



Drainage Reports

**PRELIMINARY DRAINAGE REPORT
FOR**

QUIKTRIP STORE No. 1418

McDowell Road and Pima Road

CITY OF SCOTTSDALE, ARIZONA

June 14, 2019



PREPARED FOR:
QUIKTRIP CORPORATION
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WLB No. 217025-A002-0400

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1 Introduction

1.1 Project Name, Location, Size, and Brief Description

This project name is QuikTrip Store #1418. The Site (QuikTrip Store #1418) lies within the southeast quarter of Section 36, Township 2 North, Range 4 East, of the Gila and Salt River Meridian, Maricopa County, Arizona. The approximate 2.4-acre site is located at the northwest corner of the intersection of McDowell Road and Pima Road in Scottsdale, AZ (Exhibit 1). The facility will be a convenience store and fueling station.

1.2 Type of Report

This Preliminary Drainage Report has been prepared for QuikTrip Store #1418. This report meets the outline of City of Scottsdale, *Design Standards & Policies Manual (DSPM)* (Ref. 2). The WLB Group Inc. has been contracted by QuikTrip Corporation. Final engineering design will follow and is not included in this report.

1.3 Purpose and Objectives of Drainage Report

This report is prepared to provide the hydrologic and hydraulic analyses for the existing drainage conditions and characteristics, and for the proposed drainage design.

2 Description of Existing Drainage Conditions and Characteristics

2.1 Existing Drainage and Characteristics

The Site is currently vacant and is fenced. The Site generally slopes to the south and it has an existing retention basin of 1-foot depth to the south. A valley gutter is located in an alley way along with the western boundary of the Site by south to McDowell road. The valley gutter has an average slope of 0.2%.

2.2 Off-Site Watershed

According to *Final Drainage Report for QT #1418 Scottsdale, AZ*, Atwell LLC (Ref. 5), the 100-year storm flow from an existing residential and commercial development (the North Property) located in the northern of the project site is currently retained on their storm drain system. Discharge of the North Property is assumed to be negligible. The flow of the west side of

the North Property is conveyed to south along with the existing valley gutter in the alley. See Exhibit 2, 3, and Appendix C.

A commercial property (Extra Space Storage) is located directly north of the Site and it has storm drain systems with catch basins, headwalls, and retention basins for the property. Based on *the Improvement Plans Plan for Monolith Storage – As-Built*, Helix Engineering, LLC (Ref 6.), the flow of this commercial property is assumed to be negligible. See Exhibit 3 and Appendix C.

2.3 Context of Adjacent Projects and Improvements

Directly to north of the Site is a commercial building (Extra Space Storage). To north of Extra Space Storage is a multiple family residential district. To the west of the Site is a commercial building (Sam's Market & Liquor). McDowell Road is located at the south of the Site. To the south of the McDowell Road is a commercial building which it was a car dealership building. To the east of the Site is Pima Road and east of this road is vacant.

2.4 Floodplain Designation

The Flood Insurance Rate Map (FIRM) for Maricopa County Arizona, and Incorporated Areas, Map Number 04013C2235L dated October 16, 2013 (Figure 6), as published by the Federal Emergency Management Agency (FEMA) (Ref. 3) shows the Site to lie within Zone "X" (shaded).

Zone "X" (shaded) is defined by FEMA as follows: Areas of 500-year flood; areas of 100-year flood with average depths of less than 1-foot or with drainage areas less than 1-square mile; and areas protected by levees from 100-year flood.

2.5 Site Photos

Site photos will be included in the Final Drainage Report.

3 Proposed Drainage Plan

3.1 Proposed Development Drainage

Stormwater of the gas tank canopy (drainage area 10) and the building roof (drainage area 40 and 50) will be drained to proposed basins (Basin B and Basin C) with roof drains. An Enviro Max Drywell System located at Basin B with 2 drywells will be utilized to scrub stormwater of petroleum based products prior to discharge in to the soil. Onsite runoff of drainage area 20,

30, 60, 70, and 110 will be conveyed to 5 curb openings. Drainage area 80, 90, 120, and 130 will be directly discharged to basins. Drainage area 100 is almost same as existing condition. The flow of drainage area 100 does not impact onsite and offsite for existing and proposed development). Therefore, the runoff of drainage area 100 is negligible. Table 1 shows the summary of onsite flow discharge and drainage areas are shown in Exhibit 5.

Retention basins have been designed for 100-year 2-hour storm event. All basins will be designed with drywell system to drain stormwater within 36-hours. Basin locations & calculations and drywell calculations are included in Exhibit 5 and Appendix B.

Table 1: Onsite Flow Discharge Summary

Drainage Area ID	Flow Drain	Flow to
10	roof drain	Basin B
20	curb opening	Basin B
30	curb opening	Basin B
40	roof drain	Basin B
50	roof drain	Basin C
60	curb opening	Basin C
70	curb opening	Basin C
80	over land	Basin C
90	over land	Basin D
100	Flow is negligible	
110	curb opening	Basin A
120	over land	Basin A
130	over land	Basin B

3.2 Future Drainage

There are no future projects with impacts to the project site.

3.3 Stormwater Storage

As shown Table 2, the Site requires 13,555 cubic feet storage volume. Four retention basins will provide 14,003 cubic feet. There is 448 cubic feet excess volume for the four basins. Basin A has 1,326 cubic feet shortage volume. Basin A and Basin B have an equalized pipe and Basin B has 1,393 cubic feet extra storage volume. Both Basin A and Basin B combined have 67

cubic feet excess volume. Basin C has 320 cubic feet shortage volume. Basin C and Basin D have an equalized pipe and Basin D has 702 cubic feet extra storage volume. Both Basin A and Basin B combined have 381 cubic feet excess volume. See Exhibit 5 and Appendix B for details.

Table 2: Retention Summary

Retention Basin ID	Drainage Area (SF)	Volume Required (CF)	Volume Provided (CF)	Excess Volume (CF)	Volume from other basins (CF)	Total Excess Volume (CF)	Note
Basin A	24,109	3,576	2,249	-1,326	-	-	Basin A and B are connected with a 12" equalized pipe
Basin B	49,928	7,113	8,506	1,393	1,326*	67**	
Basin C	20,106	2,734	2,414	-320	-	-	Basin C and D are connected with a 12" equalized pipe
Basin D	1,639	133	834	702	320***	381****	

*Shortage volume from Basin A

**1,393-CF (Excess Volume at Basin B) – 1,326-CF (Shortage volume from Basin A) = 67-CF (Total Excess volume)

***Shortage volume from Basin C

****702-CF (Excess Volume at Basin D) – 320-CF (Shortage volume from Basin C) = 381-CF (Total Excess volume)

3.4 Pre- and Post Runoff Characteristics

The outfall of the pre-development condition is located at southeast corner of the site and it has an approximate 1221 feet elevation. The outfall of the post-development is located at southeast corner of the site and it will be 1221 feet in elevation.

4 Special Conditions

401 and 404 permits are not necessary since there are no washes within the Site. Arizona Pollutant Discharge Elimination System (AZPDES) will be complied with for this Site.

5 Data Analysis Methods

5.1 Hydrologic Procedures

The Rational Method was used to calculate the peak discharges for pre- and post-development conditions in accordance with the City of Scottsdale, *Design Standards & Policies*

Manual (Ref. 1) and the FCDMC's *Drainage Design Manual for Maricopa County, Hydrology* (Ref. 4) as shown below. Peak discharges for the 2-, 10-, 25-, 50- and 100-year storm events have been prepared.

$$Q = CiA$$

Where: Q = the peak discharge, in cfs, from a given area

C = a coefficient relating the runoff to rainfall

i = average rainfall intensity, in inches/hour, lasting for a T_c

T_c = the time of concentration, in hours

A = drainage area, in acres

Runoff Coefficients ("C" Values) were determined using parameters as found within the City of Scottsdale, *Design Standards & Policies Manual* (Ref. 1), and were weighted based on existing and proposed conditions.

The rainfall intensity and depth are specific to the Site and has been provided by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 data with upper 90% confidence intervals. The rainfall intensity (i) for a drainage area depends on the time of concentration (T_c), with a minimum of 5 minutes. The T_c is calculated with the following equation from the FCDMC's *Drainage Design Manual for Maricopa County, Hydrology* (Ref. 4):

$$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Where: T_c = the time of concentration, in hours

L = length of the longest flow path, in miles

K_b = watershed resistance coefficient

S = watercourse slope, in feet/mile

i = rainfall intensity, in inches/hour

The drainage area, longest flow path, high and low elevations, and slopes for each watershed are based on the proposed grading design for the Site. All drainage area's names and locations are shown on Exhibit 5. The calculations of peak discharges for each drainage area are included in Appendix A.

5.2 Hydraulic Procedures

5.2.1 Curb Opening

The curb opening calculations were computed using Bentley's FlowMaster V8i (Ref. 8). See Appendix B for detail calculations

5.2.2 Drywell

The number of drywells required and discharge time were calculated with following equations:

$$\text{Number of Drywells Required} = (V_R / Q) / (60 \times 60 \times 36)$$

$$\text{Discharge time (hr)} = (V_R / Q) / (60 \times 60)$$

Where,

V_R = Retention Required

Q = Percolation rate per drywell = 0.10 cfs

*Required drywells to drain basin in 36 hours

0.22-cfs of Envibro-Max process capacity was used for the Envibro-Max calculation. Two drywells fit with an Envibro-Max system are needed. The detail calculations are included in Appendix B.

5.3 Stormwater Storage Calculation Methods and Assumptions

Based on the City of Scottsdale, *Design Standards & Policies Manual* (Ref 1.), the Site has been designed to retain onsite runoff resulting from a 100-year, 2-hour storm event. The required retention volume for the Site is calculated as the following:

$$V_r = C (R/12)A$$

Where,

V_r = required storage volume in cubic feet

R = precipitation amount = depth in inches of 100-year 2-hour rainfall (2.16 inches)

A = drainage area (square feet)

C = Runoff Coefficient

The runoff coefficients are 0.95 for paved street & roof areas and 0.45 for retention basins (Undisturbed natural desert or desert landscaping). The required volumes and provided volumes are listed in Table 2, which indicates that adequate retention volumes have been provided (See Appendix B).

Drywells are required to drain the retention basin within 36-hours after a storm event. Based on an assumed disposal rate of 0.1 cfs, a total of 5 drywells are required to drain the all retention basins.

6 Conclusions

1. This drainage report was prepared in accordance with the recommendations and design parameters from the most current DSPM of the City of Scottsdale (Ref. 1) and the FCDMC's manuals (Ref. 4 and Ref. 5).
2. This Site (QuikTrip 1418) is not impacted by off-site stormwater and the proposed improvement will not impact the existing off-site flows.
3. The proposed finish floor elevation (1223.50 feet) is 2.5 feet higher than the ultimate outfall location (1221.00 feet). This is more than adequate to protect the building from flooding. The outfall is located to the southeast corner.

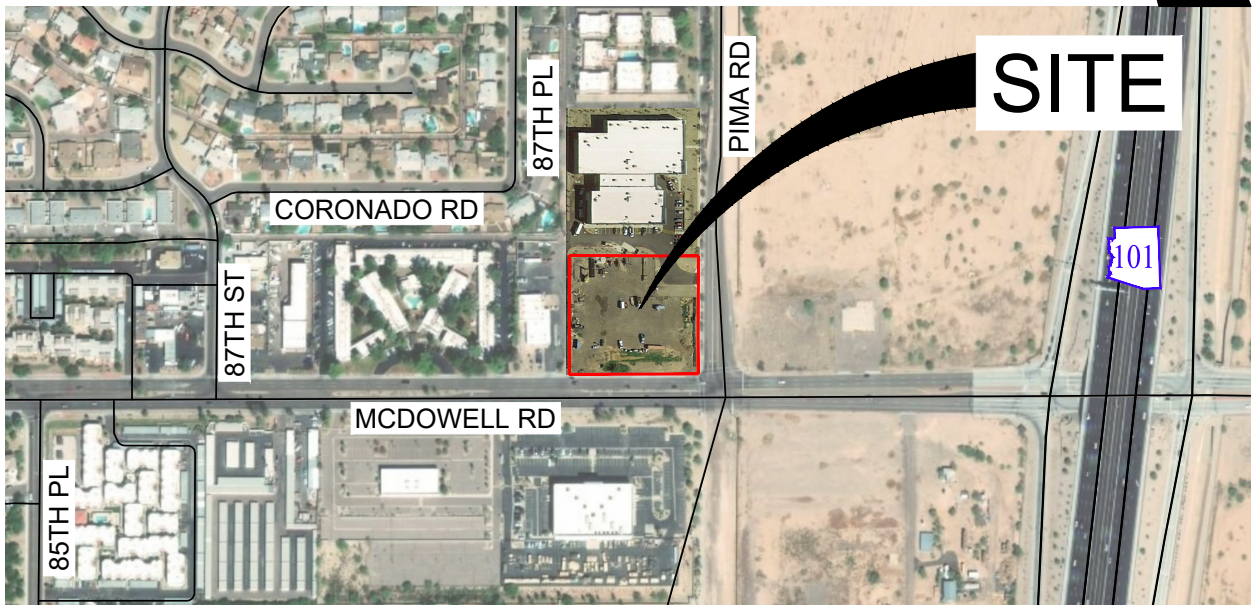
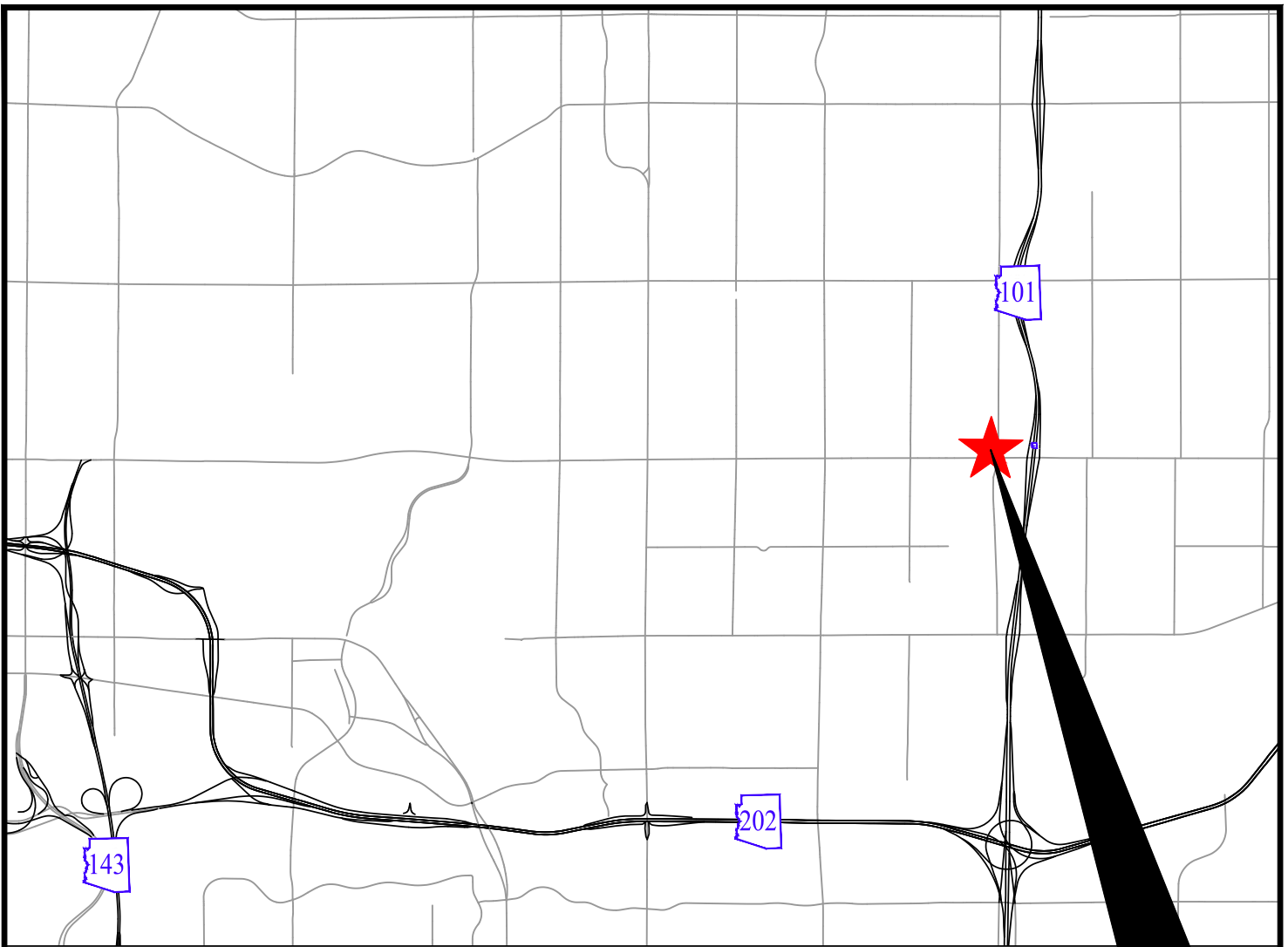
7 Warning and Disclaimer of Liability

The Warning and Disclaimer of Liability is included in Appendix A.

