Drainage Reports
Abbreviated Water & Sewer Need Reports
Water Study
Wastewater Study
Stormwater Waiver Application

WATER BASIS OF DESIGN

Estates at Hayden

Prepared for:

Blandford Homes
3321 East Baseline Road
Gilbert, AZ 85234

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020

3/31/18

291109000
March 2018

5-ZN-2018
04/03/18

Final Water Basis of Design

ESTATES AT HAYDEN

MARCH 2018

Prepared By:

Kimley»Horn

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Appendices

INTRODUCTION

INTENT

The purpose of this water report is to support the water system for the proposed Estates at Hayden residential development located on North Hayden Road between East Black Mountain Road and East Westland Road in Scottsdale, Arizona. This report presents the basis of design criteria that will be used for the engineering design of the proposed development utilizing current water design standards and guidelines set forth by the City of Scottsdale, Arizona.

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Estates at Hayden is located within Section 12, Township 5 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The development is bound to the west by North Hayden Road, Sunflower Estates development and Black Mountain Road to the north, North 81st Street to the east, and Westland Estates development to the south. See **Appendix A: Site Location Map**

The 2.9 acre site is a single family development, consisting of 8 single family residential units. Currently, the property is composed of undeveloped desert rangeland. The site is currently zoned as R1-43 and is going to be rezoned as R1-43 PAD.

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EXISTING DISTRIBUTION SYSTEM

The site is surrounded by existing single family residential development. Per the City of Scottsdale Quarter Section Map 58-47 there is an existing 12-inch waterline (material unknown) in Hayden Road directly west of the site and a 6-inch DIP waterline in 81st Street directly east of the site. At the southeast corner of the site there exists two water meters from the 6-inch DIP waterline in 81st Street.

According to Figure 6.1-3 of the City of Scottsdale Design Standards and Policies Manual (DS&PM), the site is located in Pressure Zone 10 with existing ground elevation ranging from 2310 feet in the west to 2440 feet in the east.

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The proposed Estates at Hayden site is in pressure zone 10. The water system will tap into the existing 12-inch City of Scottsdale waterline in Hayden Road. The proposed on-site distribution system will service Lots 1-6 and will consist of an 8-inch Class 350 DIP water line that will provide potable water and fire protection. Lots 7 & 8 along the south of the site will be serviced by the existing water meters located at the southeast corner of the site. Refer to **Appendix B** for the Proposed Water System Layout Exhibit.

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The WaterCAD v8i water system modeling software distributed by Haestad Methods, Inc. was used to model the proposed water network. The existing water meters servicing Lots 7 & 8 are not analyzed with this report. A fire flow test was performed to determine the residual and static pressures of the existing system. The fire flow test was performed on existing hydrants along N. Hayden Road to the west of the site. See **Appendix D** for complete fire flow test results.

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The proposed water distribution system for the project is modeled under 4 design scenarios. Average Day, Max Day, Peak Hour and Max Day plus Fire Flows scenarios are modeled. Average Day Demands are based on Figure 6.1-2 in the DS&PM, with peaking factors per section 6-1.404. A fire flow of 1,000 gpm per section 6-1.501 of the DS&PM was used. See **Table 1** below for a summary of water demands.

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Land Use	Dwelling units (du)	Average Daily Demand (gpm/du)	Average Daily Flow (gpd)	Average Day Flow (gpm)	Max Day Flow (gpm)	Peak Hour Flow (gpm)
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Average Day, Max Day, and Peak Hour Demands are applied at hydraulic model nodes based on number of adjacent proposed units. Fire flow demands are applied to all junctions within the project boundary.

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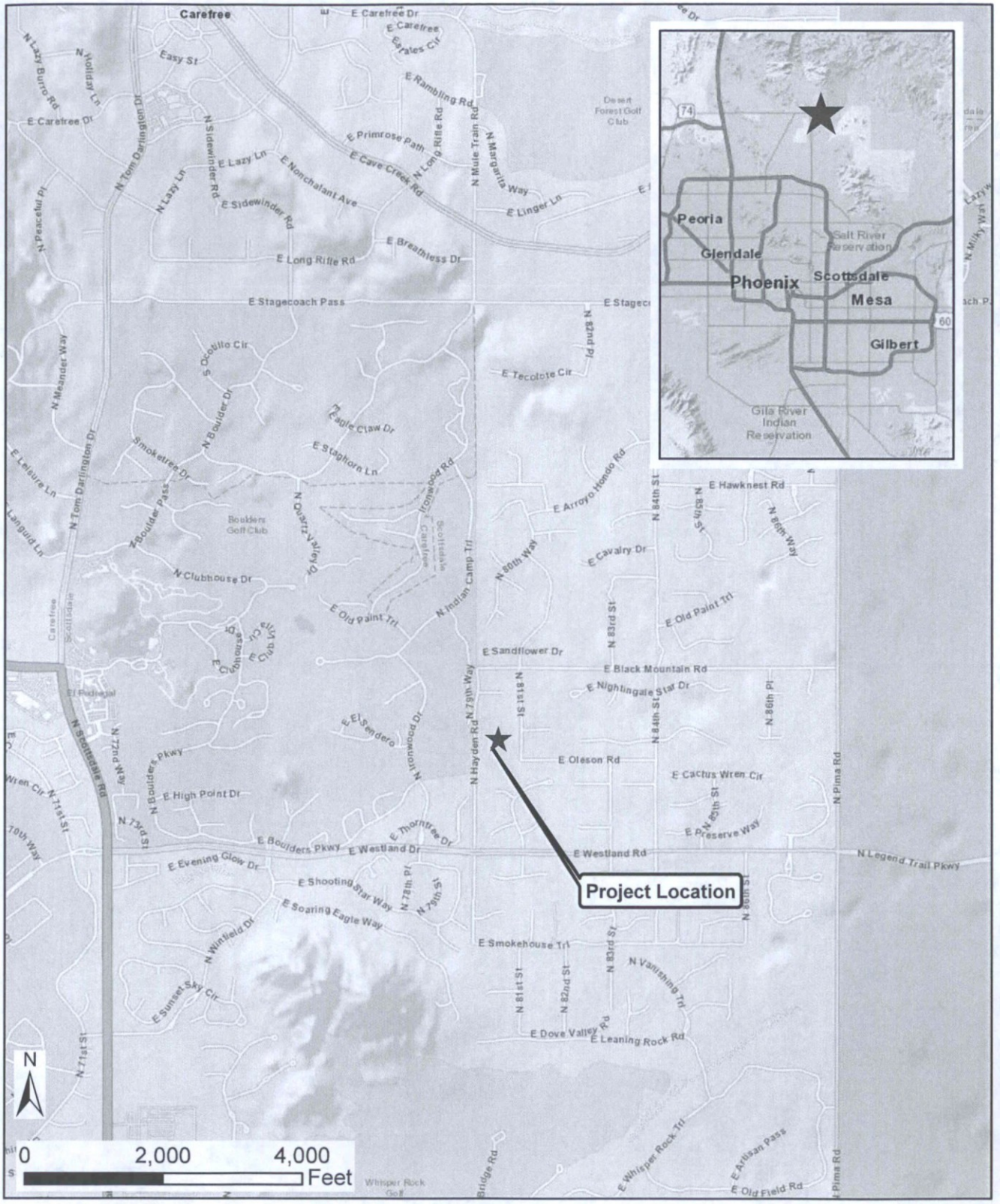
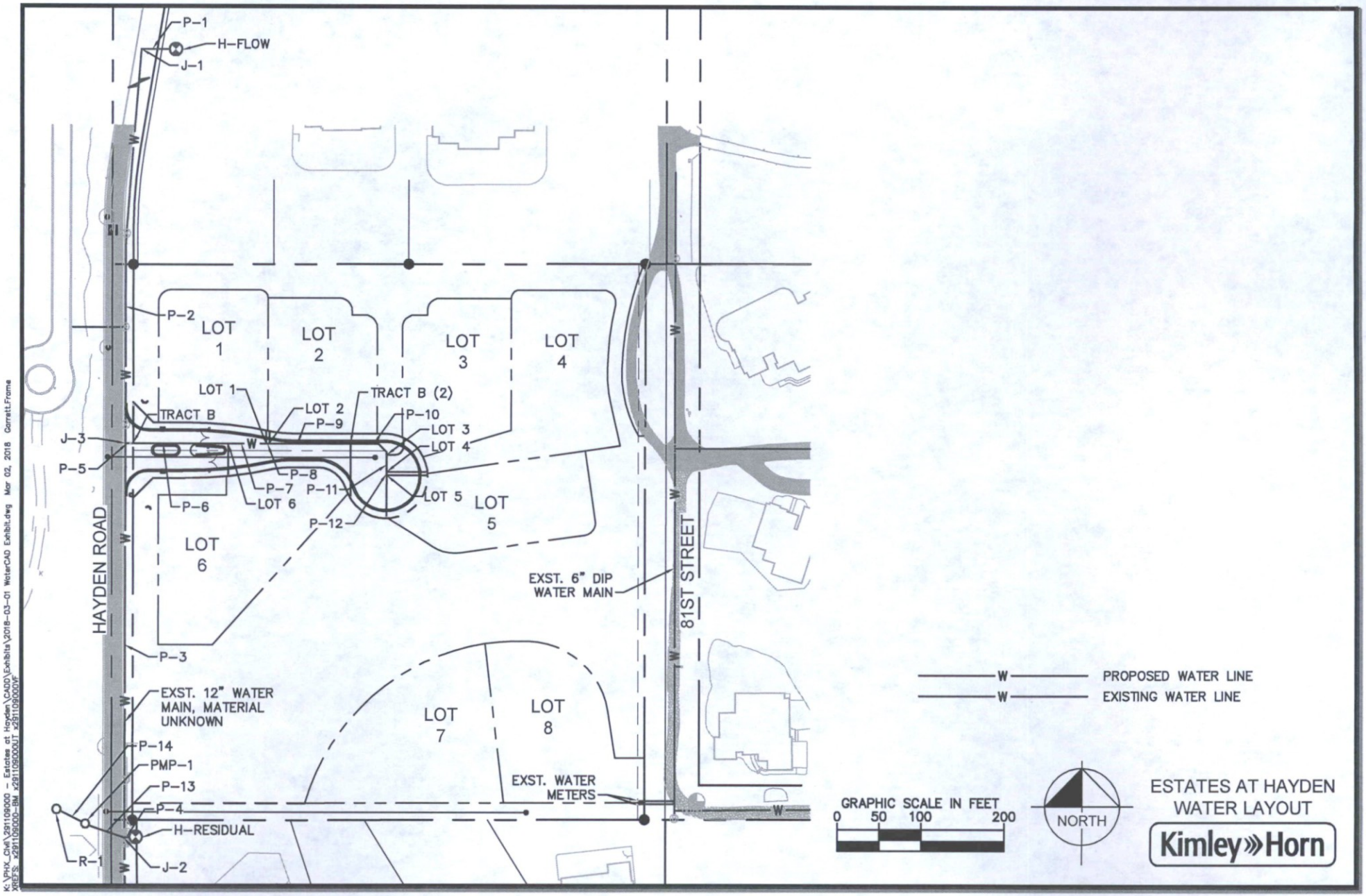
Refer to **Appendix C** for the WaterCAD results. The WaterCAD model includes a pump curve as an approximation of the existing water distribution system.

Appendix A – Site Location Map



Kimley»Horn Expect More. Experience Better.	Estates At Hayden	Scottsdale, AZ
	Site Location Map	

Appendix B – Proposed Water System Layout



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Appendix C – WaterCAD Analysis Results

Model Pump Curve

Max Day Plus Fire Flow

Average Day

Max Day

Peak Hour

Pump Definition Detailed Report: 2018-03-02 Fire Flow Test

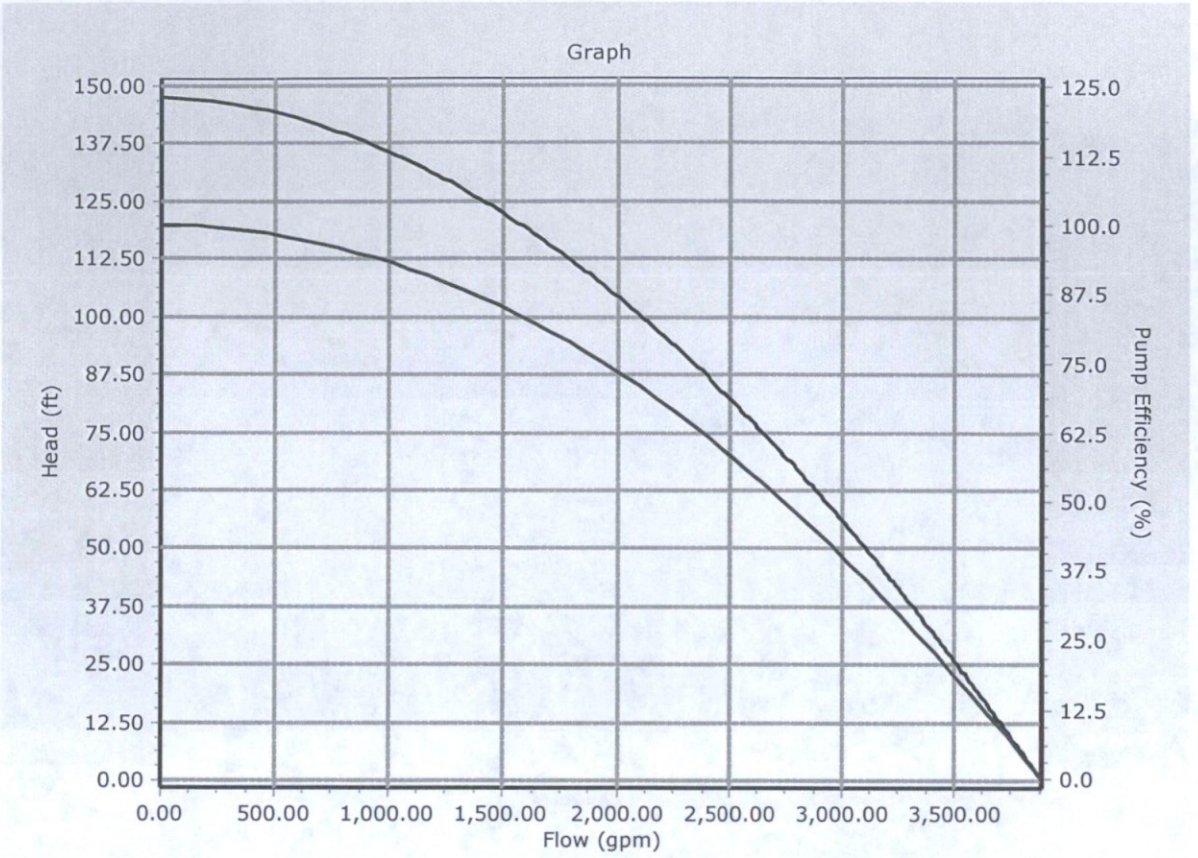
Element Details			
ID	61	Notes	
Label	2018-03-02 Fire Flow Test		

Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	110.65 ft
Shutoff Flow	0.00 gpm	Maximum Operating Flow	3,171.00 gpm
Shutoff Head	147.61 ft	Maximum Operating Head	46.20 ft
Design Flow	1,839.00 gpm		

Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0.00 gpm		

Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

Pump Definition Detailed Report: 2018-03-02 Fire Flow Test



Active Scenario: Max Day + Fire Flow

Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Satisfies Fire Flow Constraints?	Flow (Total Needed) (gpm)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Flow (Total Available) (gpm)	Pressure (Calculated System Lower Limit) (psi)
H-Flow	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
H-Residual	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-1	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-2	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-3	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
Lot 1	1,000.00	2,521.09	True	1,001.32	55.4	2,522.41	20.0
Lot 2	1,000.00	2,514.92	True	1,001.32	55.0	2,516.24	20.0
Lot 3	1,000.00	2,317.00	True	1,001.32	51.7	2,318.32	20.0
Lot 4	1,000.00	2,293.76	True	1,001.32	50.6	2,295.08	20.0
Lot 5	1,000.00	2,288.84	True	1,001.32	50.6	2,290.16	20.2
Lot 6	1,000.00	2,592.81	True	1,001.32	54.9	2,594.13	20.0
Tract B	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
Tract B (2)	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)

Active Scenario: Average Day

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	0.66	2,543.61	62.6
Lot 2	2,400.00	0.66	2,543.61	62.1
Lot 3	2,405.00	0.66	2,543.61	60.0
Lot 4	2,407.00	0.66	2,543.61	59.1
Lot 5	2,407.00	0.66	2,543.61	59.1
Lot 6	2,401.00	0.66	2,543.61	61.7
Tract B	2,398.00	0.00	2,543.61	63.0
Tract B (2)	2,401.00	0.00	2,543.61	61.7

Active Scenario: Average Day

FlexTable: Pipe Table

Label	Material	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	Ductile Iron	13	6.0	130.0	0.00	0.00
P-2	Ductile Iron	557	12.0	130.0	0.00	0.00
P-3	Ductile Iron	468	12.0	130.0	-3.96	0.01
P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	3.96	0.03
P-6	Ductile Iron	113	8.0	130.0	3.96	0.03
P-7	Ductile Iron	45	8.0	130.0	3.30	0.02
P-8	Ductile Iron	4	8.0	130.0	2.64	0.02
P-9	Ductile Iron	96	8.0	130.0	1.98	0.01
P-10	Ductile Iron	49	8.0	130.0	1.98	0.01
P-11	Ductile Iron	20	8.0	130.0	1.32	0.01
P-12	Ductile Iron	4	8.0	130.0	0.66	0.00
P-13	Ductile Iron	1	100.0	130.0	3.97	0.00
P-14	Ductile Iron	1	100.0	130.0	3.97	0.00

Active Scenario: Max Day

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	1.32	2,543.61	62.6
Lot 2	2,400.00	1.32	2,543.61	62.1
Lot 3	2,405.00	1.32	2,543.61	60.0
Lot 4	2,407.00	1.32	2,543.61	59.1
Lot 5	2,407.00	1.32	2,543.61	59.1
Lot 6	2,401.00	1.32	2,543.61	61.7
Tract B	2,398.00	1.32	2,543.61	63.0
Tract B (2)	2,401.00	0.00	2,543.61	61.7

Active Scenario: Max Day

FlexTable: Pipe Table

Label	Material	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	Ductile Iron	13	6.0	130.0	0.00	0.00
P-2	Ductile Iron	557	12.0	130.0	0.00	0.00
P-3	Ductile Iron	468	12.0	130.0	-9.24	0.03
P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	9.24	0.06
P-6	Ductile Iron	113	8.0	130.0	7.92	0.05
P-7	Ductile Iron	45	8.0	130.0	6.60	0.04
P-8	Ductile Iron	4	8.0	130.0	5.28	0.03
P-9	Ductile Iron	96	8.0	130.0	3.96	0.03
P-10	Ductile Iron	49	8.0	130.0	3.96	0.03
P-11	Ductile Iron	20	8.0	130.0	2.64	0.02
P-12	Ductile Iron	4	8.0	130.0	1.32	0.01
P-13	Ductile Iron	1	100.0	130.0	9.25	0.00
P-14	Ductile Iron	1	100.0	130.0	9.25	0.00

Active Scenario: Peak Hour

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	2.31	2,543.60	62.6
Lot 2	2,400.00	2.31	2,543.60	62.1
Lot 3	2,405.00	2.31	2,543.60	60.0
Lot 4	2,407.00	2.31	2,543.60	59.1
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Lot 6	2,401.00	2.31	2,543.60	61.7
Tract B	2,398.00	0.00	2,543.61	63.0
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P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	13.86	0.09
P-6	Ductile Iron	113	8.0	130.0	13.86	0.09
P-7	Ductile Iron	45	8.0	130.0	11.55	0.07
P-8	Ductile Iron	4	8.0	130.0	9.24	0.06
P-9	Ductile Iron	96	8.0	130.0	6.93	0.04
P-10	Ductile Iron	49	8.0	130.0	6.93	0.04
P-11	Ductile Iron	20	8.0	130.0	4.62	0.03
P-12	Ductile Iron	4	8.0	130.0	2.31	0.01
P-13	Ductile Iron	1	100.0	130.0	13.87	0.00
P-14	Ductile Iron	1	100.0	130.0	13.87	0.00

Appendix D – Fire Flow Test Results

E·J | Flow Test Summary

Project Name:	EJFT 18040
Project Address:	34303 N Hayden Rd, Scottsdale, AZ 85266
Date of Flow Test:	2018-03-02
Time of Flow Test:	7:44 AM
Data Reliable Until:	2018-09-02
Conducted By:	Cesar Reyna & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By:	Jim Demarbiex (City of Scottsdale) 602.541.0586
City Forces Contacted:	City of Scottsdale (602.541.0586)
Permit Number:	C54832

Raw Flow Test Data

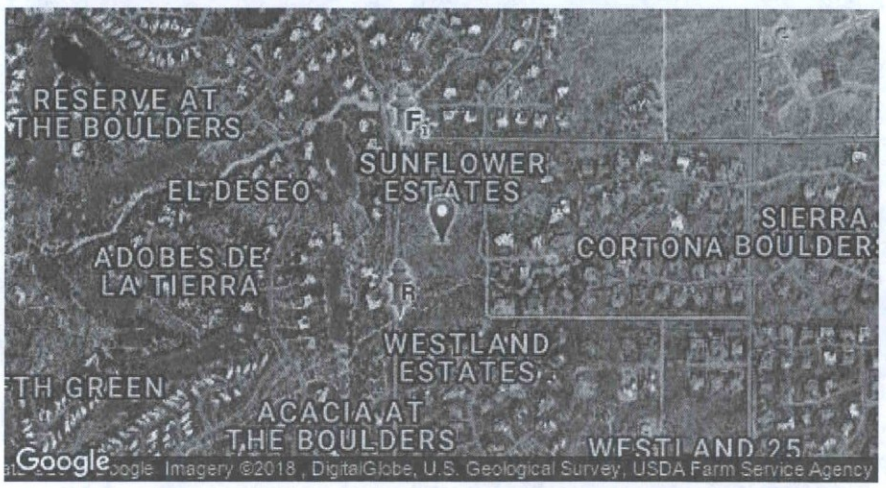
Static Pressure:	71.0 PSI
Residual Pressure:	55.0 PSI
Flowing GPM:	1,839
GPM @ 20 PSI:	3,439

Data with a 10 % Safety Factor

Static Pressure:	63.9 PSI
Residual Pressure:	47.9 PSI
Flowing GPM:	1,839
GPM @ 20 PSI:	3,171

Hydrant F_1

Pitot Pressure (1):	30	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	30	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches



Project Site

Static-Residual Hydrant

Flow Hydrant

Main Size
12 inches

Distance Between F_1 and R
1303 ft (measured linearly)

Static-Residual Elevation
2396 ft (above sea level)

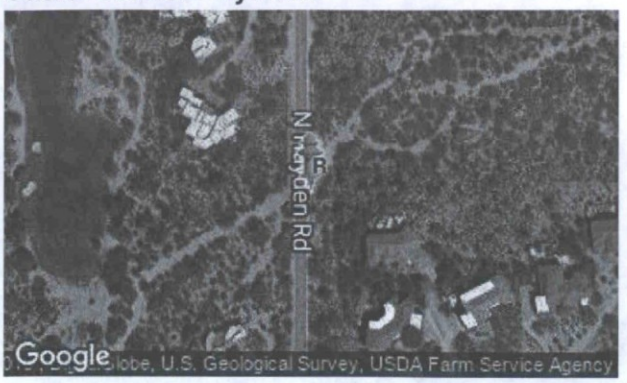
Flow Hydrant (F_1) Elevation
2403 ft (above sea level)

Elevation & distance values are approximate

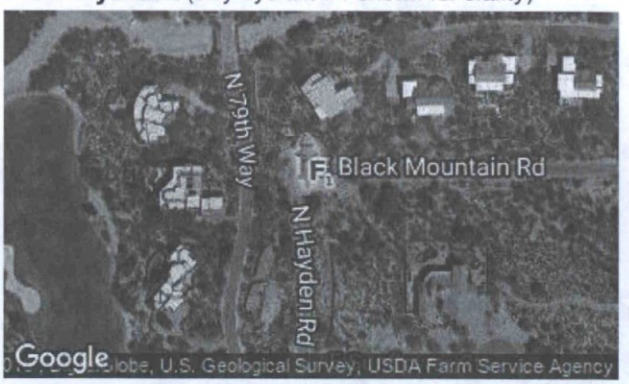
EJ Flow Tests, LLC
21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

E·J | Flow Test Summary

Static-Residual Hydrant

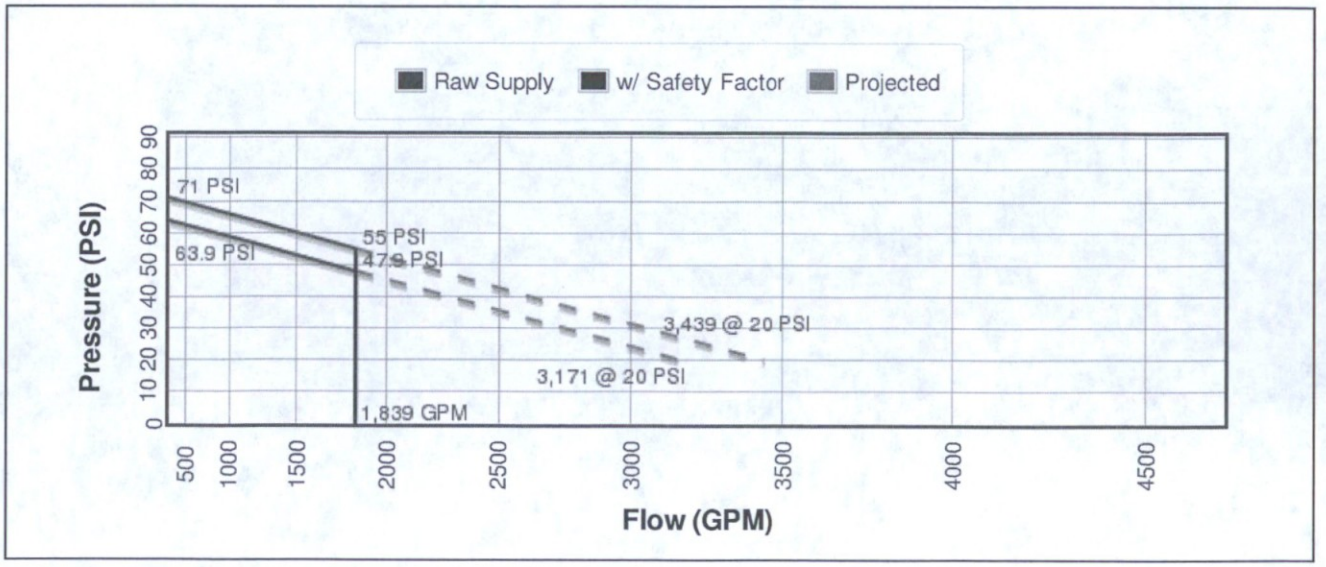


Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



WATER BASIS OF DESIGN

Estates at Hayden

REVISE & RESUBMIT

City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258

04/23/2018.

Prepared for:

Blandford Homes
3321 East Baseline Road
Gilbert, AZ 85234

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020

Exp 3/31/18

291109000
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* Co-ordinate w/ Fire Dept. if a Fire Hydrant is Required @ within the Sub-division.

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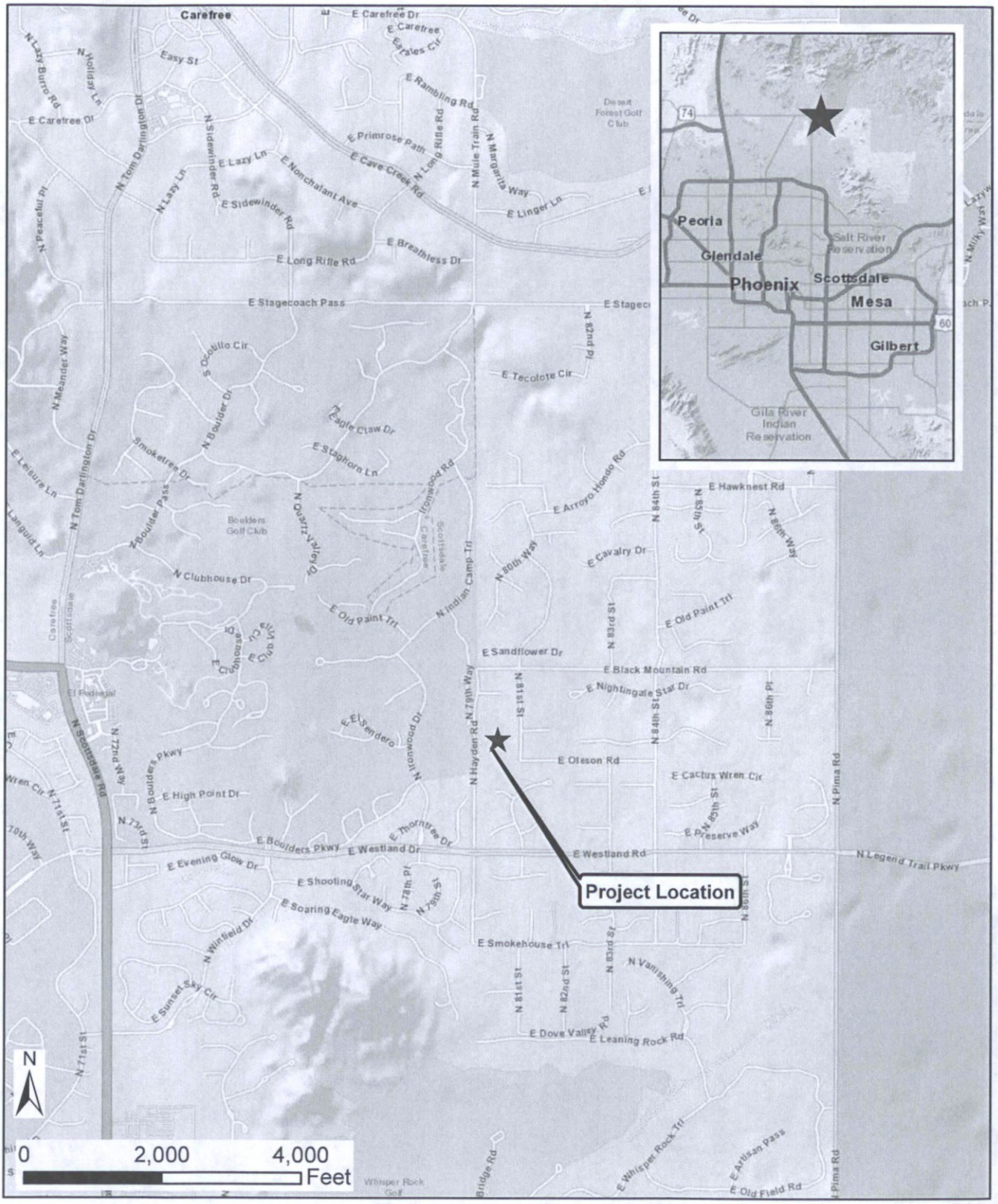

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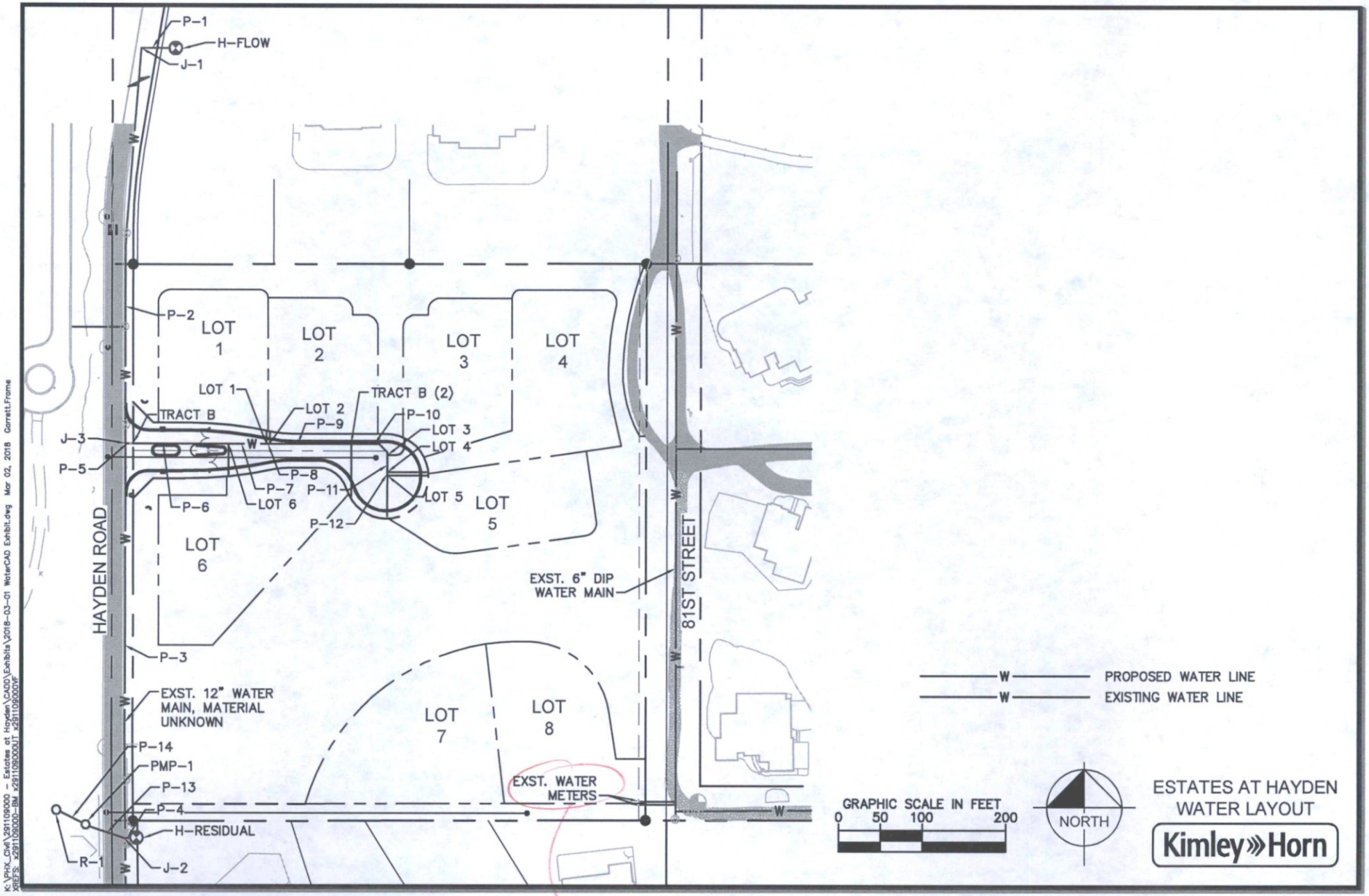

K:\PHX_Civil\291109000 - Estates at Hayden\CADD\Exhibits\2018-03-01 WaterCAD Exhibit.dwg Mar 02, 2018 Garrett.Frame
XREFS: x291109000-BM x291109000UT x291109000F

Include in the Model

City Map does not show any water Meters here.?

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Model Pump Curve

Max Day Plus Fire Flow

Average Day

Max Day

Peak Hour

Pump Definition Detailed Report: 2018-03-02 Fire Flow Test

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ID	61	Notes	
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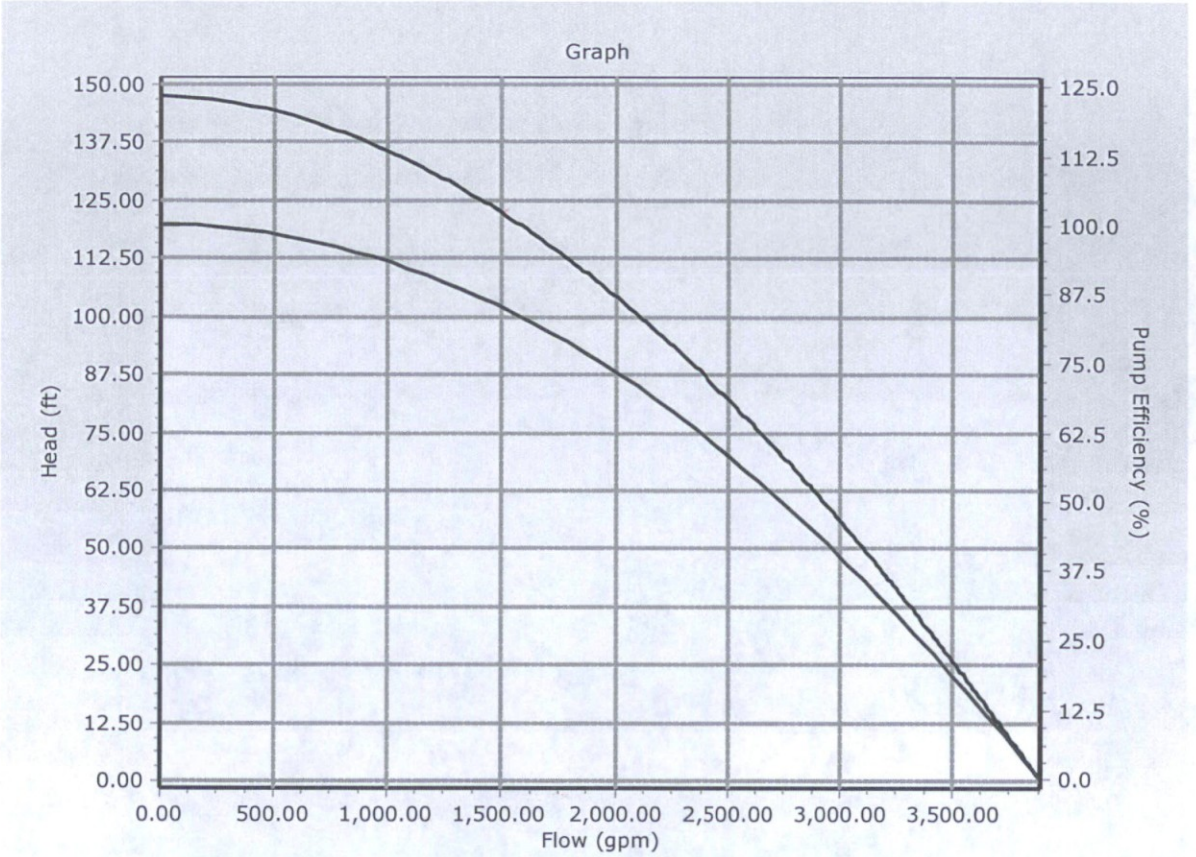
Shutoff Flow	0.00 gpm	Maximum Operating Flow	3,171.00 gpm
Shutoff Head	147.61 ft	Maximum Operating Head	46.20 ft
Design Flow	1,839.00 gpm		

Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0.00 gpm		

Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

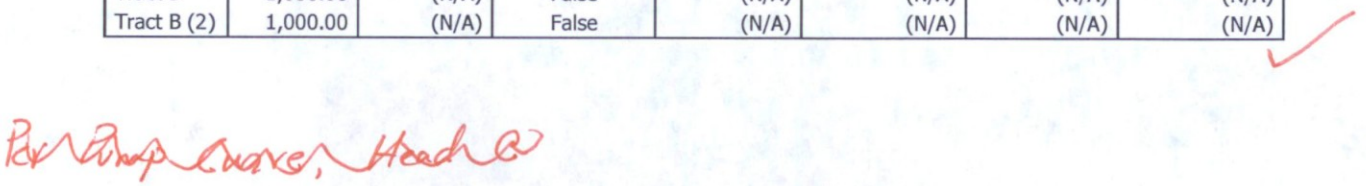
Pump Definition Detailed Report: 2018-03-02 Fire Flow Test



Active Scenario: Max Day + Fire Flow

Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Satisfies Fire Flow Constraints?	Flow (Total Needed) (gpm)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Flow (Total Available) (gpm)	Pressure (Calculated System Lower Limit) (psi)
H-Flow	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
H-Residual	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-1	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-2	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
J-3	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
Lot 1	1,000.00	2,521.09	True	1,001.32	55.4	2,522.41	20.0
Lot 2	1,000.00	2,514.92	True	1,001.32	55.0	2,516.24	20.0
Lot 3	1,000.00	2,317.00	True	1,001.32	51.7	2,318.32	20.0
Lot 4	1,000.00	2,293.76	True	1,001.32	50.6	2,295.08	20.0
Lot 5	1,000.00	2,288.84	True	1,001.32	50.6	2,290.16	20.2
Lot 6	1,000.00	2,592.81	True	1,001.32	54.9	2,594.13	20.0
Tract B	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)
Tract B (2)	1,000.00	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)



Active Scenario: Average Day

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	0.66	2,543.61	62.6
Lot 2	2,400.00	0.66	2,543.61	62.1
Lot 3	2,405.00	0.66	2,543.61	60.0
Lot 4	2,407.00	0.66	2,543.61	59.1
Lot 5	2,407.00	0.66	2,543.61	59.1
Lot 6	2,401.00	0.66	2,543.61	61.7
Tract B	2,398.00	0.00	2,543.61	63.0
Tract B (2)	2,401.00	0.00	2,543.61	61.7

Active Scenario: Average Day

FlexTable: Pipe Table

Label	Material	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	Ductile Iron	13	6.0	130.0	0.00	0.00
P-2	Ductile Iron	557	12.0	130.0	0.00	0.00
P-3	Ductile Iron	468	12.0	130.0	-3.96	0.01
P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	3.96	0.03
P-6	Ductile Iron	113	8.0	130.0	3.96	0.03
P-7	Ductile Iron	45	8.0	130.0	3.30	0.02
P-8	Ductile Iron	4	8.0	130.0	2.64	0.02
P-9	Ductile Iron	96	8.0	130.0	1.98	0.01
P-10	Ductile Iron	49	8.0	130.0	1.98	0.01
P-11	Ductile Iron	20	8.0	130.0	1.32	0.01
P-12	Ductile Iron	4	8.0	130.0	0.66	0.00
P-13	Ductile Iron	1	100.0	130.0	3.97	0.00
P-14	Ductile Iron	1	100.0	130.0	3.97	0.00

Active Scenario: Max Day

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	1.32	2,543.61	62.6
Lot 2	2,400.00	1.32	2,543.61	62.1
Lot 3	2,405.00	1.32	2,543.61	60.0
Lot 4	2,407.00	1.32	2,543.61	59.1
Lot 5	2,407.00	1.32	2,543.61	59.1
Lot 6	2,401.00	1.32	2,543.61	61.7
Tract B	2,398.00	1.32	2,543.61	63.0
Tract B (2)	2,401.00	0.00	2,543.61	61.7

Active Scenario: Max Day

FlexTable: Pipe Table

Label	Material	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	Ductile Iron	13	6.0	130.0	0.00	0.00
P-2	Ductile Iron	557	12.0	130.0	0.00	0.00
P-3	Ductile Iron	468	12.0	130.0	-9.24	0.03
P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	9.24	0.06
P-6	Ductile Iron	113	8.0	130.0	7.92	0.05
P-7	Ductile Iron	45	8.0	130.0	6.60	0.04
P-8	Ductile Iron	4	8.0	130.0	5.28	0.03
P-9	Ductile Iron	96	8.0	130.0	3.96	0.03
P-10	Ductile Iron	49	8.0	130.0	3.96	0.03
P-11	Ductile Iron	20	8.0	130.0	2.64	0.02
P-12	Ductile Iron	4	8.0	130.0	1.32	0.01
P-13	Ductile Iron	1	100.0	130.0	9.25	0.00
P-14	Ductile Iron	1	100.0	130.0	9.25	0.00

Active Scenario: Peak Hour

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,403.00	0.00	2,543.61	60.8
J-2	2,396.00	0.00	2,543.61	63.9
J-3	2,398.00	0.00	2,543.61	63.0
Lot 1	2,399.00	2.31	2,543.60	62.6
Lot 2	2,400.00	2.31	2,543.60	62.1
Lot 3	2,405.00	2.31	2,543.60	60.0
Lot 4	2,407.00	2.31	2,543.60	59.1
Lot 5	2,407.00	2.31	2,543.60	59.1
Lot 6	2,401.00	2.31	2,543.60	61.7
Tract B	2,398.00	0.00	2,543.61	63.0
Tract B (2)	2,401.00	0.00	2,543.60	61.7

Active Scenario: Peak Hour

FlexTable: Pipe Table

Label	Material	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	Ductile Iron	13	6.0	130.0	0.00	0.00
P-2	Ductile Iron	557	12.0	130.0	0.00	0.00
P-3	Ductile Iron	468	12.0	130.0	-13.86	0.04
P-4	Ductile Iron	8	6.0	130.0	0.00	0.00
P-5	Ductile Iron	9	8.0	130.0	13.86	0.09
P-6	Ductile Iron	113	8.0	130.0	13.86	0.09
P-7	Ductile Iron	45	8.0	130.0	11.55	0.07
P-8	Ductile Iron	4	8.0	130.0	9.24	0.06
P-9	Ductile Iron	96	8.0	130.0	6.93	0.04
P-10	Ductile Iron	49	8.0	130.0	6.93	0.04
P-11	Ductile Iron	20	8.0	130.0	4.62	0.03
P-12	Ductile Iron	4	8.0	130.0	2.31	0.01
P-13	Ductile Iron	1	100.0	130.0	13.87	0.00
P-14	Ductile Iron	1	100.0	130.0	13.87	0.00

Appendix D – Fire Flow Test Results

E·J | Flow Test Summary

Project Name:	EJFT 18040
Project Address:	34303 N Hayden Rd, Scottsdale, AZ 85266
Date of Flow Test:	2018-03-02
Time of Flow Test:	7:44 AM
Data Reliable Until:	2018-09-02
Conducted By:	Cesar Reyna & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By:	Jim Demarbiex (City of Scottsdale) 602.541.0586
City Forces Contacted:	City of Scottsdale (602.541.0586)
Permit Number:	C54832

