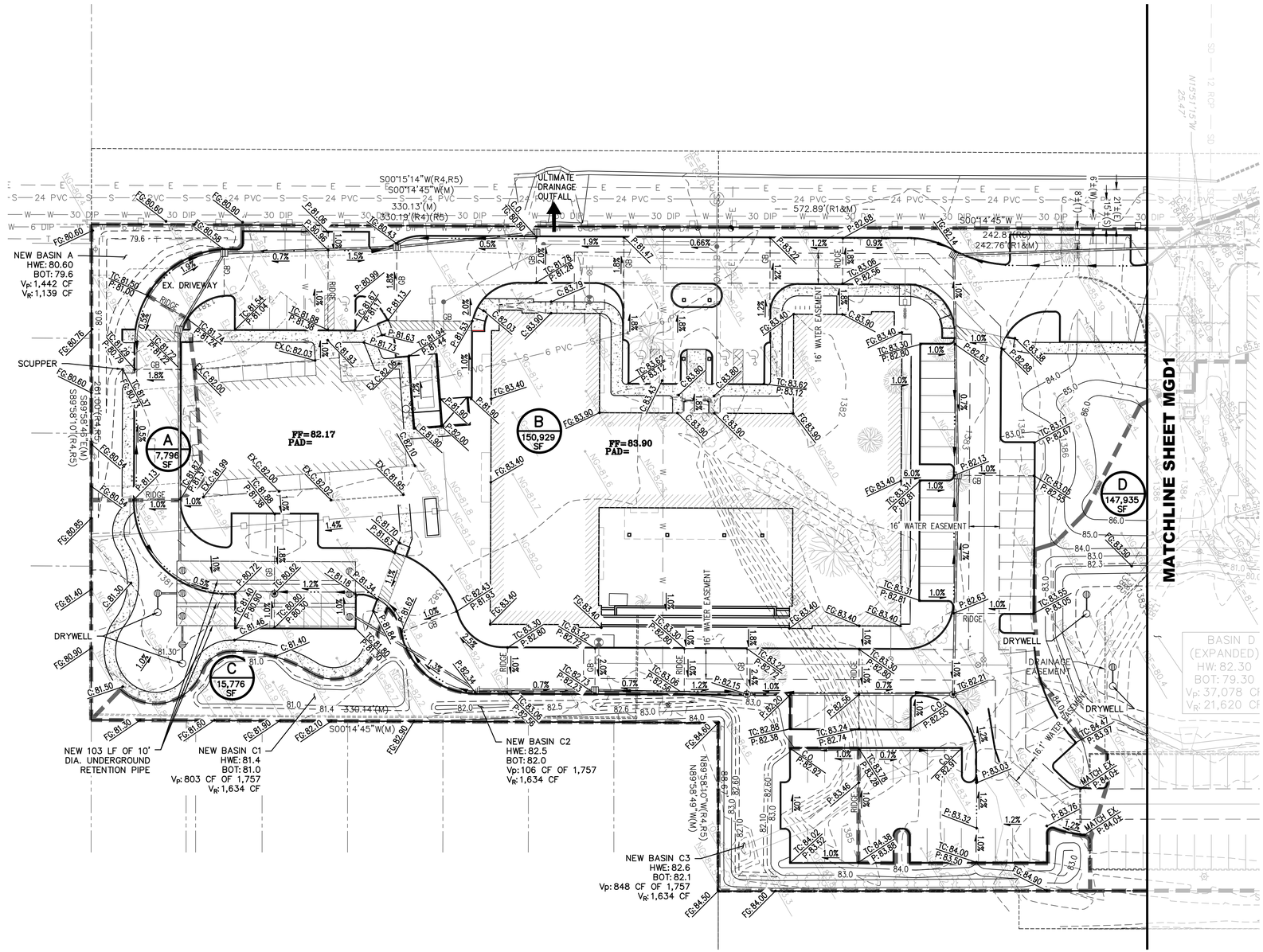
DATE: 09/11/2020
JOB NUMBER 1727-00
KLAND PROJECT NUMBER: K15153

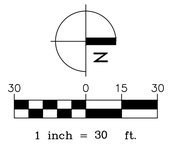
MGD1
OF 2

25-ZN-2018

K:\2015\K15153 Megerdichian Senior Center\Dwg\CONCEPT\Concept11\153-MP.dwg

25-ZN-2018
25-ZN-2018#3
12/15/2020





aakaii architecture + interiors
7505 e mcdonald ct #706 scottsdale arizona 85260
480.595.8652
aakaii.com

MEGERDICHIAN SENIOR CENTER
8849 E. CHOLLA ST.
SCOTTSDALE, AZ 85260

PRE-CONSTRUCTION PHASE

NO.	ISSUED FOR:	DATE
	REZONING & C.U.P.	12-13-2018
	REZONING & C.U.P. 2nd Review	08-03-2020

CONSTRUCTION PHASE

REV.	BULLETIN #	DATE

Registered Professional Engineer Civil
CERTIFICATE NO.
31695
LESLIE J. KLAND
Date Signed 11-25-20
ARIZONA
Expires 09/30/21

KLAND
CIVIL ENGINEERS
CIVIL ENGINEERING
LAND DEVELOPMENT
SERVICES
LAND SURVEYING
7227 N. 16th St. Suite 217
Phoenix, Arizona 85020
PHONE: (480) 344-0480
www.klandeng.com

SHEET TITLE

MASTER GRADING AND DRAINAGE PLAN

DATE: 09/11/2020
JOB NUMBER 1727-00
KLAND PROJECT NUMBER: K15153

MGD2
OF 2

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

25-ZN-2018

25-ZN-2018
12/15/2020

K:\2015\K15153 Meyerdichian Senior Center\Dwg\CONCEPT\Concept1\153--MP.dwg