8 References

1. City of Scottsdale, *Design Standards & Policies Manual*, 2018.
2. City of Scottsdale, *Design Standards & Policies Manual*, 2010.
3. Federal Emergency Management Agency, *Flood Insurance Rate Maps for Maricopa County Arizona, and Incorporated Areas, Map Number 04013C2235L*, dated October 16, 2013.
4. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona - Volume I Hydrology*, August 2013.
5. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona: Volume II- Hydraulics*, August 2013
6. Atwell LLC, *Final Drainage Report for QT #1418 Scottsdale, AZ*, October 2012.
7. Helix Engineering, LLC, *Improvement Plans Plan for Monolith Storage 1650 N. Pima Rd, Scottsdale, AZ 85257- As-Built*, September 5th 2017.
8. Bentley Systems, incorporated, *Bentley FlowMaster V8i*.

Exhibit 1 Vicinity Map



Engineering • Planning
Surveying • Landscape
Architecture • Urban Design

Offices located in: Tucson, Phoenix,
Flagstaff, AZ and Las Vegas, NV
1600 W. Broadway Rd.,
Ste. 150
Tempe AZ. 85282
(480) 736-1600

QUIKTRIP STORE #1418 VICINITY MAP

WLB JOB No. 219006-A-001



NO SCALE



50-DR-2011#2

7/31/2019

Exhibit 2 Existing Conditions

A.L.T.A./N.S.P.S. LAND TITLE SURVEY

A PORTION OF THE SOUTHEAST QUARTER
OF SECTION 36, TOWNSHIP 2 NORTH, RANGE 4 EAST,
OF THE GILA AND SALT RIVER BASE AND MERIDIAN,
MARICOPA COUNTY, ARIZONA

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, MINOR SUBDIVISION OF "QUIKTRIP #1418", ACCORDING TO THE PLAT RECORDED IN BOOK 1172 OF MAPS, PAGE 22, RECORDS OF MARICOPA COUNTY, ARIZONA.

APN: 131-49-160

BASIS OF BEARING

THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SECTION 36, MONUMENTED AS SHOWN HEREON AS BEARING S89°50'20"W

BENCHMARK

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF MCDOWELL AND GRANITE REEF CITY OF SCOTTSDALE BENCHMARK #5011

ELEVATION = 1218.037 (NAVD88)

PARCEL AREA

103,249 SQ. FT., OR 2.37 ACRES, MORE OR LESS.

PERTINENT RECORD REFERENCES

- SCOTTSDALE ESTATES TWELVE AS RECORDED IN BOOK 91 OF MAPS, PAGE 22, M.C.R.
- PIMA MEADOWS 3, AS RECORDED IN BOOK 144 OF MAPS, PAGE 21 M.C.R.
- IRVINE PARK CONDOMINIUMS OF SCOTTSDALE ARIZONA, AS RECORDED IN BOOK 253 OF MAPS, PAGE 21, M.C.R.
- GOACS SURVEY AS RECORDED IN BOOK 734 OF MAPS, PAGE 10, M.C.R.
- A MINOR SUBDIVISION OF "QUICKTRIP #1418" AS RECORDED IN BOOK 1172, PAGE 22, M.C.R.

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

COMMUNITY NUMBER	PANEL NUMBER (PANEL DATE)	SUFFIX	FIRM ZONE	BASE FLOOD ELEVATION (IN AD ZONE, USE DEPTH)
045012	2235 OCT. 16, 2013	L	X	

ZONE "X" IS DEFINED AS "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."

UTILITY TABLE

UTILITY	PROVIDER	DATE ORDERED	RESULTS
ELECTRIC	SALT RIVER PROJECT	6/25/10	SHOWN ON SURVEY
GAS	SOUTHWEST GAS	6/25/10	SHOWN ON SURVEY
IRRIGATION	SALT RIVER PROJECT	4/23/19	NOTHING RECEIVED
WATER	CITY OF SCOTTSDALE	4/23/19	SHOWN ON SURVEY
SEWER	CITY OF SCOTTSDALE	4/23/19	SHOWN ON SURVEY
STORM DRAIN	CITY OF SCOTTSDALE	4/23/19	SHOWN ON SURVEY
CATV	COX COMMUNICATIONS	6/25/10	SHOWN ON SURVEY

NOTE: IRRIGATION IS SHOWN HEREON AS IT APPEARS IN CITY OF SCOTTSDALE MAPS. INFORMATION HAS NOT BEEN RECEIVED FROM THE PROVIDER, SALT RIVER PROJECT.

"SCHEDULE B" EXCEPTIONS

- PROPERTY TAXES, WHICH ARE A LIEN NOT YET DUE AND PAYABLE, INCLUDING ANY ASSESSMENTS COLLECTED WITH TAXES TO BE LEVIED FOR THE YEAR 2019.
- PROPERTY TAXES, INCLUDING ANY PERSONAL PROPERTY TAXES AND ANY ASSESSMENTS COLLECTED WITH TAXES, FOR THE SECOND INSTALLMENT OF 2018 TAXES.
- ANY OUTSTANDING LIABILITIES AND OBLIGATIONS, INCLUDING UNPAID ASSESSMENTS, IMPOSED UPON SAID LAND BY REASON OF: (A) INCLUSION THEREOF WITHIN THE BOUNDARIES OF THE SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT; (B) MEMBERSHIP OF THE OWNER THEREOF IN THE SALT RIVER VALLEY WATER USERS' ASSOCIATION, AN ARIZONA CORPORATION AND (C) THE TERMS OF ANY WATER RIGHT APPLICATION MADE UNDER THE RECLAMATION LAWS OF THE UNITED STATES FOR THE PURPOSES OF OBTAINING WATER RIGHTS FOR SAID LAND.

4. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:

PURPOSE: INGRESS AND EGRESS
RECORDING NO: DOCKET 8919, PAGE 196
(AS SHOWN ON SURVEY)

5. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:

PURPOSE: HIGHWAY
RECORDING NO: DOCKET 3884, PAGE 164
(AS SHOWN ON SURVEY)

6. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:

PURPOSE: RIGHT OF WAY
RECORDING NO: DOCKET 7258, PAGE 869
RECORDING NO: DOCKET 7262, PAGE 624
(AS SHOWN ON SURVEY)

7. ANY EASEMENTS OR RIGHTS OF WAY FOR EXISTING UTILITIES OR OTHER RIGHTS OF WAY OVER THOSE PORTIONS OF SAID LAND SET FORTH IN ARIZONA DEPARTMENT OF TRANSPORTATION SPECIAL WARRANTY DEED RECORDED AUGUST 30, 2004 RECORDED IN DOCUMENT NO. 2004-1008148
(AS SHOWN ON SURVEY)

8. A RESOLUTION IN FAVOR OF CITY OF SCOTTSDALE FOR:

DESIGNATING A PORTION OF THE CITY AS A SINGLE CENTRAL BUSINESS DISTRICT LOCATED ENTIRELY WITHIN THE LOS ACROS REDEVELOPMENT AREA
RECORDING DATE: JUNE 29, 2010
RECORDING NO: 2010-0549775
(AFFECTS THE PROPERTY, BUT NOT THE SURVEY)

9. MATTERS CONTAINED IN THAT CERTAIN DOCUMENT

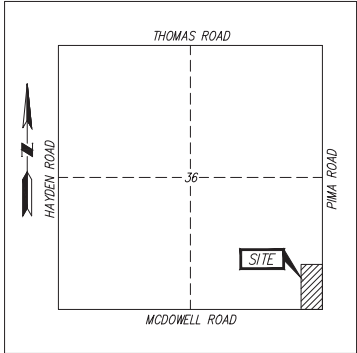
ENTITLED: WAIVER OF RIGHT TO MAKE A CLAIM UNDER PROPOSITION 207
RECORDING DATE: JUNE 30, 2011
RECORDING NO: 2011-0547791
REFERENCE IS HEREBY MADE TO SAID DOCUMENT FOR FULL PARTICULARS.
(AFFECTS THE PROPERTY, BUT NOT THE SURVEY)

10. EASEMENTS, COVENANTS, CONDITIONS AND RESTRICTIONS AS SET FORTH ON THE PLAT RECORDED IN BOOK 1097 OF MAPS, PAGE 48.
(AS SHOWN ON SURVEY)

11. MATTERS CONTAINED IN THAT CERTAIN DOCUMENT

ENTITLED: WAIVER OF RIGHT TO MAKE A CLAIM UNDER PROPOSITION 207
RECORDING DATE: MAY 22, 2012
RECORDING NO: 2012-0434765
REFERENCE IS HEREBY MADE TO SAID DOCUMENT FOR FULL PARTICULARS.
(AFFECTS THE PROPERTY, BUT NOT THE SURVEY)

12. EASEMENTS, COVENANTS, CONDITIONS AND RESTRICTIONS AS SET FORTH ON THE PLAT RECORDED IN BOOK 1172 OF MAPS, PAGE 22.
(AS SHOWN ON SURVEY)



VICINITY MAP

SECTION 36
T.2N., R.4E., G.&S.R.B.&M.
MARICOPA COUNTY, ARIZONA

GENERAL NOTES

- THE SURVEY DEPICTED HEREON WAS CONSTRUCTED UTILIZING THE CONDITION OF TITLE REPORT ORDER NO. 01907207-003-B64-SA, AS PREPARED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY, DATED 03/22/2019.
- THIS SURVEY WAS CONDUCTED ON THE GROUND OF THE PREMISES BY THE WLB GROUP, INC., AS DEPICTED HEREON IN APRIL, 2019.
- THIS SURVEY REFLECTS ABOVE GROUND INDICATIONS OF UTILITIES. THE SURVEYOR DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ADDITIONALLY, AS PER THE 2016 ALTA STANDARDS: WITH REGARD TO TABLE A, ITEM 11, SOURCE INFORMATION FROM PLANS AND MARKINGS WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES TO DEVELOP A VIEW OF THOSE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.
- THE CONTOURS SHOWN HEREON ARE 1 FOOT INTERVALS AND ARE BASED UPON THE DATUM RELATED TO THE BENCHMARK NOTED IN THE BENCHMARK NOTE SECTION ON THIS SURVEY.
- THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
- THERE IS NO OBSERVABLE EVIDENCE OF SITE USE AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
- THIS SURVEY IS THE PROPERTY OF THE WLB GROUP, INC. TRANSFER OR REASSIGNMENT TO ANY PARTY OTHER THAN THOSE CERTIFIED BELOW IS PROHIBITED UNLESS OTHERWISE STATED IN WRITING BY THE WLB GROUP, INC.

CERTIFICATE OF SURVEY

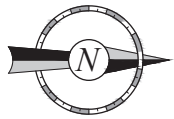
- TO:
- QUIKTRIP CORPORATION, AN OKLAHOMA CORPORATION
 - COMMONWEALTH LAND TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS. THE FIELD WORK WAS COMPLETED IN APRIL, 2019.