Raw Flow Test Data

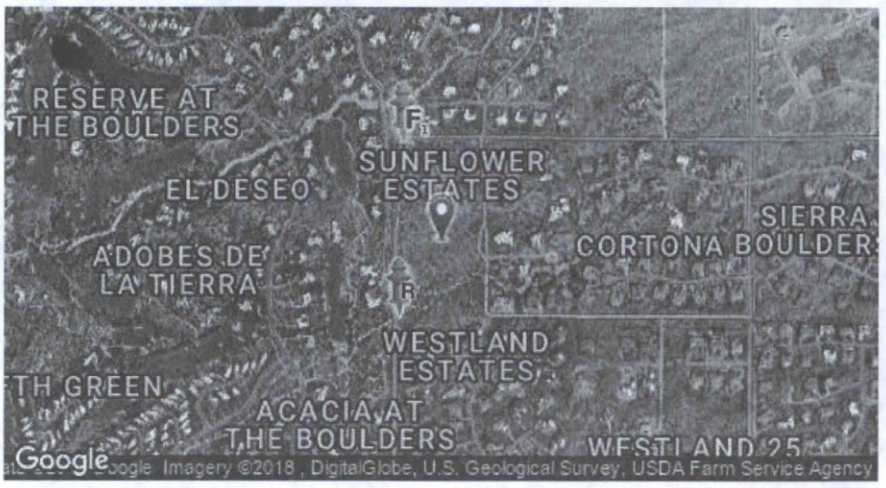
Static Pressure:	71.0 PSI
Residual Pressure:	55.0 PSI
Flowing GPM:	1,839
GPM @ 20 PSI:	3,439

Data with a 10 % Safety Factor

Static Pressure:	63.9 PSI
Residual Pressure:	47.9 PSI
Flowing GPM:	1,839
GPM @ 20 PSI:	3,171

Hydrant F_1

Pitot Pressure (1):	30	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	30	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches



Project Site

Static-Residual Hydrant

Flow Hydrant

Main Size
12 inches

Distance Between F_1 and R
1303 ft (measured linearly)

Static-Residual Elevation
2396 ft (above sea level)

Flow Hydrant (F_1) Elevation
2403 ft (above sea level)

Elevation & distance values are approximate

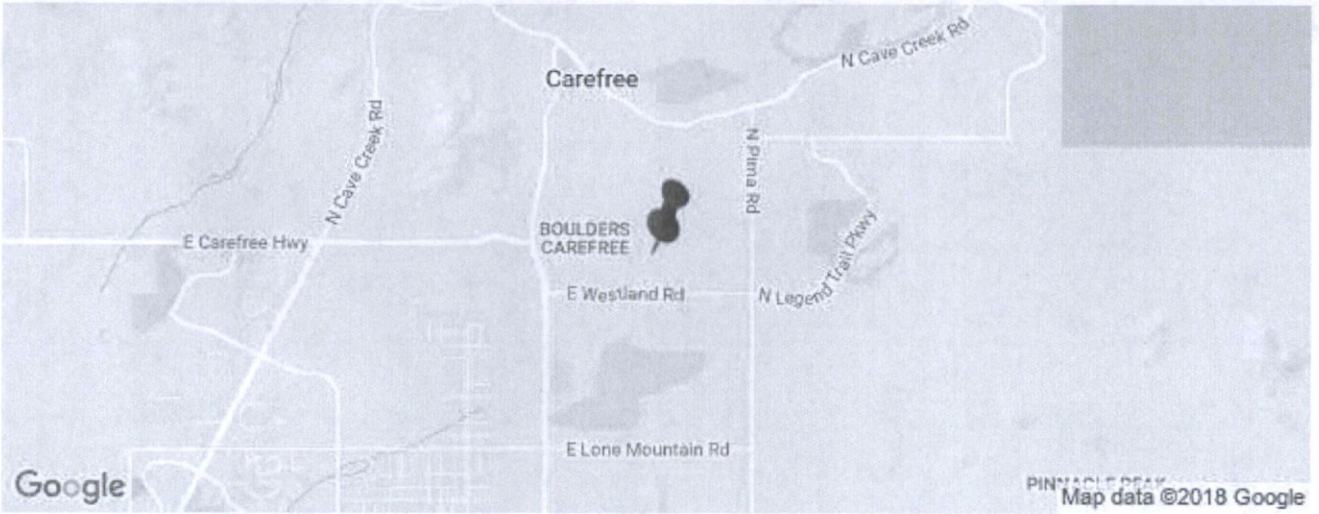
EJ Flow Tests, LLC
21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

E·J | Flow Test Summary

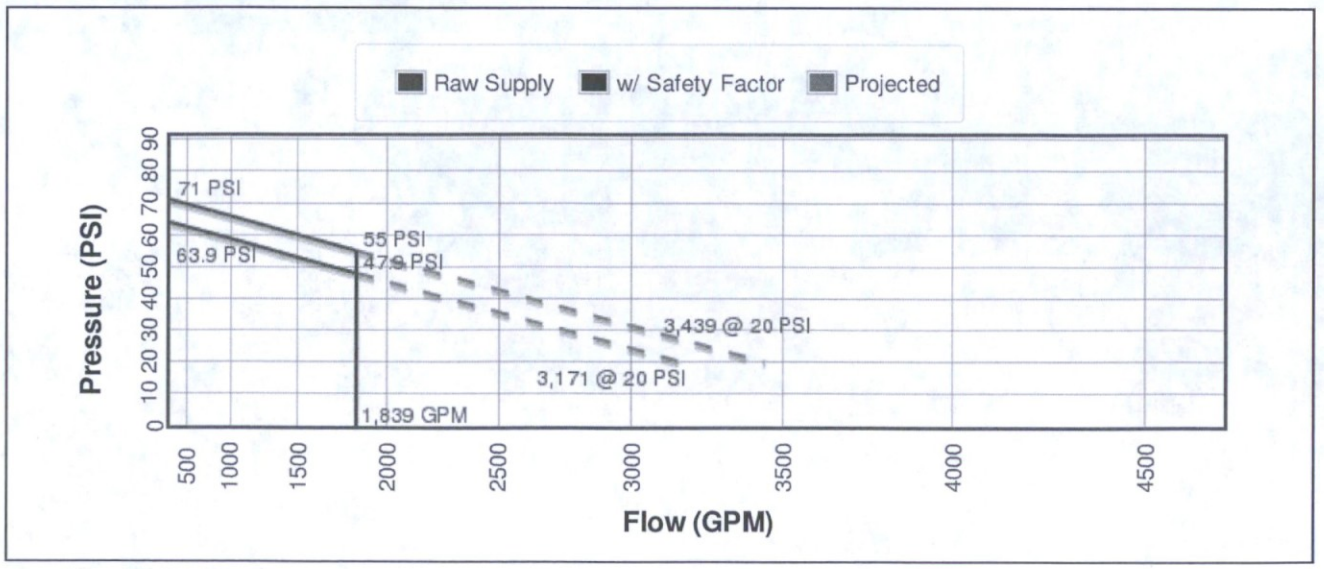
Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site



Water Supply Curve $N^{1.85}$ Graph



SEWER BASIS OF DESIGN

Estates at Hayden

Prepared for:

Blandford Homes
3321 E. Baseline Rd.
Gilbert, Arizona 85234

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020

Exp 3/31/18

291109000
March 2018

5-ZN-2018
04/03/18

Final Sewer Basis of Design

ESTATES AT HAYDEN

MARCH 2018

Prepared By:

Kimley»Horn

Contents

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Appendices

INTRODUCTION

INTENT

The purpose of this sewer report is to support the sanitary sewer system for the proposed Estates at Hayden residential development located on North Hayden Road between East Black Mountain Road and East Westland Road in Scottsdale, Arizona. This report presents the basis of design criteria that will be used for the engineering design of the proposed development utilizing current sewer design standards and guidelines set forth by the City of Scottsdale, Arizona.

PROJECT DESCRIPTION

Estates at Hayden is located within Section 12, Township 5 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The Development is bound to the west by North Hayden Road, Sunflower Estates development and Black Mountain Road to the north, North 81st Street to the east, and Westland Estates development to the south. See **Appendix A: Site Location Map**

The 2.9 acre site is a single family development, consisting of 8 single family residential units. Currently, the property is composed of undeveloped desert rangeland. The site is currently zoned as R1-43 and is going to be rezoned as R1-43 PAD.

DISTRIBUTION SYSTEM DESCRIPTION

EXISTING COLLECTION SYSTEM

The site is surrounded by existing single family residential developments. Per the City of Scottsdale Quarter Section Map 58-47 there is an existing 8-inch PVC sewer line in North Hayden Road that flows south to a 10-inch PVC main in Westland Road.

PROPOSED COLLECTION SYSTEM

The wastewater flows generated by Lots 1-6 will be collected and conveyed through a new 8-inch PVC sewer line to the existing 8-inch PVC sewer main in Hayden Road. This proposed sewer line will connect to the existing Hayden Road sewer line near the midpoint of the west property line. A second 8-inch PVC sewer line will be installed along the south property line and collect the wastewater flow generated by Lots 7 & 8. This proposed sewer line will connect to existing 8-inch PVC sewer line in Hayden Road near the southwest corner of the site. Refer to **Appendix B** for the Proposed Sewer System Layout Exhibit.

BASIS OF DESIGN

DESIGN METHODOLOGY

Average Day Demand design flows are calculated based on design criteria detailed within the City of Scottsdale Design Standards and Polices Manual (DS&PM). Per DS&PM Chapter 7, a design flow of 100 gallons per capita per day (gpcpd) shall be used. The DS&PM also requires a peaking factor of 4.0 and a residential density of 2.5 persons per dwelling unit.

WASTEWATER SYSTEM ANALYSIS

See **Table 1** below for a summary of sewer demands.

Table 1 Sewer Demands - Lots 1-6

Land Use	Dwelling units (du)	Density (persons/ du)	Population (persons)	Average Day Demand (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
<2 du/ac	6	2.5	15	1,500	6,000	4.17

Table 2 Sewer Demands - Lots 7 & 8

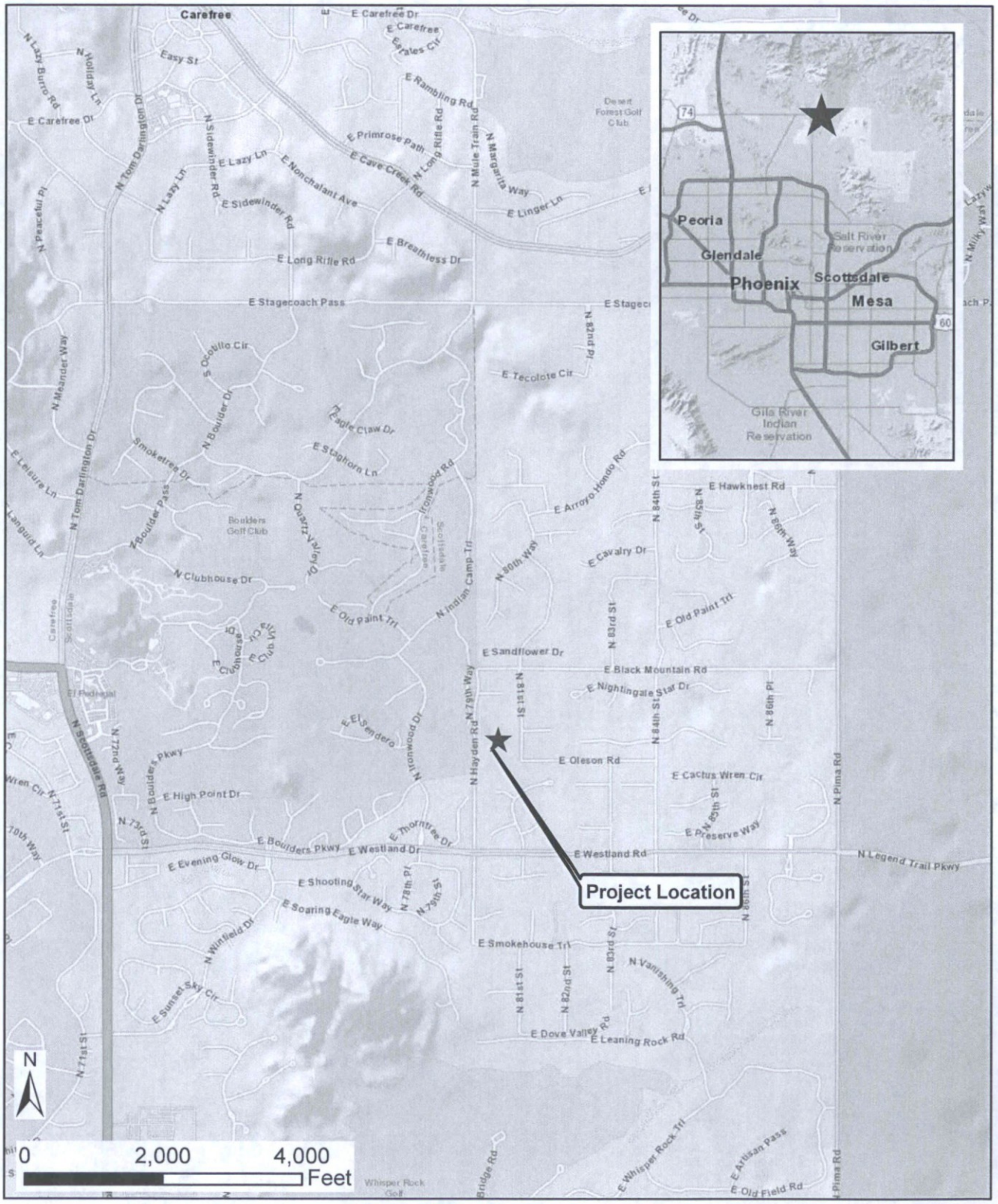
Land Use	Dwelling units (du)	Density (persons/ du)	Population (persons)	Average Day Demand (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
<2 du/ac	2	2.5	5	500	1,000	0.69

Per the DS&PM proposed sewer lines shall be designed to achieve a full flow velocity of between 2.5 and 10 feet per second and maintain a maximum d/D ratio of 0.65 when calculated with a Manning's "n" value of 0.013. An 8-inch sewer will satisfy these requirements using a minimum slope of 0.0052 ft/ft (0.52%) and a maximum slope of 0.0833 ft/ft (8.33%). See **Appendix C** for pipe slope calculations.

RESULTS

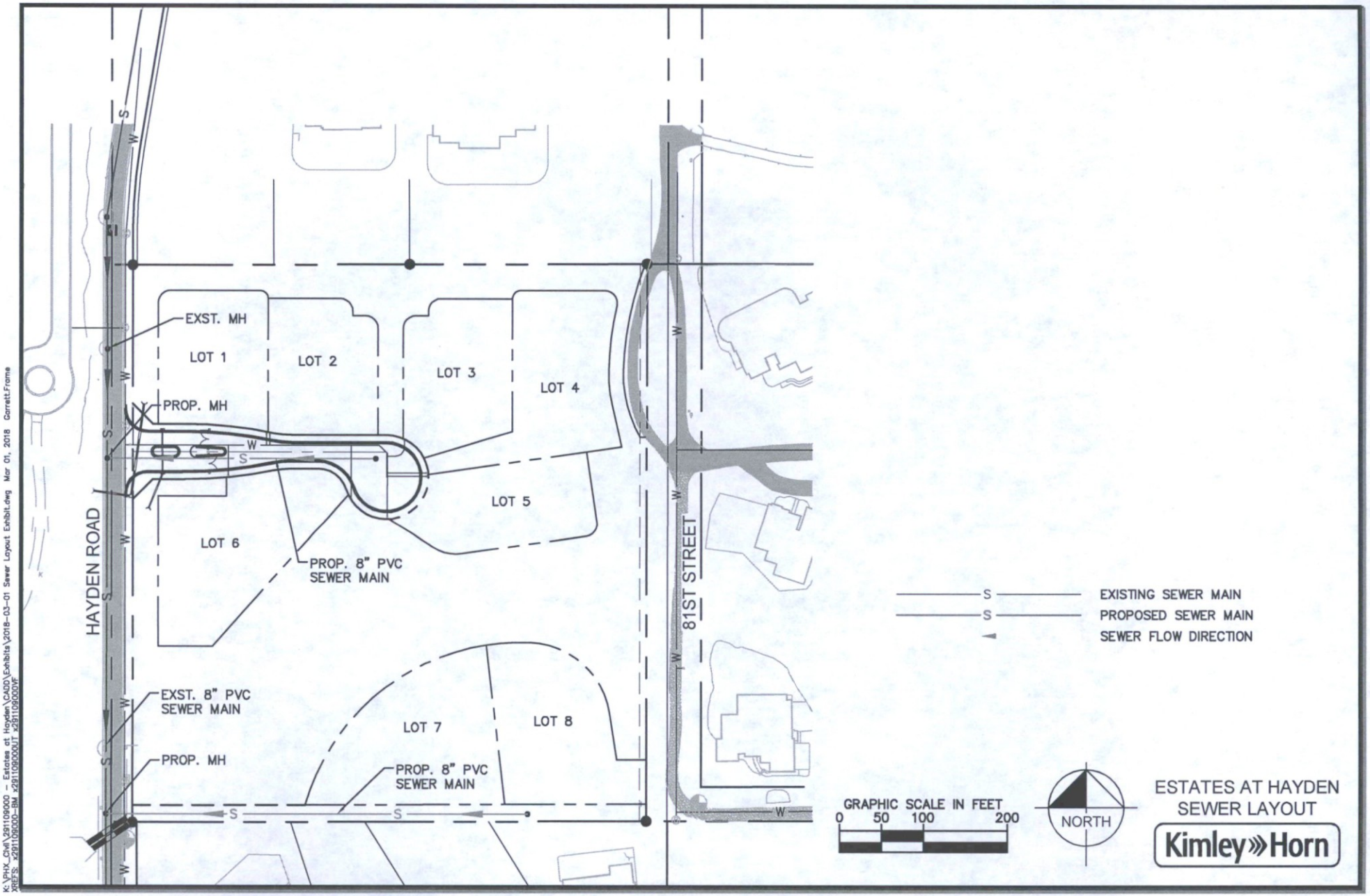
To determine the capacity of the proposed wastewater collection system, the peak design flow was analyzed within the minimum design pipe slope for the 8-inch PVC sewer line servicing Lots 1-6. At the minimum design slope of 0.0052 ft/ft an 8-inch line has the capacity to convey approximately 391.09 gallons per minute. The proposed peak design flow of 4.17 gallons per min has a normal depth of 0.52 feet or a d/D ratio of 0.065 at the minimum design slope. **See Appendix C – Flowmaster Calculations** for pipe capacity calculations.

Appendix A – Site Location Map



Kimley»Horn Expect More. Experience Better.	Estates At Hayden	Scottsdale, AZ
	Site Location Map	

Appendix B – Proposed Sewer System Layout



ESTATES AT HAYDEN
SEWER LAYOUT

Kimley»Horn

K:\PHX_Civil\291109000 - Estates at Hayden\CADD\Exhibits\2018-03-01 Sewer Layout Exhibit.dwg Mar 01, 2018 Garrett.Frame
XREFS: x291109000-BM x291109000UT x291109000VF

Appendix C – Flowmaster Calculations

Worksheet for 8" Sewer Minimum Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00520	ft/ft
Normal Depth	8.00	in
Diameter	8.00	in
Discharge	391.09	gal/min

Results

Discharge	391.09	gal/min
Normal Depth	8.00	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.00	in
Top Width	0.00	ft
Critical Depth	0.44	ft
Percent Full	100.0	%
Critical Slope	0.00857	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.76	ft
Froude Number	0.00	
Maximum Discharge	0.94	ft³/s
Discharge Full	0.87	ft³/s
Slope Full	0.00520	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8" Sewer Minimum Slope Capacity

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.00	in
Critical Depth	0.44	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00857	ft/ft

Worksheet for 8" Sewer Maximum Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08330	ft/ft
Normal Depth	8.00	in
Diameter	8.00	in
Discharge	1565.30	gal/min

Results

Discharge	1565.30	gal/min
Normal Depth	8.00	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.00	in
Top Width	0.00	ft
Critical Depth	0.66	ft
Percent Full	100.0	%
Critical Slope	0.07763	ft/ft
Velocity	9.99	ft/s
Velocity Head	1.55	ft
Specific Energy	2.22	ft
Froude Number	0.00	
Maximum Discharge	3.75	ft³/s
Discharge Full	3.49	ft³/s
Slope Full	0.08330	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8" Sewer Maximum Slope Capacity

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.00	in
Critical Depth	0.66	ft
Channel Slope	0.08330	ft/ft
Critical Slope	0.07763	ft/ft

Worksheet for 8" Sewer Normal Depth at Design Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00520	ft/ft
Diameter	8.00	in
Discharge	4.17	gal/min

Results

Normal Depth	0.52	in
Flow Area	0.01	ft²
Wetted Perimeter	0.34	ft
Hydraulic Radius	0.33	in
Top Width	0.33	ft
Critical Depth	0.04	ft
Percent Full	6.5	%
Critical Slope	0.00500	ft/ft
Velocity	0.97	ft/s
Velocity Head	0.01	ft
Specific Energy	0.06	ft
Froude Number	1.01	
Maximum Discharge	1.22	ft³/s
Discharge Full	1.13	ft³/s
Slope Full	0.00000	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	6.46	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer Normal Depth at Design Flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	in
Critical Depth	0.04	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00500	ft/ft

SEWER BASIS OF DESIGN

Estates at Hayden

REVISE & RESUBMIT

City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258

R Rehrmann · 04/23/2018.

Prepared for:

Blandford Homes
3321 E. Baseline Rd.
Gilbert, Arizona 85234

Prepared by:

Kimley-Horn and Associates, Inc.
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020

Registered Professional Engineer (Civil)
CERTIFICATE NO.
31101
CURTIS LELAND
BROWN
Date Signed 3/22/18
ARIZONA, U.S.A.

EP 3/31/18

291109000
March 2018

5-ZN-2018
04/03/18

Final Sewer Basis of Design

ESTATES AT HAYDEN

MARCH 2018

Prepared By:

Kimley»Horn

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EXISTING COLLECTION SYSTEM

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BASIS OF DESIGN

DESIGN METHODOLOGY

Average Day Demand design flows are calculated based on design criteria detailed within the City of Scottsdale Design Standards and Polices Manual (DS&PM). Per DS&PM Chapter 7, a design flow of 100 gallons per capita per day (gpcpd) shall be used. The DS&PM also requires a peaking factor of 4.0 and a residential density of 2.5 persons per dwelling unit.

WASTEWATER SYSTEM ANALYSIS

See **Table 1** below for a summary of sewer demands.

See Comment Below. Include offsite sewer from 81st St.

Table 1 Sewer Demands - Lots 1-6

Land Use	Dwelling units (du)	Density (persons/ du)	Population (persons)	Average Day Demand (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
<2 du/ac	6	2.5	15	1,500	6,000	4.17

Table 2 Sewer Demands - Lots 7 & 8

Land Use	Dwelling units (du)	Density (persons/ du)	Population (persons)	Average Day Demand (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
<2 du/ac	2	2.5	5	500	1,000	0.69

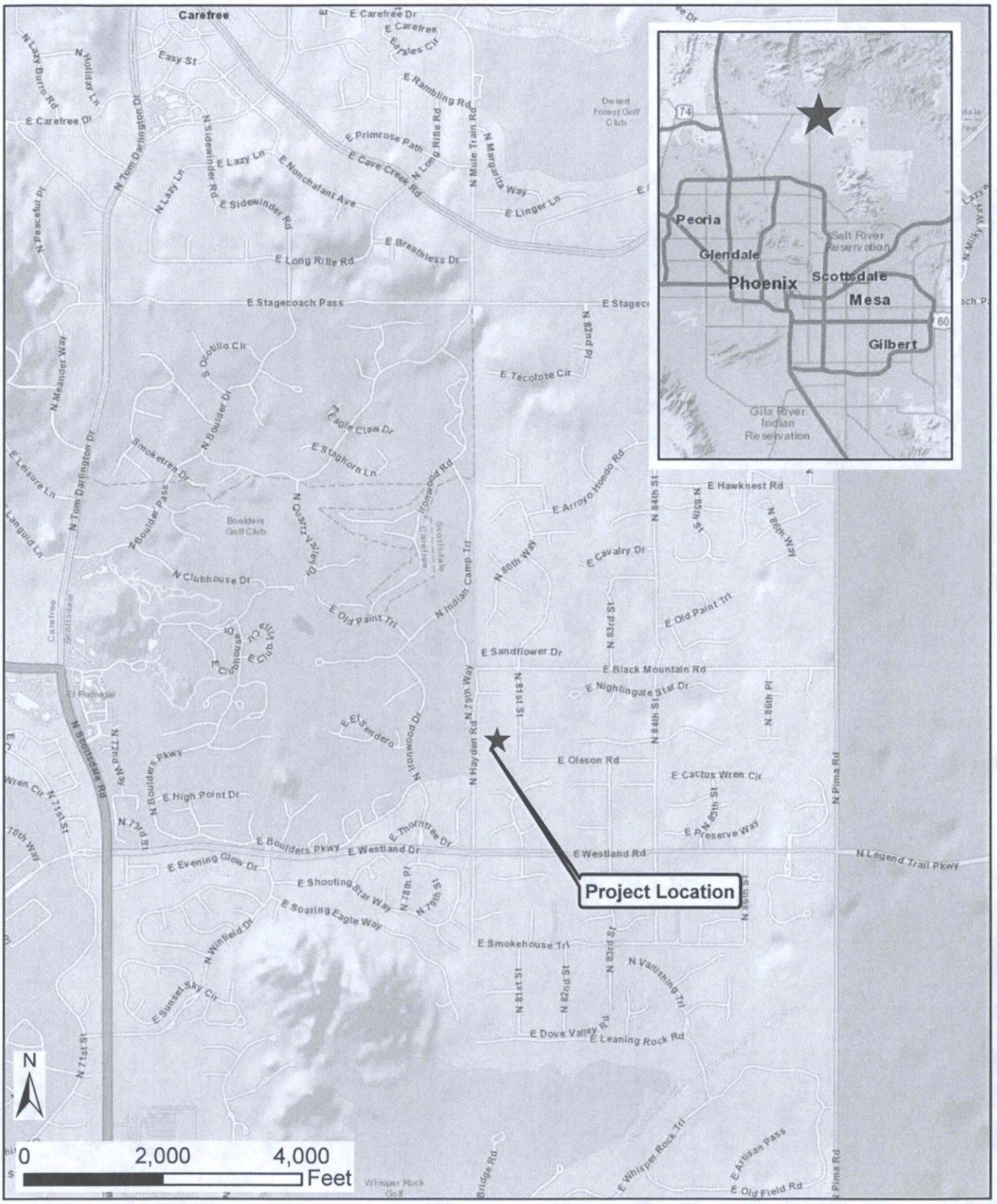
Per the DS&PM proposed sewer lines shall be designed to achieve a full flow velocity of between 2.5 and 10 feet per second and maintain a maximum d/D ratio of 0.65 when calculated with a Manning's "n" value of 0.013. An 8-inch sewer will satisfy these requirements using a minimum slope of 0.0052 ft/ft (0.52%) and a maximum slope of 0.0833 ft/ft (8.33%). See **Appendix C** for pipe slope calculations. ✓

RESULTS

To determine the capacity of the proposed wastewater collection system, the peak design flow was analyzed within the minimum design pipe slope for the 8-inch PVC sewer line servicing Lots 1-6. At the minimum design slope of 0.0052 ft/ft an 8-inch line has the capacity to convey approximately 391.09 gallons per minute. The proposed peak design flow of 4.17 gallons per min has a normal depth of 0.52 feet or a d/D ratio of 0.065 at the minimum design slope. **See Appendix C – Flowmaster Calculations** for pipe capacity calculations. ✓

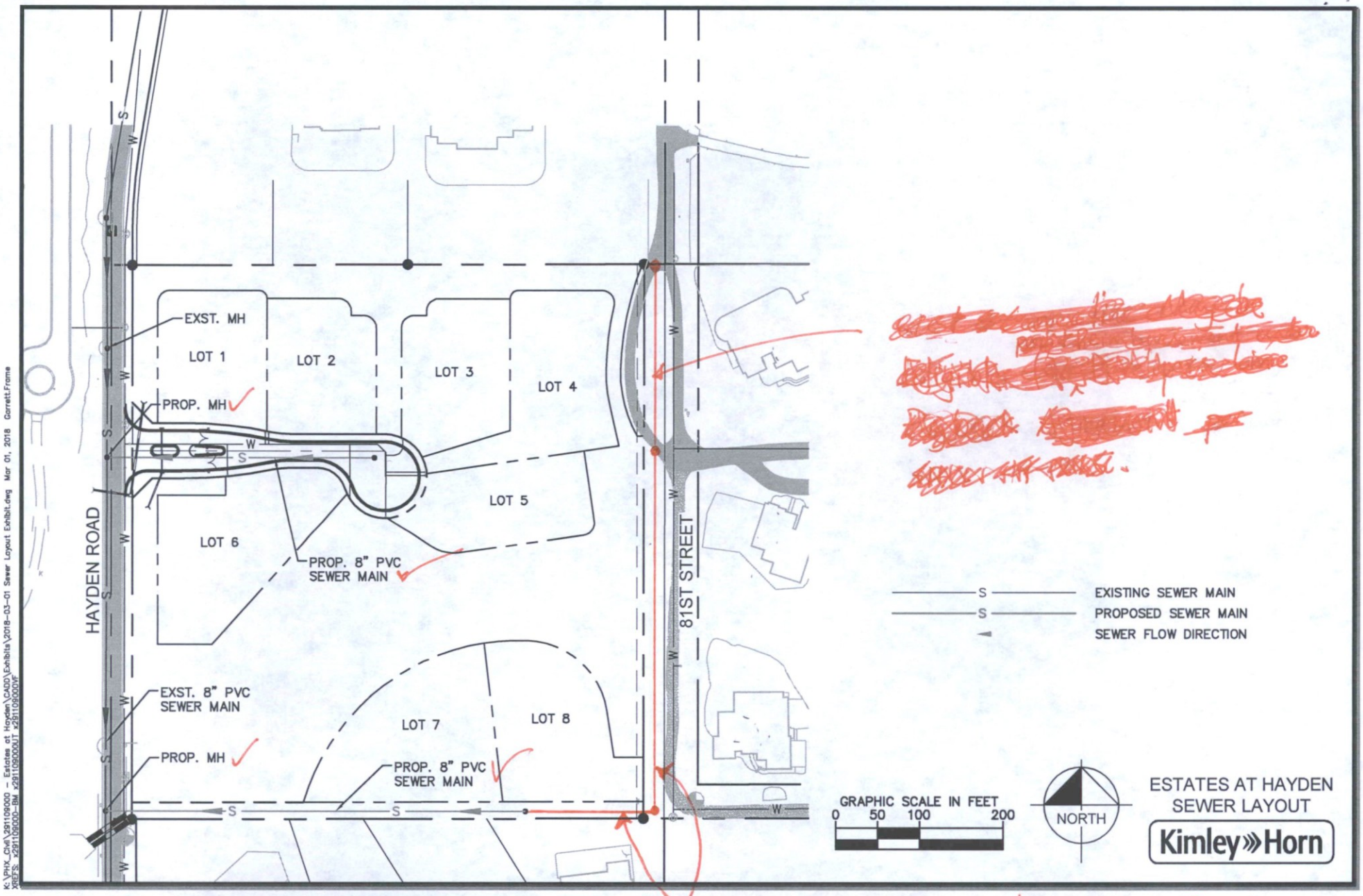
→ See Comment on Appendix B - Layout Regarding Sewer line Extension Along Property Frontages. Expand Capacity Analysis to include Sewer generated from 81st. St. Alignment (off-site sewer).

Appendix A – Site Location Map



Kimley»Horn Expect More. Experience Better.	**Estates At Hayden**	**Scottsdale, AZ**
	Site Location Map	

Appendix B – Proposed Sewer System Layout



K:\PHX_Civil\291109000 - Estates at Hayden\CADD\Exhibits\2018-03-01 Sewer Layout Exhibit.dwg Mar 01, 2018 Garrett.Frame
XREFS: x291109000-BM x291109000UT x291109000VF

Install/Extend Sewer line Along Property Frontages (Sewer Easement + 81st St) Per DSPM, Section 7-1.400.

Appendix C – Flowmaster Calculations

Worksheet for 8" Sewer Minimum Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00520	ft/ft
Normal Depth	8.00	in
Diameter	8.00	in
Discharge	391.09	gal/min

Results

Discharge	391.09	gal/min
Normal Depth	8.00	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.00	in
Top Width	0.00	ft
Critical Depth	0.44	ft
Percent Full	100.0	%
Critical Slope	0.00857	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.76	ft
Froude Number	0.00	
Maximum Discharge	0.94	ft³/s
Discharge Full	0.87	ft³/s
Slope Full	0.00520	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8" Sewer Minimum Slope Capacity

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.00	in
Critical Depth	0.44	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00857	ft/ft

Worksheet for 8" Sewer Maximum Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08330	ft/ft
Normal Depth	8.00	in
Diameter	8.00	in
Discharge	1565.30	gal/min

Results

Discharge	1565.30	gal/min
Normal Depth	8.00	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.00	in
Top Width	0.00	ft
Critical Depth	0.66	ft
Percent Full	100.0	%
Critical Slope	0.07763	ft/ft
Velocity	9.99	ft/s
Velocity Head	1.55	ft
Specific Energy	2.22	ft
Froude Number	0.00	
Maximum Discharge	3.75	ft³/s
Discharge Full	3.49	ft³/s
Slope Full	0.08330	ft/ft
Flow Type	SubCritical	

Per DSPM, Section 7-1.404, Ultimate Peak flow Condition shall be evaluated @ d/D = 0.65.

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for 8" Sewer Maximum Slope Capacity

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	8.00	in
Critical Depth	0.66	ft
Channel Slope	0.08330	ft/ft
Critical Slope	0.07763	ft/ft

Worksheet for 8" Sewer Normal Depth at Design Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00520	ft/ft
Diameter	8.00	in
Discharge	4.17	gal/min

Results

Normal Depth	0.52	in
Flow Area	0.01	ft²
Wetted Perimeter	0.34	ft
Hydraulic Radius	0.33	in
Top Width	0.33	ft
Critical Depth	0.04	ft
Percent Full	6.5	%
Critical Slope	0.00500	ft/ft
Velocity	0.97	ft/s
Velocity Head	0.01	ft
Specific Energy	0.06	ft
Froude Number	1.01	
Maximum Discharge	1.22	ft³/s
Discharge Full	1.13	ft³/s
Slope Full	0.00000	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	6.46	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer Normal Depth at Design Flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	in
Critical Depth	0.04	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00500	ft/ft

ZONING DRAINAGE REPORT

Estates at Hayden

Prepared for:

Blandford Homes

Submitted to:

City of Scottsdale
7447 E. Indian School Road
Scottsdale, Arizona 85251

Prepared by:

Kimley-Horn
7740 N. 16th Street
Suite 300
Phoenix, Arizona 85020

Stormwater Review By:
Mohammad Rahman, PE, PH, CFM
Phone 480-312-2563 Fax 480-312-7731
e-mail: mrahman@ScottsdaleAZ.gov
Review Cycle #1 Date 5/8/18

Kimley»Horn

291109000
March 2018

5-ZN-2018
04/03/18

ZONING DRAINAGE REPORT

ESTATES AT HAYDEN

MARCH 2018

Expires 06/30/19

Prepared By:

Kimley»Horn

Contents

Appendices

Figures

INTRODUCTION

PURPOSE

This Zoning Drainage Report for Estates at Hayden (Site) has been prepared to meet the drainage requirements outlined in Chapter 4 of the City of Scottsdale Design Standards and Policies Manual (DS&PM). The Site is currently zoned R1-43 and will be re-zoned to R1-43 PAD.

The main purposes of this report are the following:

- Illustrate compliance with the *DS&PM.*
- Establish drainage parameters and criteria for planning and zoning.
- Provide a preliminary hydrologic analysis for the development of the Site.
- Provide a hydraulic analysis for the impact of the Site on the existing floodplain and floodway for Upper Boulders Wash.

PROJECT LOCATION AND DESCRIPTION

The Site is bounded on the west by North Hayden Road, north by the Sunflower Estates development and Black Mountain Road, east by North 81st Street and south by the Westland Estates development. It lies within a portion of Section 12, Township 5 North, Range 4 East of the Gila and Salt River Base and Meridian. The Site is located within the City of Scottsdale (City) and falls under the City's Environmentally Sensitive Lands Overlay (ESLO). The Site consists of eight (8) lots in the nine-acre (9-acre) site. It is currently zoned R1-43. See **Figure 1A** and **Figure 1B** for the Location and Aerial Maps.

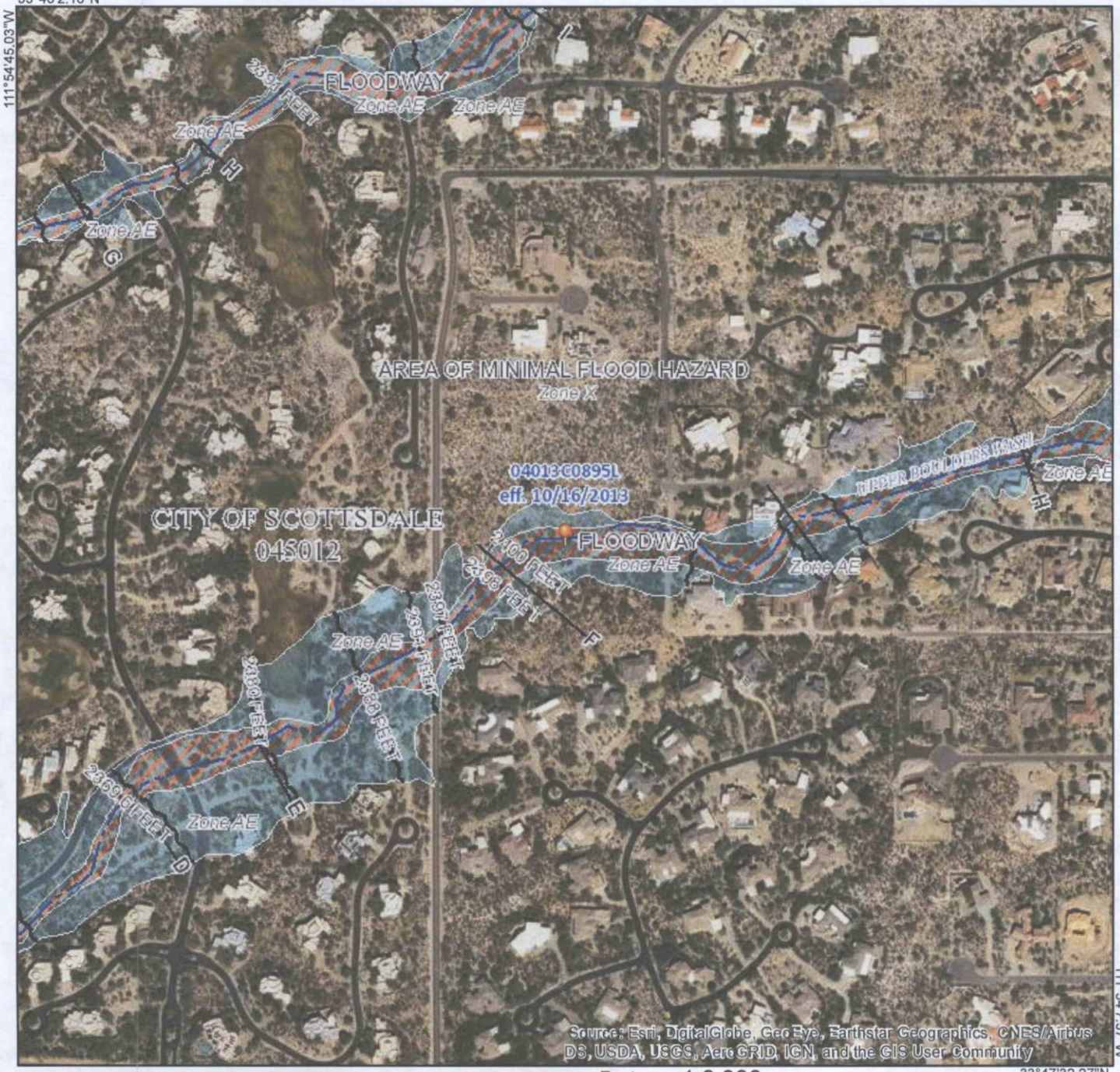
The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and incorporated areas, Panel Number 04013C0895L, effective date October 16, 2013, indicates that the Upper Boulders Wash runs through the Site. Upper Boulders Wash is a defined Zone AE floodplain with regulatory floodway. The rest of the site is Zone X. The FIRM Panel is included as **Figure 2.**

Kimley»Horn Expect More. Experience Better.	Estates At Hayden	Scottsdale, AZ
	Figure 1A. Location Map	

Kimley»Horn Expect More. Experience Better.	Estates At Hayden	Scottsdale, AZ
	Figure 1B. Aerial Photo Map	

National Flood Hazard Layer FIRMette

FEMA



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth
- Regulatory Floodway *Zone AE, AO, AH, VE, AR*

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The base map shown complies with FEMA's base map accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/27/2018 at 12:02:12 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

DESCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

EXISTING OFFSITE DRAINAGE CONDITIONS

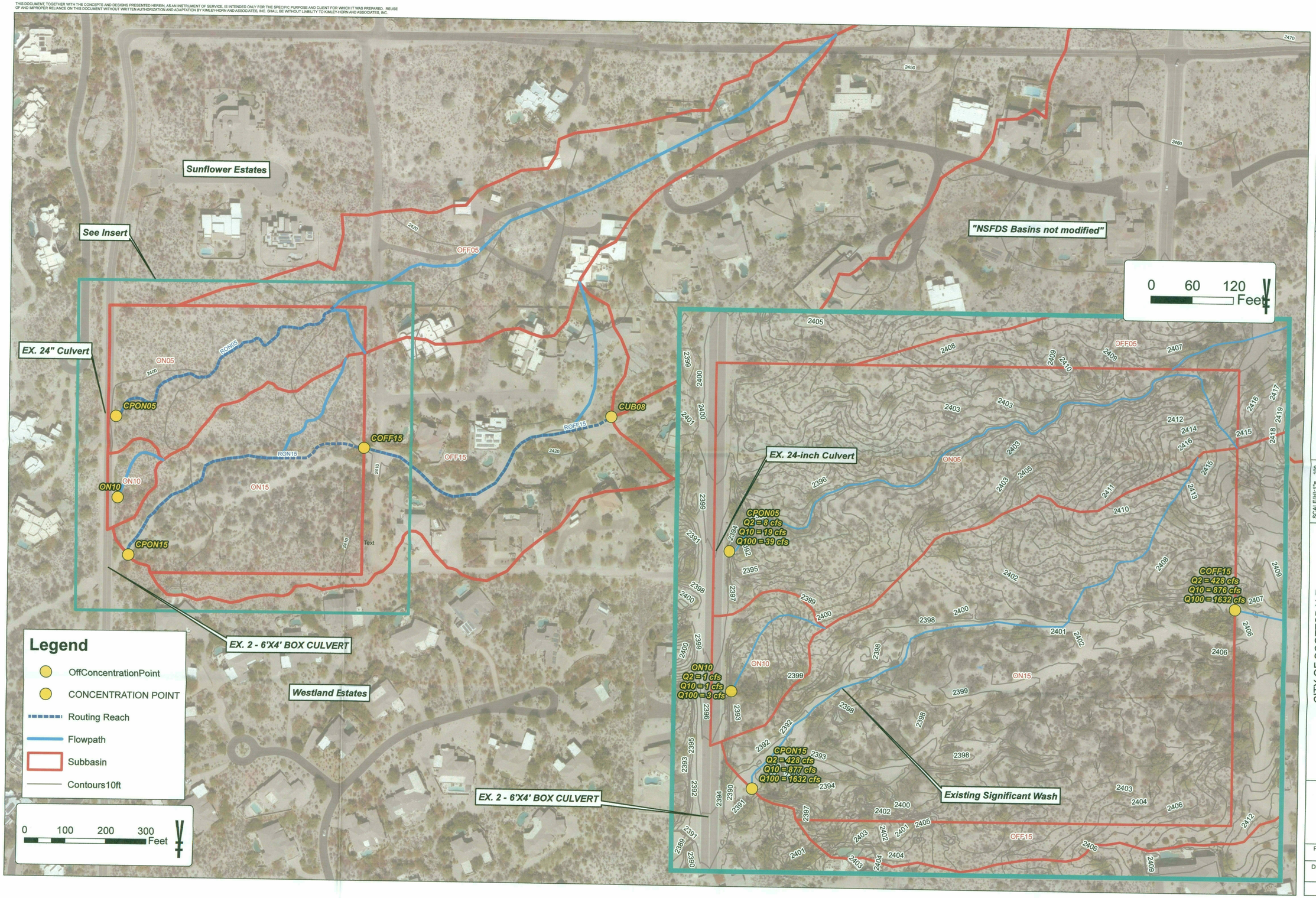
The Site is located within the North Scottsdale Floodplain Delineation Study (NSFDS). Floodplain limits and Base Flood Elevations (BFE) for Upper Boulders Wash were established as part of the NSFDS. Upper Boulders Wash flows generally from northeast to the southwest through the Site. Upper Boulders Wash crosses under Hayden Road in a two (2) barrel 6-ft x 4-ft box culvert. Additionally, a small wash enters at the northeast corner of the Site. The wash passes through the Site to an existing 24-inch culvert under Hayden Road. Refer to **Figure 3** for the Existing Conditions Map.

EXISTING ONSITE DRAINAGE CONDITIONS

The Site is undeveloped. A majority of the site drains towards Upper Boulders Wash. The north portion of the Site drains towards the 24-inch culvert crossing Hayden Road. No additional significant washes or Vista Corridors cross the Site. Refer to **Figure 3** for the Existing Conditions Map.

CONTEXT RELATIVE TO ADJACENT PROJECTS AND IMPROVEMENTS

Runoff in Upper Boulders Wash flows over 81st Street onto the Site. After exiting the Site through a culvert under Hayden Road, Upper Boulders Wash continues through the crossing at the Boulders subdivision to the west.



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SCALE(H):1"=	100
SCALE(V):	N/A
DESIGNED BY:	ZRS
DRAWN BY:	BAH
CHECKED BY:	ZRS
DATE:	03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
EXISTING CONDITIONS
FIGURE 3

PROJECT NO.
291109000

DRAWING NAME
FIGURE 3

PROPOSED DRAINAGE PLAN

PROPOSED ONSITE DRAINAGE PLAN

Upper Boulders Wash will not be impacted with the project. The wash entering the Site at the northeast corner will be re-routed along the north side of the site where it will connect through a small storm drain to the existing 24-inch culvert crossing Hayden Road similar to existing conditions.