C. Don Walding, R.L.S. 33880
THE WLB GROUP, INC.
1600 W. BROADWAY ROAD, SUITE 150
TEMPE, ARIZONA 85282
PHONE: 480-736-1600
dwalding@wlbgroup.com

05-01-19
DATE





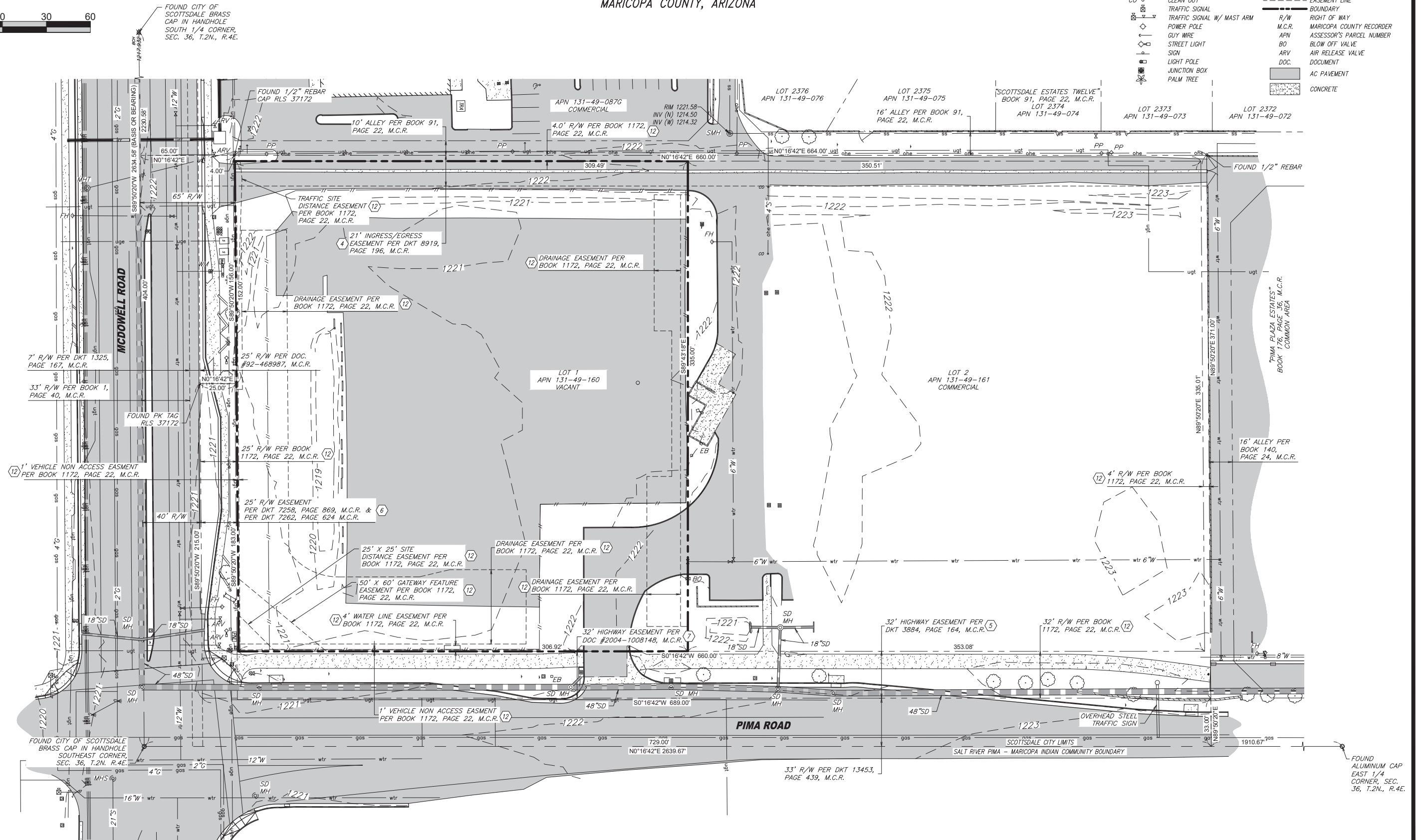
30 15 0 30 60

A.L.T.A./N.S.P.S. LAND TITLE SURVEY

A PORTION OF THE SOUTHEAST QUARTER
OF SECTION 36, TOWNSHIP 2 NORTH, RANGE 4 EAST,
OF THE GILA AND SALT RIVER BASE AND MERIDIAN,
MARICOPA COUNTY, ARIZONA

LEGEND

- BRASS CAP IN HANDHOLE
- FOUND MONUMENT AS NOTED
- SET MONUMENT AS NOTED
- VALVE
- FIRE HYDRANT
- WATER METER
- SEWER MANHOLE
- CLEAN OUT
- TRAFFIC SIGNAL
- TRAFFIC SIGNAL W/ MAST ARM
- POWER POLE
- GUY WIRE
- STREET LIGHT
- SIGN
- LIGHT POLE
- JUNCTION BOX
- PALM TREE
- IRRIGATION CONTROL VALVE
- STORM DRAIN LINE
- WALL
- FENCE
- RIGHT OF WAY LINE
- SECTION LINE
- CENTERLINE
- EASEMENT LINE
- BOUNDARY
- R/W
- M.C.R.
- APN
- BO
- ARV
- DOC.
- AC PAVEMENT
- CONCRETE



The WLB Group

Engineering • Planning • Surveying
Landscape Architecture • Urban Design
Offices located in: Tucson, Phoenix,
Flagstaff, and Las Vegas, NV.
1600 W Broadway Rd, Ste. 150
Tempe Az. 85282 PH.(480) 736-1600

QUIKTRIP #1418 @ PIMA RD AND MCDOWELL RD

A PORTION OF THE SOUTHEAST QUARTER
OF SECTION 36, TOWNSHIP 2 NORTH, RANGE 4 EAST,
OF THE GILA AND SALT RIVER BASE AND MERIDIAN,
MARICOPA COUNTY, ARIZONA

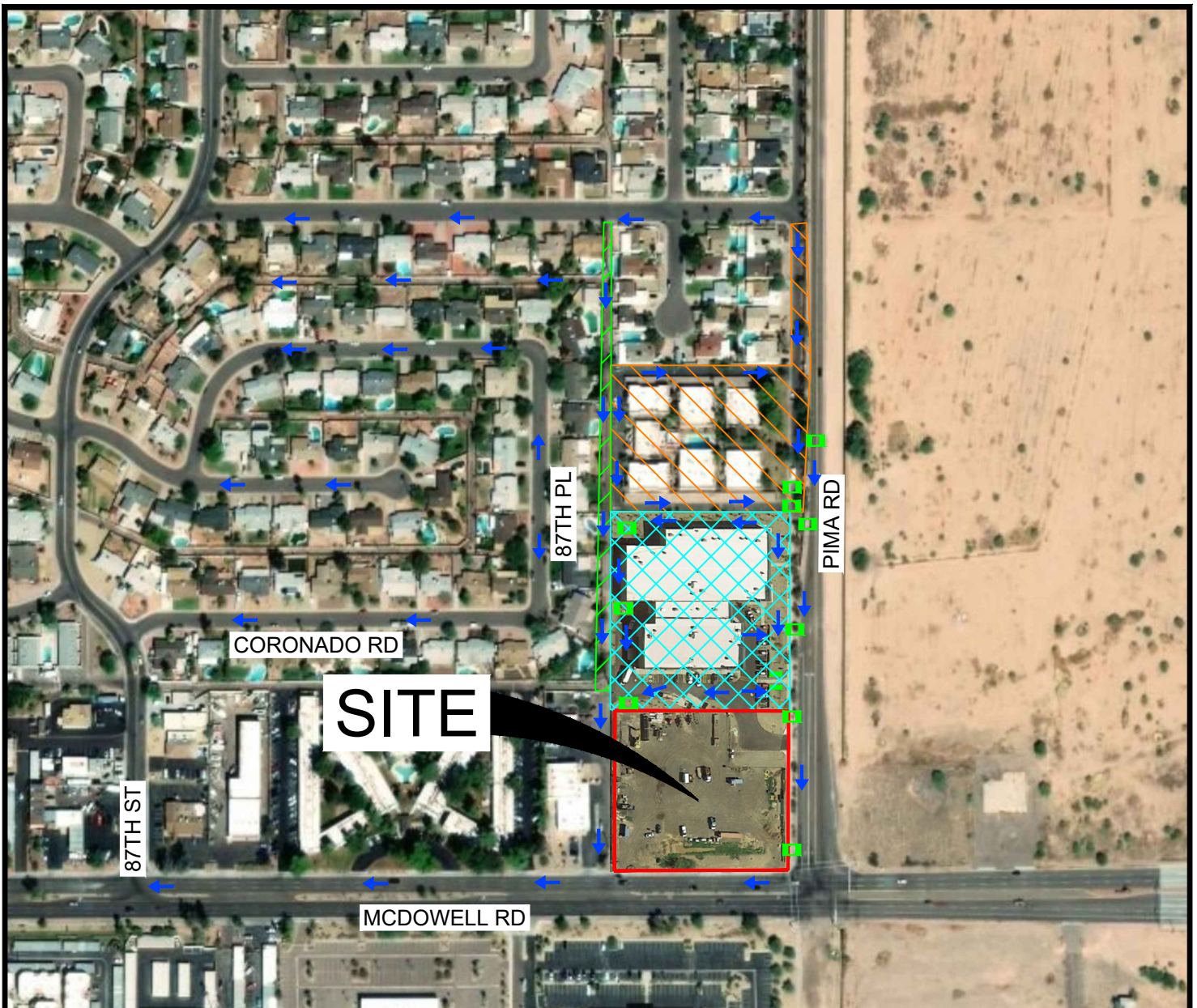
No.	Date	Item	Scale	NONE
			Job #	2190006A001
			Date	05/01/19
			Drawn By	RAM
			Checked By	CDW

Sheet 2

50-DR-2011#2

7/31/2019

Exhibit 3 Offsite Drainage Map



0' 150' 300' 600'



SCALE: 1" = 300'

LEGEND

← OFF-SITE FLOW ARROW

■ EXISTING CATCH BASIN

— EXISTING HEADWALL



STORMWATER FROM THE ALLEY WILL BE CONVEYED SOUTH TO THE VALLEY GUTTER WEST OF THE PROJECT SITE TOWARD MCDOWELL ROAD.



STORMWATER FROM THE APARTMENT COMPLEX AND THE FRONTAGE ROAD WILL FLOW TO THE CATCH BASINS IN THE SOUTHEAST OF THE APARTMENT COMPLEX.



STORMWATER FROM THE COMMERCIAL BUILDING (EXTRA SPACE STORAGE) WILL FLOW TO THREE CATCH BASINS IN THE WEST OF THE BUILDING AND FLOW TO TWO HEADWALLS IN THE SOUTHEAST OF THE BUILDING.

CONCLUSION:

THE WATERSHEDS FROM THE COMMERCIAL SUB DIVISION AND FROM RESIDENTIAL SUBDIVISION TO THE NORTH SIDE OF THE PROJECT DO NOT AFFECT THE PROJECT SITE BECAUSE THE FLOW IS CONVEYED TO THEIR STORM DRAIN SYSTEM.



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QUIKTRIP STORE #1418 OFF-SITE DRAINAGE MAP

WLB JOB No. 219006-A-001



50-DR-2011#2

7/31/2019

Exhibit 4 Aerial Map



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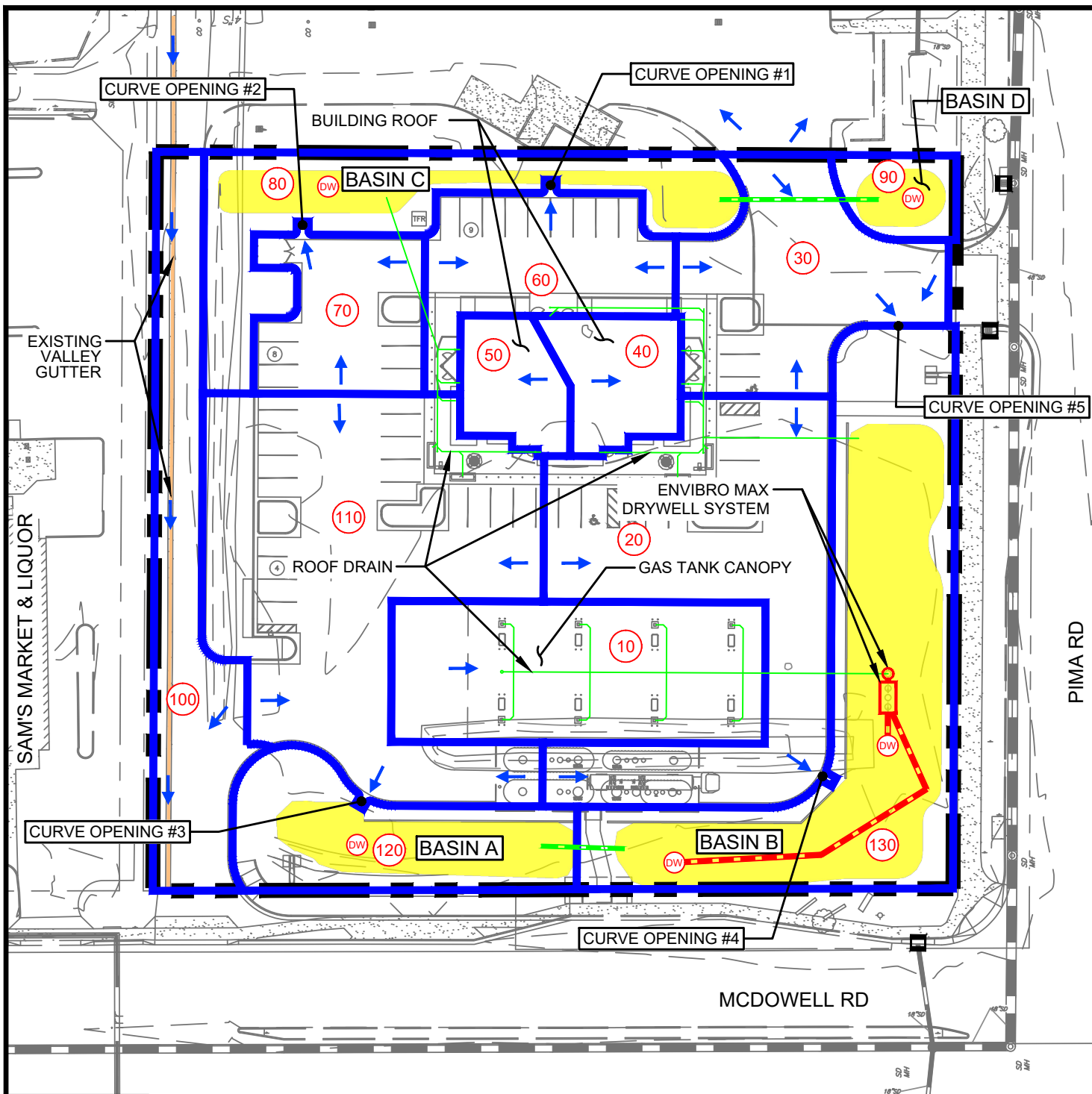
QUIKTRIP STORE #1418 AERIAL MAP

WLB JOB No. 219006-A-001



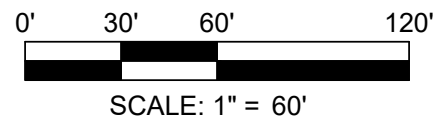
50-DR-2011#2
7/31/2019

Exhibit 5 Onsite Drainage Map



LEGEND

- | | | | |
|--|------------------------|--|----------------------|
| | PROPERTY BOUNDARY | | EQUALIZED PIPE |
| | DRAINAGE AREA BOUNDARY | | PROPOSED SD PIPE |
| | ROOF DRAIN | | EXISTING SD |
| | EXISTING VALLEY GUTTER | | EXISTING CATCH BASIN |
| | DRAINAGE AREA I.D. | | DETENTION BASIN |
| | FLOW DIRECTION ARROW | | |
| | PROPOSED DRYWELL | | |



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QUIKTRIP STORE #1418 ON-SITE DRAINAGE MAP

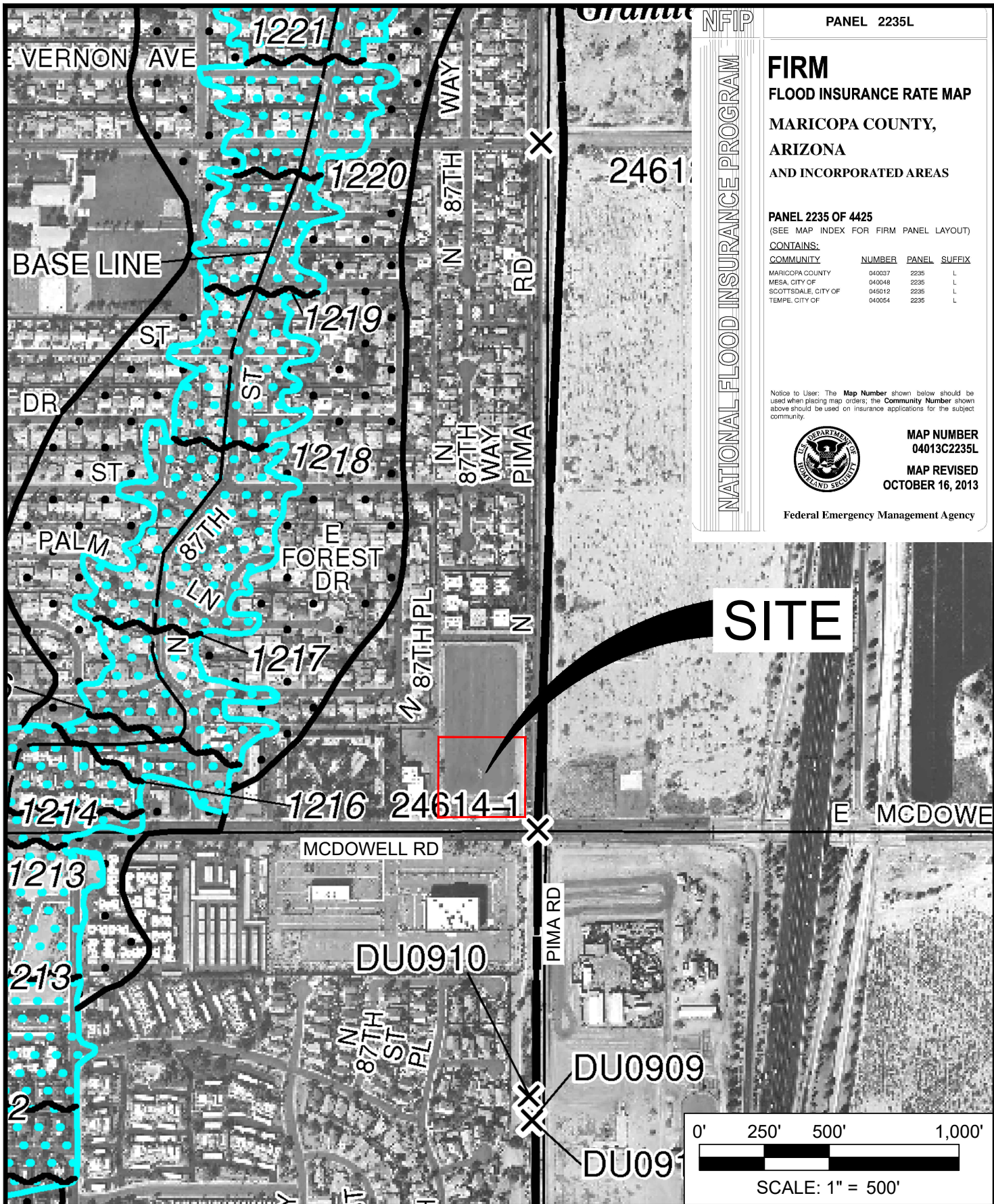
WLB JOB No. 219006-A-001



50-DR-2011#2

7/31/2019

Exhibit 6 FIRM (Flood Insurance Rate Map)



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2235L

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

PANEL 2235 OF 4425
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	2235	L
MESA, CITY OF	040048	2235	L
SCOTTSDALE, CITY OF	045012	2235	L
TEMPE, CITY OF	040054	2235	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
04013C2235L
MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

SITE

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QUICKTRIP STORE
#1418
FLOOD INSURANCE RATE MAP (FIRM)

WLB JOB No. 219006-A-001



50-DR-2011#2

7/31/2019

Q:\QuickTrip\Store 1418\Hydro\219006A001_E6 FIRM Map.dwg
 DATE: June 11, 2019

Appendix A: Hydrologic Analysis

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding. The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the city is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect 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.

Plan Check #

Owner

Date

Rainfall Data Summary per NOAA Atlas 14

WLB JOB #

219006A001

QuikTrip Store #1418

Designed:	Name
Date:	6/13/2019

Reference: NOAA Atlas 14, taken from the Precipitation Frequency Data Server (PFDS)

<http://hdsc.nws.noaa.gov/hdsc/pfds/index.html>

5/30/2019

Notes: (1) Values for 5, 10, 15, 30, 60, and 120-minute intensities taken from NOAA Atlas 14.

(2) Remaining intensity values were interpolated between known values.

Storm Event	Precipitation Depth (inches)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
1-hr	0.75	1.02	1.23	1.51	1.73	1.95
2-hr	0.86	1.16	1.38	1.69	1.92	2.16
6-hr	1.10	1.42	1.66	2.00	2.27	2.55

Tc (min.)	Site-Specific Precipitation Intensity (inches/hour)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	2.87	3.90	4.69	5.76	6.60	7.44
10	2.18	2.97	3.57	4.39	5.02	5.66
15	1.80	2.45	2.95	3.63	4.15	4.68
30	1.22	1.65	1.99	2.44	2.79	3.15
60	0.75	1.02	1.23	1.51	1.73	1.95
120	0.43	0.58	0.69	0.84	0.96	1.08

Tc (min.)	Site-Specific Precipitation Intensity (inches/hour)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	2.87	3.90	4.69	5.76	6.60	7.44
6	2.73	3.71	4.47	5.49	6.28	7.08
7	2.59	3.53	4.24	5.21	5.97	6.73
8	2.46	3.34	4.02	4.94	5.65	6.37
9	2.32	3.16	3.79	4.66	5.34	6.02
10	2.18	2.97	3.57	4.39	5.02	5.66
11	2.10	2.87	3.45	4.24	4.85	5.46
12	2.03	2.76	3.32	4.09	4.67	5.27
13	1.95	2.66	3.20	3.93	4.50	5.07
14	1.88	2.55	3.07	3.78	4.32	4.88
15	1.80	2.45	2.95	3.63	4.15	4.68
16	1.76	2.40	2.89	3.55	4.06	4.58
17	1.72	2.34	2.82	3.47	3.97	4.48
18	1.68	2.29	2.76	3.39	3.88	4.37
19	1.65	2.24	2.69	3.31	3.79	4.27
20	1.61	2.18	2.63	3.23	3.70	4.17
21	1.57	2.13	2.57	3.15	3.61	4.07
22	1.53	2.08	2.50	3.07	3.52	3.97
23	1.49	2.02	2.44	3.00	3.42	3.86
24	1.45	1.97	2.37	2.92	3.33	3.76
25	1.41	1.92	2.31	2.84	3.24	3.66
26	1.37	1.86	2.25	2.76	3.15	3.56
27	1.34	1.81	2.18	2.68	3.06	3.46
28	1.30	1.76	2.12	2.60	2.97	3.35
29	1.26	1.70	2.05	2.52	2.88	3.25
30	1.22	1.65	1.99	2.44	2.79	3.15

Tc (min.)	Site-Specific Precipitation Intensity (inches/hour)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
31	1.20	1.63	1.96	2.41	2.75	3.11
32	1.19	1.61	1.94	2.38	2.72	3.07
33	1.17	1.59	1.91	2.35	2.68	3.03
34	1.16	1.57	1.89	2.32	2.65	2.99
35	1.14	1.55	1.86	2.29	2.61	2.95
36	1.13	1.52	1.84	2.25	2.58	2.91
37	1.11	1.50	1.81	2.22	2.54	2.87
38	1.10	1.48	1.79	2.19	2.51	2.83
39	1.08	1.46	1.76	2.16	2.47	2.79
40	1.06	1.44	1.74	2.13	2.44	2.75
41	1.05	1.42	1.71	2.10	2.40	2.71
42	1.03	1.40	1.69	2.07	2.37	2.67
43	1.02	1.38	1.66	2.04	2.33	2.63
44	1.00	1.36	1.64	2.01	2.30	2.59
45	0.99	1.34	1.61	1.98	2.26	2.55
46	0.97	1.31	1.58	1.94	2.22	2.51
47	0.95	1.29	1.56	1.91	2.19	2.47
48	0.94	1.27	1.53	1.88	2.15	2.43
49	0.92	1.25	1.51	1.85	2.12	2.39
50	0.91	1.23	1.48	1.82	2.08	2.35
51	0.89	1.21	1.46	1.79	2.05	2.31
52	0.88	1.19	1.43	1.76	2.01	2.27
53	0.86	1.17	1.41	1.73	1.98	2.23
54	0.85	1.15	1.38	1.70	1.94	2.19
55	0.83	1.13	1.36	1.67	1.91	2.15
56	0.81	1.10	1.33	1.63	1.87	2.11
57	0.80	1.08	1.31	1.60	1.84	2.07
58	0.78	1.06	1.28	1.57	1.80	2.03
59	0.77	1.04	1.26	1.54	1.77	1.99
60	0.75	1.02	1.23	1.51	1.73	1.95
61	0.75	1.01	1.22	1.50	1.72	1.94
62	0.74	1.01	1.21	1.49	1.70	1.92
63	0.74	1.00	1.20	1.48	1.69	1.91
64	0.73	0.99	1.19	1.47	1.68	1.89
65	0.73	0.98	1.19	1.45	1.67	1.88
66	0.72	0.98	1.18	1.44	1.65	1.86
67	0.71	0.97	1.17	1.43	1.64	1.85
68	0.71	0.96	1.16	1.42	1.63	1.83
69	0.70	0.95	1.15	1.41	1.61	1.82
70	0.70	0.95	1.14	1.40	1.60	1.81
71	0.69	0.94	1.13	1.39	1.59	1.79
72	0.69	0.93	1.12	1.38	1.58	1.78
73	0.68	0.92	1.11	1.37	1.56	1.76
74	0.68	0.92	1.10	1.35	1.55	1.75
75	0.67	0.91	1.10	1.34	1.54	1.73
76	0.67	0.90	1.09	1.33	1.52	1.72
77	0.66	0.89	1.08	1.32	1.51	1.70
78	0.66	0.89	1.07	1.31	1.50	1.69
79	0.65	0.88	1.06	1.30	1.49	1.67
80	0.64	0.87	1.05	1.29	1.47	1.66
81	0.64	0.87	1.04	1.28	1.46	1.65

Tc (min.)	Site-Specific Precipitation Intensity (inches/hour)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
82	0.63	0.86	1.03	1.27	1.45	1.63
83	0.63	0.85	1.02	1.25	1.43	1.62
84	0.62	0.84	1.01	1.24	1.42	1.60
85	0.62	0.84	1.01	1.23	1.41	1.59
86	0.61	0.83	1.00	1.22	1.40	1.57
87	0.61	0.82	0.99	1.21	1.38	1.56
88	0.60	0.81	0.98	1.20	1.37	1.54
89	0.60	0.81	0.97	1.19	1.36	1.53
90	0.59	0.80	0.96	1.18	1.35	1.52
91	0.59	0.79	0.95	1.16	1.33	1.50
92	0.58	0.78	0.94	1.15	1.32	1.49
93	0.57	0.78	0.93	1.14	1.31	1.47
94	0.57	0.77	0.92	1.13	1.29	1.46
95	0.56	0.76	0.92	1.12	1.28	1.44
96	0.56	0.75	0.91	1.11	1.27	1.43
97	0.55	0.75	0.90	1.10	1.26	1.41
98	0.55	0.74	0.89	1.09	1.24	1.40
99	0.54	0.73	0.88	1.08	1.23	1.38
100	0.54	0.73	0.87	1.06	1.22	1.37
101	0.53	0.72	0.86	1.05	1.20	1.36
102	0.53	0.71	0.85	1.04	1.19	1.34
103	0.52	0.70	0.84	1.03	1.18	1.33
104	0.52	0.70	0.83	1.02	1.17	1.31
105	0.51	0.69	0.83	1.01	1.15	1.30
106	0.51	0.68	0.82	1.00	1.14	1.28
107	0.50	0.67	0.81	0.99	1.13	1.27
108	0.49	0.67	0.80	0.98	1.11	1.25
109	0.49	0.66	0.79	0.96	1.10	1.24
110	0.48	0.65	0.78	0.95	1.09	1.23
111	0.48	0.64	0.77	0.94	1.08	1.21
112	0.47	0.64	0.76	0.93	1.06	1.20
113	0.47	0.63	0.75	0.92	1.05	1.18
114	0.46	0.62	0.74	0.91	1.04	1.17
115	0.46	0.61	0.74	0.90	1.02	1.15
116	0.45	0.61	0.73	0.89	1.01	1.14
117	0.45	0.60	0.72	0.88	1.00	1.12
118	0.44	0.59	0.71	0.86	0.99	1.11
119	0.44	0.59	0.70	0.85	0.97	1.09
120	0.43	0.58	0.69	0.84	0.96	1.08



NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4663°, Longitude: -111.8924°
Elevation: 1214.03 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 & aerals](#)