Proposed onsite sub-basin boundaries were delineated from the proposed overall grading concept. The onsite lots are directed to drain towards the streets and in some cases toward Upper Boulders Wash. The runoff is conveyed in the street to a new storm drain system into a detention basin (D1). The storm drain system will be designed as part of final design. Detention basin D1 has a six (6) inch orifice opening located six (6) inches above the basin bottom. The outlet discharges into Upper Boulders Wash. The detention basin is designed with an overflow weir six (6) inches below the top of the basin. The orifice and overflow weirs are being used to control post-development peak discharges. Refer to **Figure 4** and **Figure 5** for the proposed hydrology and hydraulics maps.

PROPOSED ONSITE HYDROLOGY

The development of the Site minimizes increases in post-development runoff to pre-development conditions where runoff exits the Site for the three design storms (2-, 10- and 100-year). Due to the size and timing of the watershed for Upper Boulders Wash it is not achievable to reduce post-development peak discharge to a level at or below the pre-development peak discharges. However, increases are negligible. Refer to **Table 1** for a summary of pre- and post-development discharges. Detention basin D1 is used to attenuate peak discharges from onsite runoff. Refer to **Figure 4** for the Proposed Hydrology Map. Refer to **Appendix B** for detailed hydrologic calculations and results.

Table 1. Pre- Versus Post-Development Runoff

HEC-1 Name		Q_2 [cfs]		Q_{10} [cfs]		Q_{100} [cfs]	
Pre	Post	Pre	Post	Pre	Post	Pre	Post
CPON05	RON05	8	6	19	14	39	29
CPON15	CPON15	428	428	877	879	1632	1634
ON10	N/A	1	0	1	0	3	0

PROPOSED ONSITE HYDRAULICS

Onsite runoff will be conveyed in local streets and storm drains to the detention basins. Per the DS&PM, all interior streets will be designed to convey the peak discharge from the 10-year storm event at or below the top of curb elevation. Additionally, the streets will convey the 100-year runoff within the proposed tracts and maintain a maximum flow depth of eight inches above the gutter flow line. Catch basins will capture pavement runoff and outfall to the proposed detention basin. Catch basins, curb cuts, and storm drains will be designed per the DS&PM and Flood Control District of Maricopa County (FCDMC) Drainage Policies and Standards as part of the final design.

PROPOSED OFFSITE DRAINAGE PLAN

The Upper Boulders Wash floodplain will be revised with the Site development. A Conditional Letter of Map Revisions (CLOMR) application that meets FEMA requirements will be prepared as a separate report. The CLOMR application will be prepared with the Preliminary Drainage Report. The hydraulic analysis required with the CLOMR has been completed for this project. The Site will be developed to match water surface elevations and velocities at the property boundaries. Adjacent lots will be set at least one foot above the base flood elevations (BFE) from the post-project model per the DS&PM. The box culvert under Hayden Road will not be impacted with the Site. Refer to **Figure 5** for proposed floodplain mapping. Refer to **Appendix C** for wash hydraulics.

The wash entering the northeast portion of the Site will be re-routed around the north part of the Site in a new channel. The channel will discharge into a new small storm drain that will discharge into the existing 24-inch culvert crossing Hayden Road. This drainage pattern is similar to the existing condition. Hydraulic analysis for the storm drain and new channel will be completed with final design.

PROPOSED PROJECT PHASING

The project will be constructed in one phase.

Sunflower Estates

Westland Estates

"NSFDS Basins not modified"

See Insert

EX. 24-inch Culvert

EX. 2 - 6'x4' Box Culvert

New Culvert

EX. 24-inch Culvert

EX. 2 - 6'x4' Box Culvert

RON05

ON05

OFF05

CPON05

CUB08

ROFF15

COFF15

OFF15

RON15A

ON15

ON20

RON15B

CPON15

D1

CPON05
Q2 = 6 cfs
Q10 = 14 cfs
Q100 = 29 cfs

COFF15
Q2 = 427 cfs
Q10 = 877 cfs
Q100 = 1631 cfs

CPON15
Q2 = 428 cfs
Q10 = 879 cfs
Q100 = 1634 cfs

0 60 120 Feet

N

Legend

- Concentration Point
- Routing Reach
- Flowpath
- Storage
- Subbasin
- Existing Contours

0 100 200 300 Feet

N

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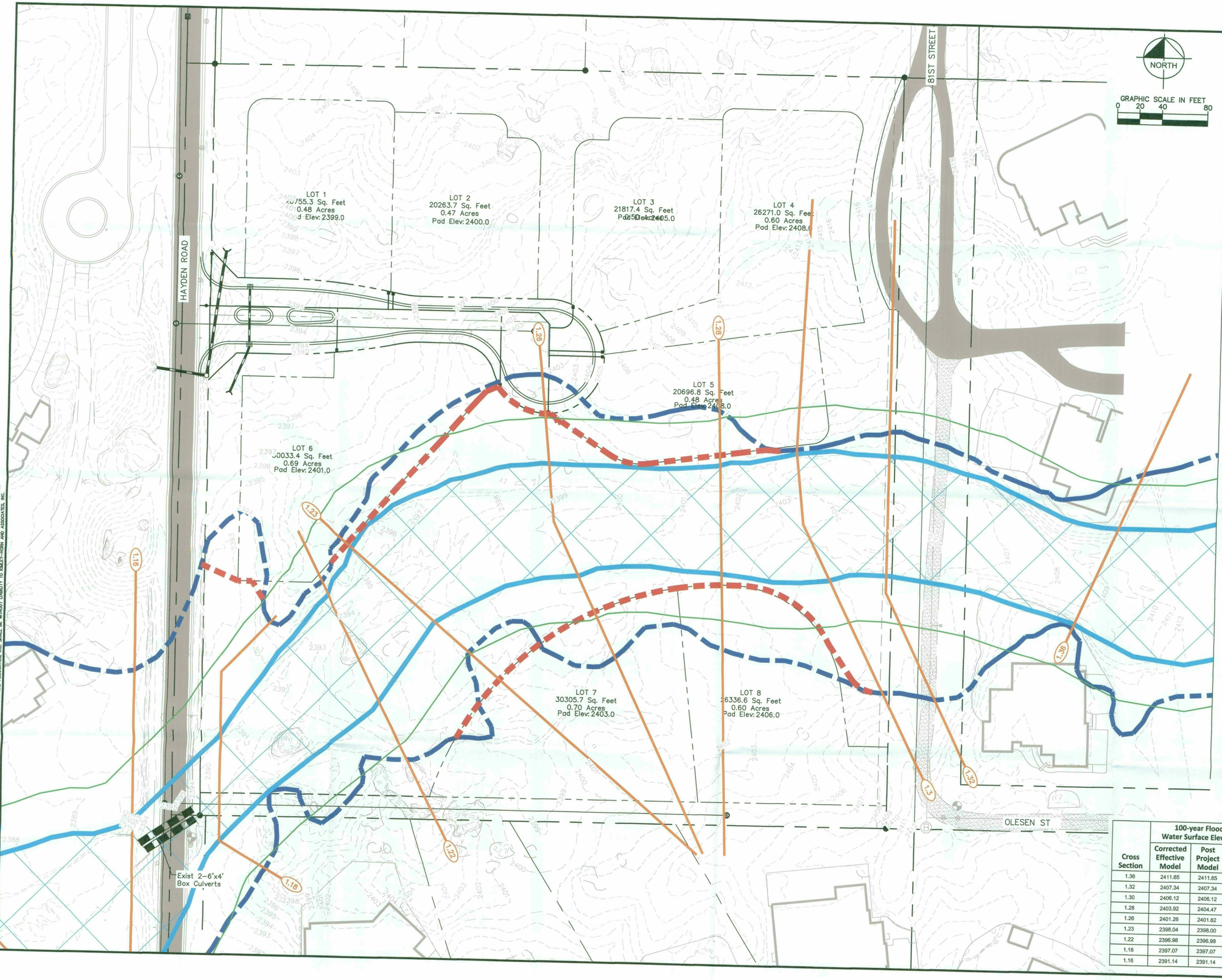
SCALE(H):1"=	100
SCALE(V):	N/A
DESIGNED BY:	ZRS
DRAWN BY:	BAH
CHECKED BY:	ZRS
DATE:	03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
PROPOSED CONDITIONS
FIGURE 4

PROJECT NO.
291109000

DRAWING NAME
FIGURE 4



Cross Section	100-year Floodplain Water Surface Elevation [ft]			100-year Floodway Water Surface Elevation [ft]		
	Corrected Effective Model	Post Project Model	Change	Corrected Effective Model	Post Project Model	Change
1.36	2411.65	2411.65	0.00	2411.57	2411.57	0.00
1.32	2407.34	2407.34	0.00	2407.32	2407.32	0.00
1.30	2406.12	2406.12	0.00	2406.12	2406.12	0.00
1.28	2403.92	2404.47	0.55	2404.55	2404.55	0.00
1.26	2401.26	2401.62	0.36	2402.00	2402.00	0.00
1.23	2398.04	2398.00	-0.04	2399.06	2399.06	0.00
1.22	2396.98	2396.98	0.00	2397.67	2397.67	0.00
1.18	2397.07	2397.07	0.00	2397.79	2397.79	0.00
1.16	2391.14	2391.14	0.00	2391.14	2391.14	0.00

NO. | REVISION | DATE

Kimley»Horn

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SCALE (H): 1"=40'
SCALE (V): NONE
DESIGNED BY: CEO
DRAWN BY: CEO
CHECKED BY: ZRS
DATE: 3/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
PROPOSED HYDRAULICS WORKMAP
FIGURE 5

PROJECT NO.
291109000

DRAWING NAME
HYDRAULICS

1 OF 1

SPECIAL CONDITIONS

ADEQ REQUIREMENTS

A stormwater management plan will be prepared to meet Arizona Department of Environmental Quality (ADEQ) requirements. The stormwater management plan is prepared under the Arizona Pollutant Discharge Elimination System (AZPDES) program. The stormwater management plan is a part of a separate document and is not included with this report.

DATA ANALYSIS METHODS

HYDROLOGY

The U.S. Army Corps of Engineers HEC-1 hydrologic computer program was used to determine the 2-, 10, and 100-year peak discharges for offsite and onsite flows. Models were prepared for both the pre- and post-development conditions. The NSFDS HEC-1 model from May 2002 was used as a basis for the hydrology. This model uses National Oceanic Atmospheric Administration Atlas 2 (NOAA2) rainfall which has since been replaced by NOAA Atlas 14 rainfall depths. The pre- and post-development conditions were modeled using the NOAA 2 rainfall depths from the NSFDS. The NOAA 2 rainfall depths were compared to the NOAA 14 rainfall depths and were determined to be higher. Using the higher NOAA 2 rainfall values in the hydrologic model is more conservative and will reflect similar results of the NSFDS and the effective hydrology used to map the Upper Boulders Wash floodplain. Existing parameters from the NSFDS were not changed for the hydrologic model. The Drainage Design Management System for Windows (DDMSW) program was used to develop the hydrologic parameters for the onsite drainage areas. The onsite sub-basins were added to the NSFDS hydrologic model.

The "Non-default value or value out of range" note in the proposed conditions parameters in Appendix B is because of the varying sub-basin sizes and flowpaths. Additionally, input parameters from NSFDS were input into DDMSW. The selected NMIN parameter will not meet the time of concentration requirements specified in the FCDMC Drainage Design Manual – Hydrology for the varying sub-basin sizes.

Green and Ampt rainfall loss parameters for the onsite basins were estimated using DDMSW, the City parameters, and the FCMDC Drainage Design Manual – Hydrology. The Clark Unit hydrograph was used. The existing onsite land use is undeveloped desert. No changes were made to the existing offsite land use types. **Table 2** is a summary of the land use parameters used for the onsite hydrologic model. The values shown were taken from the FCMDC Drainage Policies and Standards. Proposed land use maps are included in **Appendix B**

Table 2. Land Use Parameters

Land Use Code	Land Use Category	IA [in]	R_{timp} [%]	Cover [%]	D_{theta} [cfs]	Kb [cfs]
120	Large Lot Residential – Single Family	0.30	5	30	Normal	Min
730	Passive Open Space	0.10	0	90	Normal	Max

Three soil types were identified for the onsite and offsite subbasins using the web soil survey from the National Resource Conservation Service (NRCS). Maps showing the soil type is shown in **Appendix A** and **Appendix B**.

The normal depth method was used for routes through the existing washes. Eight point cross sections are provided. The proposed model includes routes through the detention basins. Refer to **Appendix A** and **Appendix B**.

HYDRAULICS

The effective hydraulic model for Upper Boulders Wash from the NSFPDS was done in HEC-RAS version 3.0. The hydraulic analysis for this report was completed in HEC-RAS 5.0. Differences in results between

the two versions are due to changes in culvert hydraulic modeling. Duplicate effective, corrected effective and post-project conditions model have been developed. The existing culvert under Hayden Road is included in all models. Additional cross sections and more detailed topography on the Site were included in the corrected effective model. Manning's n values for the channel and overbanks were maintained from the effective hydraulic model and not changed. The post-project conditions model includes grading changes associated with the Site. **Table 3** is a comparison of results between the duplicate effective and corrected effective models. Differences are due to more detailed topography on the Site. **Table 4** is a comparison of results between corrected effective and post-project models Increases in the floodplain are on the Site. Refer to **Appendix C** for results from the HEC-RAS model. Refer to **Figure 5** for the proposed hydraulics map.

Table 3. Duplicate vs Corrected

Cross Section	Floodplain Duplicate Effective WSEL	Floodplain Corrected Effective WSEL	Difference [ft]	Floodway Duplicate Effective WSEL	Floodway Duplicate Effective WSEL	Difference [ft]
1.41	2417.57	2417.57	0.00	2418.05	2418.05	0.00
1.36	2411.65	2411.65	0.00	2411.57	2411.57	0.00
1.32	2407.77	2407.34	-0.43	2407.45	2407.32	-0.13
1.30	2405.83	2406.12	0.29	2405.86	2406.12	0.26
1.28	2403.58	2403.92	0.34	2404.15	2404.55	0.40
1.26	2401.33	2401.26	-0.07	2401.25	2402.00	0.75
1.23	2397.96	2398.04	0.08	2397.96	2399.06	1.10
1.22	2397.78	2396.98	-0.80	2397.95	2397.67	-0.28
1.18	2397.07	2397.07	0.00	2397.79	2397.79	0.00
1.16	2391.14	2391.14	0.00	2391.14	2391.14	0.00
1.14	2387.89	2387.89	0.00	2388.36	2388.36	0.00
1.05	2379.57	2379.57	0.00	2380.44	2380.44	0.00

Table 4. Corrected vs Post-Project

Cross Section	Floodplain Corrected Effective WSEL	Floodplain Post-Project WSEL	Difference [ft]	Floodway Corrected Effective WSEL	Floodway Post-Project WSEL	Difference [ft]
1.41	2417.57	2417.57	0.00	2418.05	2418.05	0.00
1.36	2411.65	2411.65	0.00	2411.57	2411.57	0.00
1.32	2407.34	2407.34	0.00	2407.32	2407.32	0.00
1.30	2406.12	2406.12	0.00	2406.12	2406.12	0.00
1.28	2403.92	2404.47	0.55	2404.55	2404.55	0.00
1.26	2401.26	2401.62	0.36	2402.00	2402.00	0.00
1.23	2398.04	2398.00	-0.04	2399.06	2399.06	0.00
1.22	2396.98	2396.98	0.00	2397.67	2397.67	0.00
1.18	2397.07	2397.07	0.00	2397.79	2397.79	0.00
1.16	2391.14	2391.14	0.00	2391.14	2391.14	0.00
1.14	2387.89	2387.89	0.00	2388.36	2388.36	0.00
1.05	2379.57	2379.57	0.00	2380.44	2380.44	0.00

Lateral erosion setbacks were determined based on the Arizona Department of Water Resources (ADWR) State Standard 5-96 (SS5-96) Level I Analysis. See **Table 5** for Erosion Setbacks. Scour walls will be used to revise the erosion setbacks along Upper Boulders Wash. See **Appendix C** for erosion setback calculations.

Table 5. Erosion Setbacks

Location	Q_{100} [cfs]	Calculated setback [ft]	Minimum Setback [ft]	Used Setback [ft]
Upper Boulders Wash	1628	40	20	40

PROPOSED ONSITE STORMWATER STORAGE

The existing property is a part of the ESLO. Based on a new City ordinances, a waiver will be obtained for any volume less than the 100-year, 2-hour volume. However, there is no waiver fee associated with the volumes that do not result in an increase in downstream runoff. See **Appendix E** for the stormwater waiver.

The outlet for the detention basin is elevated six (6) inches above the bottom of the basin. The volume below the outlet will treat the first flush runoff.

CONCLUSIONS

- Hydrologic models were prepared for the onsite and offsite runoff for the pre- and post-development conditions. Increases to the post-development peak discharges from the pre-development peak discharges existing the Site into Upper Boulders Wash are negligible. A detention basin is used to attenuate onsite runoff. The detention basin will also treat the first flush runoff below the opening invert.
- Upper Boulders Wash is a FEMA-delineated wash running through the Site. Pre- and post-development hydraulic models were prepared to ensure no impact to adjacent properties. Water surface elevations and post-development floodplain boundary were determined to establish lot pad elevations. A FEMA CLOMR application will be completed as part of the Preliminary Drainage Report. Lateral erosion setbacks have been set accordingly. The existing culvert at Hayden Road will not be impacted by the development.
- Onsite runoff will be conveyed in the streets to a small storm drain system that discharges into the detention basin. The storm drain system will be sized with the Final Design.
- Adjacent properties will be unaffected by the proposed development.

REFERENCES

Arizona Department of Water Resources, *State Standard for Watercourse System Sediment Balance*, September 1996.

Bentley Systems, Inc., *FlowMaster*, V8i, 2009.

City of Scottsdale, *Design Standards and Policies Manual*, January 2010.

Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona – Hydrology,* revised 2013.

Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona – Hydraulics,* revised 2013.

Flood Control District of Maricopa County, *Drainage Policies and Standards for Maricopa County, Arizona*, revised 2016.

Flood Control District of Maricopa County, *North Scottsdale Floodplain Delineation Study*, April 2005.

Appendix A – Existing Conditions Hydrology

NSFDS Report

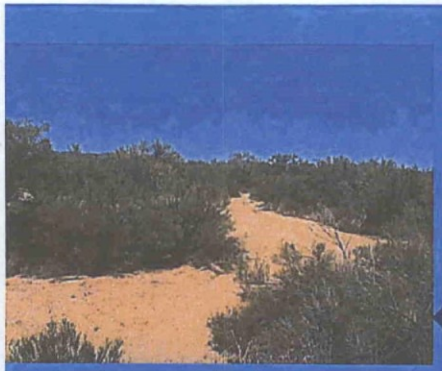
Existing Conditions Soils

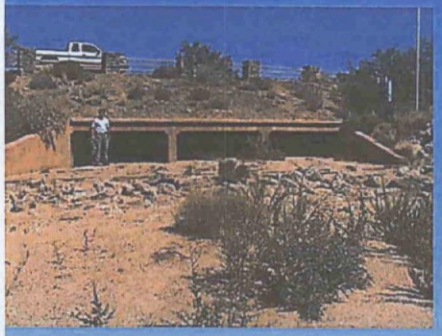
Existing Conditions Land Use

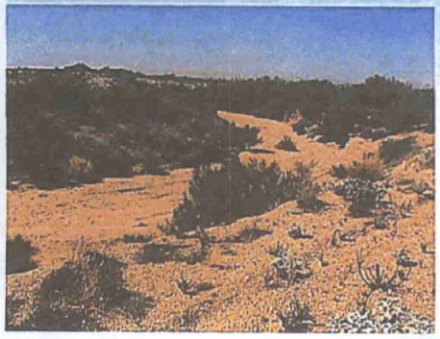
Subbasin Hydrologic Parameters

Routing Reaches

HEC-1 Results







NORTH SCOTTSDALE FLOODPLAIN DELINEATION STUDY

Report and Technical Data Notebook

MAIN REPORT

VOLUME 3 of 4

FCD CONTRACT NO. 2003C008

Submitted April 2005

PREPARED FOR:

Flood Control District of Maricopa County
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A FEMA Cooperative Technical Partner

IN CONJUNCTION WITH:

City of Scottsdale
3939 N. Drinkwater Boulevard
Scottsdale, AZ 85251

and

City of Carefree
100 Easy St.
Carefree, AZ 85377

PREPARED BY:

DEI Professional Services, LLC
6225 North 24th Street, Suite 200
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Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
Major Basin 01							
SCP-14	Aguila/Carefree	33	0.003	5.3	0.23		
	Aguila/Carefree	61	0.043	69.0	0.15		
	Aguila/Carefree	96	0.013	20.3	0.07		
	Aguila/Carefree	33	0.003	5.3	0.23		
SCP-13	Aguila/Carefree	33	0.001	0.8	0.23		
	Aguila/Carefree	61	0.066	82.8	0.15		
	Aguila/Carefree	96	0.013	16.5	0.07		
SCP-12	Aguila/Carefree	33	0.015	51.6	0.23		
	Aguila/Carefree	96	0.014	48.4	0.07		
SCP-11	Aguila/Carefree	33	0.026	100.0	0.23		
SCP-10	Aguila/Carefree	33	0.068	61.5	0.23		
	Aguila/Carefree	61	0.014	12.3	0.15		
	Aguila/Carefree	96	0.029	26.2	0.07		
SCP-09	Aguila/Carefree	33	0.102	95.0	0.23		
	Aguila/Carefree	96	0.005	5.0	0.07		
SCP-08	Aguila/Carefree	6	0.000	0.1	0.40 *		
	Aguila/Carefree	33	0.127	99.9	0.23		
SCP-06	Aguila/Carefree	6	0.025	24.7	0.40 *		
	Aguila/Carefree	33	0.076	75.3	0.23		
SCP-03	Aguila/Carefree	6	0.018	23.4	0.40 *		
	Aguila/Carefree	33	0.032	42.7	0.23		
	Aguila/Carefree	93	0.026	33.9	0.33		
SCP-01	Aguila/Carefree	6	0.074	22.7	0.40 *		
	Aguila/Carefree	33	0.096	29.7	0.23		
	Aguila/Carefree	61	0.124	38.3	0.15		
	Aguila/Carefree	63	0.014	4.4	0.14	25.0	100
	Aguila/Carefree	93	0.016	4.9	0.33		
UB-12	Aguila/Carefree	33	0.059	100.0	0.23		
UB-11	Aguila/Carefree	33	0.201	97.5	0.23		
	Aguila/Carefree	96	0.005	2.5	0.07		
UB-10	Aguila/Carefree	33	0.090	96.2	0.23		
	Aguila/Carefree	96	0.004	3.8	0.07		
UB-09	Aguila/Carefree	33	0.159	46.5	0.23		
	Aguila/Carefree	61	0.054	15.8	0.15		
	Aguila/Carefree	96	0.129	37.7	0.07		
UB-07	Aguila/Carefree	33	0.012	6.3	0.23		
	Aguila/Carefree	61	0.179	93.5	0.15		
	Aguila/Carefree	96	0.000	0.2	0.07		
UB-04	Aguila/Carefree	6	0.001	0.2	0.40 *		
	Aguila/Carefree	33	0.018	5.1	0.23		
	Aguila/Carefree	61	0.260	74.2	0.15		

* Custom Value (not default value)

Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
UB-04	Aguila/Carefree	63	0.072	20.6	0.14	25.0	100
UB-03	Aguila/Carefree	6	0.001	2.9	0.40 *		
	Aguila/Carefree	33	0.020	73.9	0.23		
	Aguila/Carefree	61	0.006	23.2	0.15		
UB-02	Aguila/Carefree	33	0.038	75.8	0.23		
	Aguila/Carefree	63	0.012	24.2	0.14	25.0	100
UB-01	Aguila/Carefree	6	0.022	41.5	0.40 *		
	Aguila/Carefree	33	0.031	58.5	0.23		
F6C-6	Aguila/Carefree	6	0.010	1.1	0.40 *		
	Aguila/Carefree	33	0.566	63.8	0.23		
	Aguila/Carefree	61	0.231	26.0	0.15		
	Aguila/Carefree	96	0.081	9.1	0.07		
F6C-5	Aguila/Carefree	33	0.137	100.0	0.23		
F6C-4	Aguila/Carefree	33	0.025	100.0	0.23		
F6C-3	Aguila/Carefree	33	0.044	94.8	0.23		
	Aguila/Carefree	96	0.002	5.2	0.07		
F6C-2	Aguila/Carefree	6	0.002	2.5	0.40 *		
	Aguila/Carefree	33	0.025	28.0	0.23		
	Aguila/Carefree	61	0.041	46.4	0.15		
	Aguila/Carefree	96	0.020	23.2	0.07		
F6AN-8	Aguila/Carefree	6	0.016	6.8	0.40 *		
	Aguila/Carefree	61	0.219	93.2	0.15		
F6AN-7	Aguila/Carefree	6	0.003	1.1	0.40 *		
	Aguila/Carefree	33	0.180	63.2	0.23		
	Aguila/Carefree	61	0.102	35.7	0.15		
F6AN-6	Aguila/Carefree	6	0.063	58.7	0.40 *		
	Aguila/Carefree	33	0.034	31.6	0.23		
	Aguila/Carefree	61	0.011	9.8	0.15		
F6AN-5	Aguila/Carefree	6	0.031	29.7	0.40 *		
	Aguila/Carefree	33	0.073	70.3	0.23		
F6AN-4	Aguila/Carefree	33	0.244	97.4	0.23		
	Aguila/Carefree	61	0.002	0.8	0.15		
	Aguila/Carefree	96	0.005	1.8	0.07		
F6AN-3	Aguila/Carefree	6	0.001	0.8	0.40 *		
	Aguila/Carefree	33	0.113	82.1	0.23		
	Aguila/Carefree	96	0.024	17.1	0.07		
F6AN-2	Aguila/Carefree	33	0.136	90.8	0.23		
	Aguila/Carefree	61	0.004	2.9	0.15		
	Aguila/Carefree	96	0.009	6.1	0.07		
	Aguila/Carefree	34	0.000	0.2	0.10 *		
F6AN-1	Aguila/Carefree	26	0.001	0.2	0.01		

Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
UF5-2	Aguila/Carefree	61	0.415	66.5	0.15		
	Aguila/Carefree	72	0.029	4.6	0.09	30.0	100
	Aguila/Carefree	93	0.052	8.4	0.33		
	Aguila/Carefree	96	0.001	0.1	0.07		
UF5-1	Aguila/Carefree	6	0.022	26.7	0.40 *		
	Aguila/Carefree	33	0.004	5.0	0.23		
	Aguila/Carefree	61	0.057	68.2	0.15		
SCP-5C	Aguila/Carefree	33	0.150	98.3	0.23		
	Aguila/Carefree	96	0.003	1.7	0.07		
SCP-5B	Aguila/Carefree	33	0.027	100.0	0.23		
SCP-5A	Aguila/Carefree	6	0.001	1.0	0.40 *		
	Aguila/Carefree	33	0.087	95.4	0.23		
	Aguila/Carefree	93	0.003	3.6	0.33		
SCP-4B	Aguila/Carefree	33	0.140	100.0	0.23		
SCP-4A	Aguila/Carefree	6	0.034	45.7	0.40 *		
	Aguila/Carefree	33	0.041	54.3	0.23		
SCP-2B	Aguila/Carefree	6	0.011	20.1	0.40 *		
	Aguila/Carefree	33	0.032	59.5	0.23		
	Aguila/Carefree	93	0.011	20.4	0.33		
SCP-2A	Aguila/Carefree	6	0.021	39.5	0.40 *		
	Aguila/Carefree	33	0.028	51.8	0.23		
	Aguila/Carefree	61	0.001	2.4	0.15		
	Aguila/Carefree	93	0.003	6.3	0.33		
UB-08C	Aguila/Carefree	33	0.009	97.9	0.23		
	Aguila/Carefree	96	0.000	2.1	0.07		
UB-08B	Aguila/Carefree	33	0.010	29.4	0.23		
	Aguila/Carefree	96	0.024	70.6	0.07		
UB-08A	Aguila/Carefree	33	0.074	61.3	0.23		
	Aguila/Carefree	61	0.047	38.7	0.15		
UB-06C	Aguila/Carefree	61	0.037	100.0	0.15		
UB-06B	Aguila/Carefree	61	0.053	100.0	0.15		
UB-06A	Aguila/Carefree	33	0.005	12.8	0.23		
	Aguila/Carefree	61	0.037	87.2	0.15		
UB-05B	Aguila/Carefree	61	0.022	100.0	0.15		
UB-05A	Aguila/Carefree	61	0.089	100.0	0.15		
F6C-1D	Aguila/Carefree	6	0.001	3.0	0.40 *		
	Aguila/Carefree	61	0.038	97.0	0.15		
F6C-1C	Aguila/Carefree	6	0.018	23.8	0.40 *		
	Aguila/Carefree	61	0.059	76.2	0.15		
F6C-1B	Aguila/Carefree	33	0.087	44.4	0.23		
	Aguila/Carefree	61	0.109	55.6	0.15		

* Custom Value (not default value)

Basin: NS | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

Sub Basin ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period (Years): 2	5	10	25	50	100
												R (hrs)	0.47	0.37	0.33	0.30	0.28	0.27
SCP-03	0.08	0.71	114.2	114.2	Urban	0.032	0.30	0.25	4.50	0.37	17	Tc (hrs)	0.31	0.25	0.23	0.21	0.20	0.19
												Vel (f/s)	3.33	4.17	4.55	4.89	5.21	5.42
												R (hrs)	0.34	0.26	0.24	0.22	0.21	0.20
SCP-01	0.32	2.18	112.0	112.0	Urban	0.031	0.31	0.25	5.10	0.29	20	Tc (hrs)	0.69	0.55	0.48	0.42	0.38	0.36
												Vel (f/s)	4.65	5.86	6.68	7.67	8.35	8.93
												R (hrs)	0.87	0.67	0.58	0.50	0.45	0.42
UB-12	0.06	0.76	119.6	119.6	Natural	0.032	0.30	0.25	5.00	0.32	26	Tc (hrs)	0.30	0.25	0.23	0.21	0.20	0.19
												Vel (f/s)	3.67	4.46	4.87	5.23	5.57	5.81
												R (hrs)	0.40	0.32	0.29	0.27	0.25	0.24
UB-11	0.21	1.36	114.4	114.4	Natural	0.029	0.27	0.25	5.10	0.31	35	Tc (hrs)	0.43	0.35	0.31	0.28	0.26	0.25
												Vel (f/s)	4.69	5.76	6.37	7.15	7.58	8.11
												R (hrs)	0.45	0.36	0.32	0.28	0.26	0.25
UB-10	0.09	1.11	110.3	110.3	Natural	0.032	0.28	0.25	5.10	0.29	28	Tc (hrs)	0.41	0.33	0.30	0.27	0.25	0.24
												Vel (f/s)	3.99	4.95	5.50	6.10	6.51	6.84
												R (hrs)	0.57	0.45	0.40	0.36	0.33	0.31
UB-09	0.34	1.66	105.5	105.5	Urban	0.028	0.28	0.23	6.20	0.20	32	Tc (hrs)	0.48	0.39	0.35	0.32	0.30	0.28
												Vel (f/s)	5.08	6.21	6.88	7.68	8.23	8.73
												R (hrs)	0.45	0.36	0.32	0.29	0.27	0.25
UB-07	0.19	1.34	104.9	104.9	Natural	0.029	0.30	0.25	6.00	0.17	15	Tc (hrs)	0.44	0.35	0.32	0.28	0.27	0.25
												Vel (f/s)	4.45	5.55	6.20	6.94	7.36	7.74
												R (hrs)	0.49	0.38	0.34	0.30	0.28	0.26
UB-04	0.35	1.82	94.9	94.9	Urban	0.028	0.26	0.28	6.00	0.17	23	Tc (hrs)	0.55	0.45	0.40	0.35	0.33	0.31
												Vel (f/s)	4.82	5.99	6.67	7.54	8.02	8.53
												R (hrs)	0.56	0.44	0.39	0.34	0.32	0.30

Basin: NS | Storms: Multiple | Duration: 6 Hour | Loss Method: Green Ampt | Unit Hydrograph: Clark

Sub Basin ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period (Years): 2	5	10	25	50	100
UB-03	0.03	0.37	106.0	106.0	Urban	0.034	0.18	0.30	5.20	0.26	23	Tc (hrs)	0.21	0.18	0.17	0.16	0.15	0.14
												Vel (f/s)	2.61	2.97	3.17	3.43	3.62	3.82
												R (hrs)	0.23	0.20	0.18	0.17	0.16	0.15
UB-02	0.05	0.63	445.2	299.0	Urban	0.033	0.24	0.27	5.30	0.27	51	Tc (hrs)	0.19	0.17	0.15	0.15	0.14	0.13
												Vel (f/s)	4.91	5.53	6.00	6.33	6.70	6.95
												R (hrs)	0.22	0.19	0.18	0.17	0.16	0.15
UB-01	0.05	0.80	100.8	100.8	Urban	0.033	0.20	0.27	4.55	0.39	47	Tc (hrs)	0.27	0.23	0.22	0.20	0.19	0.18
												Vel (f/s)	3.30	3.84	4.06	4.40	4.58	4.81
												R (hrs)	0.30	0.25	0.24	0.22	0.21	0.20
F6C-6	0.89	3.88	162.0	162.0	Urban	0.027	0.33	0.25	5.40	0.25	14	Tc (hrs)	1.50	0.70	0.60	0.52	0.48	0.45
												Vel (f/s)	3.67	8.08	9.42	10.92	11.98	12.76
												R (hrs)	1.91	0.79	0.67	0.57	0.51	0.48
F6C-5	0.14	1.71	117.5	117.5	Urban	0.031	0.32	0.25	5.00	0.33	22	Tc (hrs)	0.57	0.45	0.40	0.35	0.32	0.30
												Vel (f/s)	4.42	5.57	6.33	7.25	7.81	8.36
												R (hrs)	0.94	0.73	0.63	0.54	0.50	0.46
F6C-4	0.03	0.48	137.8	137.8	Urban	0.036	0.31	0.25	5.00	0.33	23	Tc (hrs)	0.24	0.20	0.19	0.17	0.16	0.16
												Vel (f/s)	2.96	3.52	3.74	4.12	4.32	4.46
												R (hrs)	0.34	0.28	0.26	0.24	0.22	0.22
F6C-3	0.05	0.63	64.8	64.8	Urban	0.034	0.33	0.25	5.10	0.33	24	Tc (hrs)	0.38	0.30	0.27	0.24	0.23	0.22
												Vel (f/s)	2.44	3.08	3.46	3.82	4.03	4.18
												R (hrs)	0.50	0.39	0.34	0.31	0.29	0.28
F6C-2	0.09	0.83	108.2	108.2	Natural	0.031	0.29	0.25	6.00	0.21	29	Tc (hrs)	0.31	0.26	0.24	0.23	0.21	0.20
												Vel (f/s)	3.89	4.72	5.03	5.41	5.72	5.97
												R (hrs)	0.35	0.28	0.26	0.24	0.23	0.22
F6AN-8	0.24	1.12	180.7	180.7	Natural	0.026	0.30	0.25	5.80	0.18	6	Tc (hrs)	0.28	0.24	0.22	0.20	0.19	0.18
												Vel (f/s)	5.89	6.90	7.43	8.05	8.56	8.98

Sub Basin Data

Basin: NS | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

Sub Basin ID	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
SCP-2A	0.05	0.77	137.1	137.1	Urban	0.032	0.30	0.25	4.55	0.32	14	Tc (hrs)	0.30	0.24	0.23	0.21	0.20	0.19
												Vel (f/s)	3.76	4.67	5.02	5.43	5.76	6.01
												R (hrs)	0.42	0.33	0.30	0.28	0.26	0.25
UB-08C	0.01	0.24	118.6	118.6	Natural	0.035	0.25	0.25	5.00	0.32	36	Tc (hrs)	0.16	0.14	0.13	0.13	0.12	0.11
												Vel (f/s)	2.16	2.48	2.65	2.82	3.01	3.12
												R (hrs)	0.22	0.19	0.17	0.16	0.15	0.14
UB-08B	0.03	0.42	110.8	110.8	Natural	0.032	0.25	0.15	7.00	0.14	36	Tc (hrs)	0.20	0.18	0.17	0.16	0.15	0.14
												Vel (f/s)	3.08	3.44	3.69	3.90	4.11	4.34
												R (hrs)	0.22	0.19	0.18	0.17	0.16	0.15
UB-08A	0.12	1.34	93.6	93.6	Urban	0.031	0.30	0.25	5.30	0.24	14	Tc (hrs)	0.52	0.41	0.36	0.32	0.30	0.28
												Vel (f/s)	3.80	4.82	5.49	6.20	6.64	7.04
												R (hrs)	0.75	0.58	0.50	0.44	0.40	0.38
UB-06C	0.04	0.53	119.5	119.5	Urban	0.031	0.30	0.25	6.00	0.17	17	Tc (hrs)	0.23	0.20	0.19	0.17	0.16	0.16
												Vel (f/s)	3.45	3.89	4.13	4.55	4.77	4.92
												R (hrs)	0.28	0.24	0.23	0.21	0.19	0.19
UB-06B	0.05	0.90	115.1	115.1	Urban	0.032	0.30	0.25	6.00	0.17	18	Tc (hrs)	0.34	0.27	0.25	0.23	0.22	0.21
												Vel (f/s)	3.91	4.87	5.28	5.67	5.97	6.20
												R (hrs)	0.54	0.43	0.39	0.36	0.34	0.33
UB-06A	0.04	0.56	108.1	108.1	Urban	0.034	0.24	0.28	5.80	0.20	23	Tc (hrs)	0.25	0.22	0.21	0.19	0.18	0.18
												Vel (f/s)	3.23	3.72	3.95	4.28	4.49	4.69
												R (hrs)	0.31	0.27	0.25	0.23	0.22	0.21
UB-05B	0.02	0.33	116.6	116.6	Urban	0.033	0.30	0.25	6.00	0.17	17	Tc (hrs)	0.19	0.16	0.15	0.14	0.13	0.13
												Vel (f/s)	2.57	2.97	3.14	3.41	3.64	3.75
												R (hrs)	0.21	0.18	0.17	0.15	0.14	0.14
UB-05A	0.09	0.93	116.8	116.8	Urban	0.033	0.29	0.25	6.00	0.19	24	Tc (hrs)	0.35	0.28	0.26	0.24	0.23	0.22
												Vel (f/s)	3.90	4.82	5.29	5.73	6.06	6.29

Basin	Reach ID	RS Card NSTPS	RC Card ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX	RX and RY Cards	1	2	LB	4	5	RB	7	8
N S	RSCP14	1	0.064	0.044	0.064	1086	0.0322		Sta	812.0	844.1	955.0	977.5	1000.0	1009.0	1017.6	1031.5
									Elev	957.3	957.0	956.0	955.0	954.0	956.0	958.0	960.0
N S	RSCP12	4	0.064	0.044	0.064	3465	0.0268		Sta	870.5	892.9	951.4	993.0	1049.1	1067.0	1124.7	1164.5
									Elev	886.0	884.0	882.0	880.0	880.0	882.0	884.0	886.0
N S	RSCP10	5	0.064	0.044	0.064	4424	0.0255		Sta	814.2	853.2	899.7	949.5	1052.9	1130.7	1232.4	1257.1
									Elev	820.0	815.3	816.0	812.0	812.0	814.0	818.0	820.0
N S	RSCP09	3	0.064	0.044	0.064	2968	0.0230		Sta	865.1	910.6	932.1	961.1	1066.2	1091.4	1109.0	1125.3
									Elev	724.0	722.0	718.0	714.0	714.0	718.0	722.0	724.0
N S	RSCP08	3	0.064	0.044	0.064	2847	0.0204		Sta	850.9	901.3	954.4	979.4	1000.0	1062.3	1114.0	1201.2
									Elev	668.0	666.0	664.0	662.0	660.0	662.0	664.0	666.0
N S	RSCP07	4	0.056	0.038	0.076	3297	0.0179		Sta	857.9	951.0	966.1	972.2	1006.8	1087.4	1125.8	1266.4
									Elev	578.0	574.0	572.0	568.0	568.0	571.5	569.3	578.0
N S	RSCP06	4	0.064	0.044	0.064	3157	0.0196		Sta	627.2	683.7	977.3	987.0	1012.1	1029.7	1045.2	1079.6
									Elev	538.0	534.0	536.0	530.0	530.0	534.0	536.0	538.0
N S	RSCP04	2	0.056	0.038	0.086	1499	0.0180		Sta	850.6	870.5	971.1	987.9	1027.2	1050.7	1218.9	1240.9
									Elev	492.0	490.0	486.0	484.0	484.0	486.0	488.0	492.0
N S	RSCP03	2	0.061	0.038	0.056	1378	0.0181		Sta	966.2	984.0	990.6	997.6	1003.9	1019.0	1048.1	1065.0
									Elev	447.7	446.0	444.0	442.0	442.0	444.0	446.0	448.0
N S	RSCP02	7	0.056	0.038	0.056	5949	0.0212		Sta	623.1	687.8	904.9	959.7	1000.0	1016.9	1082.0	1122.3
									Elev	290.0	286.8	289.6	286.0	284.0	286.0	288.0	290.0
N S	RUB12	6	0.056	0.044	0.056	5388	0.0182		Sta	849.6	861.9	926.8	975.3	1017.2	1046.5	1060.3	1074.7
									Elev	650.0	648.0	648.0	642.0	642.0	646.0	648.0	650.0
N S	RUB10	4	0.056	0.044	0.056	3907	0.0179		Sta	810.4	844.8	959.8	972.8	1005.9	1035.5	1109.8	1164.3
									Elev	564.0	562.0	560.0	556.0	556.0	560.0	560.0	562.0
N S	RUB09	5	0.061	0.038	0.061	4450	0.0187		Sta	865.9	913.3	986.7	990.5	1009.0	1014.7	1037.1	1056.8
									Elev	492.0	489.0	488.0	486.0	486.0	488.0	490.0	492.0

Basin	Reach ID	RS Card NSTPS	RC Card ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX	RX and RY Cards	1	2	LB	4	5	RB	7	8
N S	RUB07	2	0.061	0.038	0.061	1441	0.0187		Sta	802.8	896.1	939.4	977.6	1023.6	1036.2	1071.8	1144.8
									Elev	420.0	415.1	416.5	416.0	416.0	418.0	416.4	420.0
N S	RUB06	2	0.076	0.038	0.076	1436	0.0202		Sta	924.2	953.8	984.0	988.7	1020.6	1078.2	1087.4	1126.5
									Elev	336.0	334.0	332.0	330.0	330.0	332.0	334.0	336.0
N S	RUB05	2	0.076	0.038	0.076	1527	0.0216		Sta	924.2	953.8	984.0	988.7	1020.6	1078.2	1087.4	1126.5
									Elev	336.0	334.0	332.0	330.0	330.0	332.0	334.0	336.0
N S	RUB03	3	0.076	0.038	0.076	2425	0.0177		Sta	785.3	899.0	967.3	981.0	1004.3	1011.0	1258.0	1351.4
									Elev	312.0	306.6	308.0	306.0	306.0	308.0	310.0	312.0
N S	RF6C6	2	0.050	0.035	0.050	1780	0.0185		Sta	864.4	924.1	983.8	985.5	1015.1	1025.5	1034.0	1042.4
									Elev	626.0	625.0	624.0	622.0	622.0	624.0	625.0	626.0
N S	RF6C4	3	0.050	0.035	0.050	2707	0.0070		Sta	697.3	735.7	986.9	990.6	1012.9	1106.1	1185.2	1250.7
									Elev	596.0	592.0	592.0	590.0	590.0	592.0	594.0	596.0
N S	RF6C3	4	0.058	0.038	0.058	3172	0.0284		Sta	731.4	760.4	943.4	993.9	1019.8	1057.8	1074.8	1160.5
									Elev	552.0	550.0	548.0	548.0	548.0	550.0	550.0	552.0
N S	RF6C2	3	0.058	0.038	0.058	2486	0.0193		Sta	963.5	971.8	977.4	981.8	1009.3	1024.9	1079.5	1115.0
									Elev	464.0	462.0	460.0	458.0	458.0	460.0	462.0	462.4
N S	RF6AN8	8	0.056	0.039	0.056	6862	0.0331		Sta	942.1	950.5	958.9	988.7	1010.7	1028.3	1056.8	1085.2
									Elev	950.0	949.0	948.0	946.0	946.0	948.0	949.0	950.0
N S	RF6AN6	5	0.056	0.038	0.053	4132	0.0225		Sta	962.5	970.6	978.4	991.0	1006.8	1227.5	1256.1	1279.4
									Elev	806.0	804.0	802.0	800.0	800.0	802.0	804.0	806.0
N S	RF6AN5	3	0.056	0.038	0.053	3137	0.0217		Sta	978.0	983.5	989.4	1007.0	1029.9	1143.3	1284.4	1331.4
									Elev	732.0	730.0	728.0	728.0	729.3	729.0	726.7	732.0
N S	RF6AN3	1	0.056	0.038	0.053	876	0.0171		Sta	978.9	986.9	991.1	995.6	1017.5	1098.7	1195.1	1228.0
									Elev	690.0	688.0	686.0	684.0	684.0	686.0	688.0	690.0
N S	RF6AN2	27	0.056	0.038	0.053	7999	0.0176		Sta	897.4	913.8	927.5	971.8	1023.5	1071.1	1152.0	1224.7
									Elev	685.0	656.0	654.0	652.0	652.0	654.0	652.7	658.0