PF tabular

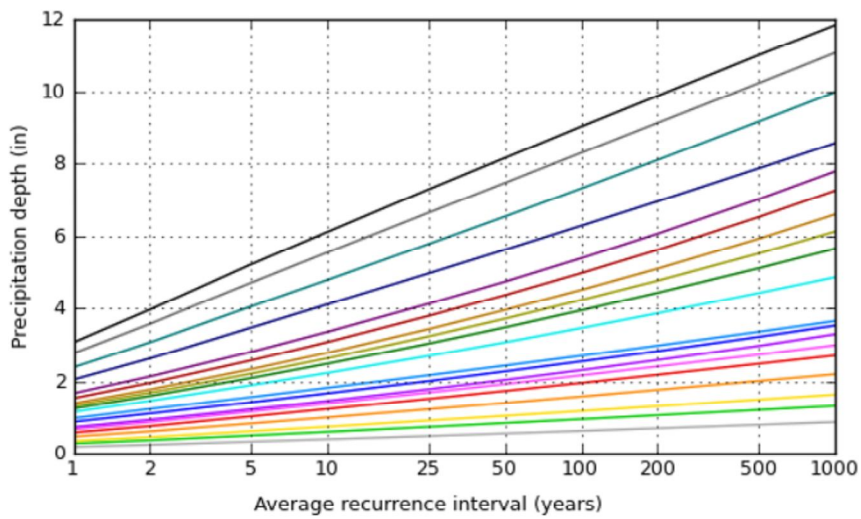
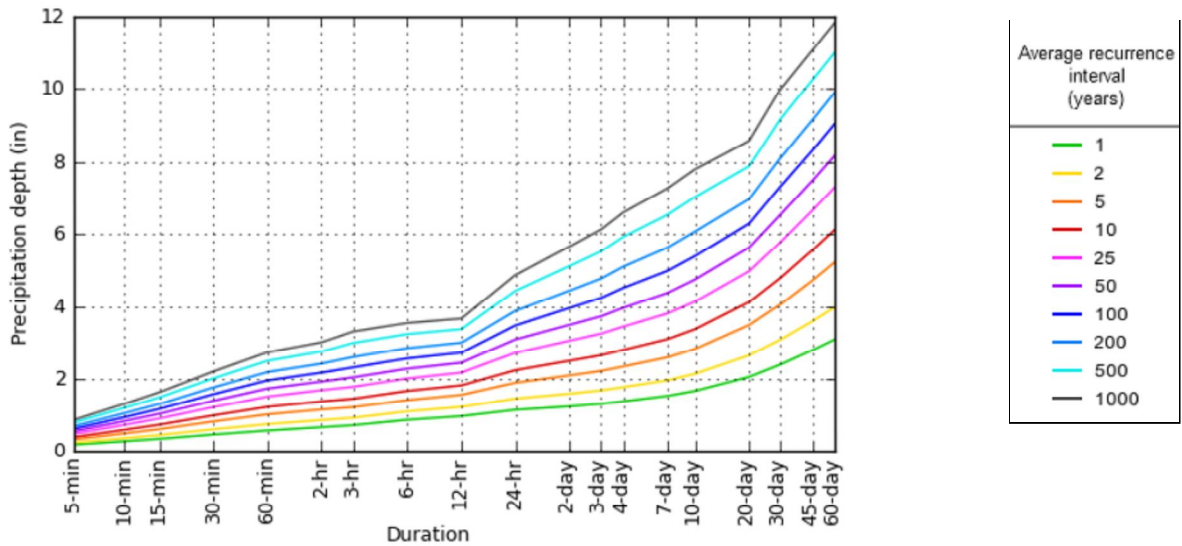
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.183 (0.153-0.223)	0.239 (0.201-0.291)	0.325 (0.272-0.394)	0.391 (0.325-0.472)	0.480 (0.393-0.577)	0.550 (0.444-0.658)	0.620 (0.491-0.739)	0.693 (0.539-0.824)	0.790 (0.598-0.940)	0.864 (0.642-1.03)
10-min	0.278 (0.233-0.339)	0.364 (0.306-0.443)	0.495 (0.413-0.600)	0.595 (0.494-0.718)	0.731 (0.598-0.878)	0.837 (0.675-1.00)	0.944 (0.747-1.13)	1.06 (0.821-1.25)	1.20 (0.911-1.43)	1.31 (0.977-1.57)
15-min	0.345 (0.289-0.420)	0.451 (0.380-0.550)	0.613 (0.512-0.744)	0.737 (0.613-0.890)	0.907 (0.741-1.09)	1.04 (0.837-1.24)	1.17 (0.927-1.40)	1.31 (1.02-1.56)	1.49 (1.13-1.77)	1.63 (1.21-1.94)
30-min	0.465 (0.389-0.566)	0.608 (0.511-0.740)	0.826 (0.690-1.00)	0.993 (0.825-1.20)	1.22 (0.998-1.47)	1.40 (1.13-1.67)	1.58 (1.25-1.88)	1.76 (1.37-2.10)	2.01 (1.52-2.39)	2.19 (1.63-2.62)
60-min	0.575 (0.482-0.700)	0.752 (0.633-0.916)	1.02 (0.854-1.24)	1.23 (1.02-1.48)	1.51 (1.24-1.81)	1.73 (1.40-2.07)	1.95 (1.55-2.33)	2.18 (1.70-2.59)	2.48 (1.88-2.96)	2.72 (2.02-3.24)
2-hr	0.667 (0.568-0.795)	0.863 (0.736-1.03)	1.16 (0.981-1.38)	1.38 (1.16-1.64)	1.69 (1.40-1.99)	1.92 (1.57-2.26)	2.16 (1.74-2.55)	2.41 (1.90-2.83)	2.74 (2.11-3.23)	2.99 (2.26-3.55)
3-hr	0.724 (0.616-0.871)	0.928 (0.792-1.12)	1.22 (1.03-1.47)	1.45 (1.22-1.74)	1.78 (1.47-2.11)	2.04 (1.66-2.41)	2.31 (1.85-2.73)	2.59 (2.04-3.06)	2.98 (2.27-3.53)	3.29 (2.45-3.91)
6-hr	0.871 (0.755-1.03)	1.10 (0.960-1.30)	1.42 (1.23-1.66)	1.66 (1.43-1.94)	2.00 (1.70-2.32)	2.27 (1.89-2.63)	2.55 (2.09-2.95)	2.83 (2.28-3.28)	3.22 (2.53-3.74)	3.53 (2.70-4.11)
12-hr	0.973 (0.852-1.13)	1.23 (1.08-1.42)	1.56 (1.36-1.80)	1.82 (1.58-2.09)	2.16 (1.86-2.48)	2.43 (2.06-2.78)	2.71 (2.26-3.10)	2.98 (2.46-3.42)	3.36 (2.70-3.87)	3.65 (2.88-4.24)
24-hr	1.15 (1.03-1.28)	1.46 (1.32-1.62)	1.89 (1.70-2.10)	2.23 (2.00-2.48)	2.70 (2.41-3.00)	3.07 (2.72-3.41)	3.46 (3.05-3.84)	3.86 (3.38-4.29)	4.42 (3.82-4.91)	4.86 (4.16-5.41)
2-day	1.24 (1.12-1.39)	1.59 (1.44-1.78)	2.09 (1.88-2.33)	2.48 (2.23-2.77)	3.04 (2.71-3.38)	3.48 (3.08-3.87)	3.94 (3.47-4.40)	4.43 (3.87-4.94)	5.11 (4.41-5.71)	5.65 (4.83-6.34)
3-day	1.31 (1.18-1.47)	1.68 (1.51-1.88)	2.21 (1.99-2.46)	2.64 (2.36-2.93)	3.23 (2.88-3.60)	3.71 (3.29-4.13)	4.22 (3.71-4.70)	4.76 (4.15-5.30)	5.52 (4.75-6.15)	6.12 (5.22-6.85)
4-day	1.38 (1.25-1.54)	1.77 (1.59-1.98)	2.33 (2.10-2.59)	2.79 (2.50-3.10)	3.43 (3.06-3.81)	3.95 (3.50-4.38)	4.51 (3.96-5.00)	5.09 (4.43-5.66)	5.92 (5.09-6.59)	6.60 (5.61-7.36)
7-day	1.53 (1.38-1.70)	1.95 (1.76-2.18)	2.58 (2.32-2.87)	3.08 (2.76-3.42)	3.79 (3.38-4.21)	4.36 (3.87-4.84)	4.97 (4.37-5.52)	5.62 (4.90-6.24)	6.53 (5.62-7.26)	7.26 (6.18-8.10)
10-day	1.67 (1.50-1.85)	2.13 (1.92-2.37)	2.81 (2.53-3.12)	3.36 (3.01-3.72)	4.12 (3.67-4.56)	4.73 (4.20-5.23)	5.38 (4.74-5.95)	6.07 (5.30-6.71)	7.02 (6.05-7.78)	7.79 (6.65-8.64)
20-day	2.05 (1.85-2.27)	2.63 (2.37-2.92)	3.47 (3.13-3.85)	4.11 (3.69-4.55)	4.96 (4.44-5.49)	5.62 (5.01-6.22)	6.29 (5.58-6.97)	6.96 (6.14-7.73)	7.88 (6.88-8.76)	8.58 (7.43-9.55)
30-day	2.38 (2.15-2.64)	3.07 (2.78-3.40)	4.05 (3.65-4.47)	4.78 (4.31-5.28)	5.78 (5.17-6.37)	6.54 (5.84-7.20)	7.32 (6.50-8.07)	8.11 (7.16-8.95)	9.18 (8.04-10.1)	9.99 (8.69-11.1)
45-day	2.77 (2.51-3.07)	3.57 (3.24-3.96)	4.70 (4.26-5.21)	5.54 (5.00-6.13)	6.64 (5.97-7.34)	7.47 (6.69-8.26)	8.31 (7.41-9.18)	9.14 (8.11-10.1)	10.2 (9.01-11.4)	11.1 (9.68-12.3)
60-day	3.07 (2.79-3.39)	3.96 (3.59-4.37)	5.21 (4.71-5.74)	6.11 (5.52-6.74)	7.29 (6.57-8.03)	8.16 (7.33-8.99)	9.04 (8.08-9.96)	9.89 (8.80-10.9)	11.0 (9.73-12.2)	11.8 (10.4-13.1)

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.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.4663°, Longitude: -111.8924°



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NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4663°, Longitude: -111.8924°
Elevation: 1214.03 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 & aeriels](#)

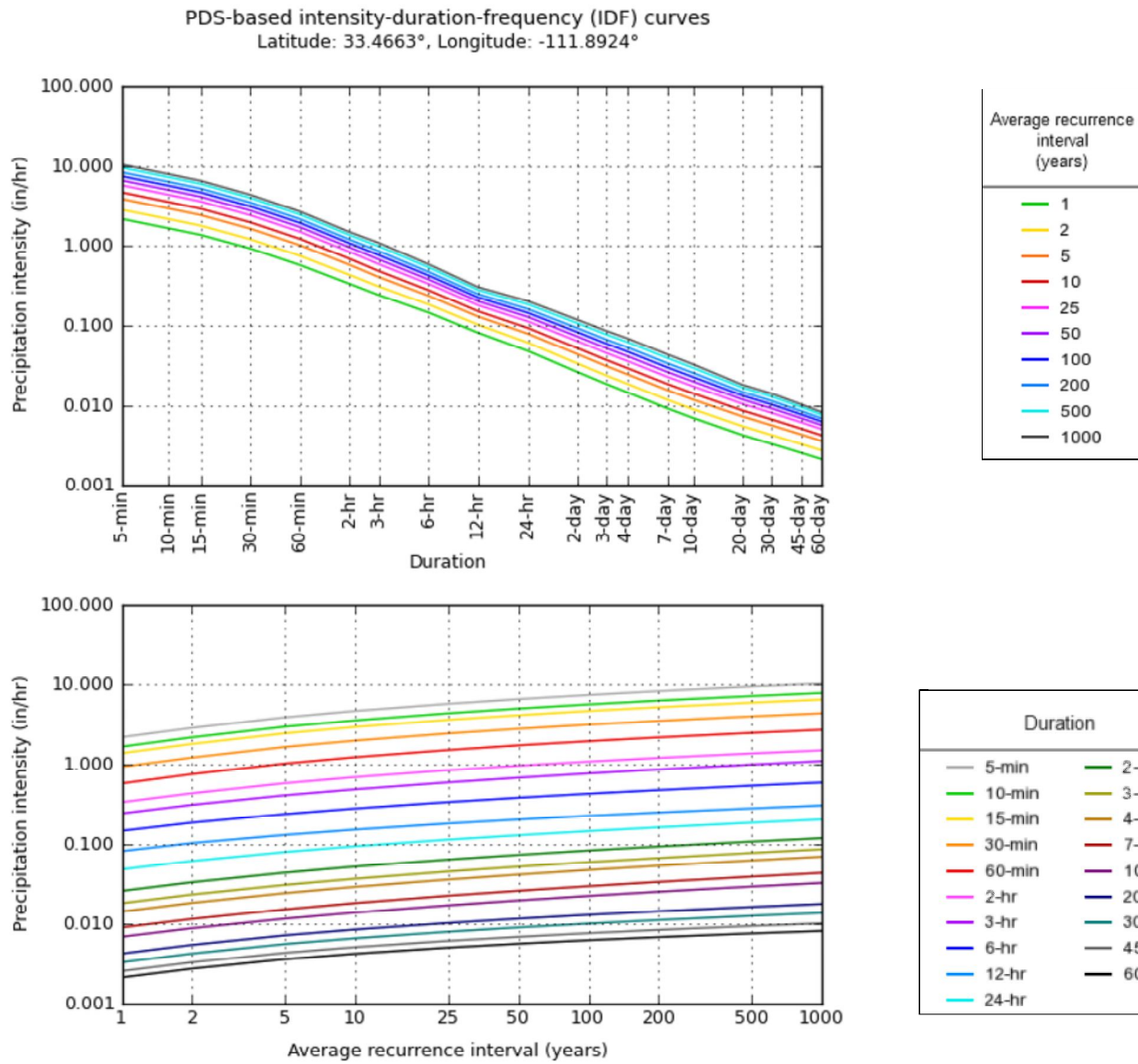
PF tabular

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	2.20 (1.84-2.68)	2.87 (2.41-3.49)	3.90 (3.26-4.73)	4.69 (3.90-5.66)	5.76 (4.72-6.92)	6.60 (5.33-7.90)	7.44 (5.89-8.87)	8.32 (6.47-9.89)	9.48 (7.18-11.3)	10.4 (7.70-12.4)
10-min	1.67 (1.40-2.03)	2.18 (1.84-2.66)	2.97 (2.48-3.60)	3.57 (2.96-4.31)	4.39 (3.59-5.27)	5.02 (4.05-6.01)	5.66 (4.48-6.75)	6.33 (4.93-7.53)	7.21 (5.47-8.59)	7.88 (5.86-9.41)
15-min	1.38 (1.16-1.68)	1.80 (1.52-2.20)	2.45 (2.05-2.98)	2.95 (2.45-3.56)	3.63 (2.96-4.35)	4.15 (3.35-4.96)	4.68 (3.71-5.58)	5.23 (4.07-6.22)	5.96 (4.52-7.10)	6.52 (4.84-7.78)
30-min	0.930 (0.778-1.13)	1.22 (1.02-1.48)	1.65 (1.38-2.00)	1.99 (1.65-2.40)	2.44 (2.00-2.93)	2.79 (2.25-3.34)	3.15 (2.50-3.76)	3.52 (2.74-4.19)	4.01 (3.04-4.78)	4.39 (3.26-5.24)
60-min	0.575 (0.482-0.700)	0.752 (0.633-0.916)	1.02 (0.854-1.24)	1.23 (1.02-1.48)	1.51 (1.24-1.81)	1.73 (1.40-2.07)	1.95 (1.55-2.33)	2.18 (1.70-2.59)	2.48 (1.88-2.96)	2.72 (2.02-3.24)
2-hr	0.334 (0.284-0.398)	0.432 (0.368-0.516)	0.578 (0.490-0.688)	0.690 (0.578-0.820)	0.842 (0.698-0.994)	0.960 (0.786-1.13)	1.08 (0.870-1.27)	1.20 (0.952-1.42)	1.37 (1.06-1.61)	1.50 (1.13-1.77)
3-hr	0.241 (0.205-0.290)	0.309 (0.264-0.373)	0.407 (0.345-0.489)	0.484 (0.406-0.579)	0.592 (0.490-0.704)	0.678 (0.553-0.803)	0.768 (0.614-0.909)	0.861 (0.678-1.02)	0.991 (0.756-1.17)	1.10 (0.816-1.30)
6-hr	0.145 (0.126-0.171)	0.184 (0.160-0.217)	0.236 (0.205-0.277)	0.278 (0.238-0.324)	0.334 (0.283-0.388)	0.379 (0.316-0.438)	0.426 (0.349-0.492)	0.473 (0.380-0.548)	0.538 (0.422-0.624)	0.589 (0.451-0.686)
12-hr	0.081 (0.071-0.093)	0.102 (0.089-0.118)	0.129 (0.113-0.149)	0.151 (0.131-0.173)	0.180 (0.154-0.206)	0.202 (0.171-0.231)	0.225 (0.188-0.257)	0.248 (0.204-0.284)	0.279 (0.224-0.322)	0.303 (0.239-0.352)
24-hr	0.048 (0.043-0.053)	0.061 (0.055-0.068)	0.079 (0.071-0.088)	0.093 (0.083-0.103)	0.113 (0.100-0.125)	0.128 (0.113-0.142)	0.144 (0.127-0.160)	0.161 (0.141-0.179)	0.184 (0.159-0.204)	0.202 (0.173-0.225)
2-day	0.026 (0.023-0.029)	0.033 (0.030-0.037)	0.043 (0.039-0.048)	0.052 (0.046-0.058)	0.063 (0.056-0.070)	0.072 (0.064-0.081)	0.082 (0.072-0.092)	0.092 (0.081-0.103)	0.106 (0.092-0.119)	0.118 (0.101-0.132)
3-day	0.018 (0.016-0.020)	0.023 (0.021-0.026)	0.031 (0.028-0.034)	0.037 (0.033-0.041)	0.045 (0.040-0.050)	0.052 (0.046-0.057)	0.059 (0.052-0.065)	0.066 (0.058-0.074)	0.077 (0.066-0.085)	0.085 (0.072-0.095)
4-day	0.014 (0.013-0.016)	0.018 (0.017-0.021)	0.024 (0.022-0.027)	0.029 (0.026-0.032)	0.036 (0.032-0.040)	0.041 (0.036-0.046)	0.047 (0.041-0.052)	0.053 (0.046-0.059)	0.062 (0.053-0.069)	0.069 (0.058-0.077)
7-day	0.009 (0.008-0.010)	0.012 (0.010-0.013)	0.015 (0.014-0.017)	0.018 (0.016-0.020)	0.023 (0.020-0.025)	0.026 (0.023-0.029)	0.030 (0.026-0.033)	0.033 (0.029-0.037)	0.039 (0.033-0.043)	0.043 (0.037-0.048)
10-day	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.012 (0.011-0.013)	0.014 (0.013-0.015)	0.017 (0.015-0.019)	0.020 (0.017-0.022)	0.022 (0.020-0.025)	0.025 (0.022-0.028)	0.029 (0.025-0.032)	0.032 (0.028-0.036)
20-day	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.007 (0.007-0.008)	0.009 (0.008-0.009)	0.010 (0.009-0.011)	0.012 (0.010-0.013)	0.013 (0.012-0.015)	0.015 (0.013-0.016)	0.016 (0.014-0.018)	0.018 (0.015-0.020)
30-day	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.006-0.007)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.013 (0.011-0.014)	0.014 (0.012-0.015)
45-day	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.008 (0.008-0.009)	0.009 (0.008-0.011)	0.010 (0.009-0.011)
60-day	0.002 (0.002-0.002)	0.003 (0.002-0.003)	0.004 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.008)	0.008 (0.007-0.009)

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.

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PF graphical



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Large scale terrain



Large scale map



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Hydrology - Rational Method (Q = CiA) QuikTrip Store #1418

WLB JOB # 219006A001

Designed:	Name
Date:	#####

Step 1. Compute Weighted "C" Values

"C" Values: DSPM (Design Standards & Policies Manual), City of Scottsdale, 2018 per Figure 4-1.5

ID No.	Land Use	Storm Frequency		
		2-25YR	50YR	100YR
1	Commercial & industrial Areas	0.8	0.83	0.86
2	Paved Street, parking lots (concrete or asphalt), roofs, driveways, etc.	0.90	0.93	0.95
3	Lawns, golf courses, & parks (grassed areas)	0.20	0.25	0.30
4	Undisturbed natural desert or desert landscaping (no impervious weed barrier)	0.37	0.42	0.45
5	Desert landscaping (with impervious weed barrier)	0.63	0.73	0.83
6	Mountain terrain - slopes greater than 10%	0.60	0.70	0.80
7	Agricultural areas (flood irrigated fields)	0.16	0.18	0.20
8	Gravel floodways and shoulders	0.68	0.78	0.82

C

A

Drainage Area ID	area, sf	area, ac	Land Use - %								Total -		
			1	2	3	4	5	6	7	8	2-25YR	50YR	100YR
10	9,234	0.21		100%							100%	0.90	0.93
20	14,444	0.33		100%							100%	0.90	0.93
30	7,682	0.18		100%							100%	0.90	0.93
40	2,739	0.06		100%							100%	0.90	0.93
50	2,256	0.05		100%							100%	0.90	0.93
60	5,608	0.13		100%							100%	0.90	0.93
70	4,415	0.10		100%							100%	0.90	0.93
80	7,827	0.18				100%					100%	0.37	0.42
90	1,639	0.04				100%					100%	0.37	0.42
100	7,852	0.18		100%							100%	0.90	0.93
110	18,031	0.41		100%							100%	0.90	0.93
120	6,078	0.14				100%					100%	0.37	0.42
130	15,829	0.36				100%					100%	0.37	0.42
Total=	103,634	2.38											

Step 2. Compute Time of Concentration, Tc and Rainfall intensity, i

$$T_c = 11.4 L^{0.5} K_b^{0.52} S^{-0.37} i^{-0.38}$$

where:

Tc = Time of Concentration, hrs

L = Length of the longest flow path, miles

Kb = Watershed resistance coefficient, Kb = $m \log 10A + b$

S = Slope of the longest flow path, ft/mile

i = Average rainfall intensity, inches/hour

$$T_c \text{ min} = 5$$

References:

1. Eqn. (3.2), FCDMC, Drainage Design Manual-Hydrology, August 15, 2013
2. NOAA Atlas 14, Point Precipitation Frequency Estimates

Drainage Area ID	Area (ac.)	Flow Path				Watershed Resistance				Calculated Tc (min)						Trial Tc (min)						Rainfall intensity, i (in/hr)					
		Elevations		Length (ft)	Slope, ft/mi	m	b	Kb	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	
		HP	LP																								
10	0.21	1,242	1,239	137	0.03	-0.00625	0.04	0.044	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	0.33	1,223	1,221	181	0.03	-0.00625	0.04	0.043	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30	0.18	1,222	1,220	88	0.02	-0.00625	0.04	0.045	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
40	0.06	1,244	1,243	42	0.01	-0.00625	0.04	0.048	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
50	0.05	1,244	1,243	42	0.01	-0.00625	0.04	0.048	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
60	0.13	1,223	1,221	111	0.02	-0.00625	0.04	0.046	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
70	0.10	1,223	1,222	84	0.02	-0.00625	0.04	0.046	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
80	0.18	1,223	1,220	75	0.01	-0.00625	0.04	0.045	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
90	0.04	1,221	1,219	22	0.00	-0.00625	0.04	0.049	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
100	0.18	1,222	1,221	302	0.06	-0.00625	0.04	0.045	10	9	8	8	7	7	10	9	8	8	7	7	10	9	8	8	7	7	7
110	0.41	1,223	1,221	185	0.04	-0.00625	0.04	0.042	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
120	0.14	1,222	1,220	27	0.01	-0.00625	0.04	0.045	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
130	0.36	1,222	1,220	45	0.01	-0.00625	0.04	0.043	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Step 3. Compute Rational Method, Discharge Q

$$Q = C i A$$

where:

C = Runoff Coefficient

i = Average rainfall intensity, inches/hour

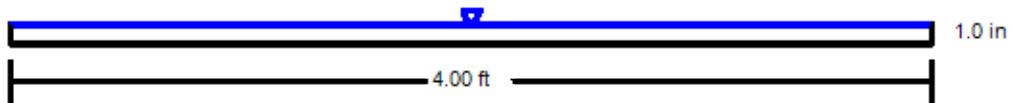
A = Drainage Area of watershed, acres

Drainage Area ID	C						i						A=		Q					
	Weighted C Values						Rainfall intensity, i (in/hr)						Area, (ac.)	Discharge, Q (cfs)						
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR		2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	
10	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.21	0.55	0.74	0.89	1.10	1.30	1.50	
20	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.33	0.86	1.16	1.40	1.72	2.04	2.34	
30	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.18	0.46	0.62	0.74	0.91	1.08	1.25	
40	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.06	0.16	0.22	0.27	0.33	0.39	0.44	
50	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.05	0.13	0.18	0.22	0.27	0.32	0.37	
60	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.13	0.33	0.45	0.54	0.67	0.79	0.91	
70	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.10	0.26	0.36	0.43	0.53	0.62	0.72	
80	0.37	0.37	0.37	0.37	0.42	0.45	2.87	3.90	4.69	5.76	6.60	7.44	0.18	0.19	0.26	0.31	0.38	0.50	0.60	
90	0.37	0.37	0.37	0.37	0.42	0.45	2.87	3.90	4.69	5.76	6.60	7.44	0.04	0.04	0.05	0.07	0.08	0.10	0.13	
100	0.90	0.90	0.90	0.90	0.93	0.95	2.18	3.16	4.02	4.94	5.97	6.73	0.18	0.35	0.51	0.65	0.80	1.00	1.15	
110	0.90	0.90	0.90	0.90	0.93	0.95	2.87	3.90	4.69	5.76	6.60	7.44	0.41	1.07	1.45	1.75	2.15	2.54	2.93	
120	0.37	0.37	0.37	0.37	0.42	0.45	2.87	3.90	4.69	5.76	6.60	7.44	0.14	0.15	0.20	0.24	0.30	0.39	0.47	
130	0.37	0.37	0.37	0.37	0.42	0.45	2.87	3.90	4.69	5.76	6.60	7.44	0.36	0.39	0.52	0.63	0.77	1.01	1.22	

Appendix B: Hydraulic Analysis

Cross Section for Curb Opening #1

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.025 ft/ft
Normal Depth	1.0 in
Bottom Width	4.00 ft
Discharge	0.91 cfs



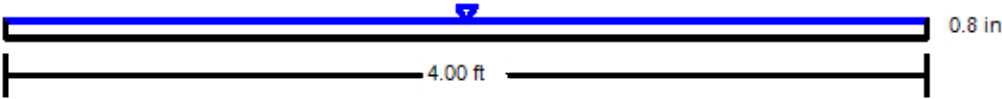
V: 1
H: 1

Worksheet for Curb Opening #1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.025 ft/ft
Bottom Width	4.00 ft
Discharge	0.91 cfs
Results	
Normal Depth	1.0 in
Flow Area	0.3 ft ²
Wetted Perimeter	4.2 ft
Hydraulic Radius	1.0 in
Top Width	4.00 ft
Critical Depth	1.4 in
Critical Slope	0.008 ft/ft
Velocity	2.73 ft/s
Velocity Head	0.12 ft
Specific Energy	0.20 ft
Froude Number	1.669
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.0 in
Critical Depth	1.4 in
Channel Slope	0.025 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for Curb Opening #2

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.030 ft/ft
Normal Depth	0.8 in
Bottom Width	4.00 ft
Discharge	0.72 cfs



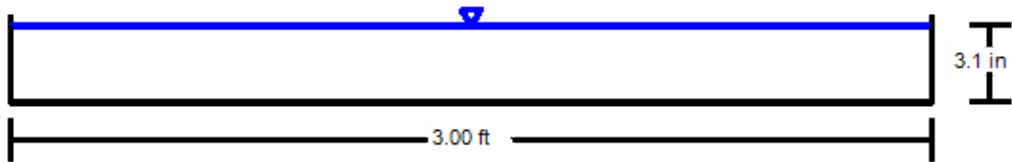
V: 1
H: 1

Worksheet for Curb Opening #2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.030 ft/ft
Bottom Width	4.00 ft
Discharge	0.72 cfs
Results	
Normal Depth	0.8 in
Flow Area	0.3 ft ²
Wetted Perimeter	4.1 ft
Hydraulic Radius	0.8 in
Top Width	4.00 ft
Critical Depth	1.2 in
Critical Slope	0.009 ft/ft
Velocity	2.63 ft/s
Velocity Head	0.11 ft
Specific Energy	0.18 ft
Froude Number	1.771
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.8 in
Critical Depth	1.2 in
Channel Slope	0.030 ft/ft
Critical Slope	0.009 ft/ft

Cross Section for Curb Opening #3

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.013 ft/ft
Normal Depth	3.1 in
Bottom Width	3.00 ft
Discharge	2.93 cfs



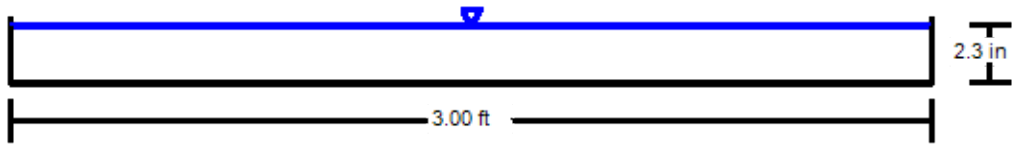
V: 1
H: 1

Worksheet for Curb Opening #3

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.013 ft/ft
Bottom Width	3.00 ft
Discharge	2.93 cfs
Results	
Normal Depth	3.1 in
Flow Area	0.8 ft ²
Wetted Perimeter	3.5 ft
Hydraulic Radius	2.6 in
Top Width	3.00 ft
Critical Depth	3.7 in
Critical Slope	0.007 ft/ft
Velocity	3.84 ft/s
Velocity Head	0.23 ft
Specific Energy	0.48 ft
Froude Number	1.340
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.1 in
Critical Depth	3.7 in
Channel Slope	0.013 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for Curb Opening #4

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.021 ft/ft
Normal Depth	2.3 in
Bottom Width	3.00 ft
Discharge	2.34 cfs



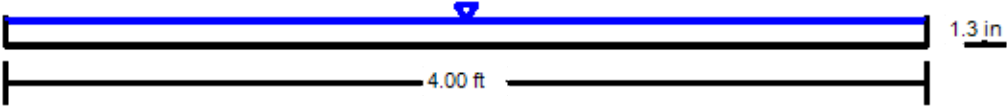
V: 1
H: 1

Worksheet for Curb Opening #4

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.021 ft/ft
Bottom Width	3.00 ft
Discharge	2.34 cfs
Results	
Normal Depth	2.3 in
Flow Area	0.6 ft ²
Wetted Perimeter	3.4 ft
Hydraulic Radius	2.0 in
Top Width	3.00 ft
Critical Depth	3.2 in
Critical Slope	0.007 ft/ft
Velocity	4.11 ft/s
Velocity Head	0.26 ft
Specific Energy	0.45 ft
Froude Number	1.662
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.3 in
Critical Depth	3.2 in
Channel Slope	0.021 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for Curb Opening #5

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.020 ft/ft
Normal Depth	1.3 in
Bottom Width	4.00 ft
Discharge	1.25 cfs



V: 1
H: 1

Worksheet for Curb Opening #5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.016
Channel Slope	0.020 ft/ft
Bottom Width	4.00 ft
Discharge	1.25 cfs
Results	
Normal Depth	1.3 in
Flow Area	0.4 ft ²
Wetted Perimeter	4.2 ft
Hydraulic Radius	1.2 in
Top Width	4.00 ft
Critical Depth	1.7 in
Critical Slope	0.008 ft/ft
Velocity	2.88 ft/s
Velocity Head	0.13 ft
Specific Energy	0.24 ft
Froude Number	1.543
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.3 in
Critical Depth	1.7 in
Channel Slope	0.020 ft/ft
Critical Slope	0.008 ft/ft