		RS Card	RC Card						RX and RY Cards							
Basin	Reach ID	NSTPS	ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX		1	2	LB	4	5	RB	7	8
N S	RF6AN1	3	0.063	0.038	0.063	2859	0.0161		Sta	879.7	894.2	947.2	979.7	1018.2	1032.6	1044.2	1055.2
									Elev	540.0	538.0	536.0	534.0	534.0	536.0	538.0	540.0
N S	RF6AS5	9	0.064	0.044	0.064	8083	0.0192		Sta	877.0	887.9	915.7	986.3	1151.0	1210.3	1238.3	1261.5
									Elev	780.0	778.0	776.0	774.0	774.0	776.0	778.0	780.0
N S	RF6AS3	3	0.064	0.044	0.064	2438	0.0160		Sta	830.7	866.0	931.0	995.0	1017.3	1026.5	1076.2	1104.9
									Elev	652.0	650.0	648.0	646.0	646.0	648.0	650.0	652.0
N S	RF6AS2	7	0.064	0.044	0.064	5914	0.0167		Sta	850.1	874.8	889.0	953.7	1000.0	1016.4	1036.5	1067.1
									Elev	602.0	600.0	598.0	596.4	595.5	596.0	598.0	602.0
N S	RRHW1	9	0.068	0.043	0.068	8155	0.0180		Sta	766.3	889.6	954.5	973.4	1000.0	1007.8	1108.1	1188.8
									Elev	736.0	730.4	730.8	730.0	728.7	730.0	732.0	736.0
N S	RUF55	9	0.068	0.043	0.068	8318	0.0174		Sta	766.3	889.6	954.5	973.4	1000.0	1007.8	1108.1	1188.8
									Elev	736.0	730.4	730.8	730.0	728.7	730.0	732.0	736.0
N S	RUF54	13	0.071	0.038	0.071	11314	0.0175		Sta	931.9	946.9	961.7	982.9	1012.6	1048.2	1068.2	1079.1
									Elev	518.0	516.0	514.0	512.0	512.0	516.6	516.0	518.0
N S	RUF52	2	0.071	0.038	0.071	2113	0.0170		Sta	904.8	916.9	925.7	945.0	1017.8	1042.5	1074.4	1089.9
									Elev	420.0	418.0	416.0	414.0	414.0	416.0	418.0	420.0
N S	RSCP5C	3	0.064	0.044	0.064	2696	0.0185		Sta	903.8	943.5	972.7	996.7	1005.3	1068.4	1099.0	1112.6
									Elev	542.0	540.0	538.0	536.0	536.0	538.0	540.0	542.0
N S	RSCP5B	3	0.064	0.044	0.064	2870	0.0209		Sta	788.3	815.7	850.1	990.6	1008.8	1019.8	1037.3	1075.2
									Elev	522.0	520.0	518.0	516.0	516.0	518.0	520.0	522.0
N S	RSCP4B	4	0.064	0.044	0.064	3614	0.0183		Sta	627.2	683.7	977.3	987.0	1012.1	1029.7	1045.2	1079.6
									Elev	538.0	534.0	536.0	530.0	530.0	534.0	536.0	538.0
N S	RSCP2B	2	0.061	0.038	0.056	1827	0.0230		Sta	930.6	951.8	959.8	985.0	1023.8	1033.5	1198.5	1217.1
									Elev	414.0	412.0	410.0	408.0	408.0	410.0	412.0	412.7
N S	RUB08C	7	0.061	0.038	0.061	5952	0.0190		Sta	975.3	981.7	986.9	991.0	1009.2	1073.1	1118.9	1137.7
									Elev	498.0	496.0	494.0	492.0	492.0	494.0	496.0	498.0

Basin	Reach ID	RS Card NSTPS	RC Card ANL	ANCH	ANR	RLNTH (ft)	SEL (ft/ft)	ELMAX	RX and RY Cards	1	2	LB	4	5	RB	7	8
N S	RUB08B	7	0.061	0.038	0.061	6656	0.0173		Sta	975.3	981.7	986.9	991.0	1009.2	1073.1	1118.9	1137.7
									Elev	498.0	496.0	494.0	492.0	492.0	494.0	496.0	498.0
N S	RUB05B	3	0.076	0.038	0.076	2325	0.0206		Sta	874.5	885.3	983.5	990.7	1012.0	1019.9	1042.6	1086.1
									Elev	370.1	370.0	368.0	366.0	366.0	368.0	369.0	369.5
N S	RUB06C	2	0.076	0.038	0.076	2022	0.0183		Sta	921.6	939.8	960.8	993.3	1002.3	1033.8	1053.5	1122.0
									Elev	366.0	364.0	362.0	360.0	360.0	362.0	364.0	366.0
N S	RUB06B	2	0.076	0.038	0.076	1719	0.0180		Sta	921.6	939.8	960.8	993.3	1002.3	1033.8	1053.5	1122.0
									Elev	366.0	364.0	362.0	360.0	360.0	362.0	364.0	366.0
N S	RF6C1B	2	0.058	0.038	0.058	1607	0.0162		Sta	963.5	971.8	977.4	981.8	1009.3	1024.9	1079.5	1115.0
									Elev	464.0	462.0	460.0	458.0	458.0	460.0	462.0	462.4
N S	RF6C1C	5	0.063	0.039	0.063	4158	0.0180		Sta	909.7	984.0	987.5	990.5	1009.6	1023.1	1039.2	1182.5
									Elev	446.0	444.0	442.0	440.0	440.0	442.0	444.0	445.2
N S	RF6C1D	4	0.063	0.039	0.063	3718	0.0169		Sta	717.1	850.7	987.4	994.7	1006.6	1013.0	1206.6	1234.5
									Elev	426.0	424.0	422.0	420.0	420.0	422.0	424.0	425.3
N S	RSCP7B	3	0.064	0.044	0.064	2275	0.0224		Sta	947.0	967.3	977.1	990.7	1013.1	1024.4	1047.5	1074.1
									Elev	646.0	644.0	642.0	640.0	640.0	642.0	644.0	646.0
N S	RSCP7C	1	0.064	0.044	0.064	821	0.0207		Sta	827.0	845.3	898.0	993.5	1008.9	1024.0	1042.1	1057.6
									Elev	640.0	638.0	636.0	634.0	634.0	636.0	638.0	640.0
N S	RSCP7D	1	0.064	0.044	0.064	217	0.0276		Sta	956.3	969.1	987.2	991.1	1012.9	1019.5	1030.2	1044.8
									Elev	620.0	618.0	616.0	614.0	614.0	616.0	618.0	619.0

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
OFF05	645	33	64533	0.002	16.10	0.230	-	100	
	645	61	64561	0.008	64.50	0.150	-	100	
	645	93	64593	0.002	19.40	0.330	-	100	
OFF15	645	61	64561	0.013	100.00	0.150	-	100	
ON05	645	61	64561	0.006	100.00	0.150	-	100	
ON10	645	61	64561	0.001	100.00	0.150	-	100	
ON15	645	61	64561	0.008	100.00	0.150	-	100	

Black Mountain Road
Hayden Road
81st Street
OFF05
ON05
ON10
ON15
OFF15
UB-08A
UB-07
Tie Into North Scottsdale Model. No changes were made to the NSFDS subbasin soil parameters.
Olesen Road
Hayden Road

Legend

- Subbasin

AZ Soils

- 64533
- 64561
- 64593

0 100 200 300 Feet

Kimley»Horn
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SCALE(H):1"=	100
SCALE(V):	N/A
DESIGNED BY:	ZRS
DRAWN BY:	BAH
CHECKED BY:	ZRS
DATE:	03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
EXISTING SOILS

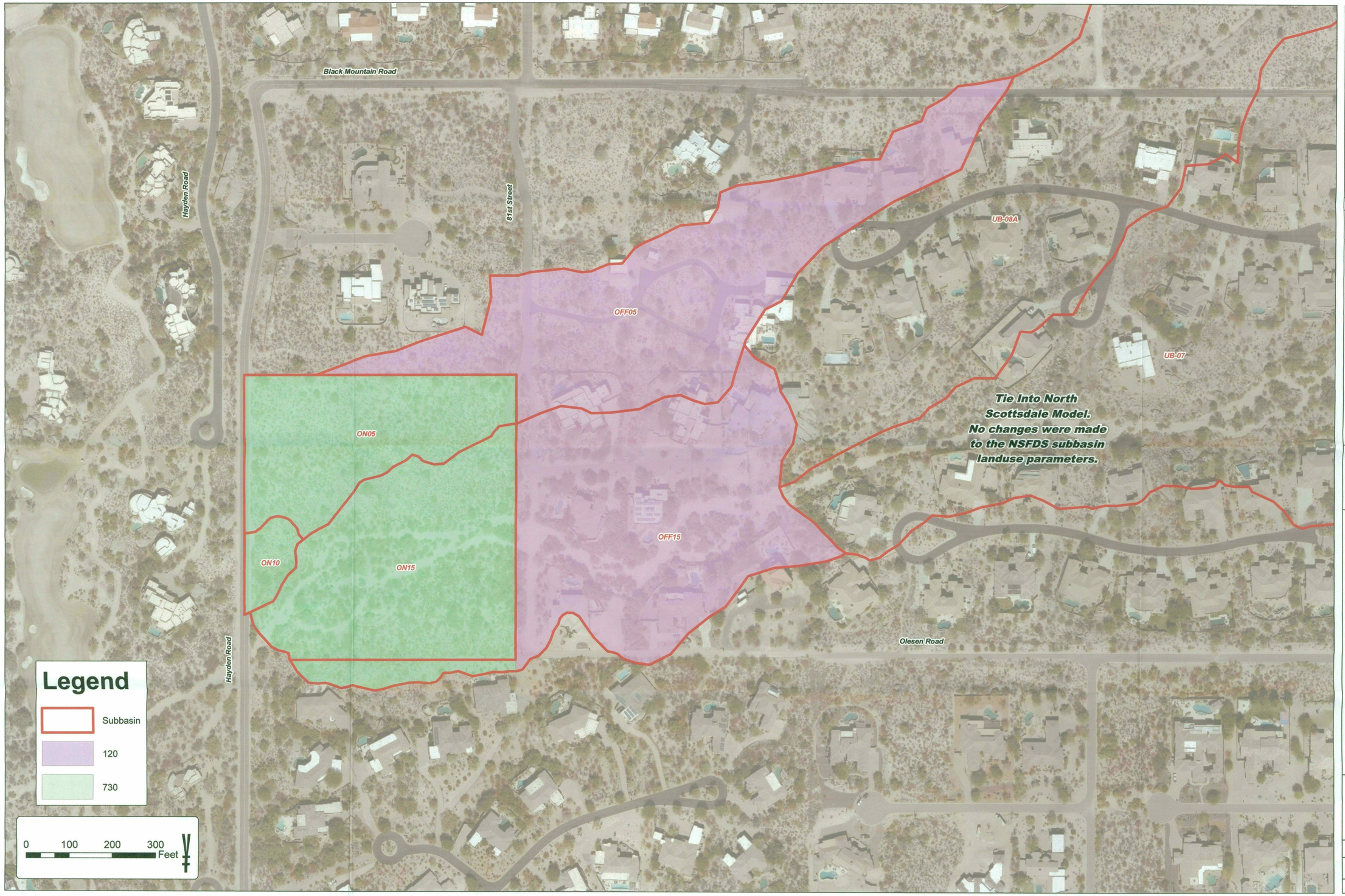
PROJECT NO.
291109000

DRAWING NAME
EX SOILS

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: ESTATES HAYDEN EX

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
Major Basin ID: 01									
OFF05	120	0.0124	100.0	0.30	5	30.0	NORMAL	0.034	Estate Residential (1/5 du per acre to 1 du per acre)
		0.0124	**100.0**						
OFF15	120	0.0125	93.3	0.30	5	30.0	NORMAL	0.034	Estate Residential (1/5 du per acre to 1 du per acre)
	730	0.0009	6.7	0.10	0	90.0	NORMAL	0.172	Passive Open Space (Includes mountain preserves and washes)
		0.0134	**100.0**						
ON05	730	0.0057	100.0	0.10	0	90.0	NORMAL	0.182	Passive Open Space (Includes mountain preserves and washes)
		0.0057	**100.0**						
ON10	730	0.0007	100.0	0.10	0	90.0	NORMAL	0.206	Passive Open Space (Includes mountain preserves and washes)
		0.0007	**100.0**						
ON15	730	0.0084	100.0	0.10	0	90.0	NORMAL	0.179	Passive Open Space (Includes mountain preserves and washes)
		0.0084	**100.0**						

* Non default value



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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1"= 100'
SCALE(V): N/A
DESIGNED BY: ZRS
DRAWN BY: BAH
CHECKED BY: ZRS
DATE: 03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
EXISTING LANDUSE

PROJECT NO.
291109000

DRAWING NAME
EX LANDUSE

```
          184          KM   AT PIMA ROAD FLOW SPLIT.
          185          HC       2
                       *

          186          KK   SUB09
          187          RS       1    FLOW       1
          188          SA       0    0.01
          189          SE    2502    2520
          190          SQ       0   10000
          191          SE    2502    2520
                       *

          192          KK  DCUB09
          193          DR  DCUB09

          194          KK  DCUB09
          195          KM   COMBINE DCUB09, AND SUB09
          196          KM   FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
          197          HC       2
                       *

          198          KK   RUB09   ROUTE   REACH
          199          RS       5    STOR      -1
          200          RC   0.061   0.038   0.061    4450  0.0187    0.00
          201          RX   865.9   913.3   986.7   990.5  1009.0  1014.7  1037.1  1056.8
          202          RY   492.0   489.0   488.0   486.0   486.0   488.0   490.0   492.0
                       *

          203          KK   UB-07   BASIN
          204          BA   0.191
          205          LG    0.30    0.15    8.80    0.06      16
          206          UC   0.440   0.490
          207          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          208          UA     100
                       *
1                                                   HEC-1 INPUT                                            PAGE  6

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          209          KK   CUB07
          210          KM   COMBINE UB-07, AND RUB09
          211          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
          212          HC       2
                       *

          213          KK  UB-08C   BASIN
          214          BA   0.010
          215          LG    0.25    0.25    4.00    0.55      55
          216          UC   0.160   0.220
          217          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          218          UA     100
                       *

          219          KK RUB08C   ROUTE   REACH
          220          RS       7    STOR      -1
          221          RC   0.061   0.038   0.061    5952  0.0190    0.00
          222          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
          223          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
                       *

          224          KK  UB-08B   BASIN
          225          BA   0.033
          226          LG    0.25    0.17    6.80    0.15      42
          227          UC   0.200   0.220
          228          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          229          UA     100
                       *

          230          KK RUB08B   ROUTE   REACH
          231          RS       7    STOR      -1
          232          RC   0.061   0.038   0.061    6656  0.0173    0.00
          233          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
          234          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
                       *

          235          KK  UB-08A   BASIN
          236          BA   0.121
          237          LG    0.30    0.25    5.70    0.21      26
          238          UC   0.520   0.750
          239          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          240          UA     100
                       *

          241          KK   CUB08
          242          KM   COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
          243          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
          244          HC       4
                       *
1                                                   HEC-1 INPUT                                            PAGE  7

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          245          KK   RUB07   ROUTE   REACH
          246          RS       2    STOR      -1
```

```
 121          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 122          UA    100
              *

 123          KK   CF6C2
 124          KM   COMBINE F6C-2, AND RF6C3
 125          KM   AT PIMA ROAD FLOW SPLIT.
 126          HC      2
              *

 127          KK   SF6C2
 128          RS      1    FLOW       1
 129          SA      0    0.01
 130          SE   2502    2512
 131          SQ      0   10000
 132          SE   2502    2512
              *
1                                          HEC-1 INPUT                                            PAGE  4

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 133          KK  DCF6C2
 134          KM   TOTAL FLOW=DI
 135          KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
 136          KM   DIVERTED FLOW=DCUB09 (DQ)
 137          DT  DCUB09
 138          DI      0     248     969    1174    1321    1369    1517
 139          DQ      0       0       0       7      18      28      37
              *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
              *

 140          KK   UB-12   BASIN
 141          BA   0.059
 142          LG    0.30    0.25    3.95    0.56      46
 143          UC   0.300   0.400
 144          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 145          UA    100
              *

 146          KK   RUB12   ROUTE   REACH
 147          RS      6    STOR      -1
 148          RC   0.056   0.044   0.056    5388  0.0182    0.00
 149          RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
 150          RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
              *

 151          KK   UB-10   BASIN
 152          BA   0.094
 153          LG    0.28    0.25    4.15    0.48      47
 154          UC   0.410   0.570
 155          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 156          UA    100
              *

 157          KK   CUB10
 158          KM   COMBINE UB-10, AND RUB12
 159          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 160          HC      2
              *

 161          KK   UB-11   BASIN
 162          BA   0.206
 163          LG    0.27    0.25    4.10    0.54      54
 164          UC   0.430   0.450
 165          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 166          UA    100
              *

 167          KK   CUB11
 168          KM   COMBINE CUB10, AND UB-11
 169          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 170          HC      2
              *
1                                          HEC-1 INPUT                                            PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 171          KK   RUB10   ROUTE   REACH
 172          RS      4    STOR      -1
 173          RC   0.056   0.044   0.056    3907  0.0179    0.00
 174          RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
 175          RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
              *

 176          KK   UB-09   BASIN
 177          BA   0.342
 178          LG    0.28    0.23    6.20    0.20      41
 179          UC   0.480   0.450
 180          UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 181          UA    100
              *

 182          KK   CUB09
 183          KM   COMBINE UB-09, AND RUB10
```

```
  54          JD   1.600  0.0001
  55          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  56          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  57          PC   0.962   0.972   0.983   0.991   1.000
  58          JD   1.590  0.5000
  59          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  60          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  61          PC   0.962   0.972   0.983   0.991   1.000
  62          JD   1.560     2.8
  63          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  64          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
  65          PC   0.950   0.963   0.975   0.988   1.000
              *
              *  END STAGE COACH PASS AND BEGIN FAN 6C
              *

  66          KK   F6C-6   BASIN
  67          BA   0.888
  68          LG    0.33    0.25    5.40    0.25      27
  69          UC   1.500   1.910
  70          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  71          UA     100
              *

  72          KK   RF6C6   ROUTE   REACH
  73          RS       2    STOR      -1
  74          RC   0.050   0.035   0.050    1780  0.0185    0.00
  75          RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
  76          RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
              *

  77          KK   F6C-4   BASIN
  78          BA   0.025
  79          LG    0.31    0.25    3.95    0.57      43
  80          UC   0.240   0.340
  81          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  82          UA     100
              *

  83          KK   CF6C4
  84          KM   COMBINE F6C-4, AND RF6C6
  85          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
  86          HC       2
              *

  87          KK   F6C-5   BASIN
  88          BA   0.137
  89          LG    0.32    0.25    3.95    0.58      42
  90          UC   0.570   0.940
  91          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  92          UA     100
              *
1                                         HEC-1 INPUT                                         PAGE  3

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  93          KK   CF6C5
  94          KM   COMBINE CF6C4, AND F6C-5
  95          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
  96          HC       2
              *

  97          KK   RF6C4   ROUTE   REACH
  98          RS       3    STOR      -1
  99          RC   0.050   0.035   0.050    2707  0.0070    0.00
 100          RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
 101          RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
              *

 102          KK   F6C-3   BASIN
 103          BA   0.046
 104          LG    0.33    0.25    4.20    0.53      43
 105          UC   0.380   0.500
 106          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 107          UA     100
              *

 108          KK   CF6C3
 109          KM   COMBINE F6C-3, AND RF6C4
 110          KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
 111          HC       2
              *

 112          KK   RF6C3   ROUTE   REACH
 113          RS       4    STOR      -1
 114          RC   0.058   0.038   0.058    3172  0.0284    0.00
 115          RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
 116          RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
              *

 117          KK   F6C-2   BASIN
 118          BA   0.088
 119          LG    0.29    0.15    7.30    0.13      34
 120          UC   0.310   0.350
```

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   26FEB18  TIME  09:16:20   *
 *                                       *
 *****************************************
```

Existing 2-year Storm

```
 *************************************
 *                                   *
 *   U.S. ARMY CORPS OF ENGINEERS    *
 *   HYDROLOGIC ENGINEERING CENTER   *
 *         609 SECOND STREET         *
 *      DAVIS, CALIFORNIA 95616      *
 *          (916) 756-1104           *
 *                                   *
 *************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        Flood Control District of Maricopa County
   2          ID        ESTATES AT HAYDEN EX - Estates at Hayden EX
   3          ID        2 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        08/01/2017
   8          ID
   9          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
  10          ID   MAY 2002
  11          ID
  12          ID   FILE NAME:  NS.DAT
  13          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
  14          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
  15          ID
  16          ID   2-YEAR, 6-HOUR FREQUENCY
  17          ID
  18          ID   METHODOLOGY:
  19          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  20          ID   VERSION 4.1
  21          ID   MULTIPLE STORMS
  22          ID   CLARK UNIT HYDROGRAPH
  23          ID   GREEN AMPT LOSS METHOD
  24          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  25          ID
  26          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  27          ID
  28          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  29          ID                           UPPER BOULDERS WASH (UB)
  30          ID                           FAN 6C (F6C)
  31          ID                           FAN 6A NORTH (F6AN)
  32          ID                           FAN 6A SOULTH (F6AS)
  33          ID                           FAN 6A (F6A)
  34          ID                           UPPER FAN 5 (UF5)
  35          ID
  36          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  37          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  38          ID
  39          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  40          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  41          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  42          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  43          ID
  44          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  45          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  46          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  47          ID
  48          ID
  49          ID
  50          ID
              *DIAGRAM
  51          IT      1                  2000
  52          IO      5
  53          IN     15
              *
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1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: ESTATES HAYDEN EX

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RON05	0.076	0.038	0.076	698.00	0.0186	-	X:	5.60	123.40	137.60	141.90	143.40	147.10	161.50	192.90
							Y:	2,412.22	2,403.48	2,402.24	2,400.40	2,400.46	2,401.89	2,402.86	2,404.84
RON15	0.076	0.038	0.073	722.00	0.0194	-	X:	7.20	66.20	275.00	300.30	349.70	364.10	401.50	491.90
							Y:	2,409.21	2,404.24	2,402.39	2,401.27	2,401.28	2,402.98	2,403.48	2,410.00

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: ESTATES HAYDEN EX

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF05	0.012	0.27	98.5	98.5	NATURAL	0.034	0.30	0.25	5.46	0.229	5	**Tc (Hrs)**	0.288	0.272	0.226	0.204	0.184	0.178
												Vel (f/s)	1.38	1.46	1.75	1.94	2.15	2.22
												R (Hrs)	0.406	0.380	0.309	0.277	0.246	0.238
OFF15	0.013	0.19	230.4	226.5	NATURAL	0.044	0.29	0.25	6.00	0.191	5	**Tc (Hrs)**	0.210	0.198	0.164*	0.149*	0.135*	0.131 *
												Vel (f/s)	1.33	1.41	1.70	1.87	2.06	2.13
												R (Hrs)	0.206	0.193	0.157	0.141	0.126	0.122
ON05	0.006	0.16	144.7	144.7	NATURAL	0.182	0.10	0.25	6.00	0.284		**Tc (Hrs)**	0.483	0.454	0.376	0.340	0.306	0.296
												Vel (f/s)	0.49	0.52	0.62	0.69	0.77	0.79
												R (Hrs)	0.703	0.656	0.533	0.476	0.423	0.408
ON10	0.001	0.04	200.0	199.9	NATURAL	0.206	0.10	0.25	6.00	0.284		**Tc (Hrs)**	0.233	0.219	0.182	0.164*	0.147*	0.143 *
												Vel (f/s)	0.25	0.27	0.32	0.36	0.40	0.41
												R (Hrs)	0.287	0.267	0.218	0.194	0.173	0.166
ON15	0.008	0.15	162.3	162.3	NATURAL	0.179	0.10	0.25	6.00	0.284		**Tc (Hrs)**	0.447	0.420	0.349	0.315	0.283	0.274
												Vel (f/s)	0.49	0.52	0.63	0.70	0.78	0.80
												R (Hrs)	0.520	0.486	0.395	0.353	0.313	0.302

* Non default value or value out of range

```
          247         RC   0.061   0.038   0.061     728  0.0247    0.00
          248         RX   802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
          249         RY   420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                      *
                      * Start of Estates at Hayden
                      *

          250         KK   OFF15   BASIN
          251         BA   0.013
          252         LG    0.29    0.25    6.00    0.19       5
          253         UC   0.210   0.206
          254         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          255         UA     100
                      *

          256         KK  COFF15
          257         HC       2
                      *

          258         KK   RON15   ROUTE
          259         RS       1    FLOW
          260         RC   0.076   0.038   0.073     722  0.0194    0.00
          261         RX    7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
          262         RY  2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                      *

          263         KK    ON15   BASIN
          264         BA   0.008
          265         LG    0.10    0.25    6.00    0.28       0
          266         UC   0.447   0.520
          267         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          268         UA     100
                      *

          269         KK  CPON15 COMBINE
          270         HC       2
                      *

          271         KK   OFF05   BASIN
          272         BA   0.012
          273         LG    0.30    0.25    5.46    0.23       5
          274         UC   0.288   0.406
          275         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          276         UA     100
                      *

          277         KK   RON05   ROUTE
          278         RS       1    FLOW
          279         RC   0.076   0.038   0.076     698  0.0186    0.00
          280         RX    5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
          281         RY  2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                      *
1                                             HEC-1 INPUT                                                    PAGE  8

         LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          282         KK    ON05   BASIN
          283         BA   0.006
          284         LG    0.10    0.25    6.00    0.28       0
          285         UC   0.483   0.703
          286         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          287         UA     100
                      *

          288         KK  CPON05 COMBINE
          289         HC       2
                      *

          290         KK    ON10   BASIN
          291         BA   0.001
          292         LG    0.10    0.25    6.00    0.28       0
          293         UC   0.233   0.287
          294         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          295         UA     100
                      *
          296         ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   66        F6C-6
                 V
                 V
   72        RF6C6
                 .
                 .
   77            .          F6C-4
                 .              .
                 .              .
   83        CF6C4...........
                 .
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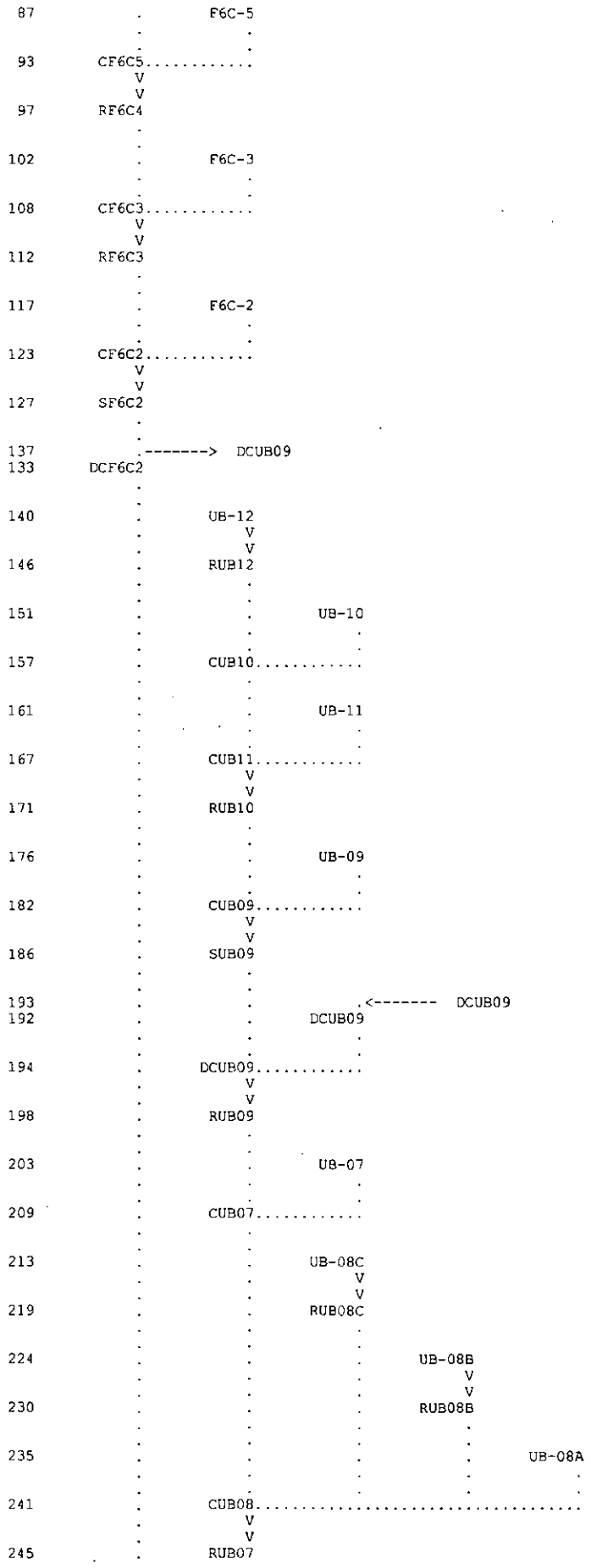
F6C-5
CF6C5
RF6C4
F6C-3
CF6C3
RF6C3
F6C-2
CF6C2
SF6C2
DCUB09
DCF6C2
UB-12
RUB12
UB-10
CUB10
UB-11
CUB11
RUB10
UB-09
CUB09
SUB09
DCUB09
DCUB09
RUB09
UB-07
CUB07
UB-08C
RUB08C
UB-08B
RUB08B
UB-08A
CUB08
RUB07

```
                .           .
                .           .
   250          .           .       OFF15
                .           .         .
                .           .         .
   256          .      COFF15.............
                .           V
                .           V
   258          .       RON15
                .           .
                .           .
   263          .           .        ON15
                .           .         .
                .           .         .
   269          .      CPON15.............
                .           .
                .           .
   271          .           .       OFF05
                .           .         V
                .           .         V
   277          .           .       RON05
                .           .         .
                .           .         .
   282          .           .         .        ON05
                .           .         .          .
                .           .         .          .
   288          .           .      CPON05.............
                .           .         .
                .           .         .
   290          .           .         .        ON10

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                    ************************************
 *                                      *                    *                                  *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS  *
 *             JUN   1998               *                    *    HYDROLOGIC ENGINEERING CENTER *
 *           VERSION 4.1                *                    *         609 SECOND STREET        *
 *                                      *                    *       DAVIS, CALIFORNIA 95616    *
 *  RUN DATE   26FEB18  TIME  09:16:20  *                    *          (916) 756-1104          *
 *                                      *                    *                                  *
 ****************************************                    ************************************
```

Flood Control District of Maricopa County
ESTATES AT HAYDEN EX - Estates at Hayden EX
2 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME: NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

2-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
UPPER BOULDERS WASH (UB)
FAN 6C (F6C)
FAN 6A NORTH (F6AN)
FAN 6A SOULTH (F6AS)
FAN 6A (F6A)
UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN NUMBER. I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND CONCENTRATION POINT NUMBER. CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB BASIN THE CONCENTRATION POINT IS LOCATED IN. I.E. CONCENTRATION POINT IN SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS. IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.

```
52 IO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                     NMIN          1  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1    0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME       0919  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .02 HOURS
                     TOTAL TIME BASE   33.32 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

54 JD         INDEX STORM NO. 1
                     STRM       1.60  PRECIPITATION DEPTH
                     TRDA        .00  TRANSPOSITION DRAINAGE AREA

55 PI           PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
                     .03       .03       .03       .03       .03       .03       .03       .03       .03       .03
                     .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

58 JD         INDEX STORM NO. 2
                     STRM       1.59  PRECIPITATION DEPTH
                     TRDA        .50  TRANSPOSITION DRAINAGE AREA

59 PI           PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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62 JD INDEX STORM NO. 3
STRM 1.56 PRECIPITATION DEPTH
TRDA 2.80 TRANSPOSITION DRAINAGE AREA

63 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.02	.02	.02	.02	.02
.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.00	.00	.00	.00	.00
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1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	126.	4.93	58.	15.	11.	.89		
+	ROUTED TO	RF6C6	126.	5.00	58.	15.	11.	.89		
+	HYDROGRAPH AT	F6C-4	17.	4.08	2.	1.	0.	.03		
+	2 COMBINED AT	CF6C4	127.	4.97	59.	15.	11.	.91		
+	HYDROGRAPH AT	F6C-5	44.	4.33	12.	3.	2.	.14		
+	2 COMBINED AT	CF6C5	150.	4.83	68.	18.	13.	1.05		
+	ROUTED TO	RF6C4	148.	5.07	68.	18.	13.	1.05		
+	HYDROGRAPH AT	F6C-3	24.	4.17	4.	1.	1.	.05		
+	2 COMBINED AT	CF6C3	153.	5.03	71.	19.	13.	1.10		
+	ROUTED TO	RF6C3	151.	5.23	71.	19.	13.	1.10		
	HYDROGRAPH AT									

+		F6C-2	74.	4.20	9.	2.	2.	.09
	2 COMBINED AT							
+		CF6C2	155.	5.17	77.	20.	15.	1.18
	ROUTED TO							
+		SF6C2	155.	5.17	77.	20.	15.	1.18
	DIVERSION TO							
+		DCUB09	0.	.00	0.	0.	0.	1.18
	HYDROGRAPH AT							
+		DCF6C2	155.	5.17	77.	20.	15.	1.18
	HYDROGRAPH AT							
+		UB-12	38.	4.20	6.	1.	1.	.06
	ROUTED TO							
+		RUB12	26.	4.83	6.	1.	1.	.06
	HYDROGRAPH AT							
+		UB-10	51.	4.28	9.	2.	2.	.09
	2 COMBINED AT							
+		CUB10	59.	4.32	15.	4.	3.	.15
	HYDROGRAPH AT							
+		UB-11	133.	4.28	22.	6.	4.	.21
	2 COMBINED AT							
+		CUB11	191.	4.28	37.	9.	7.	.36
	ROUTED TO							
+		RUB10	178.	4.48	37.	9.	7.	.36
	HYDROGRAPH AT							
+		UB-09	213.	4.20	35.	9.	6.	.34
	2 COMBINED AT							
+		CUB09	322.	4.40	69.	17.	13.	.70
	ROUTED TO							
+		SUB09	322.	4.40	69.	17.	13.	.70
	HYDROGRAPH AT							
+		DCUB09	0.	.00	0.	0.	0.	1.18
	2 COMBINED AT							
+		DCUB09	322.	4.40	69.	17.	13.	.70
	ROUTED TO							
+		RUB09	316.	4.53	69.	17.	13.	.70
	HYDROGRAPH AT							
+		UB-07	128.	4.30	18.	5.	3.	.19
	2 COMBINED AT							
+		CUB07	393.	4.48	85.	22.	16.	.89
	HYDROGRAPH AT							
+		UB-08C	10.	4.08	1.	0.	0.	.01
	ROUTED TO							
+		RUB08C	6.	4.80	1.	0.	0.	.01
	HYDROGRAPH AT							
+		UB-08B	37.	4.12	4.	1.	1.	.03
	ROUTED TO							
+		RUB08B	20.	4.70	4.	1.	1.	.03
	HYDROGRAPH AT							
+		UB-08A	47.	4.27	10.	3.	2.	.12
	4 COMBINED AT							
+		CUB08	428.	4.50	97.	25.	18.	1.06
	ROUTED TO							
+		RUB07	427.	4.53	97.	25.	18.	1.06
	HYDROGRAPH AT							
+		OFF15	11.	4.12	1.	0.	0.	.01
	2 COMBINED AT							
+		COFF15	428.	4.53	97.	25.	18.	1.07
	ROUTED TO							
+		RON15	427.	4.55	97.	25.	18.	1.07
	HYDROGRAPH AT							
+		ON15	3.	4.30	0.	0.	0.	.01
	2 COMBINED AT							
+		CPON15	428.	4.55	97.	25.	18.	1.08
	HYDROGRAPH AT							

+	OFF05	7.	4.18	1.	0.	0.	.01
	ROUTED TO						
+	RON05	6.	4.23	1.	0.	0.	.01
	HYDROGRAPH AT						
+	ON05	2.	4.33	0.	0.	0.	.01
	2 COMBINED AT						
+	CPON05	8.	4.27	1.	0.	0.	.02
	HYDROGRAPH AT						
+	ON10	1.	4.15	0.	0.	0.	.00

*** NORMAL END OF HEC-1 ***

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1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN   1998                *
 *          VERSION 4.1                  *
 *                                       *
 *  RUN DATE   26FEB18  TIME  09:16:36   *
 *                                       *
 *****************************************
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Existing 10-year Storm

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 *****************************************
 *                                       *
 *   U.S. ARMY CORPS OF ENGINEERS        *
 *   HYDROLOGIC ENGINEERING CENTER       *
 *         609 SECOND STREET             *
 *      DAVIS, CALIFORNIA 95616          *
 *          (916) 756-1104               *
 *                                       *
 *****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        Flood Control District of Maricopa County
   2          ID        ESTATES AT HAYDEN EX - Estates at Hayden EX
   3          ID        10 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        08/01/2017
   8          ID
   9          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
  10          ID   MAY 2002
  11          ID
  12          ID   FILE NAME:  NS.DAT
  13          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
  14          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
  15          ID
  16          ID   10-YEAR, 6-HOUR FREQUENCY
  17          ID
  18          ID   METHODOLOGY:
  19          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  20          ID   VERSION 4.1
  21          ID   MULTIPLE STORMS
  22          ID   CLARK UNIT HYDROGRAPH
  23          ID   GREEN AMPT LOSS METHOD
  24          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  25          ID
  26          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  27          ID
  28          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  29          ID                            UPPER BOULDERS WASH (UB)
  30          ID                            FAN 6C (F6C)
  31          ID                            FAN 6A NORTH (F6AN)
  32          ID                            FAN 6A SOULTH (F6AS)
  33          ID                            FAN 6A (F6A)
  34          ID                            UPPER FAN 5 (UF5)
  35          ID
  36          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  37          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  38          ID
  39          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  40          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  41          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  42          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  43          ID
  44          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  45          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  46          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  47          ID
  48          ID
  49          ID
  50          ID
              *DIAGRAM
  51          IT       1                    2000
  52          IO       5
  53          IN      15
              *
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
```

```
 54      JD   2.370  0.0001
 55      PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 56      PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 57      PC   0.962   0.972   0.983   0.991   1.000
 58      JD   2.356  0.5000
 59      PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 60      PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 61      PC   0.962   0.972   0.983   0.991   1.000
 62      JD   2.311     2.8
 63      PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 64      PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 65      PC   0.950   0.963   0.975   0.988   1.000
         *
         *  END STAGE COACH PASS AND BEGIN FAN 6C
         *

 66      KK   F6C-6   BASIN
 67      BA   0.888
 68      LG    0.33    0.25    5.40    0.25      27
 69      UC   0.600   0.670
 70      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 71      UA     100
         *

 72      KK   RF6C6   ROUTE   REACH
 73      RS       2    STOR      -1
 74      RC   0.050   0.035   0.050    1780  0.0185    0.00
 75      RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
 76      RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
         *

 77      KK   F6C-4   BASIN
 78      BA   0.025
 79      LG    0.31    0.25    3.95    0.57      43
 80      UC   0.190   0.260
 81      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 82      UA     100
         *

 83      KK   CF6C4
 84      KM   COMBINE F6C-4, AND RF6C6
 85      KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
 86      HC       2
         *

 87      KK   F6C-5   BASIN
 88      BA   0.137
 89      LG    0.32    0.25    3.95    0.58      42
 90      UC   0.400   0.630
 91      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 92      UA     100
         *
1                                     HEC-1 INPUT                                                   PAGE  3

LINE     ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 93      KK   CF6C5
 94      KM   COMBINE CF6C4, AND F6C-5
 95      KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
 96      HC       2
         *

 97      KK   RF6C4   ROUTE   REACH
 98      RS       3    STOR      -1
 99      RC   0.050   0.035   0.050    2707  0.0070    0.00
100      RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
101      RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
         *

102      KK   F6C-3   BASIN
103      BA   0.046
104      LG    0.33    0.25    4.20    0.53      43
105      UC   0.270   0.340
106      UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
107      UA     100
         *

108      KK   CF6C3
109      KM   COMBINE F6C-3, AND RF6C4
110      KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
111      HC       2
         *

112      KK   RF6C3   ROUTE   REACH
113      RS       4    STOR      -1
114      RC   0.058   0.038   0.058    3172  0.0284    0.00
115      RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
116      RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
         *

117      KK   F6C-2   BASIN
118      BA   0.088
119      LG    0.29    0.15    7.30    0.13      34
120      UC   0.240   0.260
```

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   121          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   122          UA     100
                *

   123          KK   CF6C2
   124          KM   COMBINE F6C-2, AND RF6C3
   125          KM   AT PIMA ROAD FLOW SPLIT.
   126          HC       2
                *

   127          KK   SF6C2
   128          RS       1    FLOW       1
   129          SA       0    0.01
   130          SE    2502    2512
   131          SQ       0   10000
   132          SE    2502    2512
                *
1                                         HEC-1 INPUT                                              PAGE  4

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


   133          KK  DCF6C2
   134          KM   TOTAL FLOW=DI
   135          KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
   136          KM   DIVERTED FLOW=DCUB09 (DQ)
   137          DT  DCUB09
   138          DI       0     248     969    1174    1321    1369    1517
   139          DQ       0       0       0       7      18      28      37
                *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
                *

   140          KK   UB-12   BASIN
   141          BA   0.059
   142          LG    0.30    0.25    3.95    0.56      46
   143          UC   0.230   0.290
   144          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   145          UA     100
                *

   146          KK   RUB12   ROUTE   REACH
   147          RS       6    STOR      -1
   148          RC   0.056   0.044   0.056    5388  0.0182    0.00
   149          RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
   150          RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
                *

   151          KK   UB-10   BASIN
   152          BA   0.094
   153          LG    0.28    0.25    4.15    0.48      47
   154          UC   0.300   0.400
   155          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   156          UA     100
                *

   157          KK   CUB10
   158          KM   COMBINE UB-10, AND RUB12
   159          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
   160          HC       2
                *

   161          KK   UB-11   BASIN
   162          BA   0.206
   163          LG    0.27    0.25    4.10    0.54      54
   164          UC   0.310   0.320
   165          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   166          UA     100
                *

   167          KK   CUB11
   168          KM   COMBINE CUB10, AND UB-11
   169          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
   170          HC       2
                *
1                                         HEC-1 INPUT                                              PAGE  5

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   171          KK   RUB10   ROUTE   REACH
   172          RS       4    STOR      -1
   173          RC   0.056   0.044   0.056    3907  0.0179    0.00
   174          RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
   175          RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
                *

   176          KK   UB-09   BASIN
   177          BA   0.342
   178          LG    0.28    0.23    6.20    0.20      41
   179          UC   0.350   0.320
   180          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   181          UA     100
                *

   182          KK   CUB09
   183          KM   COMBINE UB-09, AND RUB10
```

```
      184        KM    AT PIMA ROAD FLOW SPLIT.
      185        HC       2
                 *

      186        KK    SUB09
      187        RS       1    FLOW       1
      188        SA       0    0.01
      189        SE    2502    2520
      190        SQ       0   10000
      191        SE    2502    2520
                 *

      192        KK  DCUB09
      193        DR  DCUB09

      194        KK  DCUB09
      195        KM    COMBINE DCUB09, AND SUB09
      196        KM    FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
      197        HC       2
                 *

      198        KK    RUB09   ROUTE   REACH
      199        RS       5    STOR      -1
      200        RC   0.061   0.038   0.061    4450  0.0187    0.00
      201        RX   865.9   913.3   986.7   990.5  1009.0  1014.7  1037.1  1056.8
      202        RY   492.0   489.0   488.0   486.0   486.0   488.0   490.0   492.0
                 *

      203        KK   UB-07   BASIN
      204        BA   0.191
      205        LG    0.30    0.15    8.80    0.06      16
      206        UC   0.320   0.340
      207        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      208        UA     100
                 *
1                                          HEC-1 INPUT                                              PAGE  6

     LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


      209        KK    CUB07
      210        KM    COMBINE UB-07, AND RUB09
      211        KM    CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
      212        HC       2
                 *

      213        KK  UB-08C   BASIN
      214        BA   0.010
      215        LG    0.25    0.25    4.00    0.55      55
      216        UC   0.130   0.170
      217        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      218        UA     100
                 *

      219        KK  RUB08C   ROUTE   REACH
      220        RS       7    STOR      -1
      221        RC   0.061   0.038   0.061    5952  0.0190    0.00
      222        RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
      223        RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
                 *

      224        KK  UB-08B   BASIN
      225        BA   0.033
      226        LG    0.25    0.17    6.80    0.15      42
      227        UC   0.170   0.180
      228        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      229        UA     100
                 *

      230        KK  RUB08B   ROUTE   REACH
      231        RS       7    STOR      -1
      232        RC   0.061   0.038   0.061    6656  0.0173    0.00
      233        RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
      234        RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
                 *

      235        KK  UB-08A   BASIN
      236        BA   0.121
      237        LG    0.30    0.25    5.70    0.21      26
      238        UC   0.360   0.500
      239        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
      240        UA     100
                 *

      241        KK    CUB08
      242        KM    COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
      243        KM    CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
      244        HC       4
                 *
1                                          HEC-1 INPUT                                              PAGE  7

     LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


      245        KK    RUB07   ROUTE   REACH
      246        RS       2    STOR      -1
```

```
         247            RC   0.061   0.038   0.061     728  0.0247    0.00
         248            RX   802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
         249            RY   420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                        *

         250            KK   OFF15   BASIN
         251            BA   0.012
         252            LG    0.30    0.25    6.00    0.18       5
         253            UC   0.143   0.141
         254            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         255            UA     100
                        *

         256            KK  COFF15
         257            HC       2
                        *

         258            KK   RON15   ROUTE
         259            RS       1    FLOW
         260            RC   0.076   0.038   0.073     722  0.0194    0.00
         261            RX    7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
         262            RY  2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                        *

         263            KK    ON15   BASIN
         264            BA   0.009
         265            LG    0.10    0.25    6.00    0.28       0
         266            UC   0.347   0.367
         267            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         268            UA     100
                        *

         269            KK  CPON15 COMBINE
         270            HC       2
                        *

         271            KK   OFF05   BASIN
         272            BA   0.012
         273            LG    0.30    0.25    5.46    0.23       5
         274            UC   0.226   0.309
         275            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         276            UA     100
                        *

         277            KK   RON05   ROUTE
         278            RS       1    FLOW
         279            RC   0.076   0.038   0.076     698  0.0186    0.00
         280            RX    5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
         281            RY  2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                        *
1                                                          HEC-1 INPUT                                          PAGE  8

        LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

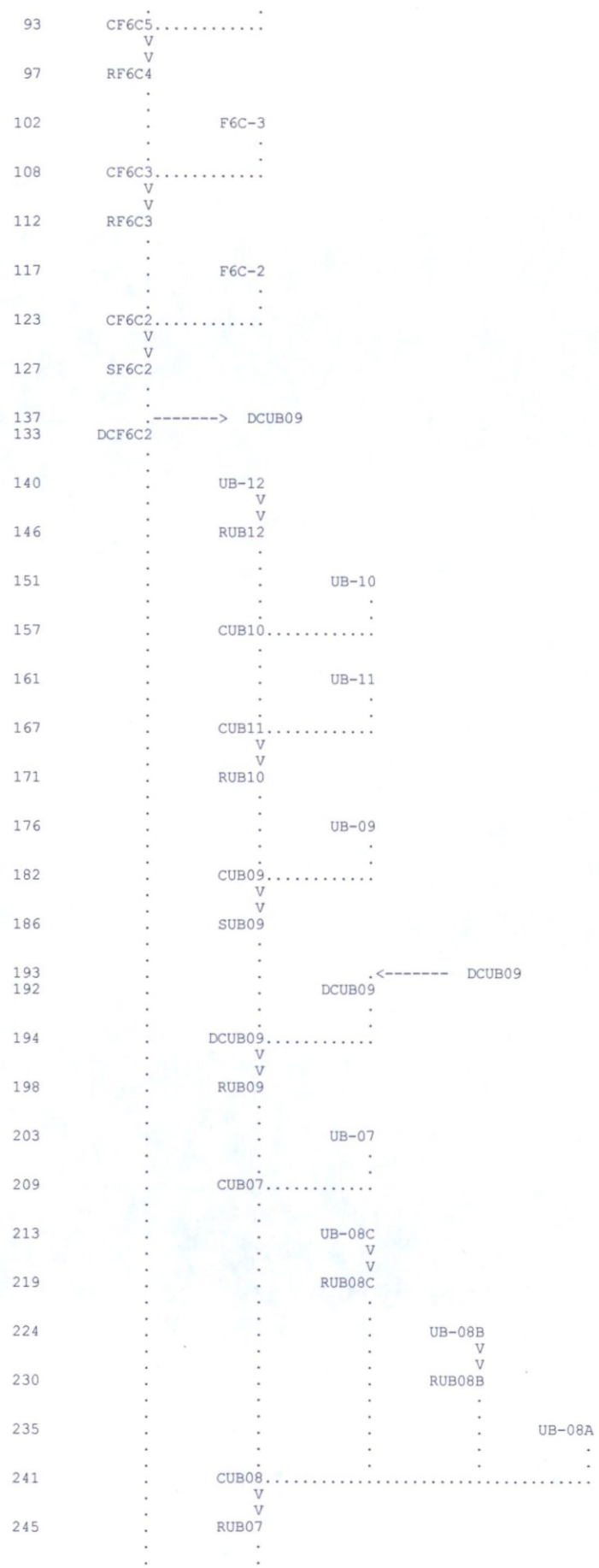

         282            KK    ON05   BASIN
         283            BA   0.006
         284            LG    0.10    0.25    6.00    0.28       0
         285            UC   0.376   0.533
         286            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         287            UA     100
                        *

         288            KK  CPON05 COMBINE
         289            HC       2
                        *

         290            KK    ON10   BASIN
         291            BA   0.001
         292            LG    0.10    0.25    6.00    0.28       0
         293            UC   0.182   0.218
         294            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         295            UA     100
                        *
         296            ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING            (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR          (<---) RETURN OF DIVERTED OR PUMPED FLOW

    66        F6C-6
                  V
                  V
    72        RF6C6
                  .
                  .
    77            .           F6C-4
                  .               .
                  .               .
    83        CF6C4...........
                  .
                  .
    87            .           F6C-5
                  .               .
```