Retention Calculations

WLB JOB # 219006A001

QuikTrip Store #1418

V = C (R/12) A Eqn. (9.1), FCDMC, Drainage Design Manual-Hydraulics, August 15, 2013
 Where: V = Storage Volume (acre-ft)
 C = Weighted Runoff Coefficient
 R = 100-year, 2-hour Precipitation Depth = 2.16 inches
 A = Drainage Area, acres

Designed: JP
 Date: 6/13/2019

Basin ID	Contributing Drainage Area ID	Drainage Area (SF)	Drainage Area (Ac)	C Value for 100-YR	Retention Volume Required (CF)	Retention Volume Required (AF)	Volume From Other Basins (CF)	Total Retention Volume Required (CF)	Retention Volume Provided (CF)	Excess Volume (CF)	Notes
Basin A											
	110	18,031	0.41	0.95	3,083	0.07					Basin A and B are connected with a 12" equalized pipe
	120	6,078	0.14	0.45	492	0.01					
Total Basin A		24,109	0.55	0.82	3,576	0.08	0	3,576	2,249	-1,326	To Basin B
Basin B											
	10	9,234	0.21	0.95	1,579	0.04					Basin A and B are connected with a 12" equalized pipe
	20	14,444	0.33	0.95	2,470	0.06					
	30	7,682	0.18	0.95	1,314	0.03					
	40	2,739	0.06	0.95	468	0.01					
	130	15,829	0.36	0.45	1,282	0.03	1,326				
Total Basin B		49,928	1.15	0.79	7,113	0.16	1,326	8,440	8,506	67	
Basin C											
	50	2,256	0.05	0.95	386	0.01					Basin C and D are connected with a 12" equalized pipe
	60	5,608	0.13	0.95	959	0.02					
	70	4,415	0.10	0.95	755	0.02					
	80	7,827	0.18	0.45	634	0.01					
Total Basin C		20,106	0.46	0.76	2,734	0.06	0	2,734	2,414	-320	To Basin D
Basin D											
	90	1,639	0.04	0.45	133	0.003	320				Basin C and D are connected with a 12" equalized pipe
Total Basin D		1,639	0.04	0.45	133	0.003	320	453	834	381	
Total Retained Basins		95,782	2.20		13,555	0.31			14,003	448	

Retention Basins Provided Volume Calculations

WLB JOB # 219006A001

QuikTrip Store #1418

Designed:	JP
Date:	6/13/2019

Note: Conic Method for Volume Calculations

$$\text{Incremental Volume} = h/3(A_1 + A_2 + (A_1 \cdot A_2)^{0.5})$$

Basin A

Elevation	Area (sq. ft.)	Area (Ac.)	Volume Provided (cf)	Volume Provided (af)
1220.0	1729	0.04	-	-
1221.0	2813	0.06	2,249	0.052
Total =			2,249	0.052

Basin B

Elevation	Area (sq. ft.)	Area (Ac.)	Volume Provided (cf)	Volume Provided (af)
1220.0	7290	0.17	-	-
1221.0	9784	0.22	8,506	0.195
			8,506	0.195

Basin C

Elevation	Area (sq. ft.)	Area (Ac.)	Volume Provided (cf)	Volume Provided (af)
1219.0	146	0.00	-	-
1220.0	1087	0.02	544	0.012
1221.0	2783	0.06	1,870	0.043
			2,414	0.055

Basin D

Elevation	Area (sq. ft.)	Area (Ac.)	Volume Provided (cf)	Volume Provided (af)
1219.0	146	0.00	-	-
1220.0	399	0.01	262	0.006
1221.0	765	0.02	572	0.013
			834	0.019

Required Drywells

WLB JOB #

219006A001

QuikTrip Store #1418

Designed:	Name
Date:	6/13/2019

Number of Drywells Required = $(V_R / Q) / (60 \times 60 \times 36)$

Discharge time (hr) = $(V_R / Q) / (60 \times 60)$

Actual number of drywells to be determined onsite.

Where: V_R = Retention Required

Q = Percolation rate per drywell = 0.10 cfs

* Required drywells to drain basin in 36 hours

Retention Basin	Volume Drained (cu ft)	Number of Drywells	Discharge time (hr)
A	3,576	1	9.93
C	2,734	1	7.59
D	453	1	1.26
SUM =	6,762	3	

Basin B with Envibro Max Drywell System

Envibro-Max process capacity, per Standard= 0.22 cfs

Retention Basin	Volume Drained (cu ft)	Number of Envibro-Max	Discharge time (hr)
B	8,440	1	10.66

Retention Basin	Volume Drained (cu ft)	Number of Drywells	Discharge time (hr)
B	8,440	2	11.72

Conclusion: Two Drywells with a Envibro-Max System

Total number of Drywells = 5

Appendix C: Excerpt from Referenced Materials

Final Drainage Report

for
QT #1418
Scottsdale, AZ

Atwell, LLC Job # 10002500

Prepared for:

QuikTrip Corporation
1116 E. Broadway Road
Tempe, AZ 85282
Tel: (480) 446-6300

Prepared by:



Atwell, LLC
4700 E. Southern Ave.
Mesa, AZ 85206
Tel: (480) 218-8831
Fax: (480) 830-4888

October 2012



Table of Contents

1.0 Introduction

2.0 Description of Existing Drainage Conditions and Characteristics

3.0 Proposed Drainage Plan

4.0 Special Conditions

5.0 Data Analysis Methods

6.0 Conclusions

7.0 Warning and Disclaimer of Liability

8.0 References

EXHIBITS

Exhibit 1	Vicinity Map
Exhibit 2	Existing Conditions
Exhibit 3	Offsite Drainage Patterns.
Exhibit 4	Current Aerial Photo
Exhibit 5	On-site Drainage Map
Exhibit 6	FIRM Map
Exhibit 7	Site Photos

APPENDICES

Appendix A	Signed Warning and Disclaimer and Outline Form
Appendix B	Isopluvial Map
Appendix C	Storm Drain Analysis
Appendix D	Detention Basin



1.0 Introduction

Project Name, Location, Size and Description

The project name is QuikTrip#1418 (Site). It is located at the northwest corner of the intersection of McDowell and Pima Roads in Scottsdale, AZ. The Site is located in the southeast quarter of Section 36, Township 2 North, Range 4 East, of the Gila and Salt River Meridian, Maricopa County, Arizona. The facility will be a convenience store and fueling station on approximately 2.5 acres of land. The site is currently four separate vacant parcels that will be combined as part of this project.

Purpose and Objectives of Drainage Report

This is a final drainage report presenting the existing drainage characteristics and support for the drainage solutions proposed as part of this project.

2.0 Description of Existing Drainage Condition and Characteristics

Existing Drainage and Characteristics

The Site was roughly graded during a previous project and is generally devoid of vegetation. It generally slopes to the south where there is an existing retention basin which has a depth of approximately one (1) foot. The current out-fall of the site is at the southeast corner. There is a valley gutter located in an alley way that runs along the western boundary of the Site south to McDowell Road. It has an average slope of 0.2%.

Off-Site Watershed

The property to the north is an existing residential and commercial development which currently retains the 100 year storm volume on their property. Therefore discharges from this property to the Site are assumed to be negligible. This property generally slopes to the southwest where it discharges to the existing valley gutter in the alley to the west of the Site.

The nearby Granite Reef Project includes 25 acres that generates 40 cfs for the 100-year 6-hour storm. Evaluation of these off-site flows indicates that they will not affect the site. Please refer to Exhibit 3 for a more detailed analysis of off-site flow patterns.

Context of Adjacent Projects and Improvements

To the west of the proposed development is a commercial building. It is zoned C-3. To the south of the development is McDowell Road and to the south of the road is a car dealership lot zoned C-4. To the east of the development is Pima Road, and a vacant lot whose zoning is unknown. Directly to the north is a vacant lot. To the north of the vacant lot is a multiple family residential district zoned R-5.

Floodplain Designation

The floodplain designation for the project is Zone X, found on FEMA Flood Insurance Rate Map Number 04013C2160F dated September 30, 2005. Zone X is defined as:



LEGEND:

OFF-SITE FLOW ARROW
CATCH BASIN

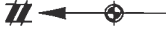


STORM FLOW FROM THE ALLEY WILL BE
CONVEYED SOUTH TO THE VALLEY
GUTTER WEST OF THE PROJECT SITE
TOWARDS McDOWELL ROAD.



STORM FLOW FROM THE APARTMENT
COMPLEX AND THE FRONTAGE ROAD WILL
FLOW TO THE CATCH BASINS IN THE
SOUTHEAST OF THE APARTMENT
COMPLEX.

THE WATERSHED FROM THE RESIDENTIAL
SUBDIVISION TO THE NORTHWEST OF THE
PROJECT DOES NOT IMPACT THE QUICKTRIP
SITE BECAUSE THE RUNOFF IS CONVEYED
TO THE WEST OF THE SUBDIVISION.



NOT TO SCALE

JOB #10002500

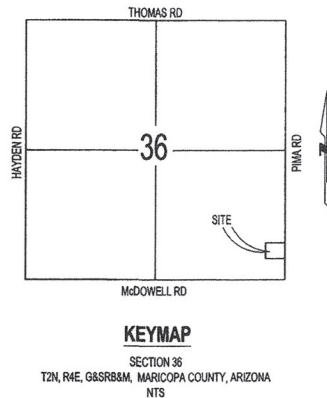
OFFSITE DRAINAGE FLOW
SCOTTSDALE, ARIZONA

Land Development & Real Estate
Power & Energy
Telecommunications
Manufacturing & Transportation
Environmental & Construction
Water & Natural Resources



IMPROVMENT PLANS PLAN FOR MONOLITH STORAGE AS-BUILT

1650 N. PIMA RD, SCOTTSDALE, AZ 85257



GENERAL NOTES FOR PUBLIC WORKS CONSTRUCTION (SCOTTSDALE)

- ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE CITY'S SUPPLEMENTAL STANDARD DETAILS WILL GOVERN.
- THE CITY ONLY APPROVES THE SCOPE, NOT THE DETAIL, OF ENGINEERING DESIGNS; THEREFORE, IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
- THE APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS MUST BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
- A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY OF SCOTTSDALE RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO BEGINNING CONSTRUCTION BY CALLING 480-312-5750.
- WHENEVER EXCAVATION IS NECESSARY, CALL THE BLUE STAKE CENTER, 602-263-1100, TWO WORKING DAYS BEFORE EXCAVATION BEGINS. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT. CALL "COLLECT" IF NECESSARY.
- ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE CITY ONLY AFTER THE REGISTRANT HAS PAID A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. COPIES OF ALL PERMITS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
- ALL EXCAVATION AND GRADING THAT IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE UNIFORM BUILDING CODE PREPARED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE UNIFORM BUILDING CODE.
- SIGNS REQUIRE SEPARATE APPROVALS AND PERMITS.

NOTES:

ALL QUANTITIES LISTED ON THESE PLANS ARE ESTIMATES ONLY. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION OF THE QUANTITIES AND BASE HIS BID ON HIS ESTIMATE.

CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATION AND VERIFICATION OF ALL UTILITIES (BOTH SHOWN ON THE PLANS & THOSE NOT SHOWN ON THE PLANS) PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO THE CONSTRUCTION PHASE OF THE PROJECT.

IN ACCORDANCE WITH AAC R18-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO THE NATIONAL SANITATION FOUNDATION STANDARDS 60 & 61.

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION, OR AS NOTED, AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

COLIN D. HARVEY, RPLS
REGISTERED LAND SURVEYOR

9-14-18
DATE

42017
REGISTRATION NUMBER

Harvey Land Surveying, Inc.
P.O. Box # 10772
Casa Grande, AZ, 85139
Serving AZ, CO, ND, NV, UT

NO CONFLICT SIGNATURE BLOCK

UTILITY	UTILITY COMPANY	NAME OF COMPANY REPRESENTATIVE	TELEPHONE NUMBER	DATE SIGNED
ELECTRIC	SRP	JOEL GILMORE	602-236-3150	5-23-17
TELEPHONE	AT&T	JOE FORKERT	619-200-7896	5-5-17
NATURAL GAS	SW GAS	ZACH STEVENSON	480-730-3857	5-16-17
CABLE TV	COX	TRAVIS CURRY	480-328-3554	5-15-17
OTHER	AIR PRODUCTS	DAN SVIR	480-899-7700	5-11-17
OTHER	APS	JEANNE-MARIE HORMELL		5-15-17
OTHER	CENTURY LINK	N/R		
OTHER	EPNG	STEVE WEATHERFORD		5-8-17

ENGINEER'S CERTIFICATION

I, STEVE BOWSER, AS THE ENGINEER OF RECORD FOR THE DEVELOPMENT, HEREBY CERTIFY THAT ALL UTILITY COMPANIES LISTED ABOVE HAVE BEEN PROVIDED FINAL IMPROVEMENT PLANS FOR REVIEW, AND THAT ALL CONFLICTS IDENTIFIED BY THE UTILITIES HAVE BEEN RESOLVED. IN ADDITION, "NO CONFLICT" FORMS HAVE BEEN OBTAINED FROM EACH UTILITY COMPANY AND ARE INCLUDED IN THIS SUBMITTAL.

SIGNATURE
DATE

3-15-17

FEMA DESIGNATION

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	FIRM PANEL DATE	INDEX DATE	FIRM ZONE	BASE FLOOD ELEVATION IN AO ZONE USE DEPTH
045012	2235	L	10-16-13	11-4-15	X	

THE LOWEST FLOOR ELEVATION(S) AND/OR FLOOD PROOFING ELEVATION(S) ON THIS PLAN ARE SUFFICIENTLY HIGH TO PROVIDE PROTECTION FROM FLOODING CAUSED BY A 100-YEAR STORM, AND ARE IN ACCORDANCE WITH SCOTTSDALE REVISED CODE, CHAPTER 37 - FLOODPLAIN AND STORMWATER REGULATION.

SCOPE OF WORK / DRAINAGE STATEMENT

THIS PROJECT INVOLVES CONSTRUCTION OF ONE STORAGE BUILDING, DECELERATION LANE / DRIVEWAY SITEWORK AND UTILITY CONNECTIONS.

SITE HAS NOT BEEN PREVIOUSLY DEVELOPED.