93 CF6C5
97 RF6C4
102 F6C-3
108 CF6C3
112 RF6C3
117 F6C-2
123 CF6C2
127 SF6C2
137 DCUB09
133 DCF6C2
140 UB-12
146 RUB12
151 UB-10
157 CUB10
161 UB-11
167 CUB11
171 RUB10
176 UB-09
182 CUB09
186 SUB09
193 DCUB09
192 DCUB09
194 DCUB09
198 RUB09
203 UB-07
209 CUB07
213 UB-08C
219 RUB08C
224 UB-08B
230 RUB08B
235 UB-08A
241 CUB08
245 RUB07

```
  250          .           .       OFF15
               .           .         .
               .           .         .
  256          .      COFF15.............
               .           V
               .           V
  258          .       RON15
               .           .
               .           .
  263          .           .        ON15
               .           .         .
               .           .         .
  269          .      CPON15.............
               .           .
               .           .
  271          .           .       OFF05
               .           .         V
               .           .         V
  277          .           .       RON05
               .           .         .
               .           .         .
  282          .           .         .       ON05
               .           .         .         .
               .           .         .         .
  288          .           .      CPON05.............
               .           .         .
               .           .         .
  290          .           .         .       ON10

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1**************************************                  **************************************
*                                    *                  *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                  *    U.S. ARMY CORPS OF ENGINEERS    *
*              JUN   1998            *                  *    HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.1              *                  *         609 SECOND STREET          *
*                                    *                  *       DAVIS, CALIFORNIA 95616      *
*  RUN DATE   26FEB18  TIME  09:16:36*                  *          (916) 756-1104            *
*                                    *                  *                                    *
**************************************                  **************************************
```

Flood Control District of Maricopa County
ESTATES AT HAYDEN EX - Estates at Hayden EX
10 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME: NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

10-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
UPPER BOULDERS WASH (UB)
FAN 6C (F6C)
FAN 6A NORTH (F6AN)
FAN 6A SOULTH (F6AS)
FAN 6A (F6A)
UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN NUMBER. I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND CONCENTRATION POINT NUMBER. CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB BASIN THE CONCENTRATION POINT IS LOCATED IN. I.E. CONCENTRATION POINT IN SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS. IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.

```
  52 IO          OUTPUT CONTROL VARIABLES
```

```
                   IPRNT           5  PRINT CONTROL
                   IPLOT           0  PLOT CONTROL
                   QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                    NMIN           1  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1    0  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2    0  ENDING DATE
                  NDTIME        0919  ENDING TIME
                   ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     .02 HOURS
                   TOTAL TIME BASE   33.32 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

 54 JD         INDEX STORM NO. 1
                    STRM        2.37  PRECIPITATION DEPTH
                    TRDA         .00  TRANSPOSITION DRAINAGE AREA

 55 PI           PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                    .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
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 58 JD         INDEX STORM NO. 2
                    STRM        2.36  PRECIPITATION DEPTH
                    TRDA         .50  TRANSPOSITION DRAINAGE AREA

 59 PI           PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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  62 JD        INDEX STORM NO. 3
                 STRM       2.31  PRECIPITATION DEPTH
                 TRDA       2.80  TRANSPOSITION DRAINAGE AREA

  63 PI          PRECIPITATION PATTERN
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	558.	4.30	119.	30.	22.	.89		
+	ROUTED TO	RF6C6	556.	4.35	119.	30.	22.	.89		
+	HYDROGRAPH AT	F6C-4	36.	4.07	4.	1.	1.	.03		
+	2 COMBINED AT	CF6C4	569.	4.33	122.	31.	22.	.91		
+	HYDROGRAPH AT	F6C-5	106.	4.18	20.	5.	4.	.14		
+	2 COMBINED AT	CF6C5	637.	4.33	139.	35.	25.	1.05		
+	ROUTED TO	RF6C4	604.	4.58	139.	35.	25.	1.05		
+	HYDROGRAPH AT	F6C-3	55.	4.10	7.	2.	1.	.05		
+	2 COMBINED AT	CF6C3	619.	4.57	145.	37.	27.	1.10		
+	ROUTED TO	RF6C3	612.	4.70	145.	37.	27.	1.10		
+	HYDROGRAPH AT	F6C-2	145.	4.13	15.	4.	3.	.09		

+	2 COMBINED AT	CF6C2	636.	4.67	158.	40.	29.	1.18
+	ROUTED TO	SF6C2	636.	4.67	158.	40.	29.	1.18
+	DIVERSION TO	DCUB09	0.	.00	0.	0.	0.	1.18
+	HYDROGRAPH AT	DCF6C2	636.	4.67	158.	40.	29.	1.18
+	HYDROGRAPH AT	UB-12	81.	4.13	9.	2.	2.	.06
+	ROUTED TO	RUB12	53.	4.57	9.	2.	2.	.06
+	HYDROGRAPH AT	UB-10	109.	4.20	15.	4.	3.	.09
+	2 COMBINED AT	CUB10	121.	4.20	25.	6.	4.	.15
+	HYDROGRAPH AT	UB-11	275.	4.20	36.	9.	6.	.21
+	2 COMBINED AT	CUB11	396.	4.20	60.	15.	11.	.36
+	ROUTED TO	RUB10	367.	4.35	60.	15.	11.	.36
+	HYDROGRAPH AT	UB-09	458.	4.13	58.	15.	11.	.34
+	2 COMBINED AT	CUB09	673.	4.27	115.	29.	21.	.70
+	ROUTED TO	SUB09	673.	4.27	115.	29.	21.	.70
+	HYDROGRAPH AT	DCUB09	0.	.00	0.	0.	0.	1.18
+	2 COMBINED AT	DCUB09	673.	4.27	115.	29.	21.	.70
+	ROUTED TO	RUB09	646.	4.45	115.	29.	21.	.70
+	HYDROGRAPH AT	UB-07	273.	4.20	32.	8.	6.	.19
+	2 COMBINED AT	CUB07	789.	4.40	144.	36.	26.	.89
+	HYDROGRAPH AT	UB-08C	19.	4.07	2.	0.	0.	.01
+	ROUTED TO	RUB08C	10.	4.75	2.	0.	0.	.01
+	HYDROGRAPH AT	UB-08B	65.	4.08	6.	2.	1.	.03
+	ROUTED TO	RUB08B	41.	4.57	6.	2.	1.	.03
+	HYDROGRAPH AT	UB-08A	116.	4.15	18.	4.	3.	.12
+	4 COMBINED AT	CUB08	876.	4.42	167.	42.	30.	1.06
+	ROUTED TO	RUB07	875.	4.43	167.	42.	30.	1.06
+	HYDROGRAPH AT	OFF15	23.	4.03	1.	0.	0.	.01
+	2 COMBINED AT	COFF15	876.	4.43	168.	42.	31.	1.07
+	ROUTED TO	RON15	874.	4.47	168.	42.	31.	1.07
+	HYDROGRAPH AT	ON15	9.	4.13	1.	0.	0.	.01
+	2 COMBINED AT	CPON15	877.	4.45	169.	43.	31.	1.08
+	HYDROGRAPH AT	OFF05	15.	4.08	1.	0.	0.	.01

	ROUTED TO						
+	RON05	14.	4.12	1.	0.	0.	.01
	HYDROGRAPH AT						
+	ON05	5.	4.15	1.	0.	0.	.01
	2 COMBINED AT						
+	CPON05	19.	4.13	2.	1.	0.	.02
	HYDROGRAPH AT						
+	ON10	1.	4.05	0.	0.	0.	.00

*** NORMAL END OF HEC-1 ***

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1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN  1998                 *
 *          VERSION 4.1                  *
 *                                       *
 *  RUN DATE   26FEB18  TIME  09:16:49   *
 *                                       *
 *****************************************
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Existing 100-year Storm

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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X       XXXXX    X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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      LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

        1           ID        Flood Control District of Maricopa County
        2           ID        ESTATES AT HAYDEN EX - Estates at Hayden EX
        3           ID        100 YEAR
        4           ID        6 Hour  Storm
        5           ID        Unit Hydrograph: Clark
        6           ID        Storm: Multiple
        7           ID        08/01/2017
        8           ID
        9           ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
       10           ID   MAY 2002
       11           ID
       12           ID   FILE NAME:  NS.DAT
       13           ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
       14           ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
       15           ID
       16           ID   100-YEAR, 6-HOUR FREQUENCY
       17           ID
       18           ID   METHODOLOGY:
       19           ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
       20           ID   VERSION 4.1
       21           ID   MULTIPLE STORMS
       22           ID   CLARK UNIT HYDROGRAPH
       23           ID   GREEN AMPT LOSS METHOD
       24           ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
       25           ID
       26           ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
       27           ID
       28           ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
       29           ID                            UPPER BOULDERS WASH (UB)
       30           ID                            FAN 6C (F6C)
       31           ID                            FAN 6A NORTH (F6AN)
       32           ID                            FAN 6A SOULTH (F6AS)
       33           ID                            FAN 6A (F6A)
       34           ID                            UPPER FAN 5 (UF5)
       35           ID
       36           ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
       37           ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
       38           ID
       39           ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
       40           ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
       41           ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
       42           ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
       43           ID
       44           ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
       45           ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
       46           ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
       47           ID
       48           ID
       49           ID
       50           ID
                    *DIAGRAM
       51           IT       1                    2000
       52           IO       5
       53           IN      15
                    *
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1 HEC-1 INPUT PAGE 2

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      LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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          JD    3.50    0.01
          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
          PC   0.962   0.972   0.983   0.991   1.000
          JD   3.477    0.50
          JD   3.412    2.80
          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
          PC   0.950   0.963   0.975   0.988   1.000
          JD   3.227    16.0
          PC   0.000   0.015   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
          PC   0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
          PC   0.946   0.960   0.973   0.987   1.000
          JD   2.842    90.0
          PC   0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
          PC   0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
          PC   0.927   0.945   0.964   0.982   1.000
          JD   1.995    500.0
          PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
          PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
          PC   0.907   0.930   0.954   0.977   1.000
          *DIAGRAM
          *  END STAGE COACH PASS AND BEGIN FAN 6C
          *

          KK   F6C-6   BASIN
          BA   0.888
          LG    0.33    0.25    5.40    0.25      27
          UC   0.438   0.469
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   RF6C6   ROUTE   REACH
          RS       2    STOR      -1
          RC   0.050   0.035   0.050    1780  0.0185    0.00
          RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
          RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
          *

          KK   F6C-4   BASIN
          BA   0.025
          LG    0.31    0.25    3.95    0.57      43
          UC   0.158   0.217
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   CF6C4
          KM   COMBINE F6C-4, AND RF6C6
          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
          HC       2
          *
1                                        HEC-1 INPUT                                    PAGE  3

     LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          KK   F6C-5   BASIN
          BA   0.137
          LG    0.32    0.25    3.95    0.58      42
          UC   0.300   0.464
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   CF6C5
          KM   COMBINE CF6C4, AND F6C-5
          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
          HC       2
          *

          KK   RF6C4   ROUTE   REACH
          RS       3    STOR      -1
          RC   0.050   0.035   0.050    2707  0.0070    0.00
          RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
          RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
          *

          KK   F6C-3   BASIN
          BA   0.046
          LG    0.33    0.25    4.20    0.53      43
          UC   0.221   0.278
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   CF6C3
          KM   COMBINE F6C-3, AND RF6C4
          KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
          HC       2
          *

          KK   RF6C3   ROUTE   REACH
          RS       4    STOR      -1
```

```
    123        RC   0.058   0.038   0.058    3172  0.0284    0.00
    124        RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
    125        RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
               *

    126        KK  F6C-2   BASIN
    127        BA   0.088
    128        LG    0.29    0.15    7.30    0.13      34
    129        UC   0.200   0.214
    130        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    131        UA     100
               *
1                                             HEC-1 INPUT                                            PAGE  4

   LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


    132        KK   CF6C2
    133        KM   COMBINE F6C-2, AND RF6C3
    134        KM   AT PIMA ROAD FLOW SPLIT.
    135        HC       2
               *

    136        KK   SF6C2
    137        RS       1    FLOW       1
    138        SA       0    0.01
    139        SE    2502    2512
    140        SQ       0   10000
    141        SE    2502    2512
               *

    142        KK  DCF6C2
    143        KM   TOTAL FLOW=DI
    144        KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
    145        KM   DIVERTED FLOW=DCUB09 (DQ)
    146        DT  DCUB09
    147        DI       0     248     969    1174    1321    1369    1517
    148        DQ       0       0       0       7      18      28      37
               *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
               *

    149        KK   UB-12   BASIN
    150        BA   0.059
    151        LG    0.30    0.25    3.95    0.56      46
    152        UC   0.192   0.239
    153        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    154        UA     100
               *

    155        KK   RUB12   ROUTE   REACH
    156        RS       6    STOR      -1
    157        RC   0.056   0.044   0.056    5388  0.0182    0.00
    158        RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
    159        RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
               *

    160        KK   UB-10   BASIN
    161        BA   0.094
    162        LG    0.28    0.25    4.15    0.48      47
    163        UC   0.238   0.314
    164        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    165        UA     100
               *

    166        KK   CUB10
    167        KM   COMBINE UB-10, AND RUB12
    168        KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
    169        HC       2
               *
1                                             HEC-1 INPUT                                            PAGE  5

   LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


    170        KK   UB-11   BASIN
    171        BA   0.206
    172        LG    0.27    0.25    4.10    0.54      54
    173        UC   0.246   0.246
    174        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    175        UA     100
               *

    176        KK   CUB11
    177        KM   COMBINE CUB10, AND UB-11
    178        KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
    179        HC       2
               *

    180        KK   RUB10   ROUTE   REACH
    181        RS       4    STOR      -1
    182        RC   0.056   0.044   0.056    3907  0.0179    0.00
    183        RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
    184        RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
               *

    185        KK   UB-09   BASIN
```

```
186          BA   0.342
187          LG    0.28    0.23    6.20    0.20      41
188          UC   0.279   0.248
189          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
190          UA     100
             *

191          KK   CUB09
192          KM   COMBINE UB-09, AND RUB10
193          KM   AT PIMA ROAD FLOW SPLIT.
194          HC       2
             *

195          KK   SUB09
196          RS       1    FLOW       1
197          SA       0    0.01
198          SE    2502    2520
199          SQ       0   10000
200          SE    2502    2520
             *

201          KK  DCUB09
202          DR  DCUB09

203          KK  DCUB09
204          KM   COMBINE DCUB09, AND SUB09
205          KM   FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
206          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

207          KK   RUB09   ROUTE   REACH
208          RS       5    STOR      -1
209          RC   0.061   0.038   0.061    4450  0.0187    0.00
210          RX   865.9   913.3   986.7   990.5  1009.0  1014.7  1037.1  1056.8
211          RY   492.0   489.0   488.0   486.0   486.0   488.0   490.0   492.0
             *

212          KK   UB-07   BASIN
213          BA   0.191
214          LG    0.30    0.15    8.80    0.06      16
215          UC   0.250   0.257
216          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
217          UA     100
             *

218          KK   CUB07
219          KM   COMBINE UB-07, AND RUB09
220          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
221          HC       2
             *

222          KK  UB-08C   BASIN
223          BA   0.010
224          LG    0.25    0.25    4.00    0.55      55
225          UC   0.113   0.143
226          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
227          UA     100
             *

228          KK  RUB08C   ROUTE   REACH
229          RS       7    STOR      -1
230          RC   0.061   0.038   0.061    5952  0.0190    0.00
231          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
232          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *

233          KK  UB-08B   BASIN
234          BA   0.033
235          LG    0.25    0.17    6.80    0.15      42
236          UC   0.142   0.147
237          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
238          UA     100
             *

239          KK  RUB08B   ROUTE   REACH
240          RS       7    STOR      -1
241          RC   0.061   0.038   0.061    6656  0.0173    0.00
242          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
243          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

244          KK  UB-08A   BASIN
245          BA   0.121
246          LG    0.30    0.25    5.70    0.21      26
247          UC   0.275   0.371
248          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
249          UA     100
             *
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         250            KK   CUB08
         251            KM   COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
         252            KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
         253            HC       4
                        *

         254            KK   RUB07   ROUTE   REACH
         255            RS       2    STOR      -1
         256            RC   0.061   0.038   0.061     728  0.0247    0.00
         257            RX   802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
         258            RY   420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                        *
                        * Start of Estates at Hayden
                        *

         259            KK   OFF15   BASIN
         260            BA   0.013
         261            LG    0.29    0.25    6.00    0.19       5
         262            UC   0.131   0.122
         263            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         264            UA     100
                        *

         265            KK  COFF15
         266            HC       2
                        *

         267            KK   RON15   ROUTE
         268            RS       1    FLOW
         269            RC   0.076   0.038   0.073     722  0.0194    0.00
         270            RX    7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
         271            RY  2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                        *

         272            KK    ON15   BASIN
         273            BA   0.008
         274            LG    0.10    0.25    6.00    0.28       0
         275            UC   0.274   0.302
         276            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         277            UA     100
                        *
1                                             HEC-1 INPUT                                                   PAGE  8

        LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


         278            KK  CPON15 COMBINE
         279            HC       2
                        *

         280            KK   OFF05   BASIN
         281            BA   0.012
         282            LG    0.30    0.25    5.46    0.23       5
         283            UC   0.178   0.238
         284            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         285            UA     100
                        *

         286            KK   RON05   ROUTE
         287            RS       1    FLOW
         288            RC   0.076   0.038   0.076     698  0.0186    0.00
         289            RX    5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
         290            RY  2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                        *

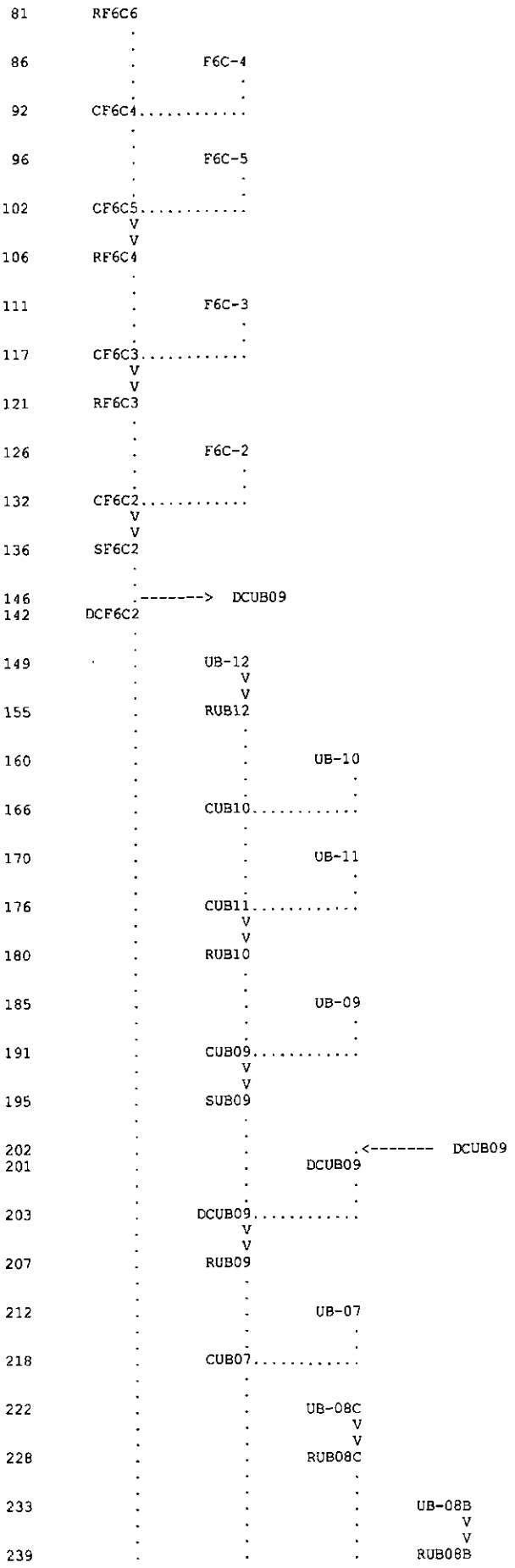
         291            KK    ON05   BASIN
         292            BA   0.006
         293            LG    0.10    0.25    6.00    0.28       0
         294            UC   0.296   0.408
         295            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         296            UA     100
                        *

         297            KK  CPON05 COMBINE
         298            HC       2
                        *

         299            KK    ON10   BASIN
         300            BA   0.001
         301            LG    0.10    0.25    6.00    0.28       0
         302            UC   0.143   0.166
         303            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         304            UA     100
                        *
         305            ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   75      F6C-6
              V
              V
```


81 RF6C6
86 F6C-4
92 CF6C4
96 F6C-5
102 CF6C5
106 RF6C4
111 F6C-3
117 CF6C3
121 RF6C3
126 F6C-2
132 CF6C2
136 SF6C2
146
142 DCF6C2
149 UB-12
155 RUB12
160 UB-10
166 CUB10
170 UB-11
176 CUB11
180 RUB10
185 UB-09
191 CUB09
195 SUB09
202
201 DCUB09
203 DCUB09
207 RUB09
212 UB-07
218 CUB07
222 UB-08C
228 RUB08C
233 UB-08B
239 RUB08B
DCUB09

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                .          .          .          .
                .          .          .          .
   244          .          .          .          .     UB-08A
                .          .          .          .          .
                .          .          .          .          .
   250          .       CUB08.....................................
                .          V
                .          V
   254          .       RUB07
                .          .
                .          .
   259          .          .       OFF15
                .          .          .
                .          .          .
   265          .       COFF15............
                .          V
                .          V
   267          .       RON15
                .          .
                .          .
   272          .          .        ON15
                .          .          .
                .          .          .
   278          .       CPON15............
                .          .
                .          .
   280          .          .       OFF05
                .          .          V
                .          .          V
   286          .          .       RON05
                .          .          .
                .          .          .
   291          .          .          .        ON05
                .          .          .          .
                .          .          .          .
   297          .          .       CPON05............
                .          .          .
                .          .          .
   299          .          .          .        ON10

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
 1****************************************
  *                                      *
  *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
  *              JUN   1998              *
  *           VERSION 4.1                *
  *                                      *
  *  RUN DATE   26FEB18  TIME  09:16:49  *
  *                                      *
  ****************************************

  ****************************************
  *                                      *
  *    U.S. ARMY CORPS OF ENGINEERS      *
  *    HYDROLOGIC ENGINEERING CENTER     *
  *          609 SECOND STREET           *
  *       DAVIS, CALIFORNIA 95616        *
  *           (916) 756-1104             *
  *                                      *
  ****************************************
```

Flood Control District of Maricopa County
ESTATES AT HAYDEN EX - Estates at Hayden EX
100 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME: NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

100-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
UPPER BOULDERS WASH (UB)
FAN 6C (F6C)
FAN 6A NORTH (F6AN)
FAN 6A SOULTH (F6AS)
FAN 6A (F6A)
UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN NUMBER. I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND CONCENTRATION POINT NUMBER. CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB BASIN THE CONCENTRATION POINT IS LOCATED IN. I.E. CONCENTRATION POINT IN

```
                         SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

                         PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
                         NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
                         IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.



 52 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0919  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     .02 HOURS
                      TOTAL TIME BASE   33.32 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

 54 JD          INDEX STORM NO. 1
                       STRM        3.50  PRECIPITATION DEPTH
                       TRDA         .01  TRANSPOSITION DRAINAGE AREA

 55 PI            PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 58 JD          INDEX STORM NO. 2
                       STRM        3.48  PRECIPITATION DEPTH
                       TRDA         .50  TRANSPOSITION DRAINAGE AREA

  0 PI            PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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59 JD INDEX STORM NO. 3

STRM 3.41 PRECIPITATION DEPTH

TRDA 2.80 TRANSPOSITION DRAINAGE AREA

60 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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63 JD INDEX STORM NO. 4

STRM 3.23 PRECIPITATION DEPTH

TRDA 16.00 TRANSPOSITION DRAINAGE AREA

64 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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 67 JD         INDEX STORM NO. 5
                   STRM      2.84   PRECIPITATION DEPTH
                   TRDA     90.00   TRANSPOSITION DRAINAGE AREA

 68 PI           PRECIPITATION PATTERN
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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 71 JD         INDEX STORM NO. 6
                   STRM      2.00   PRECIPITATION DEPTH
                   TRDA    500.00   TRANSPOSITION DRAINAGE AREA

 72 PI           PRECIPITATION PATTERN
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                   .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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        WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	1251.	4.18	210.	53.	38.	.89		
+	ROUTED TO	RF6C6	1236.	4.25	210.	53.	38.	.89		
+	HYDROGRAPH AT	F6C-4	65.	4.05	6.	2.	1.	.03		
+	2 COMBINED AT	CF6C4	1261.	4.25	215.	54.	39.	.91		
+	HYDROGRAPH AT	F6C-5	222.	4.12	34.	9.	6.	.14		
+	2 COMBINED AT	CF6C5	1399.	4.23	246.	62.	45.	1.05		
+	ROUTED TO	RF6C4	1317.	4.43	246.	62.	45.	1.05		
+	HYDROGRAPH AT	F6C-3	103.	4.07	12.	3.	2.	.05		
+	2 COMBINED AT	CF6C3	1346.	4.43	256.	64.	46.	1.10		
+	ROUTED TO	RF6C3	1324.	4.55	256.	64.	46.	1.10		
+	HYDROGRAPH AT	F6C-2	248.	4.12	25.	6.	5.	.09		
+	2 COMBINED AT	CF6C2	1369.	4.53	278.	70.	51.	1.18		
+	ROUTED TO	SF6C2	1369.	4.53	278.	70.	51.	1.18		
+	DIVERSION TO	DCUB09	24.	4.53	1.	0.	0.	1.18		
+	HYDROGRAPH AT	DCF6C2	1345.	4.53	277.	70.	50.	1.18		
+	HYDROGRAPH AT	UB-12	146.	4.12	15.	4.	3.	.06		
+	ROUTED TO	RUB12	112.	4.42	15.	4.	3.	.06		
+	HYDROGRAPH AT	UB-10	206.	4.15	25.	6.	5.	.09		
+	2 COMBINED AT	CUB10	238.	4.32	40.	10.	7.	.15		
+	HYDROGRAPH AT	UB-11	508.	4.15	57.	14.	10.	.21		
+	2 COMBINED AT	CUB11	735.	4.15	97.	24.	18.	.36		
+	ROUTED TO	RUB10	691.	4.27	97.	24.	18.	.36		
+	HYDROGRAPH AT	UB-09	848.	4.10	94.	24.	17.	.34		
+	2 COMBINED AT	CUB09	1270.	4.18	188.	47.	34.	.70		
+	ROUTED TO	SUB09	1270.	4.18	188.	47.	34.	.70		
+	HYDROGRAPH AT	DCUB09	24.	4.53	1.	0.	0.	1.18		
+	2 COMBINED AT	DCUB09	1270.	4.18	190.	48.	34.	.70		
+	ROUTED TO	RUB09	1217.	4.35	190.	48.	34.	.70		
+	HYDROGRAPH AT	UB-07	496.	4.15	53.	13.	10.	.19		

+	2 COMBINED AT	CUB07	1459.	4.32	239.	60.	43.	.89
+	HYDROGRAPH AT	UB-08C	32.	4.05	3.	1.	1.	.01
+	ROUTED TO	RUB08C	16.	4.60	3.	1.	1.	.01
+	HYDROGRAPH AT	UB-08B	108.	4.07	10.	2.	2.	.03
+	ROUTED TO	RUB08B	75.	4.43	10.	2.	2.	.03
+	HYDROGRAPH AT	UB-08A	238.	4.10	30.	8.	5.	.12
+	4 COMBINED AT	CUB08	1629.	4.32	278.	70.	51.	1.06
+	ROUTED TO	RUB07	1626.	4.35	278.	70.	51.	1.06
+	HYDROGRAPH AT	OFF15	42.	4.05	3.	1.	1.	.01
+	2 COMBINED AT	COFF15	1632.	4.33	281.	71.	51.	1.07
+	ROUTED TO	RON15	1625.	4.37	281.	71.	51.	1.07
+	HYDROGRAPH AT	ON15	17.	4.17	2.	0.	0.	.01
+	2 COMBINED AT	CPON15	1632.	4.37	282.	71.	51.	1.08
+	HYDROGRAPH AT	OFF05	30.	4.10	3.	1.	0.	.01
+	ROUTED TO	RON05	29.	4.13	3.	1.	0.	.01
+	HYDROGRAPH AT	ON05	10.	4.18	1.	0.	0.	.01
+	2 COMBINED AT	CPON05	39.	4.13	4.	1.	1.	.02
+	HYDROGRAPH AT	ON10	3.	4.07	0.	0.	0.	.00

*** NORMAL END OF HEC-1 ***

Appendix B – Proposed Conditions Hydrology

Proposed Conditions Soils

Proposed Conditions Land Use

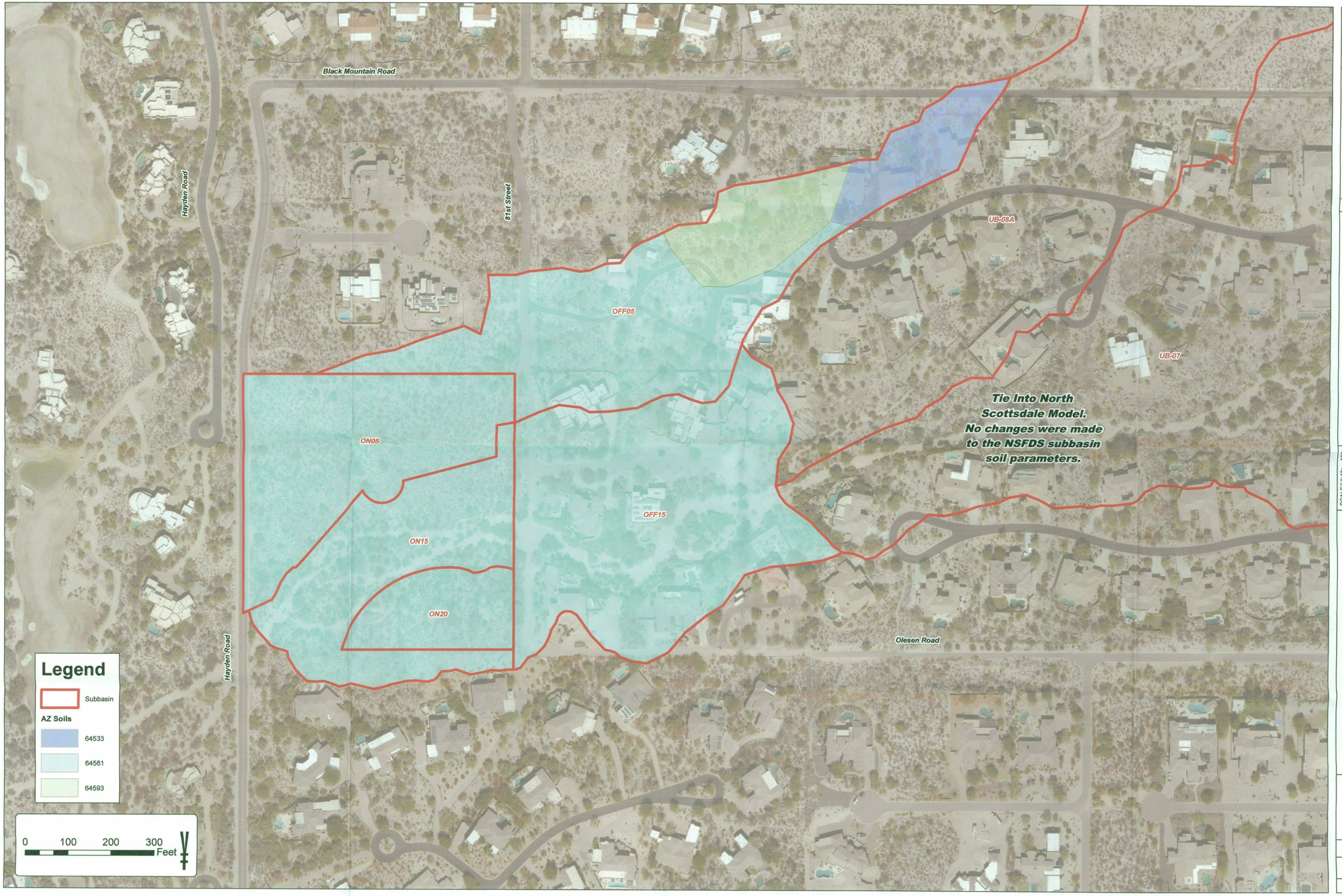
Subbasin Hydrologic Parameters

Routing Reaches

Storage Facilities

HEC-1 Results

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)		Effective Rock (%)	Comments
Major Basin ID: 01										
OFF05			64533	0.002	16.10	0.230	-	*	100	
			64561	0.008	64.50	0.150	-	*	100	
			64593	0.002	19.40	0.330	-	*	100	
OFF15			64561	0.013	100.00	0.150	-	*	100	
ON05			64561	0.007	100.00	0.150	-	*	100	
ON15			64561	0.006	100.00	0.150	-	*	100	
ON20			64561	0.002	100.00	0.150	-	*	100	



Kimley»Horn

Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1"=	100
SCALE(V):	N/A
DESIGNED BY:	ZRS
DRAWN BY:	BAH
CHECKED BY:	ZRS
DATE:	03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
PROPOSED SOILS

PROJECT NO.
291109000

DRAWING NAME
PR SOILS

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: ESTATES AT HAYDEN PR

o sin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
jor Basin ID: 01									
F05	120	0.0124	100.0	0.30 *	5 *	30.0 *	NORMAL *	0.034	
		0.0124	**100.0**						
F15	120	0.0125	100.0	0.30 *	5 *	30.0 *	NORMAL *	0.034	
		0.0125	**100.0**						
05	120	0.0067	93.1	0.30 *	5 *	30.0 *	NORMAL *	0.036	
	730	0.0005	6.9	0.10 *	0 *	90.0 *	NORMAL *	0.180	
		0.0072	**100.0**						
15	120	0.0009	14.5	0.30 *	5 *	30.0 *	NORMAL *	0.036	
	730	0.0053	85.5	0.10 *	0 *	90.0 *	NORMAL *	0.182	
		0.0062	**100.0**						
20	120	0.0020	87.0	0.30 *	5 *	30.0 *	NORMAL *	0.039	
	730	0.0003	13.0	0.10 *	0 *	9.0 *	NORMAL *	0.197	
		0.0023	**100.0**						

* Non default value

Black Mountain Road
Hayden Road
61st Street
Olesen Road
Hayden Road

OFF05
OFF15
ON05
ON15
ON20
UB-08A
UB-07

Tie Into North Scottsdale Model. No changes were made to the NSFDS subbasin landuse parameters.

Legend

- Subbasin
- 120
- 730

0 100 200 300 Feet

Kimley»Horn

Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1"= 100
SCALE(V): N/A
DESIGNED BY: ZRS
DRAWN BY: AH
CHECKED BY: ZRS
DATE: 03/2018

CITY OF SCOTTSDALE
ESTATES AT HAYDEN
PROPOSED LANDUSE

PROJECT NO.
291109000

DRAWING NAME
PR LANDUSE

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF05	0.012	0.27	98.5	98.5	NATURAL	0.034	0.30	0.25	5.46	0.229	5	**Tc (Hrs)**	0.288	0.272	0.226	0.204	0.184	0.178
												Vel (f/s)	1.38	1.46	1.75	1.94	2.15	2.22
												R (Hrs)	0.406	0.380	0.309	0.277	0.246	0.238
OFF15	0.012	0.19	230.4	226.5	NATURAL	0.034	0.30	0.25	6.00	0.183	5	**Tc (Hrs)**	0.183	0.173	0.143*	0.130*	0.118*	0.114 *
												Vel (f/s)	1.52	1.61	1.95	2.14	2.36	2.44
												R (Hrs)	0.185	0.173	0.141	0.127	0.113	0.109
ON05	0.007	0.17	138.7	138.7	URBAN	0.046	0.29	0.25	6.00	0.191	5	**Tc (Hrs)**	0.237	0.223	0.185	0.168	0.152*	0.147 *
												Vel (f/s)	1.05	1.12	1.35	1.48	1.64	1.70
												R (Hrs)	0.306	0.287	0.233	0.209	0.187	0.181
ON15	0.006	0.18	142.0	142.0	NATURAL	0.161	0.13	0.25	6.00	0.269	1	**Tc (Hrs)**	0.479	0.451	0.374	0.338	0.304	0.294
												Vel (f/s)	0.55	0.59	0.71	0.78	0.87	0.90
												R (Hrs)	0.766	0.715	0.582	0.520	0.463	0.446
ON20	0.002	0.08	155.8	155.8	URBAN	0.060	0.27	0.25	6.00	0.179	4	**Tc (Hrs)**	0.178	0.168	0.139*	0.127*	0.115*	0.111 *
												Vel (f/s)	0.66	0.70	0.84	0.92	1.02	1.06
												R (Hrs)	0.250	0.234	0.190	0.171	0.153	0.148

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: ESTATES AT HAYDEN PR

3/1/2018

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RON05	0.076	0.038	0.076	698.00	0.0186	-	X:	5.60	123.40	137.60	141.90	143.40	147.10	161.50	192.90
							Y:	2,412.22	2,403.48	2,402.24	2,400.40	2,400.46	2,401.89	2,402.86	2,404.84
RON15	0.076	0.038	0.073	722.00	0.0194	-	X:	7.20	66.20	275.00	300.30	349.70	364.10	401.50	491.90
							Y:	2,409.21	2,404.24	2,402.39	2,401.27	2,401.28	2,402.98	2,403.48	2,410.00

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   01MAR18  TIME  09:12:18   *
 *                                       *
 *****************************************
```

Proposed 2-year Storm

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        Flood Control District of Maricopa County
   2          ID        ESTATES AT HAYDEN PR - Estates at Hayden PR
   3          ID        2 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        08/01/2017
   8          ID
   9          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
  10          ID   MAY 2002
  11          ID
  12          ID   FILE NAME:  NS.DAT
  13          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
  14          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
  15          ID
  16          ID   2-YEAR, 6-HOUR FREQUENCY
  17          ID
  18          ID   METHODOLOGY:
  19          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  20          ID   VERSION 4.1
  21          ID   MULTIPLE STORMS
  22          ID   CLARK UNIT HYDROGRAPH
  23          ID   GREEN AMPT LOSS METHOD
  24          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  25          ID
  26          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  27          ID
  28          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  29          ID                           UPPER BOULDERS WASH (UB)
  30          ID                           FAN 6C (F6C)
  31          ID                           FAN 6A NORTH (F6AN)
  32          ID                           FAN 6A SOULTH (F6AS)
  33          ID                           FAN 6A (F6A)
  34          ID                           UPPER FAN 5 (UF5)
  35          ID
  36          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  37          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  38          ID
  39          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  40          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  41          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  42          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  43          ID
  44          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  45          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  46          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  47          ID
  48          ID
  49          ID
  50          ID
              *DIAGRAM
  51          IT       1                   2000
  52          IO       5
  53          IN      15
              *
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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```
          JD   1.600  0.0001
          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
          PC   0.962   0.972   0.983   0.991   1.000
          JD   1.590  0.5000
          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
          PC   0.962   0.972   0.983   0.991   1.000
          JD   1.560     2.8
          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
          PC   0.950   0.963   0.975   0.988   1.000
          *
          *  END STAGE COACH PASS AND BEGIN FAN 6C
          *

          KK   F6C-6   BASIN
          BA   0.888
          LG    0.33    0.25    5.40    0.25      27
          UC   1.500   1.910
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   RF6C6   ROUTE   REACH
          RS       2    STOR      -1
          RC   0.050   0.035   0.050    1780  0.0185    0.00
          RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
          RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
          *

          KK   F6C-4   BASIN
          BA   0.025
          LG    0.31    0.25    3.95    0.57      43
          UC   0.240   0.340
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   CF6C4
          KM   COMBINE F6C-4, AND RF6C6
          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
          HC       2
          *

          KK   F6C-5   BASIN
          BA   0.137
          LG    0.32    0.25    3.95    0.58      42
          UC   0.570   0.940
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *
```



```
     LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          KK   CF6C5
          KM   COMBINE CF6C4, AND F6C-5
          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
          HC       2
          *

          KK   RF6C4   ROUTE   REACH
          RS       3    STOR      -1
          RC   0.050   0.035   0.050    2707  0.0070    0.00
          RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
          RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
          *

          KK   F6C-3   BASIN
          BA   0.046
          LG    0.33    0.25    4.20    0.53      43
          UC   0.380   0.500
          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
          UA     100
          *

          KK   CF6C3
          KM   COMBINE F6C-3, AND RF6C4
          KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
          HC       2
          *

          KK   RF6C3   ROUTE   REACH
          RS       4    STOR      -1
          RC   0.058   0.038   0.058    3172  0.0284    0.00
          RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
          RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
          *

          KK   F6C-2   BASIN
          BA   0.088
          LG    0.29    0.15    7.30    0.13      34
          UC   0.310   0.350
```

```
        121          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        122          UA    100
                     *

        123          KK   CF6C2
        124          KM   COMBINE F6C-2, AND RF6C3
        125          KM   AT PIMA ROAD FLOW SPLIT.
        126          HC      2
                     *

        127          KK   SF6C2
        128          RS      1    FLOW       1
        129          SA      0    0.01
        130          SE   2502    2512
        131          SQ      0   10000
        132          SE   2502    2512
                     *
1                                          HEC-1 INPUT                                            PAGE  4

       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


        133          KK  DCF6C2
        134          KM   TOTAL FLOW=DI
        135          KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
        136          KM   DIVERTED FLOW=DCUB09 (DQ)
        137          DT  DCUB09
        138          DI      0     248     969    1174    1321    1369    1517
        139          DQ      0       0       0       7      18      28      37
                     *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
                     *

        140          KK   UB-12   BASIN
        141          BA   0.059
        142          LG    0.30    0.25    3.95    0.56      46
        143          UC   0.300   0.400
        144          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        145          UA    100
                     *

        146          KK   RUB12   ROUTE   REACH
        147          RS      6    STOR      -1
        148          RC   0.056   0.044   0.056    5388  0.0182    0.00
        149          RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
        150          RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
                     *

        151          KK   UB-10   BASIN
        152          BA   0.094
        153          LG    0.28    0.25    4.15    0.48      47
        154          UC   0.410   0.570
        155          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        156          UA    100
                     *

        157          KK   CUB10
        158          KM   COMBINE UB-10, AND RUB12
        159          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
        160          HC      2
                     *

        161          KK   UB-11   BASIN
        162          BA   0.206
        163          LG    0.27    0.25    4.10    0.54      54
        164          UC   0.430   0.450
        165          UA      0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        166          UA    100
                     *

        167          KK   CUB11
        168          KM   COMBINE CUB10, AND UB-11
        169          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
        170          HC      2
                     *
1                                          HEC-1 INPUT                                            PAGE  5

       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


        171          KK   RUB10   ROUTE   REACH
        172          RS      4    STOR      -1
        173          RC   0.056   0.044   0.056    3907  0.0179    0.00
        174          RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
        175          RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
                     *

        176          KK   UB-09   BASIN
        177          BA   0.342
        178          LG    0.28    0.23    6.20    0.20      41
        179          UC   0.480   0.450
        180          UA      0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
        181          UA    100
                     *

        182          KK   CUB09
        183          KM   COMBINE UB-09, AND RUB10
```

```
184          KM   AT PIMA ROAD FLOW SPLIT.
185          HC      2
             *

186          KK   SUB09
187          RS      1    FLOW       1
188          SA      0    0.01
189          SE   2502    2520
190          SQ      0   10000
191          SE   2502    2520
             *

192          KK  DCUB09
193          DR  DCUB09

194          KK  DCUB09
195          KM   COMBINE DCUB09, AND SUB09
196          KM   FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
197          HC      2
             *

198          KK   RUB09   ROUTE   REACH
199          RS       5    STOR      -1
200          RC   0.061   0.038   0.061    4450  0.0187    0.00
201          RX   865.9   913.3   986.7   990.5  1009.0  1014.7  1037.1  1056.8
202          RY   492.0   489.0   488.0   486.0   486.0   488.0   490.0   492.0
             *

203          KK   UB-07   BASIN
204          BA   0.191
205          LG    0.30    0.15    8.80    0.06      16
206          UC   0.440   0.490
207          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
208          UA     100
             *
```

1 HEC-1 INPUT PAGE 6

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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

209          KK   CUB07
210          KM   COMBINE UB-07, AND RUB09
211          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
212          HC      2
             *

213          KK  UB-08C   BASIN
214          BA   0.010
215          LG    0.25    0.25    4.00    0.55      55
216          UC   0.160   0.220
217          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
218          UA     100
             *

219          KK  RUB08C   ROUTE   REACH
220          RS       7    STOR      -1
221          RC   0.061   0.038   0.061    5952  0.0190    0.00
222          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
223          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *

224          KK  UB-08B   BASIN
225          BA   0.033
226          LG    0.25    0.17    6.80    0.15      42
227          UC   0.200   0.220
228          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
229          UA     100
             *

230          KK  RUB08B   ROUTE   REACH
231          RS       7    STOR      -1
232          RC   0.061   0.038   0.061    6656  0.0173    0.00
233          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
234          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *

235          KK  UB-08A   BASIN
236          BA   0.121
237          LG    0.30    0.25    5.70    0.21      26
238          UC   0.520   0.750
239          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
240          UA     100
             *

241          KK   CUB08
242          KM   COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
243          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
244          HC      4
             *
```

1 HEC-1 INPUT PAGE 7

```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

245          KK   RUB07   ROUTE   REACH
246          RS       2    STOR      -1
```

```
         247            RC   0.061   0.038   0.061     728  0.0247    0.00
         248            RX   802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
         249            RY   420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                        *

         250            KK   OFF15   BASIN
         251            BA   0.012
         252            LG    0.30    0.25    6.00    0.18       5
         253            UC   0.183   0.185
         254            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         255            UA     100
                        *

         256            KK  COFF15
         257            HC       2
                        *

         258            KK   RON15   ROUTE
         259            RS       1    FLOW
         260            RC   0.076   0.038   0.073     722  0.0194    0.00
         261            RX    7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
         262            RY  2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                        *

         263            KK    ON15   BASIN
         264            BA   0.006
         265            LG    0.13    0.25    6.00    0.27       1
         266            UC   0.479   0.766
         267            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         268            UA     100
                        *

         269            KK    ON05   BASIN
         270            BA   0.007
         271            LG    0.29    0.25    6.00    0.19       5
         272            UC   0.237   0.306
         273            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         274            UA     100
                        *

         275            KK      D1 STORAGE
         276            RS       1    STOR
         277            SV            0.03    0.07    0.09    0.10    0.12    0.14    0.16    0.18
         278            SE  2395.0 2396.00 2396.75 2397.00 2397.25 2397.50 2397.75 2398.00 2398.25
         279            SQ       0       0       1      10      28      50      76     106     139
                        *
1                                                     HEC-1 INPUT                                            PAGE  8

        LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

         280            KK    ON20   BASIN
         281            BA   0.002
         282            LG    0.27    0.25    6.00    0.18       4
         283            UC   0.178   0.250
         284            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         285            UA     100
                        *

         286            KK  CPON15 COMBINE
         287            HC       4
                        *

         288            KK   OFF05   BASIN
         289            BA   0.012
         290            LG    0.30    0.25    5.46    0.23       5
         291            UC   0.288   0.406
         292            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         293            UA     100
                        *

         294            KK   RON05   ROUTE
         295            RS       1    FLOW
         296            RC   0.076   0.038   0.076     698  0.0186    0.00
         297            RX    5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
         298            RY  2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                        *
         299            ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING            (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR          (<---) RETURN OF DIVERTED OR PUMPED FLOW

    66       F6C-6
                 V
                 V
    72       RF6C6
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    77         .          F6C-4
               .            .
               .            .
    83       CF6C4............
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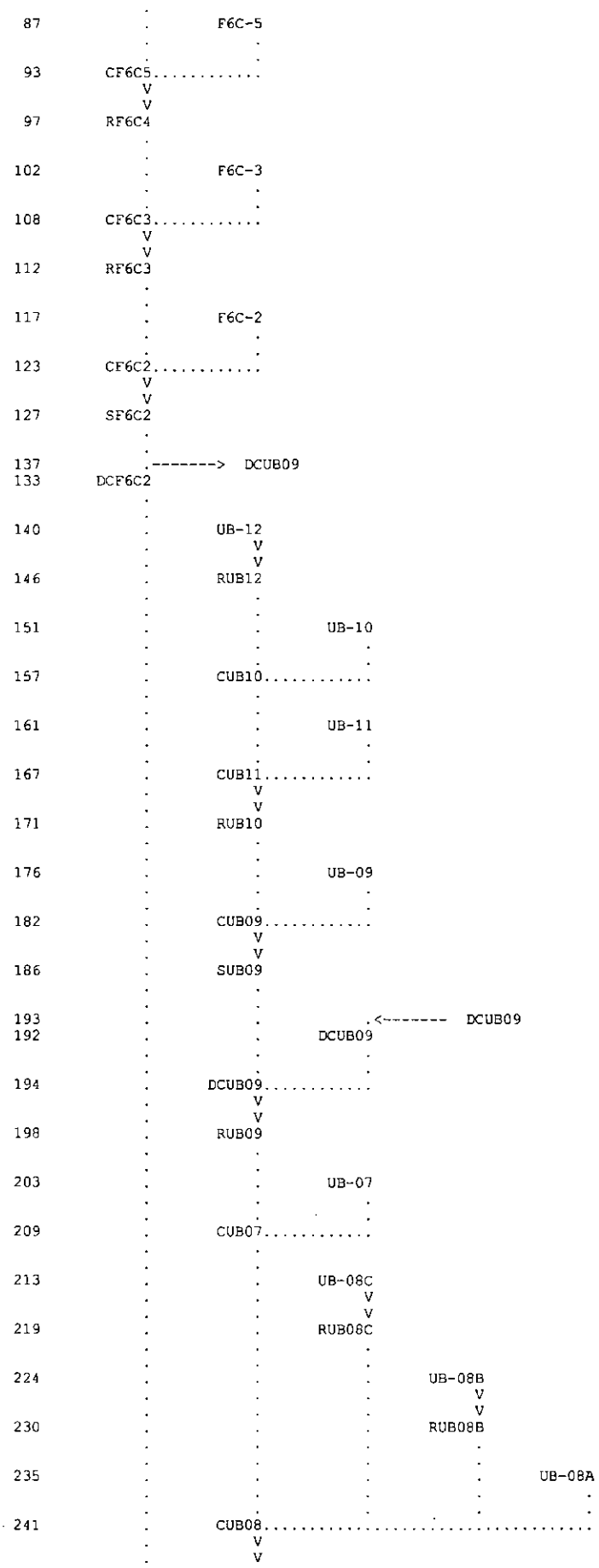
F6C-5
CF6C5
RF6C4
F6C-3
CF6C3
RF6C3
F6C-2
CF6C2
SF6C2
DCUB09
DCF6C2
UB-12
RUB12
UB-10
CUB10
UB-11
CUB11
RUB10
UB-09
CUB09
SUB09
DCUB09
DCUB09
RUB09
UB-07
CUB07
UB-08C
RUB08C
UB-08B
RUB08B
UB-08A
CUB08

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 245          .        RUB07
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              .          .
 250          .          .         OFF15
              .          .             .
              .          .             .
 256          .       COFF15............
              .          V
              .          V
 258          .        RON15
              .          .
              .          .
 263          .          .          ON15
              .          .             .
              .          .             .
 269          .          .             .          ON05
              .          .             .             V
              .          .             .             V
 275          .          .             .            D1
              .          .             .             .
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 280          .          .             .             .          ON20
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 286          .       CPON15....................................
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              .          .
 288          .          .         OFF05
              .          .             V
              .          .             V
 294          .          .         RON05

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
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1*****************************************                                        ****************************************
 *                                       *                                        *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                        *  U.S. ARMY CORPS OF ENGINEERS        *
 *              JUN  1998                *                                        *  HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.1               *                                        *       609 SECOND STREET              *
 *                                       *                                        *    DAVIS, CALIFORNIA 95616           *
 *  RUN DATE   01MAR18  TIME  09:12:18   *                                        *        (916) 756-1104                *
 *                                       *                                        *                                      *
 *****************************************                                        ****************************************
```

```
     Flood Control District of Maricopa County
     ESTATES AT HAYDEN PR - Estates at Hayden PR
     2 YEAR
     6 Hour  Storm
     Unit Hydrograph: Clark
     Storm: Multiple
     08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME:  NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

2-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
                        UPPER BOULDERS WASH (UB)
                        FAN 6C (F6C)
                        FAN 6A NORTH (F6AN)
                        FAN 6A SOULTH (F6AS)
                        FAN 6A (F6A)
                        UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
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52 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN          1  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     2    0  ENDING DATE
                    NDTIME       0919  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .02 HOURS
                     TOTAL TIME BASE   33.32 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

54 JD          INDEX STORM NO. 1
                      STRM       1.60  PRECIPITATION DEPTH
                      TRDA        .00  TRANSPOSITION DRAINAGE AREA

55 PI            PRECIPITATION PATTERN
                    .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
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58 JD          INDEX STORM NO. 2
                      STRM       1.59  PRECIPITATION DEPTH
                      TRDA        .50  TRANSPOSITION DRAINAGE AREA

59 PI            PRECIPITATION PATTERN
                    .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
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 62 JD         INDEX STORM NO. 3
                    STRM       1.56  PRECIPITATION DEPTH
                    TRDA       2.80  TRANSPOSITION DRAINAGE AREA

 63 PI           PRECIPITATION PATTERN
                          .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                          .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	126.	4.93	58.	15.	11.	.89		
+	ROUTED TO	RF6C6	126.	5.00	58.	15.	11.	.89		
+	HYDROGRAPH AT	F6C-4	17.	4.08	2.	1.	0.	.03		
+	2 COMBINED AT	CF6C4	127.	4.97	59.	15.	11.	.91		
+	HYDROGRAPH AT	F6C-5	44.	4.33	12.	3.	2.	.14		
+	2 COMBINED AT	CF6C5	150.	4.83	68.	18.	13.	1.05		
+	ROUTED TO	RF6C4	148.	5.07	68.	18.	13.	1.05		
+	HYDROGRAPH AT	F6C-3	24.	4.17	4.	1.	1.	.05		
+	2 COMBINED AT	CF6C3	153.	5.03	71.	19.	13.	1.10		
+	ROUTED TO	RF6C3	151.	5.23	71.	19.	13.	1.10		

+	HYDROGRAPH AT	F6C-2	74.	4.20	9.	2.	2.	.09
+	2 COMBINED AT	CF6C2	155.	5.17	77.	20.	15.	1.18
+	ROUTED TO	SF6C2	155.	5.17	77.	20.	15.	1.18
+	DIVERSION TO	DCUB09	0.	.00	0.	0.	0.	1.18
+	HYDROGRAPH AT	DCF6C2	155.	5.17	77.	20.	15.	1.18
+	HYDROGRAPH AT	UB-12	38.	4.20	6.	1.	1.	.06
+	ROUTED TO	RUB12	26.	4.83	6.	1.	1.	.06
+	HYDROGRAPH AT	UB-10	51.	4.28	9.	2.	2.	.09
+	2 COMBINED AT	CUB10	59.	4.32	15.	4.	3.	.15
+	HYDROGRAPH AT	UB-11	133.	4.28	22.	6.	4.	.21
+	2 COMBINED AT	CUB11	191.	4.28	37.	9.	7.	.36
+	ROUTED TO	RUB10	178.	4.48	37.	9.	7.	.36
+	HYDROGRAPH AT	UB-09	213.	4.20	35.	9.	6.	.34
+	2 COMBINED AT	CUB09	322.	4.40	69.	17.	13.	.70
+	ROUTED TO	SUB09	322.	4.40	69.	17.	13.	.70
+	HYDROGRAPH AT	DCUB09	0.	.00	0.	0.	0.	1.18
+	2 COMBINED AT	DCUB09	322.	4.40	69.	17.	13.	.70
+	ROUTED TO	RUB09	316.	4.53	69.	17.	13.	.70
+	HYDROGRAPH AT	UB-07	128.	4.30	18.	5.	3.	.19
+	2 COMBINED AT	CUB07	393.	4.48	85.	22.	16.	.89
+	HYDROGRAPH AT	UB-08C	10.	4.08	1.	0.	0.	.01
+	ROUTED TO	RUB08C	6.	4.80	1.	0.	0.	.01
+	HYDROGRAPH AT	UB-08B	37.	4.12	4.	1.	1.	.03
+	ROUTED TO	RUB08B	20.	4.70	4.	1.	1.	.03
+	HYDROGRAPH AT	UB-08A	47.	4.27	10.	3.	2.	.12
+	4 COMBINED AT	CUB08	428.	4.50	97.	25.	18.	1.06
+	ROUTED TO	RUB07	427.	4.53	97.	25.	18.	1.06
+	HYDROGRAPH AT	OFF15	11.	4.10	1.	0.	0.	.01
+	2 COMBINED AT	COFF15	427.	4.53	97.	25.	18.	1.07
+	ROUTED TO	RON15	426.	4.55	97.	25.	18.	1.07
+	HYDROGRAPH AT	ON15	2.	4.33	0.	0.	0.	.01
+	HYDROGRAPH AT	ON05	5.	4.08	0.	0.	0.	.01

	ROUTED TO						
+		D1	4.	4.18	0.	0.	0.	.01
	HYDROGRAPH AT						
+		ON20	2.	4.07	0.	0.	0.	.00
	4 COMBINED AT						
+		CPON15	428.	4.55	97.	25.	18.	1.08
	HYDROGRAPH AT						
+		OFF05	7.	4.18	1.	0.	0.	.01
	ROUTED TO						
+		RON05	6.	4.23	1.	0.	0.	.01

*** NORMAL END OF HEC-1 ***

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   01MAR18  TIME  09:12:30   *
*                                       *
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Proposed 10-year Storm

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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
            1       ID        Flood Control District of Maricopa County
            2       ID        ESTATES AT HAYDEN PR - Estates at Hayden PR
            3       ID        10 YEAR
            4       ID        6 Hour  Storm
            5       ID        Unit Hydrograph: Clark
            6       ID        Storm: Multiple
            7       ID        08/01/2017
            8       ID
            9       ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
           10       ID   MAY 2002
           11       ID
           12       ID   FILE NAME:  NS.DAT
           13       ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
           14       ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
           15       ID
           16       ID   10-YEAR, 6-HOUR FREQUENCY
           17       ID
           18       ID   METHODOLOGY:
           19       ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
           20       ID   VERSION 4.1
           21       ID   MULTIPLE STORMS
           22       ID   CLARK UNIT HYDROGRAPH
           23       ID   GREEN AMPT LOSS METHOD
           24       ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
           25       ID
           26       ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
           27       ID
           28       ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
           29       ID                            UPPER BOULDERS WASH (UB)
           30       ID                            FAN 6C (F6C)
           31       ID                            FAN 6A NORTH (F6AN)
           32       ID                            FAN 6A SOULTH (F6AS)
           33       ID                            FAN 6A (F6A)
           34       ID                            UPPER FAN 5 (UF5)
           35       ID
           36       ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
           37       ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
           38       ID
           39       ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
           40       ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
           41       ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
           42       ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
           43       ID
           44       ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
           45       ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
           46       ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
           47       ID
           48       ID
           49       ID
           50       ID
                    *DIAGRAM
           51       IT       1                    2000
           52       IO       5
           53       IN      15
                    *
```

1 HEC-1 INPUT PAGE 2

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
```

```
   54          JD   2.370  0.0001
   55          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
   56          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
   57          PC   0.962   0.972   0.983   0.991   1.000
   58          JD   2.356  0.5000
   59          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
   60          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
   61          PC   0.962   0.972   0.983   0.991   1.000
   62          JD   2.311     2.8
   63          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
   64          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
   65          PC   0.950   0.963   0.975   0.988   1.000
               *
               *  END STAGE COACH PASS AND BEGIN FAN 6C
               *

   66          KK   F6C-6   BASIN
   67          BA   0.888
   68          LG    0.33    0.25    5.40    0.25      27
   69          UC   0.600   0.670
   70          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   71          UA     100
               *

   72          KK   RF6C6   ROUTE   REACH
   73          RS       2    STOR      -1
   74          RC   0.050   0.035   0.050    1780  0.0185    0.00
   75          RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
   76          RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
               *

   77          KK   F6C-4   BASIN
   78          BA   0.025
   79          LG    0.31    0.25    3.95    0.57      43
   80          UC   0.190   0.260
   81          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   82          UA     100
               *

   83          KK   CF6C4
   84          KM   COMBINE F6C-4, AND RF6C6
   85          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
   86          HC       2
               *

   87          KK   F6C-5   BASIN
   88          BA   0.137
   89          LG    0.32    0.25    3.95    0.58      42
   90          UC   0.400   0.630
   91          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
   92          UA     100
               *
1                                         HEC-1 INPUT                                             PAGE  3

        LINE   ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


   93          KK   CF6C5
   94          KM   COMBINE CF6C4, AND F6C-5
   95          KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
   96          HC       2
               *

   97          KK   RF6C4   ROUTE   REACH
   98          RS       3    STOR      -1
   99          RC   0.050   0.035   0.050    2707  0.0070    0.00
  100          RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
  101          RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
               *

  102          KK   F6C-3   BASIN
  103          BA   0.046
  104          LG    0.33    0.25    4.20    0.53      43
  105          UC   0.270   0.340
  106          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  107          UA     100
               *

  108          KK   CF6C3
  109          KM   COMBINE F6C-3, AND RF6C4
  110          KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
  111          HC       2
               *

  112          KK   RF6C3   ROUTE   REACH
  113          RS       4    STOR      -1
  114          RC   0.058   0.038   0.058    3172  0.0284    0.00
  115          RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
  116          RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
               *

  117          KK   F6C-2   BASIN
  118          BA   0.088
  119          LG    0.29    0.15    7.30    0.13      34
  120          UC   0.240   0.260
```

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 121          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 122          UA     100
              *

 123          KK   CF6C2
 124          KM   COMBINE F6C-2, AND RF6C3
 125          KM   AT PIMA ROAD FLOW SPLIT.
 126          HC       2
              *

 127          KK   SF6C2
 128          RS       1    FLOW       1
 129          SA       0    0.01
 130          SE    2502    2512
 131          SQ       0   10000
 132          SE    2502    2512
              *
1                                        HEC-1 INPUT                                        PAGE  4

       LINE   ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 133          KK  DCF6C2
 134          KM   TOTAL FLOW=DI
 135          KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
 136          KM   DIVERTED FLOW=DCUB09 (DQ)
 137          DT  DCUB09
 138          DI       0     248     969    1174    1321    1369    1517
 139          DQ       0       0       0       7      18      28      37
              *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
              *

 140          KK   UB-12   BASIN
 141          BA   0.059
 142          LG    0.30    0.25    3.95    0.56      46
 143          UC   0.230   0.290
 144          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 145          UA     100
              *

 146          KK   RUB12   ROUTE   REACH
 147          RS       6    STOR      -1
 148          RC   0.056   0.044   0.056    5388  0.0182    0.00
 149          RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
 150          RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
              *

 151          KK   UB-10   BASIN
 152          BA   0.094
 153          LG    0.28    0.25    4.15    0.48      47
 154          UC   0.300   0.400
 155          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 156          UA     100
              *

 157          KK   CUB10
 158          KM   COMBINE UB-10, AND RUB12
 159          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 160          HC       2
              *

 161          KK   UB-11   BASIN
 162          BA   0.206
 163          LG    0.27    0.25    4.10    0.54      54
 164          UC   0.310   0.320
 165          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 166          UA     100
              *

 167          KK   CUB11
 168          KM   COMBINE CUB10, AND UB-11
 169          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 170          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE  5

       LINE   ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 171          KK   RUB10   ROUTE   REACH
 172          RS       4    STOR      -1
 173          RC   0.056   0.044   0.056    3907  0.0179    0.00
 174          RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
 175          RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
              *

 176          KK   UB-09   BASIN
 177          BA   0.342
 178          LG    0.28    0.23    6.20    0.20      41
 179          UC   0.350   0.320
 180          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 181          UA     100
              *

 182          KK   CUB09
 183          KM   COMBINE UB-09, AND RUB10
```

```
 184          KM    AT PIMA ROAD FLOW SPLIT.
 185          HC       2
              *

 186          KK    SUB09
 187          RS       1     FLOW       1
 188          SA       0     0.01
 189          SE    2502     2520
 190          SQ       0    10000
 191          SE    2502     2520
              *

 192          KK   DCUB09
 193          DR   DCUB09

 194          KK   DCUB09
 195          KM    COMBINE DCUB09, AND SUB09
 196          KM    FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
 197          HC       2
              *

 198          KK    RUB09    ROUTE    REACH
 199          RS       5     STOR      -1
 200          RC    0.061    0.038    0.061     4450  0.0187     0.00
 201          RX    865.9    913.3    986.7    990.5  1009.0   1014.7   1037.1   1056.8
 202          RY    492.0    489.0    488.0    486.0   486.0    488.0    490.0    492.0
              *

 203          KK    UB-07    BASIN
 204          BA    0.191
 205          LG     0.30     0.15     8.80     0.06      16
 206          UC    0.320    0.340
 207          UA        0      3.0      5.0      8.0    12.0     20.0     43.0     75.0     90.0     96.0
 208          UA      100
              *
1                                        HEC-1 INPUT                                                     PAGE  6

      LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 209          KK    CUB07
 210          KM    COMBINE UB-07, AND RUB09
 211          KM    CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
 212          HC       2
              *

 213          KK   UB-08C    BASIN
 214          BA    0.010
 215          LG     0.25     0.25     4.00     0.55      55
 216          UC    0.130    0.170
 217          UA        0      3.0      5.0      8.0    12.0     20.0     43.0     75.0     90.0     96.0
 218          UA      100
              *

 219          KK   RUB08C    ROUTE    REACH
 220          RS        7     STOR      -1
 221          RC    0.061    0.038    0.061     5952  0.0190     0.00
 222          RX    975.3    981.7    986.9    991.0  1009.2   1073.1   1118.9   1137.7
 223          RY    498.0    496.0    494.0    492.0   492.0    494.0    496.0    498.0
              *

 224          KK   UB-08B    BASIN
 225          BA    0.033
 226          LG     0.25     0.17     6.80     0.15      42
 227          UC    0.170    0.180
 228          UA        0      3.0      5.0      8.0    12.0     20.0     43.0     75.0     90.0     96.0
 229          UA      100
              *

 230          KK   RUB08B    ROUTE    REACH
 231          RS        7     STOR      -1
 232          RC    0.061    0.038    0.061     6656  0.0173     0.00
 233          RX    975.3    981.7    986.9    991.0  1009.2   1073.1   1118.9   1137.7
 234          RY    498.0    496.0    494.0    492.0   492.0    494.0    496.0    498.0
              *

 235          KK   UB-08A    BASIN
 236          BA    0.121
 237          LG     0.30     0.25     5.70     0.21      26
 238          UC    0.360    0.500
 239          UA        0      5.0     16.0     30.0    65.0     77.0     84.0     90.0     94.0     97.0
 240          UA      100
              *

 241          KK    CUB08
 242          KM    COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
 243          KM    CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
 244          HC       4
              *
1                                        HEC-1 INPUT                                                     PAGE  7

      LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 245          KK    RUB07    ROUTE    REACH
 246          RS        2     STOR      -1
```

```
         247            RC   0.061   0.038   0.061     728  0.0247    0.00
         248            RX   802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
         249            RY   420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                        *

         250            KK   OFF15   BASIN
         251            BA   0.012
         252            LG    0.30    0.25    6.00    0.18       5
         253            UC   0.143   0.141
         254            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         255            UA     100
                        *

         256            KK  COFF15
         257            HC       2
                        *

         258            KK   RON15   ROUTE
         259            RS       1    FLOW
         260            RC   0.076   0.038   0.073     722  0.0194    0.00
         261            RX    7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
         262            RY  2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                        *

         263            KK    ON15   BASIN
         264            BA   0.006
         265            LG    0.13    0.25    6.00    0.27       1
         266            UC   0.374   0.582
         267            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         268            UA     100
                        *

         269            KK    ON05   BASIN
         270            BA   0.007
         271            LG    0.29    0.25    6.00    0.19       5
         272            UC   0.185   0.233
         273            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         274            UA     100
                        *

         275            KK      D1 STORAGE
         276            RS       1    STOR
         277            SV            0.03    0.07    0.09    0.10    0.12    0.14    0.16    0.18
         278            SE  2395.0 2396.00 2396.75 2397.00 2397.25 2397.50 2397.75 2398.00 2398.25
         279            SQ       0       0       1      10      28      50      76     106     139
                        *
1                                                          HEC-1 INPUT                                             PAGE  8

        LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


         280            KK    ON20   BASIN
         281            BA   0.002
         282            LG    0.27    0.25    6.00    0.18       4
         283            UC   0.139   0.190
         284            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
         285            UA     100
                        *

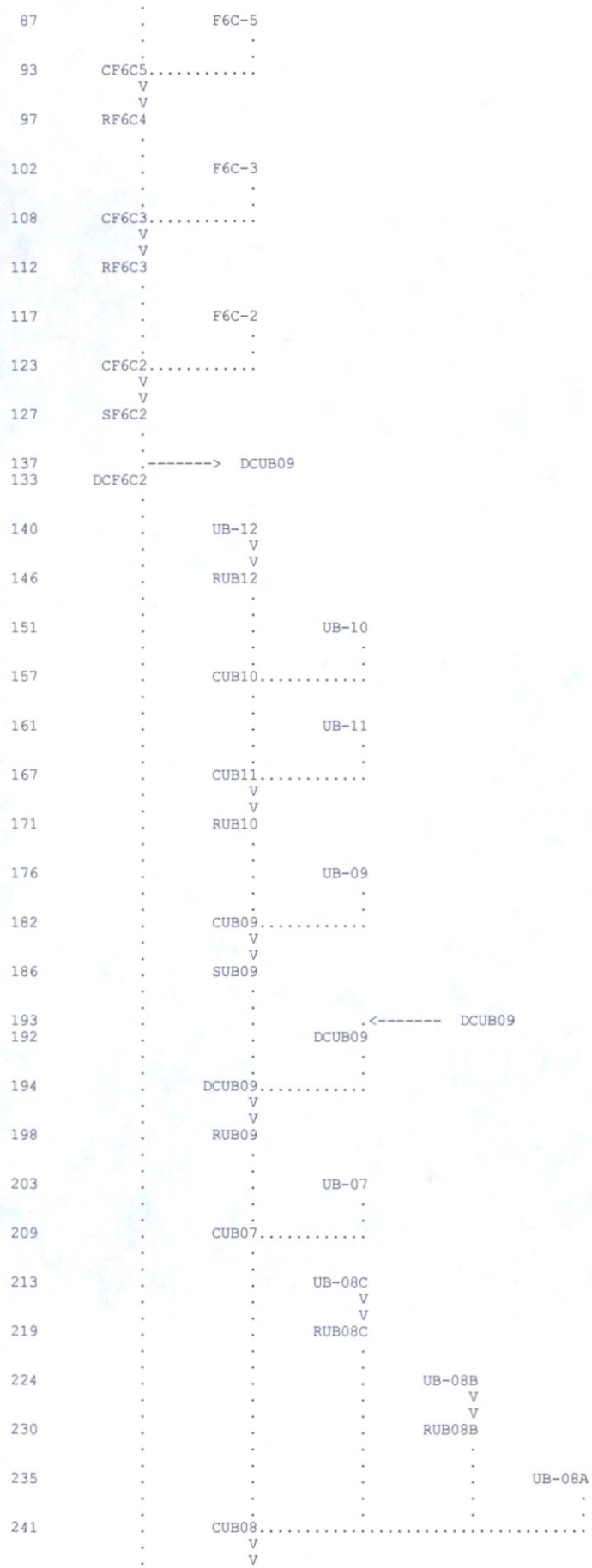
         286            KK  CPON15 COMBINE
         287            HC       4
                        *

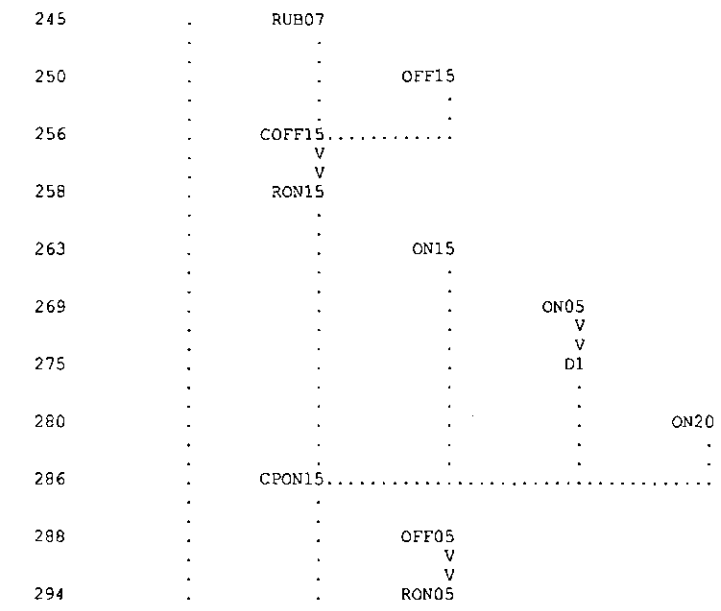
         288            KK   OFF05   BASIN
         289            BA   0.012
         290            LG    0.30    0.25    5.46    0.23       5
         291            UC   0.226   0.309
         292            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         293            UA     100
                        *

         294            KK   RON05   ROUTE
         295            RS       1    FLOW
         296            RC   0.076   0.038   0.076     698  0.0186    0.00
         297            RX    5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
         298            RY  2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                        *
         299            ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   66        F6C-6
                 V
                 V
   72        RF6C6
                 .
                 .
   77            .         F6C-4
                 .             .
                 .             .
   83        CF6C4.............
                 .
```


87 F6C-5
93 CF6C5
97 RF6C4
102 F6C-3
108 CF6C3
112 RF6C3
117 F6C-2
123 CF6C2
127 SF6C2
137 DCUB09
133 DCF6C2
140 UB-12
146 RUB12
151 UB-10
157 CUB10
161 UB-11
167 CUB11
171 RUB10
176 UB-09
182 CUB09
186 SUB09
193 DCUB09
192 DCUB09
194 DCUB09
198 RUB09
203 UB-07
209 CUB07
213 UB-08C
219 RUB08C
224 UB-08B
230 RUB08B
235 UB-08A
241 CUB08



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   01MAR18  TIME  09:12:30   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

Flood Control District of Maricopa County
ESTATES AT HAYDEN PR - Estates at Hayden PR
10 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME: NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

10-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
UPPER BOULDERS WASH (UB)
FAN 6C (F6C)
FAN 6A NORTH (F6AN)
FAN 6A SOULTH (F6AS)
FAN 6A (F6A)
UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN NUMBER. I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND CONCENTRATION POINT NUMBER. CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB BASIN THE CONCENTRATION POINT IS LOCATED IN. I.E. CONCENTRATION POINT IN SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS. IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.

```
52 IO         OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                     NMIN           1  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1    0  STARTING DATE
                    ITIME        0000  STARTING TIME
                       NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2    0  ENDING DATE
                   NDTIME        0919  ENDING TIME
                    ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     .02 HOURS
                     TOTAL TIME BASE   33.32 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

54 JD         INDEX STORM NO. 1
                    STRM         2.37  PRECIPITATION DEPTH
                    TRDA          .00  TRANSPOSITION DRAINAGE AREA

55 PI           PRECIPITATION PATTERN
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
                  .03       .03       .03       .03       .03       .03       .03       .03       .03       .03
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

58 JD         INDEX STORM NO. 2
                    STRM         2.36  PRECIPITATION DEPTH
                    TRDA          .50  TRANSPOSITION DRAINAGE AREA

59 PI           PRECIPITATION PATTERN
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
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                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .03       .03       .03       .03       .03
                .03       .03       .03       .03       .03       .03       .03       .03       .03       .03
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 62 JD          INDEX STORM NO. 3
                  STRM      2.31   PRECIPITATION DEPTH
                  TRDA      2.80   TRANSPOSITION DRAINAGE AREA

 63 PI            PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                .02       .02       .02       .02       .02       .02       .02       .02       .02       .02
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
1
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	558.	4.30	119.	30.	22.	.89		
+	ROUTED TO	RF6C6	556.	4.35	119.	30.	22.	.89		
+	HYDROGRAPH AT	F6C-4	36.	4.07	4.	1.	1.	.03		
+	2 COMBINED AT	CF6C4	569.	4.33	122.	31.	22.	.91		
+	HYDROGRAPH AT	F6C-5	106.	4.18	20.	5.	4.	.14		
+	2 COMBINED AT	CF6C5	637.	4.33	139.	35.	25.	1.05		
+	ROUTED TO	RF6C4	604.	4.58	139.	35.	25.	1.05		
+	HYDROGRAPH AT	F6C-3	55.	4.10	7.	2.	1.	.05		
+	2 COMBINED AT	CF6C3	619.	4.57	145.	37.	27.	1.10		
+	ROUTED TO	RF6C3	612.	4.70	145.	37.	27.	1.10		

+	HYDROGRAPH AT	F6C-2	145.	4.13	15.	4.	3.	.09
+	2 COMBINED AT	CF6C2	636.	4.67	158.	40.	29.	1.18
+	ROUTED TO	SF6C2	636.	4.67	158.	40.	29.	1.18
+	DIVERSION TO	DCUB09	0.	.00	0.	0.	0.	1.18
+	HYDROGRAPH AT	DCF6C2	636.	4.67	158.	40.	29.	1.18
+	HYDROGRAPH AT	UB-12	81.	4.13	9.	2.	2.	.06
+	ROUTED TO	RUB12	53.	4.57	9.	2.	2.	.06
+	HYDROGRAPH AT	UB-10	109.	4.20	15.	4.	3.	.09
+	2 COMBINED AT	CUB10	121.	4.20	25.	6.	4.	.15
+	HYDROGRAPH AT	UB-11	275.	4.20	36.	9.	6.	.21
+	2 COMBINED AT	CUB11	396.	4.20	60.	15.	11.	.36
+	ROUTED TO	RUB10	367.	4.35	60.	15.	11.	.36
+	HYDROGRAPH AT	UB-09	458.	4.13	58.	15.	11.	.34
+	2 COMBINED AT	CUB09	673.	4.27	115.	29.	21.	.70
+	ROUTED TO	SUB09	673.	4.27	115.	29.	21.	.70
+	HYDROGRAPH AT	DCUB09	0.	.00	0.	0.	0.	1.18
+	2 COMBINED AT	DCUB09	673.	4.27	115.	29.	21.	.70
+	ROUTED TO	RUB09	646.	4.45	115.	29.	21.	.70
+	HYDROGRAPH AT	UB-07	273.	4.20	32.	8.	6.	.19
+	2 COMBINED AT	CUB07	789.	4.40	144.	36.	26.	.89
+	HYDROGRAPH AT	UB-08C	19.	4.07	2.	0.	0.	.01
+	ROUTED TO	RUB08C	10.	4.75	2.	0.	0.	.01
+	HYDROGRAPH AT	UB-08B	65.	4.08	6.	2.	1.	.03
+	ROUTED TO	RUB08B	41.	4.57	6.	2.	1.	.03
+	HYDROGRAPH AT	UB-08A	116.	4.15	18.	4.	3.	.12
+	4 COMBINED AT	CUB08	876.	4.42	167.	42.	30.	1.06
+	ROUTED TO	RUB07	875.	4.43	167.	42.	30.	1.06
+	HYDROGRAPH AT	OFF15	23.	4.07	1.	0.	0.	.01
+	2 COMBINED AT	COFF15	877.	4.43	168.	42.	31.	1.07
+	ROUTED TO	RON15	875.	4.47	168.	42.	31.	1.07
+	HYDROGRAPH AT	ON15	5.	4.25	1.	0.	0.	.01
+	HYDROGRAPH AT	ON05	11.	4.05	1.	0.	0.	.01

	ROUTED TO						
+		D1	11.	4.07	1.	0.	0.	.01
	HYDROGRAPH AT						
+		ON20	3.	4.03	0.	0.	0.	.00
	4 COMBINED AT						
+		CPON15	879.	4.45	169.	43.	31.	1.08
	HYDROGRAPH AT						
+		OFF05	15.	4.13	1.	0.	0.	.01
	ROUTED TO						
+		RON05	14.	4.17	1.	0.	0.	.01

*** NORMAL END OF HEC-1 ***

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1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   01MAR18  TIME  09:12:43   *
 *                                       *
 *****************************************
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Proposed 100-year Storm

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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID        Flood Control District of Maricopa County
   2          ID        ESTATES AT HAYDEN PR - Estates at Hayden PR
   3          ID        100 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        08/01/2017
   8          ID
   9          ID   NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
  10          ID   MAY 2002
  11          ID
  12          ID   FILE NAME:  NS.DAT
  13          ID   THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
  14          ID   THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.
  15          ID
  16          ID   100-YEAR, 6-HOUR FREQUENCY
  17          ID
  18          ID   METHODOLOGY:
  19          ID   THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
  20          ID   VERSION 4.1
  21          ID   MULTIPLE STORMS
  22          ID   CLARK UNIT HYDROGRAPH
  23          ID   GREEN AMPT LOSS METHOD
  24          ID   NORMAL DEPTH BASIN AND REACH ROUTING METHOD
  25          ID
  26          ID   LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS
  27          ID
  28          ID   PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
  29          ID                           UPPER BOULDERS WASH (UB)
  30          ID                           FAN 6C (F6C)
  31          ID                           FAN 6A NORTH (F6AN)
  32          ID                           FAN 6A SOULTH (F6AS)
  33          ID                           FAN 6A (F6A)
  34          ID                           UPPER FAN 5 (UF5)
  35          ID
  36          ID   PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN
  37          ID   NUMBER.  I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.
  38          ID
  39          ID   PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND
  40          ID   CONCENTRATION POINT NUMBER.  CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB
  41          ID   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
  42          ID   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.
  43          ID
  44          ID   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
  45          ID   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
  46          ID   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.
  47          ID
  48          ID
  49          ID
  50          ID
              *DIAGRAM
  51          IT       1                   2000
  52          IO       5
  53          IN      15
              *
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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  54        JD    3.50    0.01
  55        PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  56        PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  57        PC   0.962   0.972   0.983   0.991   1.000
  58        JD   3.477    0.50
  59        JD   3.412    2.80
  60        PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  61        PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
  62        PC   0.950   0.963   0.975   0.988   1.000
  63        JD   3.227    16.0
  64        PC   0.000   0.015   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
  65        PC   0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
  66        PC   0.946   0.960   0.973   0.987   1.000
  67        JD   2.842    90.0
  68        PC   0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
  69        PC   0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
  70        PC   0.927   0.945   0.964   0.982   1.000
  71        JD   1.995   500.0
  72        PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
  73        PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
  74        PC   0.907   0.930   0.954   0.977   1.000
            *DIAGRAM
            *  END STAGE COACH PASS AND BEGIN FAN 6C
            *

  75        KK   F6C-6   BASIN
  76        BA   0.888
  77        LG    0.33    0.25    5.40    0.25      27
  78        UC   0.438   0.469
  79        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  80        UA     100
            *

  81        KK   RF6C6   ROUTE   REACH
  82        RS       2    STOR      -1
  83        RC   0.050   0.035   0.050    1780  0.0185    0.00
  84        RX   864.4   924.1   983.8   985.5  1015.1  1025.5  1034.0  1042.4
  85        RY   626.0   625.0   624.0   622.0   622.0   624.0   625.0   626.0
            *

  86        KK   F6C-4   BASIN
  87        BA   0.025
  88        LG    0.31    0.25    3.95    0.57      43
  89        UC   0.158   0.217
  90        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  91        UA     100
            *

  92        KK   CF6C4
  93        KM   COMBINE F6C-4, AND RF6C6
  94        KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
  95        HC       2
            *
1                                        HEC-1 INPUT                                          PAGE  3

 LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  96        KK   F6C-5   BASIN
  97        BA   0.137
  98        LG    0.32    0.25    3.95    0.58      42
  99        UC   0.300   0.464
 100        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 101        UA     100
            *

 102        KK   CF6C5
 103        KM   COMBINE CF6C4, AND F6C-5
 104        KM   CONFLUENCE WITHIN LENGEN TRAIL LOCATED IN SECTION 6 OF T5NR5E.
 105        HC       2
            *

 106        KK   RF6C4   ROUTE   REACH
 107        RS       3    STOR      -1
 108        RC   0.050   0.035   0.050    2707  0.0070    0.00
 109        RX   697.3   735.7   986.9   990.6  1012.9  1106.1  1185.2  1250.7
 110        RY   596.0   592.0   592.0   590.0   590.0   592.0   594.0   596.0
            *

 111        KK   F6C-3   BASIN
 112        BA   0.046
 113        LG    0.33    0.25    4.20    0.53      43
 114        UC   0.221   0.278
 115        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 116        UA     100
            *

 117        KK   CF6C3
 118        KM   COMBINE F6C-3, AND RF6C4
 119        KM   EXITING LEGEND TRAIL ALONG WEST BOUNDARY.
 120        HC       2
            *

 121        KK   RF6C3   ROUTE   REACH
 122        RS       4    STOR      -1
```

```
 123          RC   0.058   0.038   0.058    3172  0.0284    0.00
 124          RX   731.4   760.4   943.4   993.9  1019.8  1057.8  1074.8  1160.5
 125          RY   552.0   550.0   548.0   548.0   548.0   550.0   550.0   552.0
              *

 126          KK   F6C-2   BASIN
 127          BA   0.088
 128          LG    0.29    0.15    7.30    0.13      34
 129          UC   0.200   0.214
 130          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 131          UA     100
              *
1                                        HEC-1 INPUT                                        PAGE  4

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 132          KK   CF6C2
 133          KM   COMBINE F6C-2, AND RF6C3
 134          KM   AT PIMA ROAD FLOW SPLIT.
 135          HC       2
              *

 136          KK   SF6C2
 137          RS       1    FLOW       1
 138          SA       0    0.01
 139          SE    2502    2512
 140          SQ       0   10000
 141          SE    2502    2512
              *

 142          KK  DCF6C2
 143          KM   TOTAL FLOW=DI
 144          KM   CONTINUING FLOW=DCF6C2 (DI-DQ)
 145          KM   DIVERTED FLOW=DCUB09 (DQ)
 146          DT  DCUB09
 147          DI       0     248     969    1174    1321    1369    1517
 148          DQ       0       0       0       7      18      28      37
              *  END FAN 6C AND BEGIN UPPER BOULDERS WASH
              *

 149          KK   UB-12   BASIN
 150          BA   0.059
 151          LG    0.30    0.25    3.95    0.56      46
 152          UC   0.192   0.239
 153          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 154          UA     100
              *

 155          KK   RUB12   ROUTE   REACH
 156          RS       6    STOR      -1
 157          RC   0.056   0.044   0.056    5388  0.0182    0.00
 158          RX   849.6   861.9   926.8   975.3  1017.2  1046.5  1060.3  1074.7
 159          RY   650.0   648.0   648.0   642.0   642.0   646.0   648.0   650.0
              *

 160          KK   UB-10   BASIN
 161          BA   0.094
 162          LG    0.28    0.25    4.15    0.48      47
 163          UC   0.238   0.314
 164          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 165          UA     100
              *

 166          KK   CUB10
 167          KM   COMBINE UB-10, AND RUB12
 168          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 169          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE  5

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 170          KK   UB-11   BASIN
 171          BA   0.206
 172          LG    0.27    0.25    4.10    0.54      54
 173          UC   0.246   0.246
 174          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 175          UA     100
              *

 176          KK   CUB11
 177          KM   COMBINE CUB10, AND UB-11
 178          KM   EXITING LEGEND TRAIL ON NORTHWEST CORNER.
 179          HC       2
              *

 180          KK   RUB10   ROUTE   REACH
 181          RS       4    STOR      -1
 182          RC   0.056   0.044   0.056    3907  0.0179    0.00
 183          RX   810.4   844.8   959.8   972.8  1005.9  1035.5  1109.8  1164.3
 184          RY   564.0   562.0   560.0   556.0   556.0   560.0   560.0   562.0
              *

 185          KK   UB-09   BASIN
```

```
186          BA   0.342
187          LG    0.28    0.23    6.20    0.20      41
188          UC   0.279   0.248
189          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
190          UA     100
             *