SITE CURRENTLY HAS NO RETENTION. PROJECT WILL PROVIDE 100 YEAR 2 HOUR RETENTION FOR THE SITE WITH BLEEDOFF TO CITY STORM DRAIN IN PIMA ROAD. OVERLAND FLOWS IN 87TH AVE WILL BE UNCHANGED AND BE PERMITTED TO FLOW THRU AREA BETWEEN BUILDING AND RIGHT OF WAY LINE

OFFSITE QUANTITIES (SCOTTSDALE)

ITEM	UNIT	QTY
1" WATER METER AND BACKFLOW	EA	1
1" WATER METER AND BACKFLOW	EA	1
REFUSE ENCLOSURE	EA	1
12" WATER	LF	380
6" WATER	LF	230
WATER CONNECT TO EXISTING	EA	1
SEWER TAP	EA	1
SEWER SERVICE IN R/W	LF	36
PIMA RD CURB	LF	171
PIMA RD SIDEWALK	SF	524
PIMA RD RAMPS	EA	2
PIMA RD PAVING	SY	105
PIMA RD INLET	EA	2
PIMA RD REMOVE INLET	EA	1
PIMA RD STORM DRAIN	LF	16
CONNECTOR PIPE		
PIMA RD STORM MH	EA	2
PIMA RD BLEED STORM DRAIN	LF	27
MCDOWELL RD DRIVEWAY	EA	1

LEGEND

EXISTING	PROPOSED	
---	---	CENTER LINE
---	---	EASEMENT
---	---	RIGHT OF WAY
---	---	PROPERTY LINE
⊗	⊗	GATE VALVE
⊕	⊕	FIRE HYDRANT
○	○	SANITARY SEWER MANHOLE
○	○	SANITARY SEWER CLEANOUT
⌒	⌒	STREET SIGN
⌒	⌒	STREET LIGHT
⊖	⊖	POWER POLE
1225	1225	MAJOR CONTOUR
1226	1226	MINOR CONTOUR
8"W	8"W	WATER LINE
8"S	8"S	SANITARY SEWER LINE
SD	SD	STORM DRAIN LINE
GAS	GAS	GAS LINE
T	T	TELEPHONE LINE
OHP	OHP	OVERHEAD POWER LINE
□	□	WALL
-X-X-X-X-	-X-X-X-X-	FENCE
TC=22.50 G=22.00	GB	GRADE BREAK
		SPOT ELEVATION
		CUT OR FILL SLOPE
		CURB AND GUTTER
		FLOW ARROW
		MONUMENT SIGN

ABBREVIATIONS

COS CITY OF SCOTTSDALE

AC ASPHALTIC CONCRETE	INV INVERT
BC BACK OF CURB	LF LINEAL FEET
BCR BEGIN CURB RETURN	MH MANHOLE
BCHH BRASS CAP HAND HOLE	OHP OVERHEAD ELECTRIC
BDRY BOUNDARY	P PAVEMENT
BM BENCHMARK	PC POINT OF CURVATURE
CEN CENTER	PCC POINT OF COMPOUND CURVE
CL CENTER LINE	PI POINT OF INTERSECTION
ECR END CURB RETURN	PIC POINT OF CURVE
EG EXIST GROUND/GRADE	PP POWER POLE
EL ELEVATION	PRC POINT OF REVERSE CURVE
EP EDGE OF PAVEMENT	PROP PROPOSED
ESMT EASEMENT	PUE POINT OF TANGENCY
EXIST EXISTING	PVC PUBLIC UTILITY EASEMENT
FC FACE OF CURB	PVC POLYVINYL CHLORIDE
FF FINISH FLOOR	RW RIGHT-OF-WAY
FG FINISH GRADE	S SANITARY SEWER
FG(NSEW) FINISH GRADE NORTH/ SOUTH/EAST/WEST	SD STORM DRAIN
FL FIRE HYDRANT	STA STATION
FL FLOW LINE	SW SIDEWALK
G GUTTER	TF TOP OF FOOTING
GB GRADE BREAK	TW TOP OF WALL
GV GAS VALVE	TC TOP OF CURB
HP HIGH POINT	TRANS TRANSITION
	VG VALLEY GUTTER
	W WATER

SHEET INDEX

C-1	COVER SHEET
C-2	NOTES
C-3	GRADING/DRAINAGE PLAN
C-4	PUBLIC WATER PLAN
C-5	PRIVATE UTILITY PLAN
C-6	UG DETAILS
C-7	SECTIONS / DETAILS
C-8	OFFSITE PLAN/PROFILE
C-9	OFFSITE STRIPING PLAN

DEVELOPER

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15849 N 71ST ST #235
SCOTTSDALE, AZ 85254
EMAIL: KEVIN@ZZONECO.COM
PHONE: (480) 719-3000
CONTACT: KEVIN PROCIW

ARCHITECT

SPS+ ARCHITECTS
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Scottsdale, AZ 85258
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TEL CONTACT: BRENT HEATON

ENGINEER

HELIX ENGINEERING, LLC
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PHOENIX, ARIZONA 85050
TEL: (602) 788-2616
CONTACT: STEVE BOWSER

LEGAL DESCRIPTION

LOT 2, A MINOR SUBDIVISION OF "QUICKTRIP #1418", ACCORDING TO BOOK 1172 OF MAPS, PAGE 22, RECORDS OF MARICOPA COUNTY, ARIZONA.

APN: 131-49-161

BENCHMARK (MCDOWELL/GRANITE REEF)

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF MCDOWELL AND GRANITE REEF, CITY OF SCOTTSDALE BENCHMARK #5011
ELEVATION = 1218.037 (NAVD83)

I HEREBY CERTIFY THAT ALL ELEVATIONS REPRESENTED ON THIS PLAN ARE BASED ON THE ELEVATION DATUM FOR THE CITY OF SCOTTSDALE BENCHMARK PROVIDED ABOVE.

BASIS OF BEARINGS

THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SECTION 36, MONUMENTED AS SHOWN HEREON AS BEARING S89°50'20"W

AREA

LEASE AREA NET: 2.705 ACRES, 117,849 SQ. FT.

ZONING

C-4

NATIVE PLANT NOTE

NO NATIVE PROTECTED PLANTS WILL BE DISTURBED DURING ENTIRE DURATION OF CONSTRUCTION

CITY OF SCOTTSDALE

REVIEW AND RECOMMENDED APPROVAL BY:

PAVING	9/1/17	TRAFFIC	9/5/17
G&D	9/1/17	PLANNING	9/1/17
W&S	9/1/17	FIRE	9/5/17
RET WALLS			

APPROVED BY:

ENGINEERING COORDINATION MANAGER (OR DESIGNEE) DATE

CLIENT:

Monolith Development Group

15849 N 71ST STREET
SUITE 235
SCOTTSDALE, AZ 85254
TEL: 480-719-3000
CONTACT: KEVIN PROCIW



Helix Engineering, LLC

Engineering / Surveying / Consulting

3240 E Union Hills
Suite 112
Phoenix AZ 85050
602-788-2616
www.hxeng.com

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TWO WORKING DAYS BEFORE YOU DIG.
CALL FOR THE BLUE STAKES
1-800-782-5348
BLUE STAKE CENTER

RELEASE DATE	
11-21-15	PRELIM ENGR
1-26-16	PRELIM ENGR
3-6-17	PROGRESS SET
6-6-17	2nd SUBMITTAL
7-25-17	3rd SUBMITTAL
8-24-17	FINAL SUBMITTAL

REVISIONS NO.	DATE	
1		
2		
3		

PROJECT NAME

Pima / McDowell

PROJECT LOCATION

PROJECT

1650 N. Pima Road

HELIX JOB NUMBER

215

SHEET TITLE

COVER SHEET

SHEET

C-1

PAGE

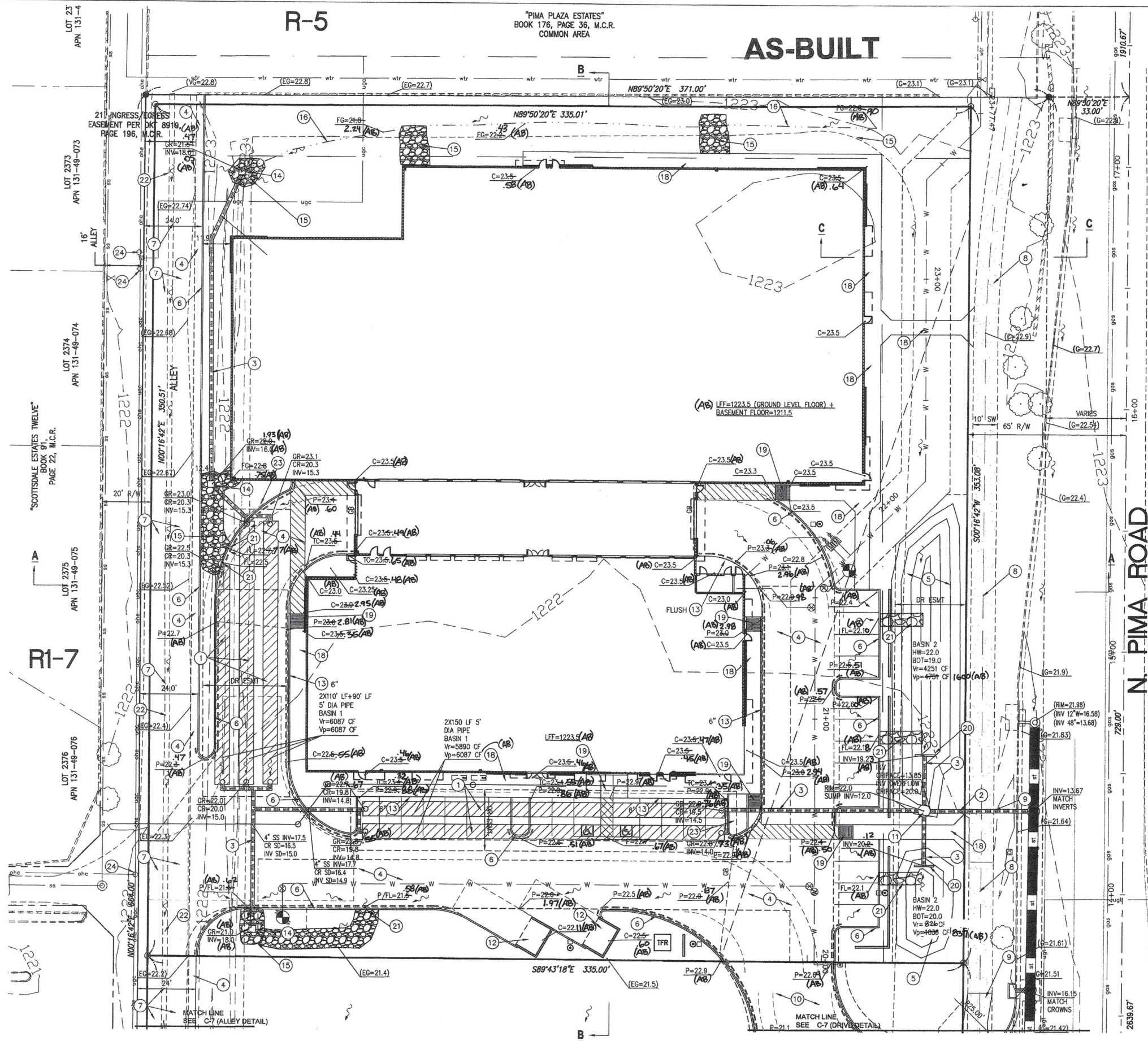
1 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1

50-DR-2011#2

7/31/2019

Aug 24, 2017 - 11:13am
C:\Users\215 Pima McDowell Storage\Drawings\MPR\215.mpr pima.dwg



KEYED NOTES

- NEW 5" DIA CMP ALUMINIZED TYPE 2 RETENTION. SEE DETAIL ON SHEET C-6. NOT SMOOTH INVERT PAVING REQUIRED - SEE DETAIL ON SHEET C-6.
- CONSTRUCT 18" STORM DRAIN RGRCP CL III PIPE.
- NEW 18" ONSITE STORM DRAIN. PIPE SHALL BE HDPE N-12 PIPE.
- PAVE ONSITE ASPHALT 3" AC OVER 7" ABC ON 8" PREPARED SUBGRADE.
- CONSTRUCT NEW SURFACE BASIN.
- CONSTRUCT CURB PER MAG STD DET 222 TYPE A.
- EXISTING ALLEY PAVEMENT VALLEY GUTTER TO REMAIN. MILL AND REPLACE ASPHALT WITH 3" AC. PAVE WEST EDGE TO SURVEY LINE AS SHOWN. PAVEMENT WIDTH SHALL BE 24' FROM FACE OF CURB TO WEST EDGE OF ALLEY PAVEMENT.
- BIKE / PEDESTRIAN PATH TO REMAIN. RECONSTRUCT ALONG NEW DECEL LANE - SEE OFFSITE PLANS.
- SEE OFFSITE PLANS FOR DECEL LANE CONSTRUCTION.
- INTERIM CROSS ACCESS ONSITE CROSS ACCESS DRIVE. INSTALL 6" EXTRUDED CURB ON INTERIM DRIVE. PAVEMENT SHALL BE 3" AC OVER 7" ABC OVER 8" PREPARED SUBGRADE.
- STORM DRAIN MANHOLE WITH 3" ORIFICE PLATE. SEE DETAIL ON SHEET C-7 AND C-2.
- CONSTRUCT REFUSE ENCLOSURE PER COS STD DET 2146-1. SEE ARCH PLANS FOR FINISHES AND COLORS.
- CONSTRUCT TURNDOWN SIDEWALK - SEE DETAIL ON SHEET C-2.
- CONSTRUCT INLET PER MAG STD DET MAG 535.
- PLACE RIPRAP 12" THICK AT ROOF DRAIN OUTLETS. SEE DETAIL SHEET C-2.
- GRADE DRAINAGE SWALE TO ELEVATIONS SHOWN.
- NOT USED THIS SHEET.
- CONSTRUCT SIDEWALK PER MAG STD DET 230.
- CONSTRUCT 12:1 RAMP. RAMP SHALL HALF HEAVY BROOM FINISH.
- CONSTRUCT HEADWALL PER MAG STD DET 501-1.
- CONSTRUCT CURB OPENING AND DOWNDRAIN PER DETAIL ON SHEET C-2.
- MAINTAIN VALLEY GUTTER IN PLACE.
- INSTALL 12"x12" SIGN STATING "NOTICE - UNDERGROUND STORMWATER STORAGE TANK". LETTERING SHALL BE BLACK ON WHITE BACKGROUND. MOUNT BOTTOM OF SIGN 7' ABOVE GRADE.
- EXISTING POWER POLE TO REMAIN.

PROVIDE A KNOX ENTRY ACCESS SYSTEM

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE AS-BUILT ANNOTATIONS PROVIDED ON THIS DRAWING WERE BASED ON AN AS-BUILT SURVEY CONDUCTED UNDER MY SUPERVISION AND ACCURATELY DEPICTS EXISTING FIELD CONDITIONS TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Harvey Land Surveying, Inc.
P.O. Box # 10772
Casa Grande, AZ, 85130
Serving AZ, CO, ND, NV, UT



CLIENT:
Monolith Development Group

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NO.	DATE
1	
2	
3	

PROJECT NAME
Pima / McDowell

PROJECT LOCATION

PROJECT
1650 N. Pima Road

HELIX JOB NUMBER
215

IN HOUSE
DRAWN BY: HXE
CHECKED BY: SB

SHEET TITLE

G/D PLAN

SHEET
C-3

PAGE
3 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2

IS LOG NUMBER 808-PA-2015 62-DR-2015 PLAN REVIEW LOG 2172-17-2