191          KK   CUB09
192          KM   COMBINE UB-09, AND RUB10
193          KM   AT PIMA ROAD FLOW SPLIT.
194          HC       2
             *

195          KK   SUB09
196          RS       1    FLOW       1
197          SA       0    0.01
198          SE    2502    2520
199          SQ       0   10000
200          SE    2502    2520
             *

201          KK  DCUB09
202          DR  DCUB09

203          KK  DCUB09
204          KM   COMBINE DCUB09, AND SUB09
205          KM   FLOW SPLIT WEST OF PIMA ROAD FROM FAN 6C TO UPPER BOULDERS
206          HC       2
             *
1                                        HEC-1 INPUT                                    PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

207          KK   RUB09   ROUTE   REACH
208          RS       5    STOR      -1
209          RC   0.061   0.038   0.061    4450  0.0187    0.00
210          RX   865.9   913.3   986.7   990.5  1009.0  1014.7  1037.1  1056.8
211          RY   492.0   489.0   488.0   486.0   486.0   488.0   490.0   492.0
             *

212          KK   UB-07   BASIN
213          BA   0.191
214          LG    0.30    0.15    8.80    0.06      16
215          UC   0.250   0.257
216          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
217          UA     100
             *

218          KK   CUB07
219          KM   COMBINE UB-07, AND RUB09
220          KM   CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
221          HC       2
             *

222          KK  UB-08C   BASIN
223          BA   0.010
224          LG    0.25    0.25    4.00    0.55      55
225          UC   0.113   0.143
226          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
227          UA     100
             *

228          KK  RUB08C   ROUTE   REACH
229          RS       7    STOR      -1
230          RC   0.061   0.038   0.061    5952  0.0190    0.00
231          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
232          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *

233          KK  UB-08B   BASIN
234          BA   0.033
235          LG    0.25    0.17    6.80    0.15      42
236          UC   0.142   0.147
237          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
238          UA     100
             *

239          KK  RUB08B   ROUTE   REACH
240          RS       7    STOR      -1
241          RC   0.061   0.038   0.061    6656  0.0173    0.00
242          RX   975.3   981.7   986.9   991.0  1009.2  1073.1  1118.9  1137.7
243          RY   498.0   496.0   494.0   492.0   492.0   494.0   496.0   498.0
             *
1                                        HEC-1 INPUT                                    PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

244          KK  UB-08A   BASIN
245          BA   0.121
246          LG    0.30    0.25    5.70    0.21      26
247          UC   0.275   0.371
248          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
249          UA     100
             *
```

```
 250            KK    CUB08
 251            KM    COMBINE UB-08A, RUB08B, RUB08C, AND CUB07
 252            KM    CONFLUENCE POINT SOUTH OF BLACK MOUNTAIN ROAD AND EAST OF HAYDEN ROAD.
 253            HC        4
                 *

 254            KK    RUB07   ROUTE   REACH
 255            RS        2    STOR      -1
 256            RC    0.061   0.038   0.061     728  0.0247    0.00
 257            RX    802.8   896.1   939.4   977.6  1023.6  1036.2  1071.8  1144.8
 258            RY    420.0   415.1   416.5   416.0   416.0   418.0   416.4   420.0
                 *

 259            KK    OFF15   BASIN
 260            BA    0.012
 261            LG     0.30    0.25    6.00    0.18       5
 262            UC    0.114   0.109
 263            UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 264            UA      100
                 *

 265            KK   COFF15
 266            HC        2
                 *

 267            KK    RON15   ROUTE
 268            RS        1    FLOW
 269            RC    0.076   0.038   0.073     722  0.0194    0.00
 270            RX     7.20   66.20  275.00  300.30  349.70  364.10  401.50  491.90
 271            RY   2409.2 2404.24 2402.39 2401.27 2401.28 2402.98 2403.48 2410.00
                 *

 272            KK     ON15   BASIN
 273            BA    0.006
 274            LG     0.13    0.25    6.00    0.27       1
 275            UC    0.294   0.446
 276            UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 277            UA      100
                 *

 278            KK     ON05   BASIN
 279            BA    0.007
 280            LG     0.29    0.25    6.00    0.19       5
 281            UC    0.147   0.181
 282            UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 283            UA      100
                 *
1                                               HEC-1 INPUT                                        PAGE  8

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 284            KK       D1 STORAGE
 285            RS        1    STOR
 286            SV             0.03    0.07    0.09    0.10    0.12    0.14    0.16    0.18
 287            SE   2395.0 2396.00 2396.75 2397.00 2397.25 2397.50 2397.75 2398.00 2398.25
 288            SQ        0       0       1      10      28      50      76     106     139
                 *

 289            KK     ON20   BASIN
 290            BA    0.002
 291            LG     0.27    0.25    6.00    0.18       4
 292            UC    0.111   0.148
 293            UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 294            UA      100
                 *

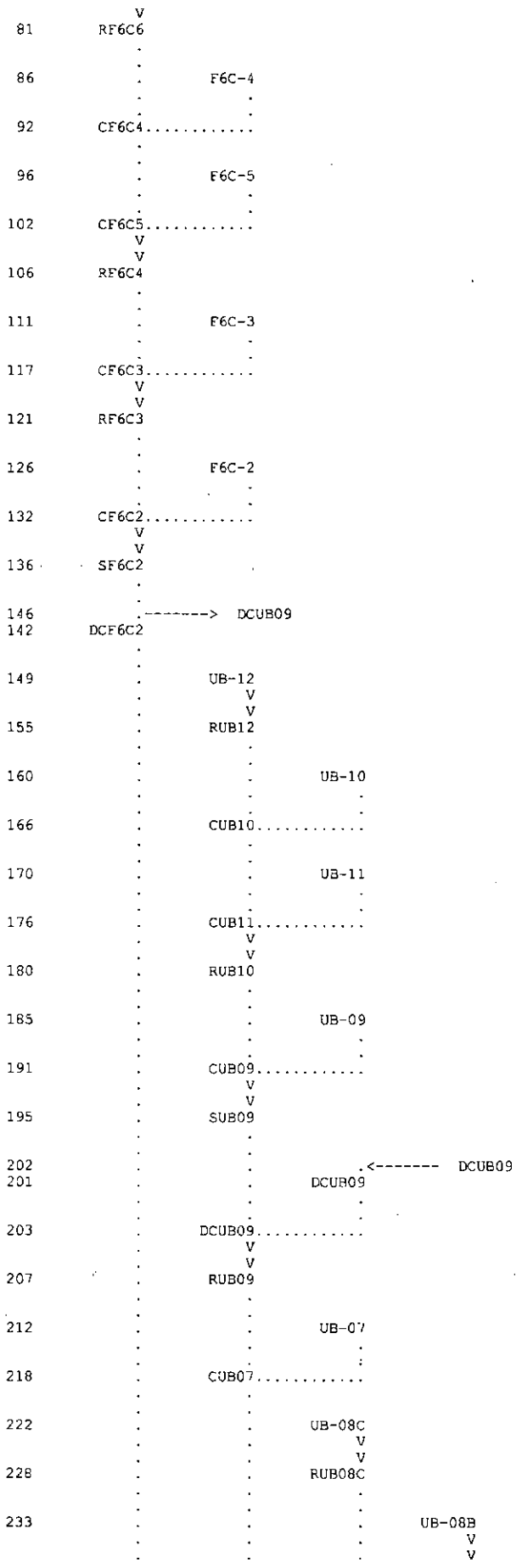
 295            KK   CPON15 COMBINE
 296            HC        4
                 *

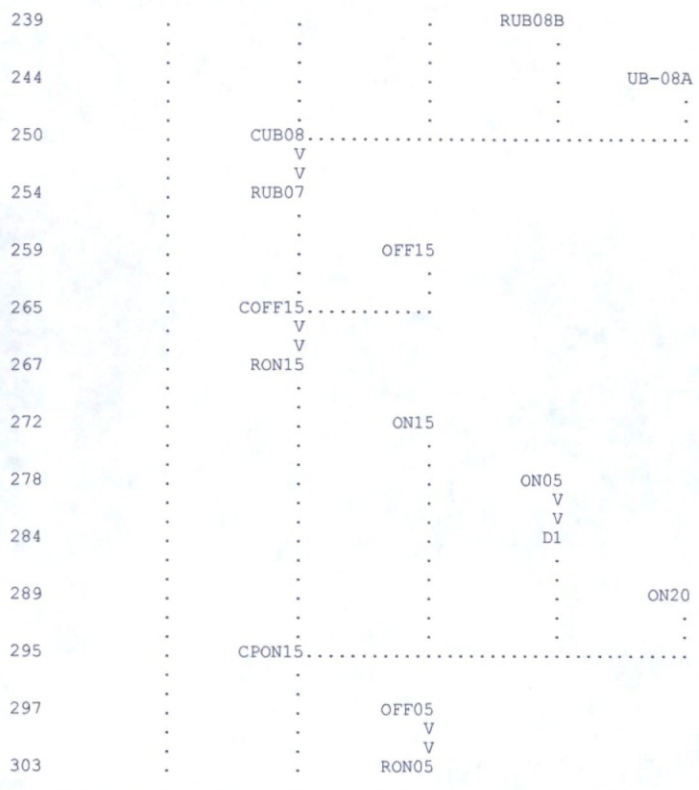
 297            KK    OFF05   BASIN
 298            BA    0.012
 299            LG     0.30    0.25    5.46    0.23       5
 300            UC    0.178   0.238
 301            UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 302            UA      100
                 *

 303            KK    RON05   ROUTE
 304            RS        1    FLOW
 305            RC    0.076   0.038   0.076     698  0.0186    0.00
 306            RX     5.60  123.40  137.60  141.90  143.40  147.10  161.50  192.90
 307            RY   2412.2 2403.48 2402.24 2400.40 2400.46 2401.89 2402.86 2404.84
                 *
 308            ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   75       F6C-6
                V
```


RF6C6
F6C-4
CF6C4
F6C-5
CF6C5
RF6C4
F6C-3
CF6C3
RF6C3
F6C-2
CF6C2
SF6C2
DCUB09
DCF6C2
UB-12
RUB12
UB-10
CUB10
UB-11
CUB11
RUB10
UB-09
CUB09
SUB09
DCUB09
DCUB09
RUB09
UB-07
CUB07
UB-08C
RUB08C
UB-08B



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   01MAR18  TIME  09:12:43   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

Flood Control District of Maricopa County
ESTATES AT HAYDEN PR - Estates at Hayden PR
100 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
08/01/2017

NORTH SCOTTSDALE 100-YR FLOODPLAIN DELINEATION STUDY
MAY 2002

FILE NAME: NS.DAT
THIS MODEL REPRESENTS THE FUTURE LAND USE CONDITIONS OF THE WATERSHEDS.
THE TOTAL DRAINAGE AREA FOR THE ENTIRE STUDY IS 15.2 SQUARE MILES.

100-YEAR, 6-HOUR FREQUENCY

METHODOLOGY:
THE US CORPS OF ENGINEERS FLOOD HYROLOGY MODEL HEC-1, DATED JUNE 1998,
VERSION 4.1
MULTIPLE STORMS
CLARK UNIT HYDROGRAPH
GREEN AMPT LOSS METHOD
NORMAL DEPTH BASIN AND REACH ROUTING METHOD

LAND USES PER CITY OF SCOTTSDALE PROVIDED GIS

PROJECT WASHES INCLUDE: STAGE COACH PASS (SCP)
UPPER BOULDERS WASH (UB)
FAN 6C (F6C)
FAN 6A NORTH (F6AN)
FAN 6A SOULTH (F6AS)
FAN 6A (F6A)
UPPER FAN 5 (UF5)

PROJECT SUB-BASINS DESIGNATED AS SUB-BASIN NAME ABREVIATION FOLLOWED BY BASIN NUMBER. I.E. STAGE COACH PASS SUB-BASIN 14 IS DESIGNATED AS SCP-14.

PROJECT CONCENTRATION POINTS DESIGNATED AS C FOLLOWED BY SUB-BASIN NAME AND CONCENTRATION POINT NUMBER. CONCENTRATION POINT NUMBER IS CHOOSEN BY THE SUB

```
                                   BASIN THE CONCENTRATION POINT IS LOCATED IN.  I.E.  CONCENTRATION POINT IN
                                   SUB-BASIN 06 OF UPPER BOULDERS WASH IS DESIGNATED AS CUB06.

                                   PROJECT ROUTES ARE DESIGNATED AS R FOLLOWED BY SUB-BASIN NAME AND ROUTE
                                   NUMBER. ROUTE NUMBER IS CHOOSEN BY THE SUB-BASIN IN WHICH THE ROUTE BEGINS.
                                   IE A ROUTE FROM SUB-BASIN 4 IN FAN 6C IS DESIGNATED AS RF6C4.



   52 IO        OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                       NMIN          1  MINUTES IN COMPUTATION INTERVAL
                      IDATE     1    0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2    0  ENDING DATE
                     NDTIME       0919  ENDING TIME
                      ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .02 HOURS
                       TOTAL TIME BASE    33.32 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   54 JD        INDEX STORM NO. 1
                       STRM       3.50  PRECIPITATION DEPTH
                       TRDA        .01  TRANSPOSITION DRAINAGE AREA

   55 PI          PRECIPITATION PATTERN
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .C0       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .C0       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .C0       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                       .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
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                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

   58 JD        INDEX STORM NO. 2
                       STRM       3.48  PRECIPITATION DEPTH
                       TRDA        .50  TRANSPOSITION DRAINAGE AREA

    0 PI          PRECIPITATION PATTERN
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
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59 JD INDEX STORM NO. 3
STRM 3.41 PRECIPITATION DEPTH
TRDA 2.80 TRANSPOSITION DRAINAGE AREA

60 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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63 JD INDEX STORM NO. 4
STRM 3.23 PRECIPITATION DEPTH
TRDA 16.00 TRANSPOSITION DRAINAGE AREA

64 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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 67 JD         INDEX STORM NO. 5
                   STRM       2.84  PRECIPITATION DEPTH
                   TRDA      90.00  TRANSPOSITION DRAINAGE AREA

 68 PI           PRECIPITATION PATTERN
                 .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
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 71 JD         INDEX STORM NO. 6
                   STRM       2.00  PRECIPITATION DEPTH
                   TRDA     500.00  TRANSPOSITION DRAINAGE AREA

 72 PI           PRECIPITATION PATTERN
                 .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                 .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
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                 .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
                 .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
                 .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
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WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	F6C-6	1251.	4.18	210.	53.	38.	.89		
+	ROUTED TO	RF6C6	1236.	4.25	210.	53.	38.	.89		
+	HYDROGRAPH AT	F6C-4	65.	4.05	6.	2.	1.	.03		
+	2 COMBINED AT	CF6C4	1261.	4.25	215.	54.	39.	.91		
+	HYDROGRAPH AT	F6C-5	222.	4.12	34.	9.	6.	.14		
+	2 COMBINED AT	CF6C5	1399.	4.23	246.	62.	45.	1.05		
+	ROUTED TO	RF6C4	1317.	4.43	246.	62.	45.	1.05		
+	HYDROGRAPH AT	F6C-3	103.	4.07	12.	3.	2.	.05		
+	2 COMBINED AT	CF6C3	1346.	4.43	256.	64.	46.	1.10		
+	ROUTED TO	RF6C3	1324.	4.55	256.	64.	46.	1.10		
+	HYDROGRAPH AT	F6C-2	248.	4.12	25.	6.	5.	.09		
+	2 COMBINED AT	CF6C2	1369.	4.53	278.	70.	51.	1.18		
+	ROUTED TO	SF6C2	1369.	4.53	278.	70.	51.	1.18		
+	DIVERSION TO	DCUB09	24.	4.53	1.	0.	0.	1.18		
+	HYDROGRAPH AT	DCF6C2	1345.	4.53	277.	70.	50.	1.18		
+	HYDROGRAPH AT	UB-12	146.	4.12	15.	4.	3.	.06		
+	ROUTED TO	RUB12	112.	4.42	15.	4.	3.	.06		
+	HYDROGRAPH AT	UB-10	206.	4.15	25.	6.	5.	.09		
+	2 COMBINED AT	CUB10	238.	4.32	40.	10.	7.	.15		
+	HYDROGRAPH AT	UB-11	508.	4.15	57.	14.	10.	.21		
+	2 COMBINED AT	CUB11	735.	4.15	97.	24.	18.	.36		
+	ROUTED TO	RUB10	691.	4.27	97.	24.	18.	.36		
+	HYDROGRAPH AT	UB-09	848.	4.10	94.	24.	17.	.34		
+	2 COMBINED AT	CUB09	1270.	4.18	188.	47.	34.	.70		
+	ROUTED TO	SUB09	1270.	4.18	188.	47.	34.	.70		
+	HYDROGRAPH AT	DCUB09	24.	4.53	1.	0.	0.	1.18		
+	2 COMBINED AT	DCUB09	1270.	4.18	190.	48.	34.	.70		
+	ROUTED TO	RUB09	1217.	4.35	190.	48.	34.	.70		
+	HYDROGRAPH AT	UB-07	496.	4.15	53.	13.	10.	.19		

+	2 COMBINED AT	CUB07	1459.	4.32	239.	60.	43.	.89
+	HYDROGRAPH AT	UB-08C	32.	4.05	3.	1.	1.	.01
+	ROUTED TO	RUB08C	16.	4.60	3.	1.	1.	.01
+	HYDROGRAPH AT	UB-08B	108.	4.07	10.	2.	2.	.03
+	ROUTED TO	RUB08B	75.	4.43	10.	2.	2.	.03
+	HYDROGRAPH AT	UB-08A	238.	4.10	30.	8.	5.	.12
+	4 COMBINED AT	CUB08	1629.	4.32	278.	70.	51.	1.06
+	ROUTED TO	RUB07	1626.	4.35	278.	70.	51.	1.06
+	HYDROGRAPH AT	OFF15	40.	4.05	3.	1.	0.	.01
+	2 COMBINED AT	COFF15	1631.	4.33	281.	71.	51.	1.07
+	ROUTED TO	RON15	1624.	4.37	280.	71.	51.	1.07
+	HYDROGRAPH AT	ON15	10.	4.18	1.	0.	0.	.01
+	HYDROGRAPH AT	ON05	20.	4.03	2.	0.	0.	.01
+	ROUTED TO	D1	20.	4.05	1.	0.	0.	.01
+	HYDROGRAPH AT	ON20	6.	4.02	0.	0.	0.	.00
+	4 COMBINED AT	CPON15	1634.	4.37	283.	71.	51.	1.08
+	HYDROGRAPH AT	OFF05	30.	4.10	3.	1.	0.	.01
+	ROUTED TO	RON05	29.	4.13	3.	1.	0.	.01

*** NORMAL END OF HEC-1 ***

Appendix C – Upper Boulders Wash Hydraulics

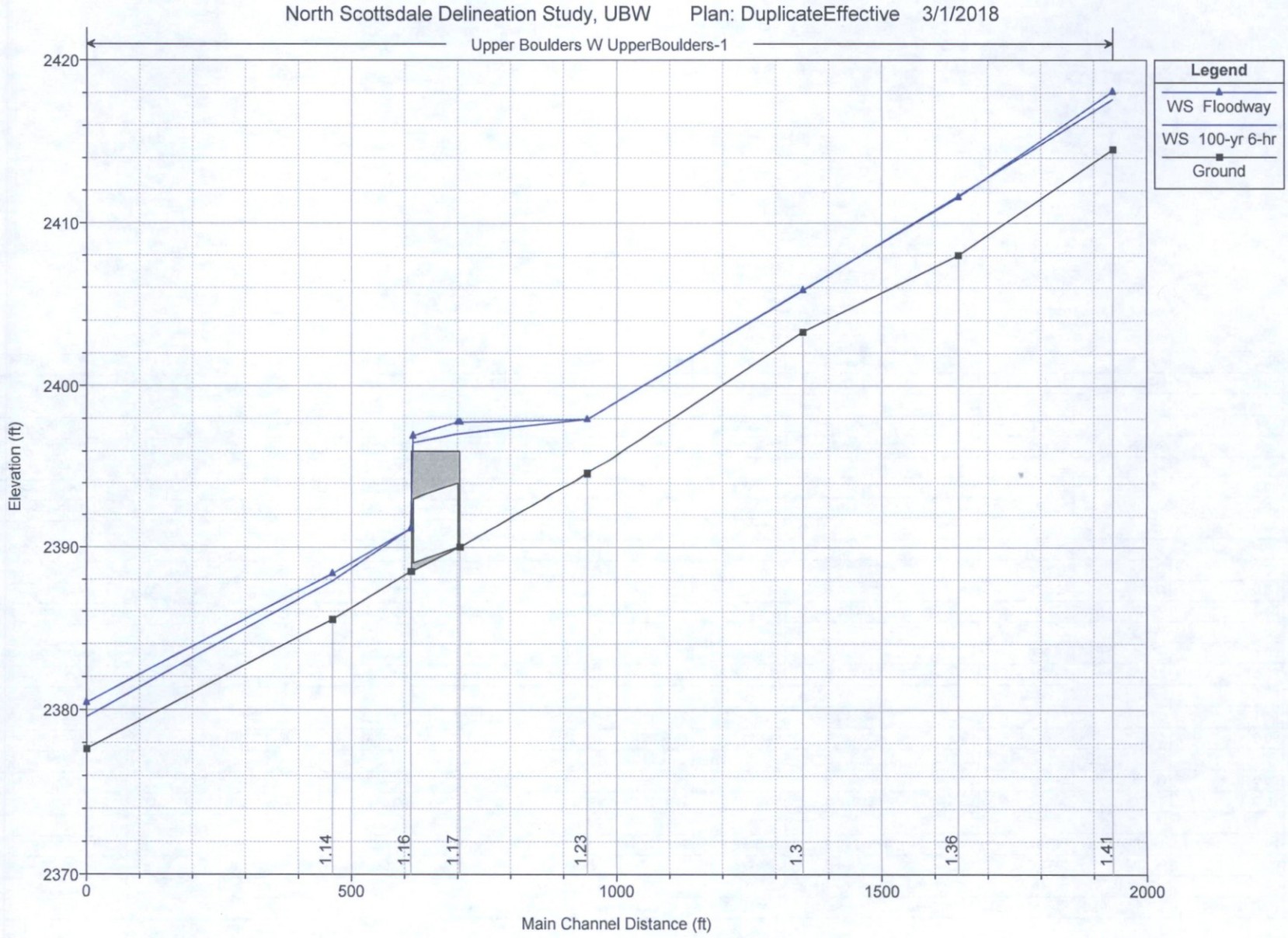
HEC-RAS Results

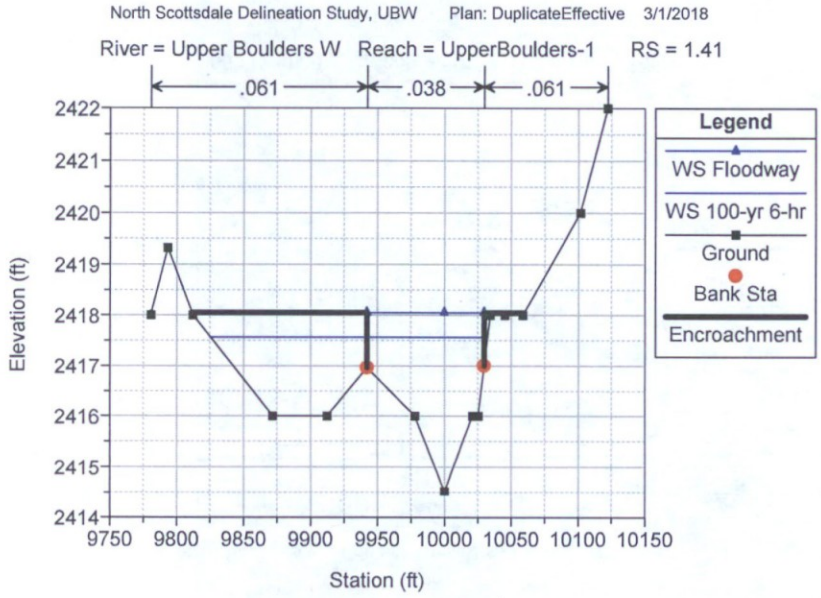
Lateral Erosion Setbacks

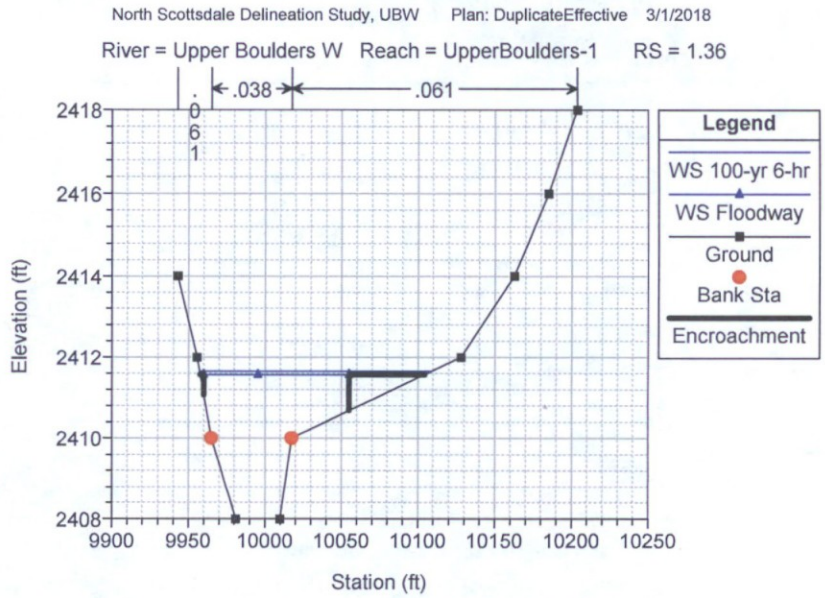
Duplicate Effective Model

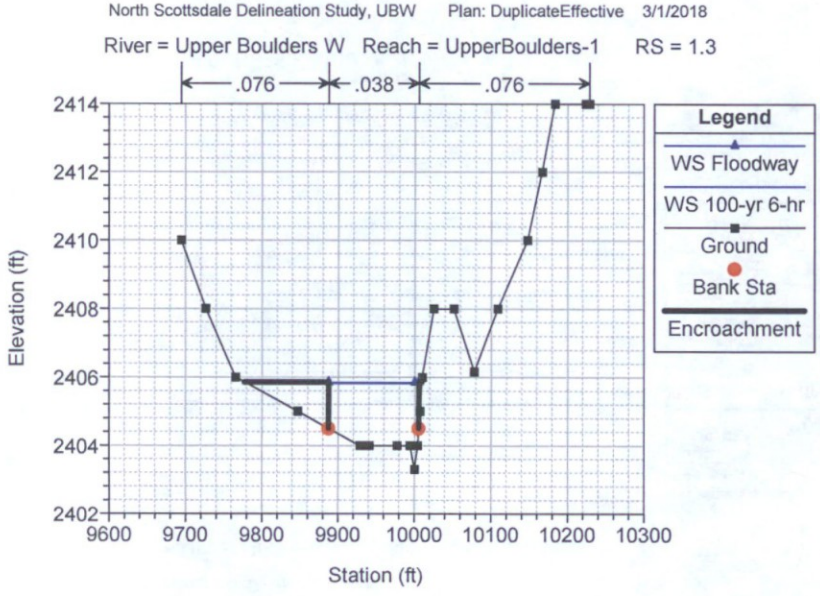
HEC-RAS Plan: DupEff River: Upper Boulders W Reach: UpperBoulders-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
UpperBoulders-1	1.41	100-yr 6-hr	1628.00	2414.52	2417.57	2417.57	2418.27	0.018862	7.66	282.92	207.33	1.03
UpperBoulders-1	1.41	Floodway	1628.00	2414.52	2418.05	2418.05	2419.17	0.017159	8.49	191.83	87.59	1.01
UpperBoulders-1	1.36	100-yr 6-hr	1628.00	2408.00	2411.65	2411.65	2412.68	0.010338	8.60	250.38	151.68	0.85
UpperBoulders-1	1.36	Floodway	1628.00	2408.00	2411.57	2411.57	2412.72	0.011729	9.00	215.36	95.00	0.90
UpperBoulders-1	1.3	100-yr 6-hr	1628.00	2403.30	2405.83	2405.83	2406.56	0.015708	7.15	282.35	229.62	0.95
UpperBoulders-1	1.3	Floodway	1628.00	2403.30	2405.86	2405.86	2406.77	0.018233	7.68	211.97	117.92	1.01
UpperBoulders-1	1.23	100-yr 6-hr	1628.00	2394.57	2397.96	2397.96	2398.92	0.016124	7.96	223.66	147.74	0.98
UpperBoulders-1	1.23	Floodway	1628.00	2394.57	2397.96	2397.96	2398.99	0.017159	8.12	200.44	98.25	1.00
UpperBoulders-1	1.18	100-yr 6-hr	1628.00	2390.00	2397.07	2393.74	2397.16	0.000479	2.87	988.23	260.56	0.20
UpperBoulders-1	1.18	Floodway	1628.00	2390.00	2397.79	2393.72	2397.95	0.000661	3.41	573.28	93.27	0.23
UpperBoulders-1	1.17		Culvert									
UpperBoulders-1	1.16	100-yr 6-hr	1667.00	2388.49	2391.14	2391.14	2392.36	0.015836	8.83	188.80	361.75	1.00
UpperBoulders-1	1.16	Floodway	1667.00	2388.49	2391.14	2391.14	2392.36	0.016144	8.83	188.80	146.23	1.00
UpperBoulders-1	1.14	100-yr 6-hr	1667.00	2385.50	2387.89	2387.89	2388.43	0.019929	6.85	364.28	384.35	1.03
UpperBoulders-1	1.14	Floodway	1667.00	2385.50	2388.36	2388.33	2389.24	0.016647	7.53	221.32	119.46	0.98
UpperBoulders-1	1.05	100-yr 6-hr	1667.00	2377.62	2379.57	2379.57	2379.71	0.008135	3.97	611.18	436.34	0.64
UpperBoulders-1	1.05	Floodway	1667.00	2377.62	2380.44	2380.44	2381.45	0.016817	8.07	206.49	100.03	0.99


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
Upper Boulders W UpperBoulders-1
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Elevation (ft)
2420
2410
2400
2390
2380
2370
0
500
1000
1500
2000
Main Channel Distance (ft)
1.14
1.16
1.17
1.23
1.3
1.36
1.41


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.41
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.36
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.3
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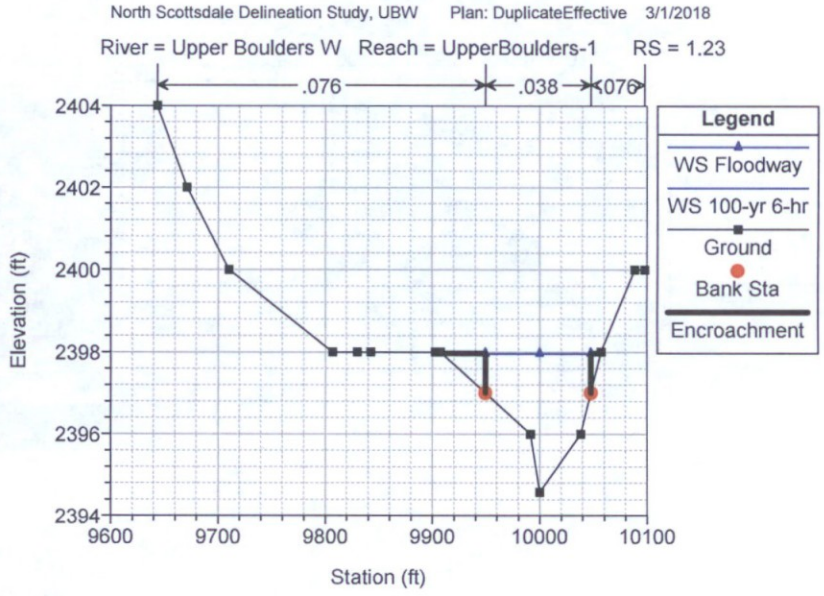
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.23
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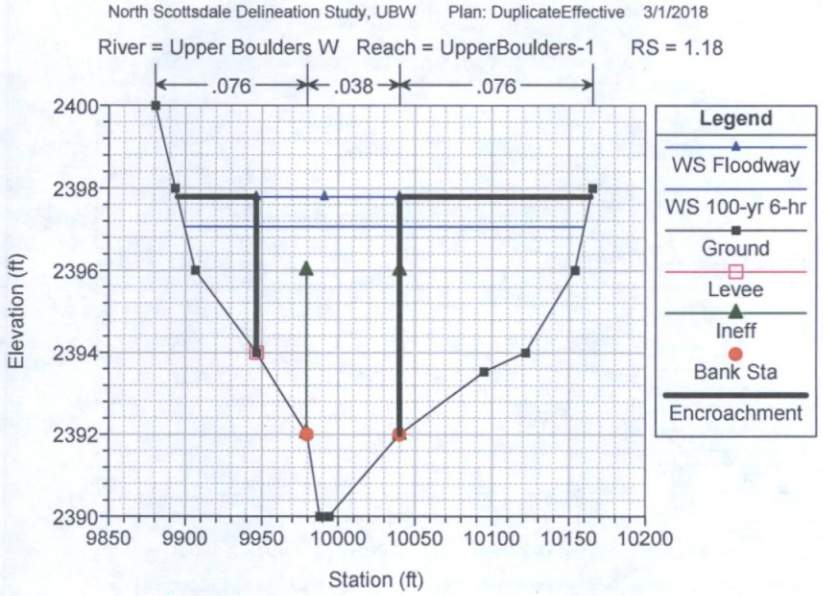
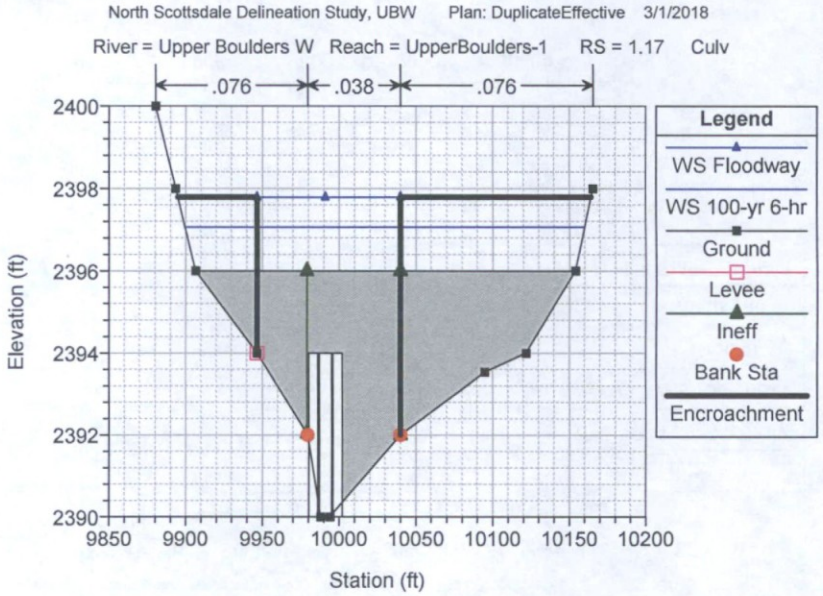
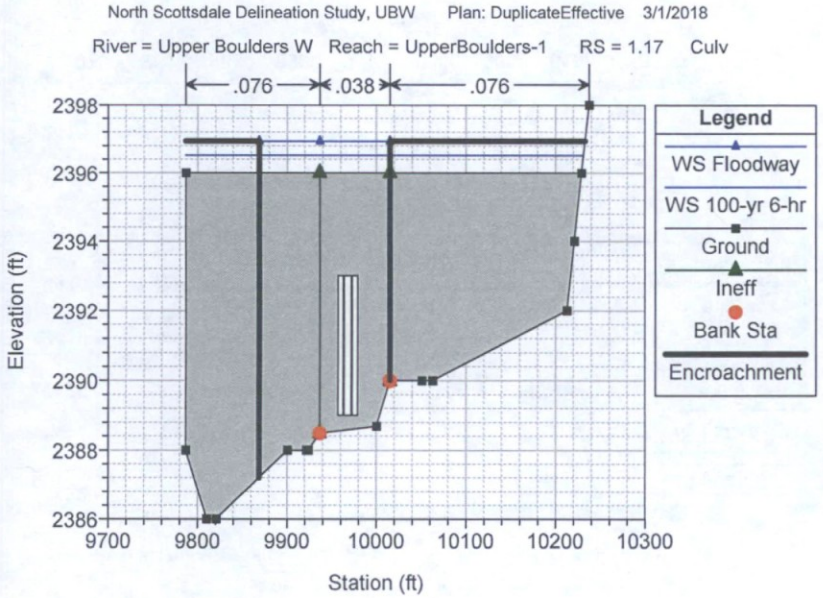
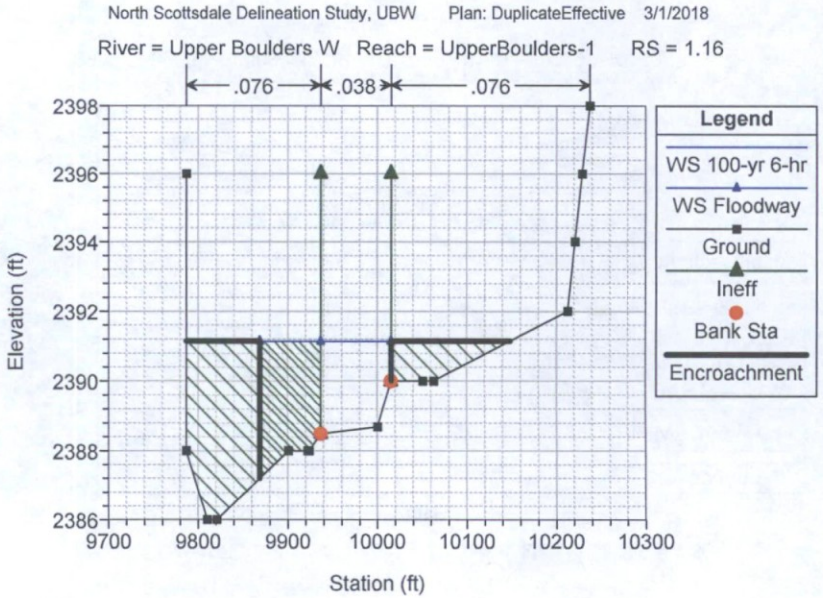
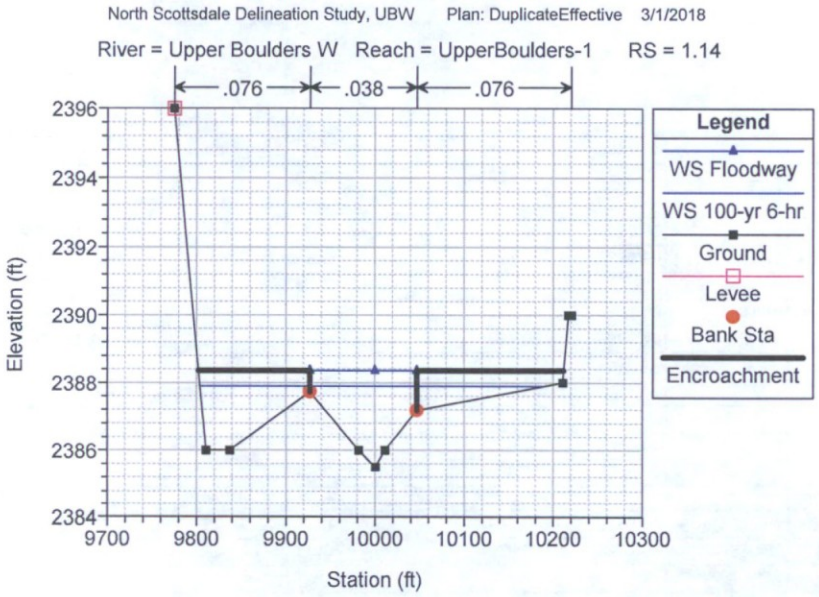
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment

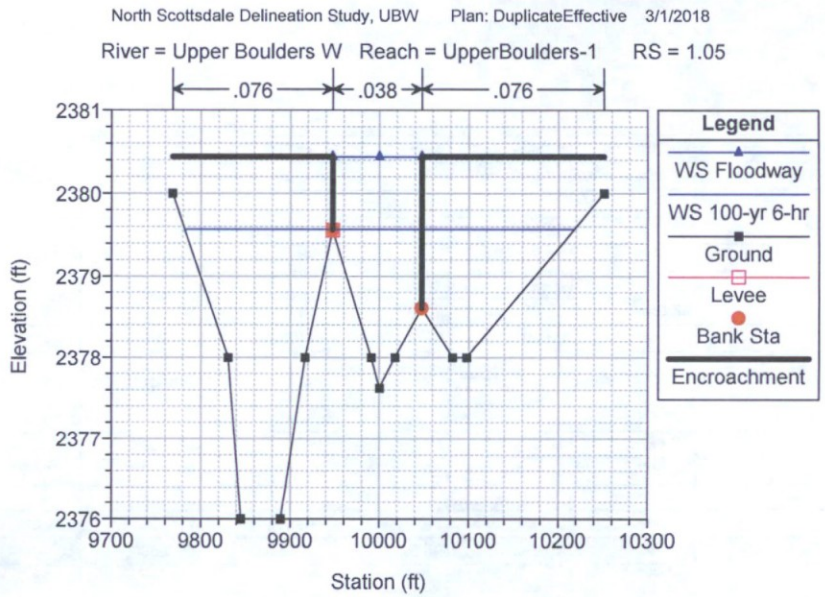

North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.18
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.16
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Ineff
Bank Sta
Encroachment

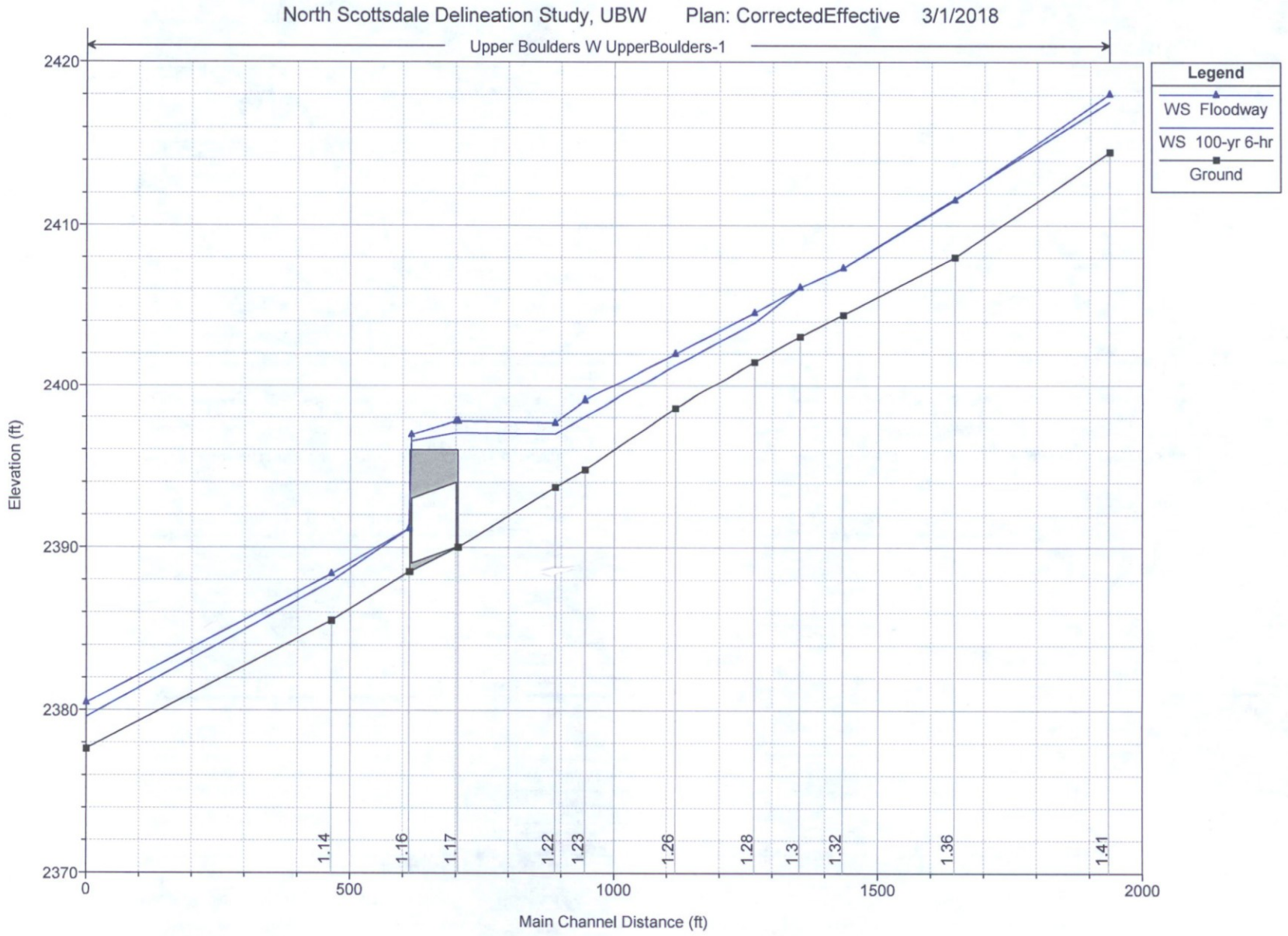

North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.14
.076
.038
.076
Elevation (ft)
2396
2394
2392
2390
2388
2386
2384
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment

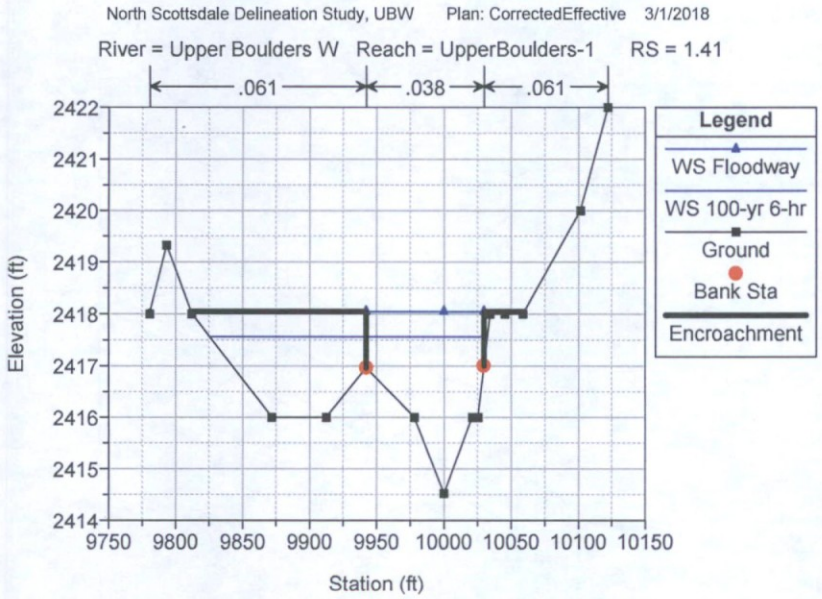

North Scottsdale Delineation Study, UBW Plan: DuplicateEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.05
.076
.038
.076
Elevation (ft)
2381
2380
2379
2378
2377
2376
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment

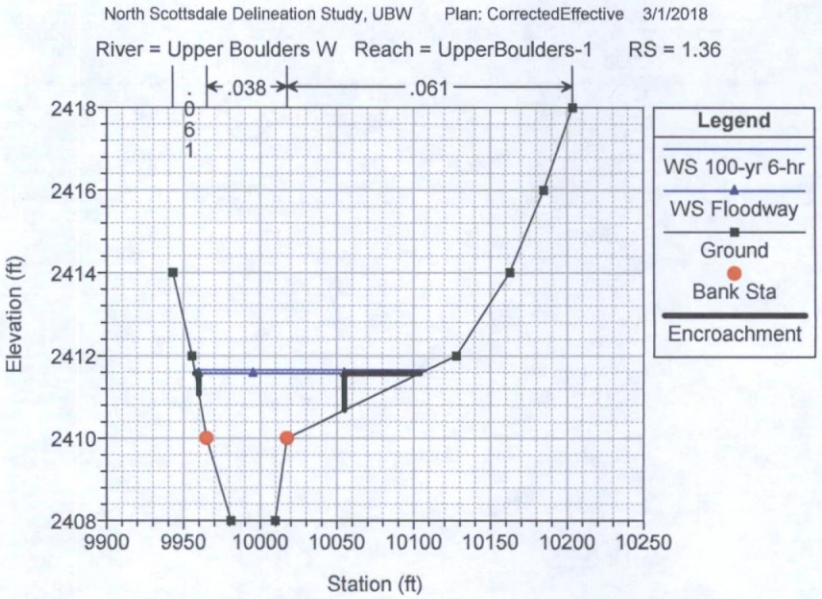
Corrected Effective Model

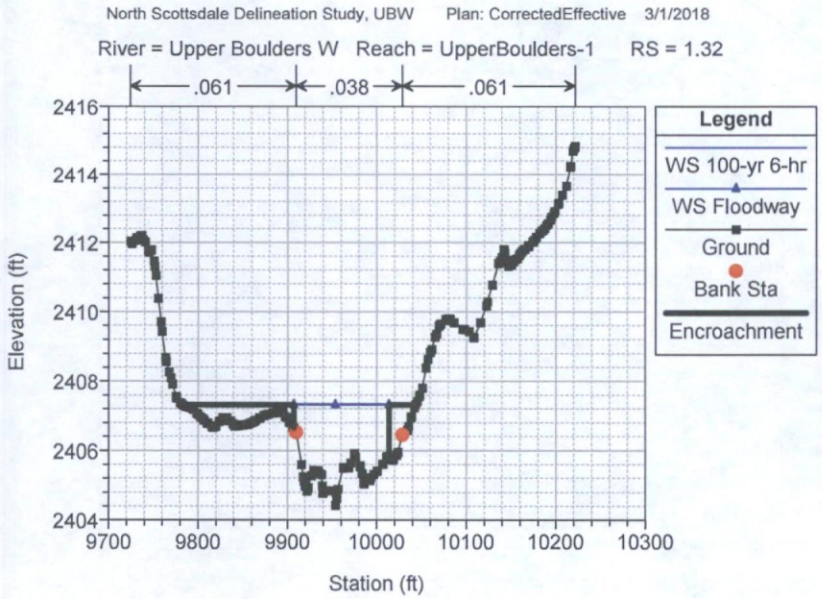
HEC-RAS Plan: CorrEff River: Upper Boulders W Reach: UpperBoulders-1

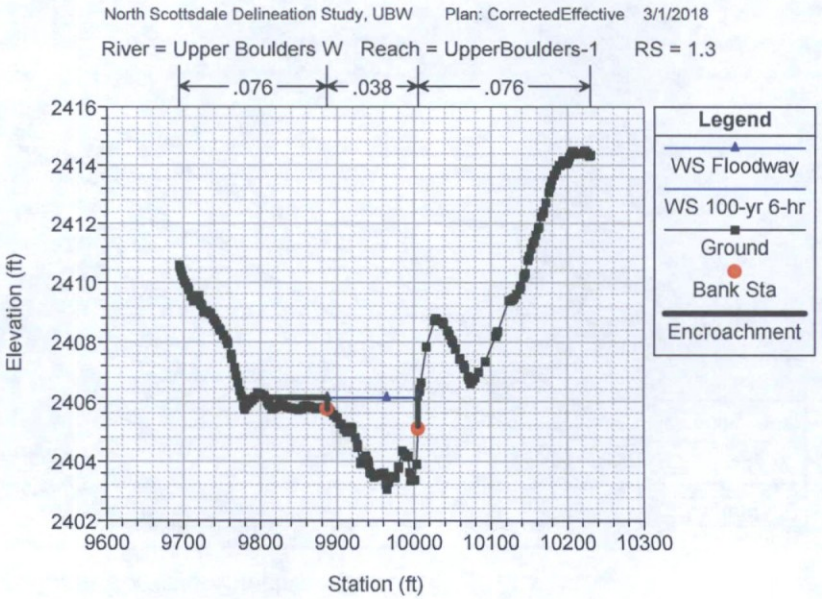
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
UpperBoulders-1	1.41	100-yr 6-hr	1628.00	2414.52	2417.57	2417.57	2418.27	0.018862	7.66	282.92	207.33	1.03
UpperBoulders-1	1.41	Floodway	1628.00	2414.52	2418.05	2418.05	2419.17	0.017159	8.49	191.83	87.59	1.01
UpperBoulders-1	1.36	100-yr 6-hr	1628.00	2408.00	2411.65	2411.65	2412.68	0.010338	8.60	250.38	151.68	0.85
UpperBoulders-1	1.36	Floodway	1628.00	2408.00	2411.57	2411.57	2412.72	0.011729	9.00	215.36	95.00	0.90
UpperBoulders-1	1.32	100-yr 6-hr	1628.00	2404.42	2407.34	2407.30	2407.99	0.011933	6.64	293.33	261.59	0.84
UpperBoulders-1	1.32	Floodway	1628.00	2404.42	2407.32	2407.28	2408.27	0.016456	7.86	208.68	106.27	0.98
UpperBoulders-1	1.3	100-yr 6-hr	1628.00	2403.07	2406.12	2406.12	2406.90	0.014651	7.17	251.15	216.91	0.92
UpperBoulders-1	1.3	Floodway	1628.00	2403.07	2406.12	2406.04	2406.95	0.015032	7.30	223.31	117.92	0.93
UpperBoulders-1	1.28	100-yr 6-hr	1628.00	2401.48	2403.91		2404.36	0.014585	6.60	384.64	287.49	0.90
UpperBoulders-1	1.28	Floodway	1628.00	2401.48	2404.55	2404.55	2405.63	0.015050	8.43	202.82	96.40	0.96
UpperBoulders-1	1.26	100-yr 6-hr	1628.00	2398.58	2401.26	2401.26	2401.82	0.024684	7.41	345.23	310.55	1.13
UpperBoulders-1	1.26	Floodway	1628.00	2398.58	2402.00	2402.00	2403.04	0.017658	8.44	211.46	103.76	1.02
UpperBoulders-1	1.23	100-yr 6-hr	1628.00	2394.78	2398.04	2398.01	2398.79	0.013658	7.22	277.74	220.21	0.90
UpperBoulders-1	1.23	Floodway	1628.00	2394.78	2399.06		2399.51	0.004367	5.38	302.75	98.25	0.54
UpperBoulders-1	1.22	100-yr 6-hr	1628.00	2393.69	2396.98	2396.97	2397.80	0.018862	8.95	283.03	149.51	1.06
UpperBoulders-1	1.22	Floodway	1628.00	2393.69	2397.67	2397.67	2398.85	0.015551	9.63	225.24	90.05	0.99
UpperBoulders-1	1.18	100-yr 6-hr	1628.00	2390.00	2397.07	2393.74	2397.16	0.000479	2.87	988.23	260.56	0.20
UpperBoulders-1	1.18	Floodway	1628.00	2390.00	2397.79	2393.72	2397.95	0.000661	3.41	573.28	93.27	0.23
UpperBoulders-1	1.17		Culvert									
UpperBoulders-1	1.16	100-yr 6-hr	1667.00	2388.49	2391.14	2391.14	2392.36	0.015836	8.83	188.80	361.75	1.00
UpperBoulders-1	1.16	Floodway	1667.00	2388.49	2391.14	2391.14	2392.36	0.016144	8.83	188.80	146.23	1.00
UpperBoulders-1	1.14	100-yr 6-hr	1667.00	2385.50	2387.89	2387.89	2388.43	0.019929	6.85	364.28	384.35	1.03
UpperBoulders-1	1.14	Floodway	1667.00	2385.50	2388.36	2388.33	2389.24	0.016647	7.53	221.32	119.46	0.98
UpperBoulders-1	1.05	100-yr 6-hr	1667.00	2377.62	2379.57	2379.57	2379.71	0.008135	3.97	611.18	436.34	0.64
UpperBoulders-1	1.05	Floodway	1667.00	2377.62	2380.44	2380.44	2381.45	0.016817	8.07	206.49	100.03	0.99

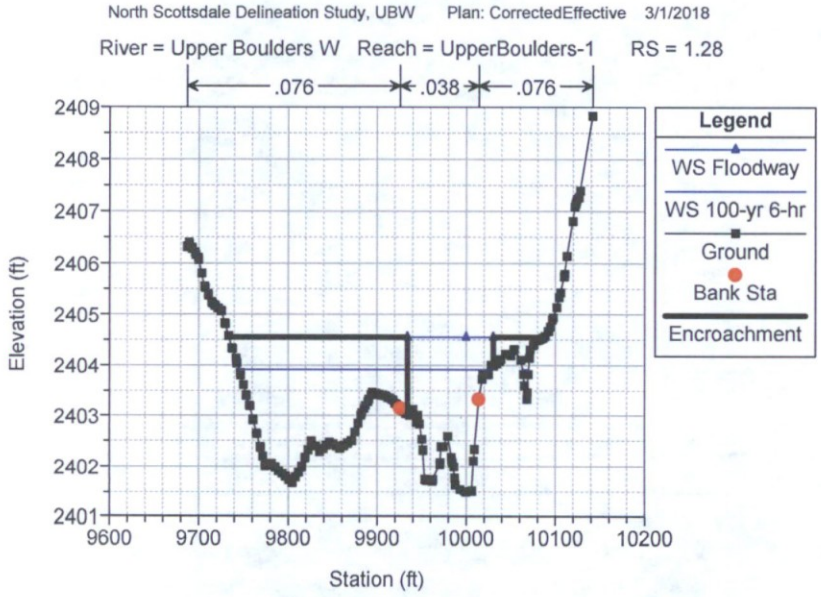

North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
Upper Boulders W UpperBoulders-1
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Elevation (ft)
2420
2410
2400
2390
2380
2370
0
500
1000
1500
2000
Main Channel Distance (ft)
1.14
1.16
1.17
1.22
1.23
1.26
1.28
1.3
1.32
1.36
1.41


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.41
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.36
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.32
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.3
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.28
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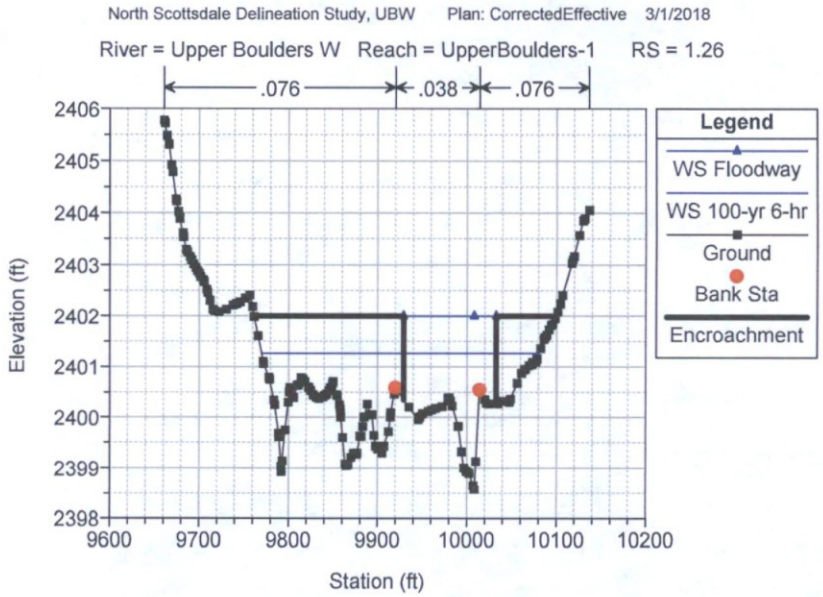
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.26
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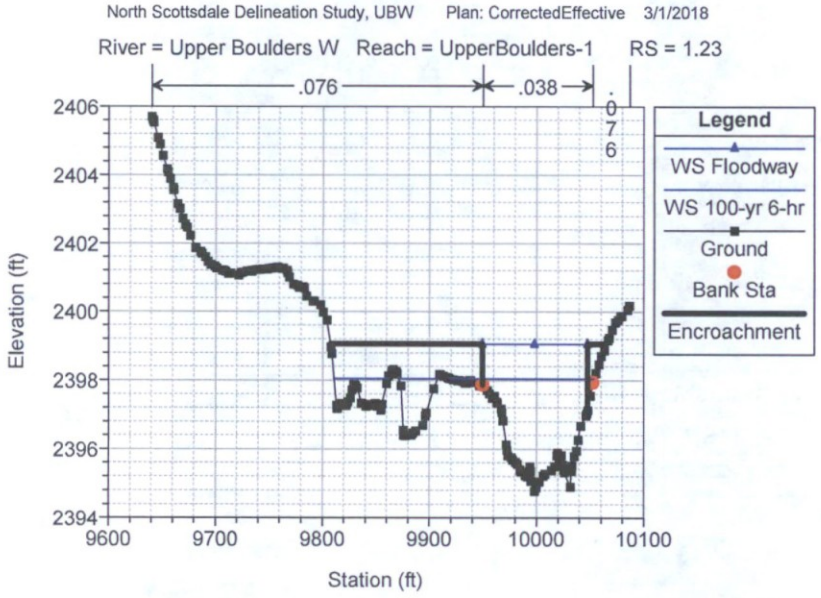
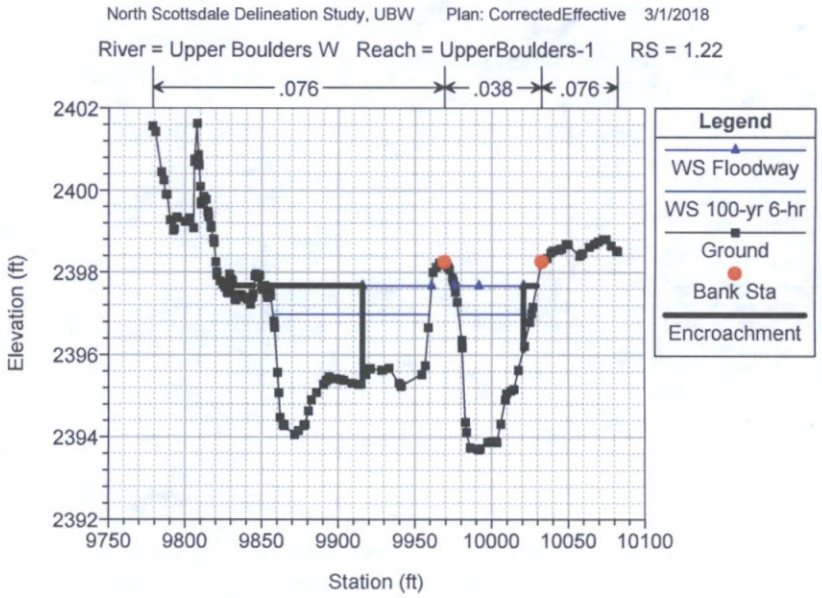
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.23
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.22
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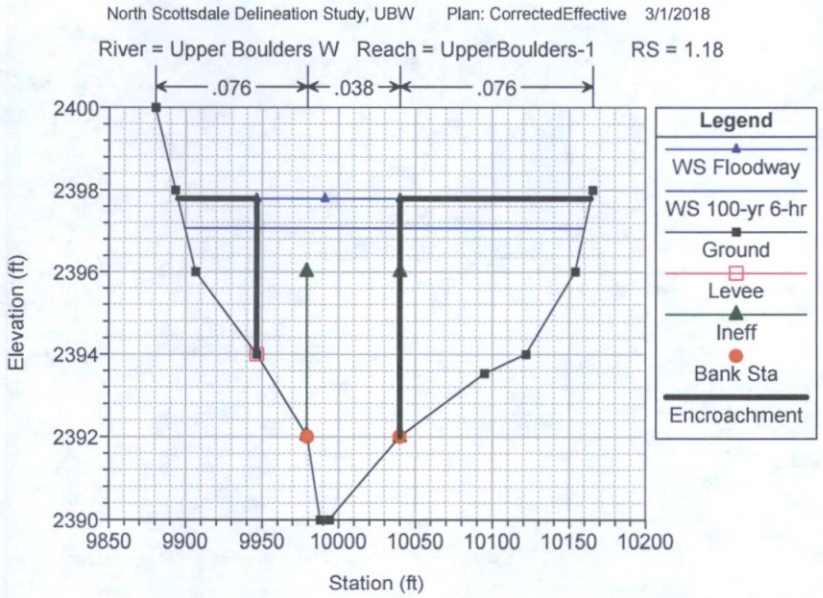
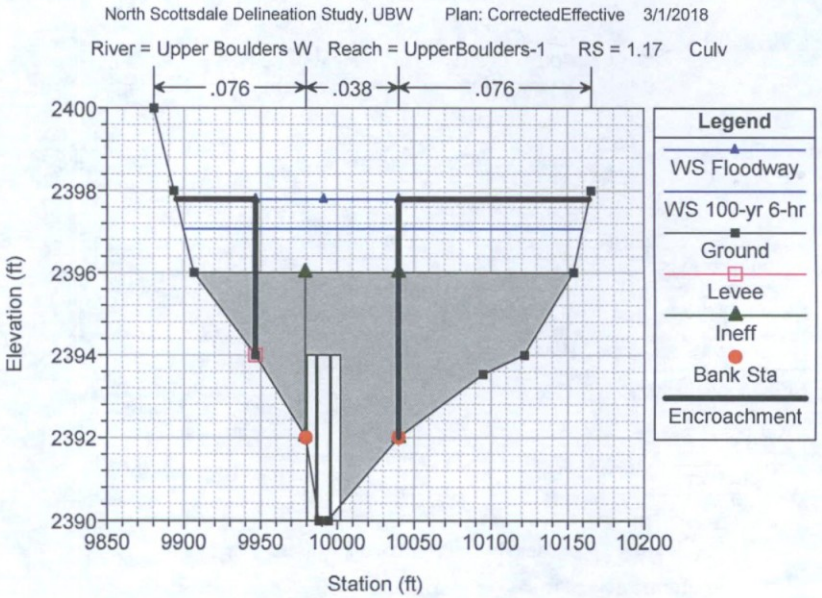
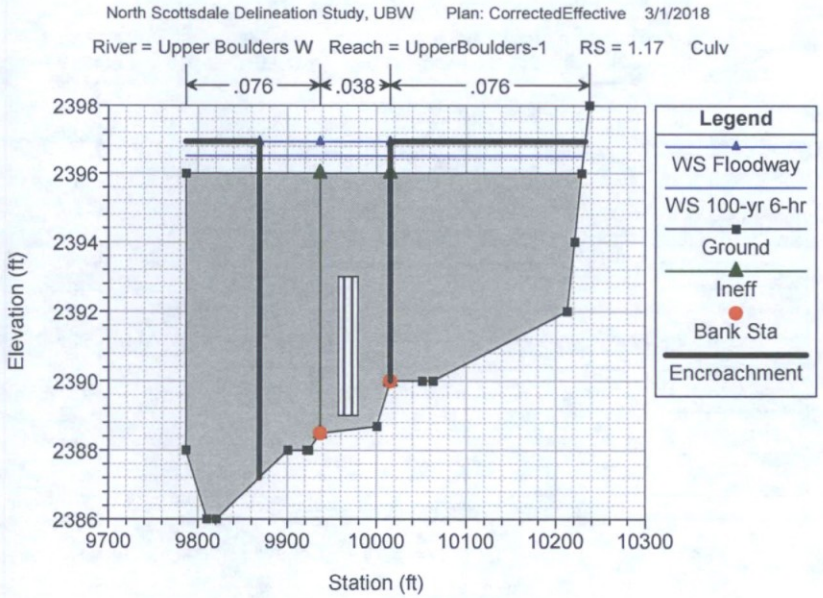
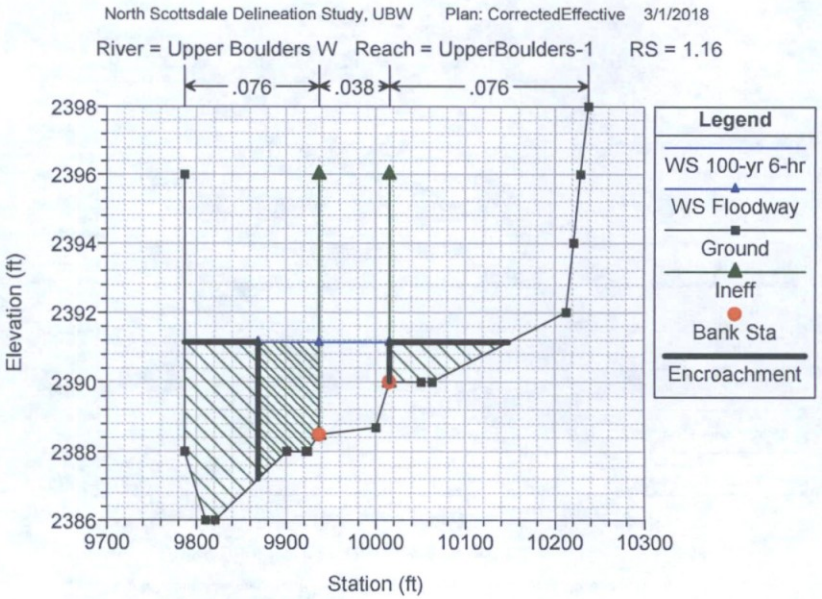
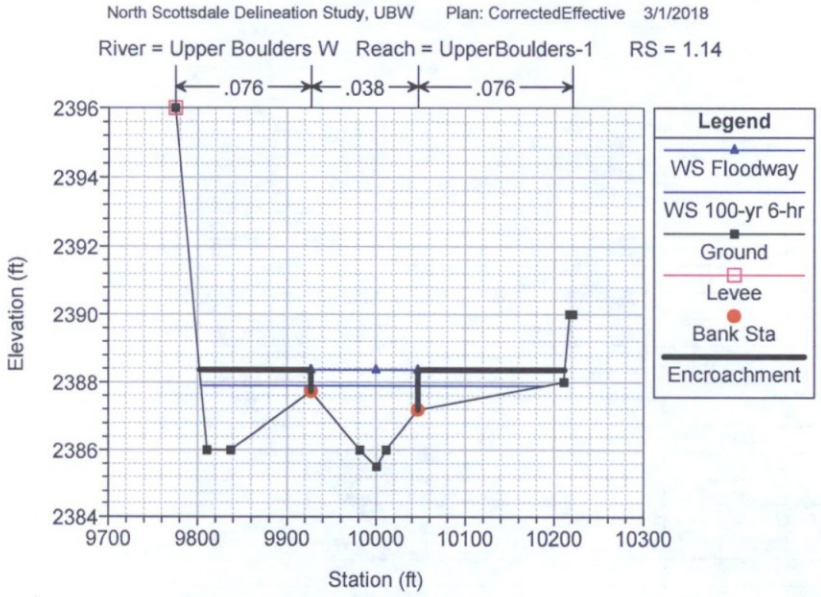
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment

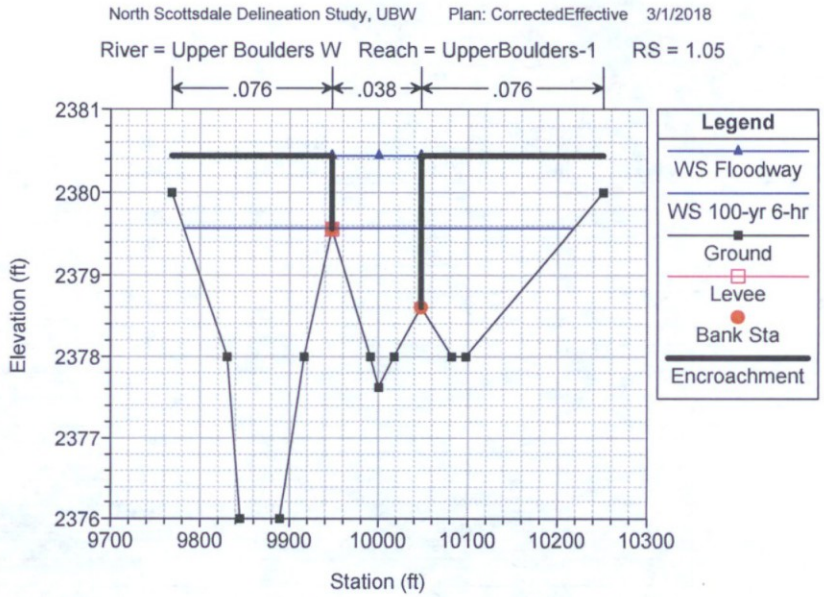

North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.18
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.16
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Ineff
Bank Sta
Encroachment

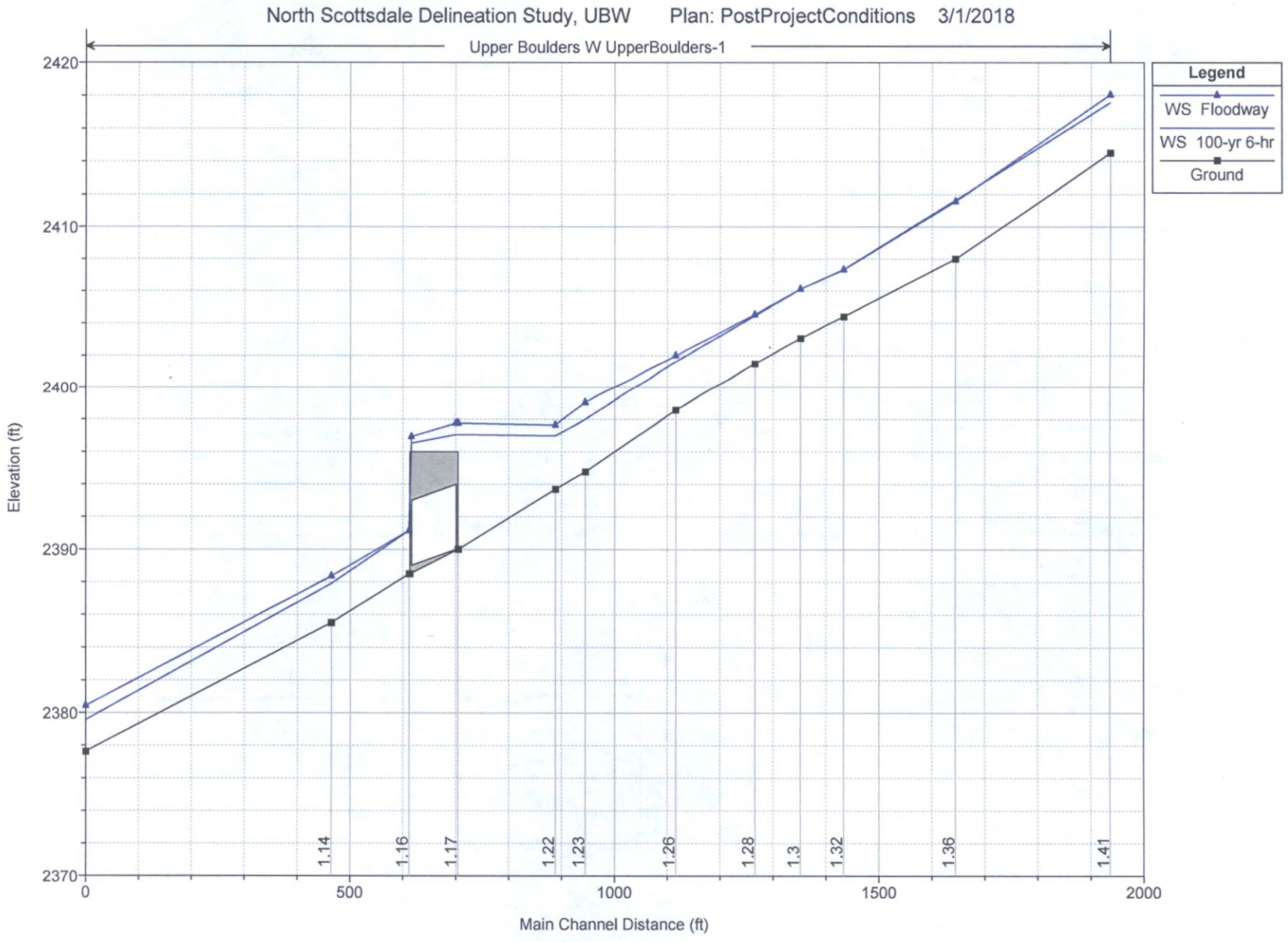

North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.14
.076
.038
.076
Elevation (ft)
2396
2394
2392
2390
2388
2386
2384
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment

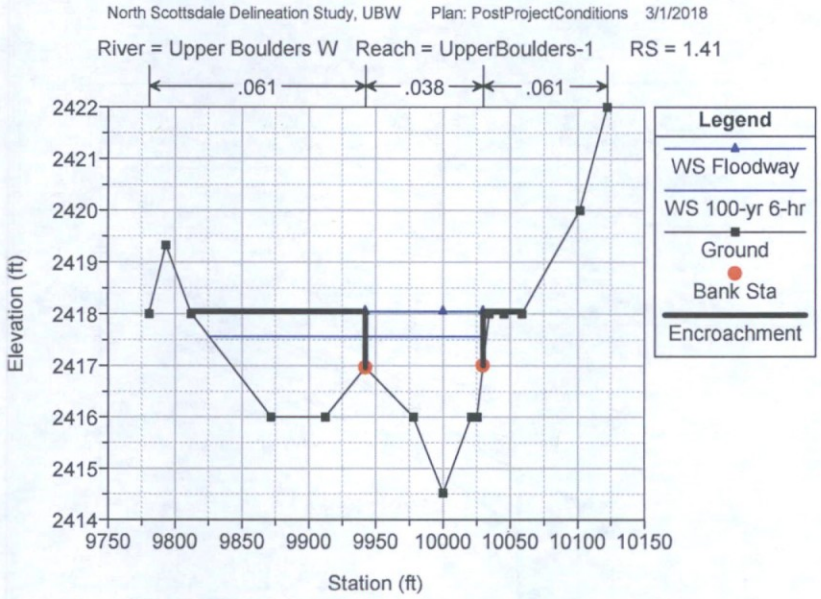

North Scottsdale Delineation Study, UBW Plan: CorrectedEffective 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.05
.076
.038
.076
Elevation (ft)
2381
2380
2379
2378
2377
2376
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment

Post-Project Model

HEC-RAS Plan: PPM River: Upper Boulders W Reach: UpperBoulders-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
UpperBoulders-1	1.41	100-yr 6-hr	1628.00	2414.52	2417.57	2417.57	2418.27	0.018862	7.66	282.92	207.33	1.03
UpperBoulders-1	1.41	Floodway	1628.00	2414.52	2418.05	2418.05	2419.17	0.017159	8.49	191.83	87.59	1.01
UpperBoulders-1	1.36	100-yr 6-hr	1628.00	2408.00	2411.65	2411.65	2412.68	0.010338	8.60	250.38	151.68	0.85
UpperBoulders-1	1.36	Floodway	1628.00	2408.00	2411.57	2411.57	2412.72	0.011729	9.00	215.36	95.00	0.90
UpperBoulders-1	1.32	100-yr 6-hr	1628.00	2404.42	2407.34	2407.30	2407.99	0.012010	6.65	292.50	261.42	0.84
UpperBoulders-1	1.32	Floodway	1628.00	2404.42	2407.32	2407.28	2408.27	0.016456	7.86	208.68	106.27	0.98
UpperBoulders-1	1.3	100-yr 6-hr	1628.00	2403.07	2406.12	2406.12	2406.90	0.014601	7.16	251.36	216.98	0.92
UpperBoulders-1	1.3	Floodway	1628.00	2403.07	2406.12	2406.03	2406.95	0.015024	7.29	223.34	117.92	0.93
UpperBoulders-1	1.28	100-yr 6-hr	1628.00	2401.48	2404.47	2404.47	2405.48	0.015195	8.15	211.95	139.73	0.97
UpperBoulders-1	1.28	Floodway	1628.00	2401.48	2404.55	2404.55	2405.63	0.015050	8.43	202.82	96.40	0.96
UpperBoulders-1	1.26	100-yr 6-hr	1628.00	2398.58	2401.62	2401.62	2402.37	0.019823	7.76	274.35	182.72	1.06
UpperBoulders-1	1.26	Floodway	1628.00	2398.58	2402.00	2402.00	2403.04	0.017658	8.44	211.46	103.76	1.02
UpperBoulders-1	1.23	100-yr 6-hr	1628.00	2394.78	2398.00	2397.99	2398.85	0.015546	7.60	240.40	161.74	0.96
UpperBoulders-1	1.23	Floodway	1628.00	2394.78	2399.06		2399.51	0.004367	5.38	302.75	98.25	0.54
UpperBoulders-1	1.22	100-yr 6-hr	1628.00	2393.69	2396.98	2396.97	2397.80	0.018869	8.95	282.99	149.50	1.06
UpperBoulders-1	1.22	Floodway	1628.00	2393.69	2397.67	2397.67	2398.85	0.015551	9.63	225.24	90.05	0.99
UpperBoulders-1	1.18	100-yr 6-hr	1628.00	2390.00	2397.07	2393.74	2397.16	0.000479	2.87	988.23	260.56	0.20
UpperBoulders-1	1.18	Floodway	1628.00	2390.00	2397.79	2393.72	2397.95	0.000661	3.41	573.28	93.27	0.23
UpperBoulders-1	1.17		Culvert									
UpperBoulders-1	1.16	100-yr 6-hr	1667.00	2388.49	2391.14	2391.14	2392.36	0.015836	8.83	188.80	361.75	1.00
UpperBoulders-1	1.16	Floodway	1667.00	2388.49	2391.14	2391.14	2392.36	0.016144	8.83	188.80	146.23	1.00
UpperBoulders-1	1.14	100-yr 6-hr	1667.00	2385.50	2387.89	2387.89	2388.43	0.019929	6.85	364.28	384.35	1.03
UpperBoulders-1	1.14	Floodway	1667.00	2385.50	2388.36	2388.33	2389.24	0.016647	7.53	221.32	119.46	0.98
UpperBoulders-1	1.05	100-yr 6-hr	1667.00	2377.62	2379.57	2379.57	2379.71	0.008135	3.97	611.18	436.34	0.64
UpperBoulders-1	1.05	Floodway	1667.00	2377.62	2380.44	2380.44	2381.45	0.016817	8.07	206.49	100.03	0.99


North Scottsdale Delineation Study, UBW Plan: PostProjectConditions 3/1/2018
Upper Boulders W UpperBoulders-1
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Elevation (ft)
2420
2410
2400
2390
2380
2370
0
500
1000
1500
2000
Main Channel Distance (ft)
1.14
1.16
1.17
1.22
1.23
1.26
1.28
1.3
1.32
1.36
1.41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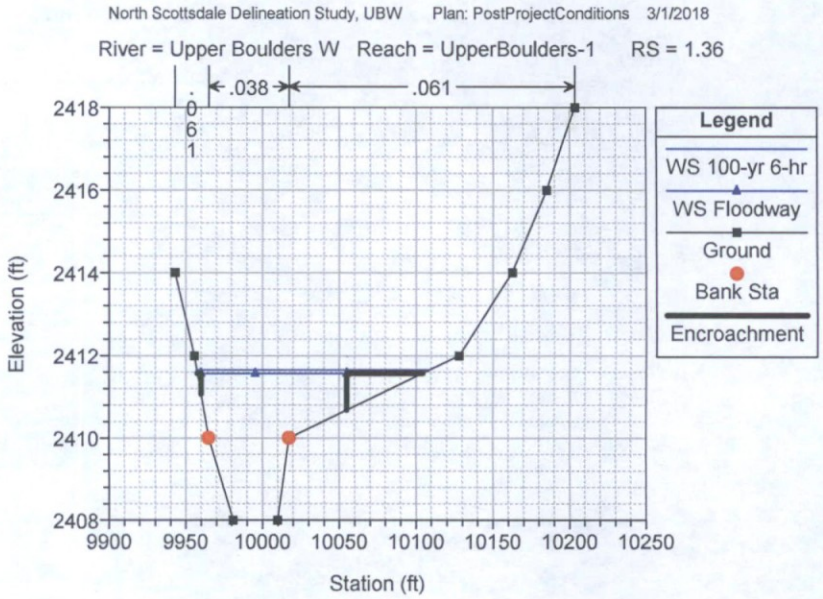
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.41
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment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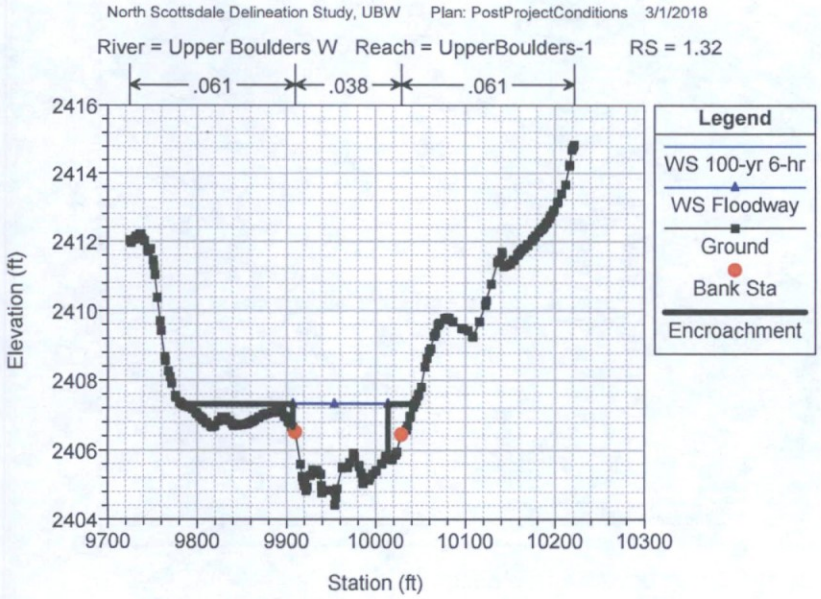
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.36
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Bank Sta
Encroachment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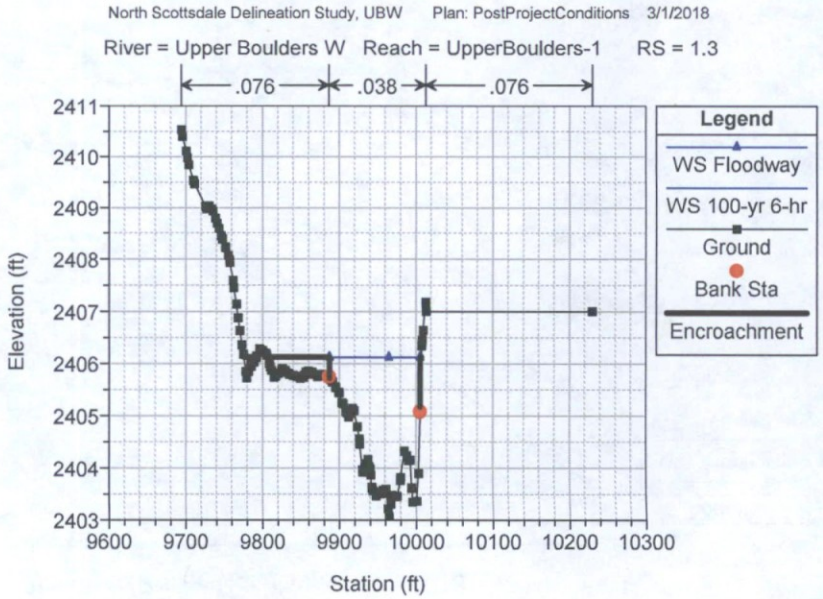
.061
.038
.061
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Bank Sta
Encroachment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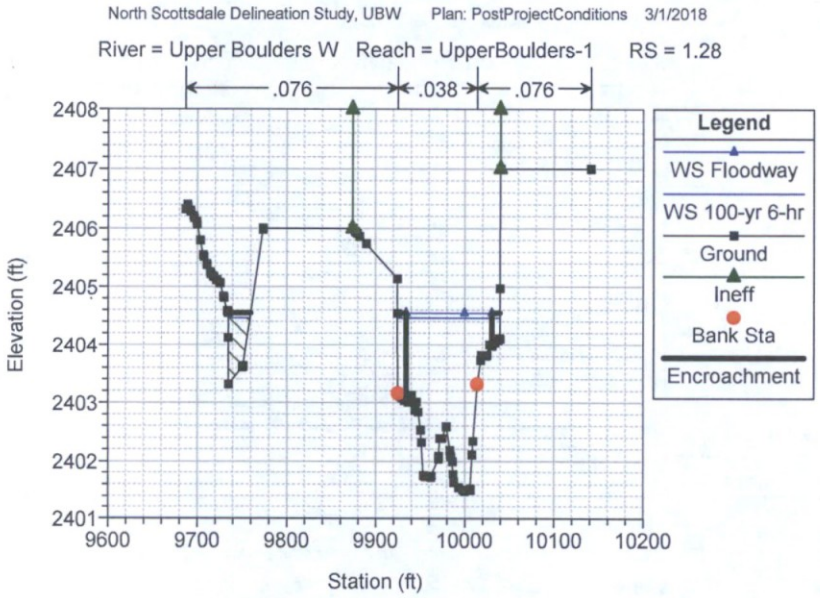
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment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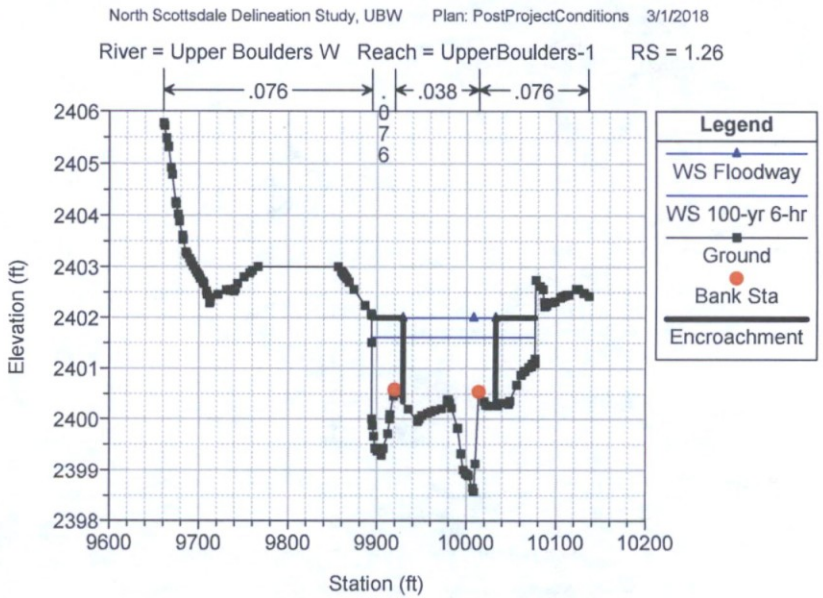
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Ineff
Bank Sta
Encroachment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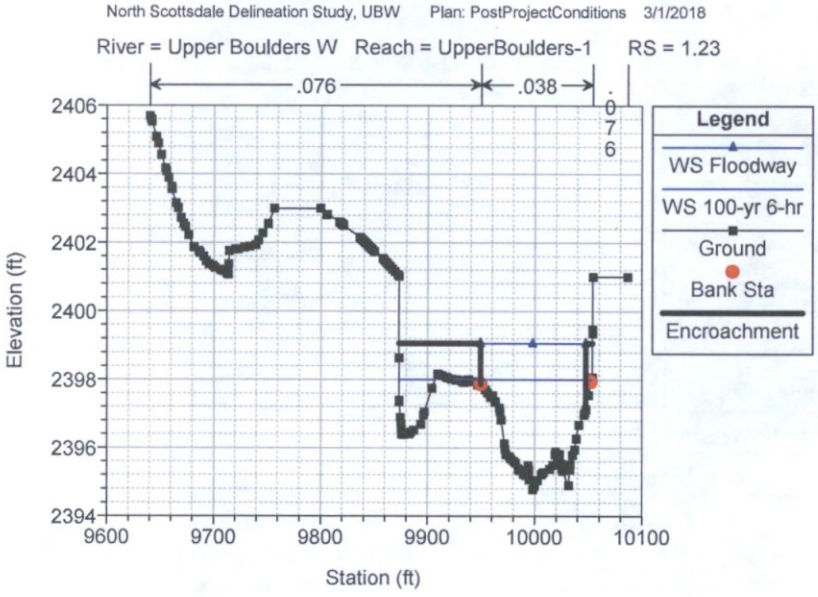
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment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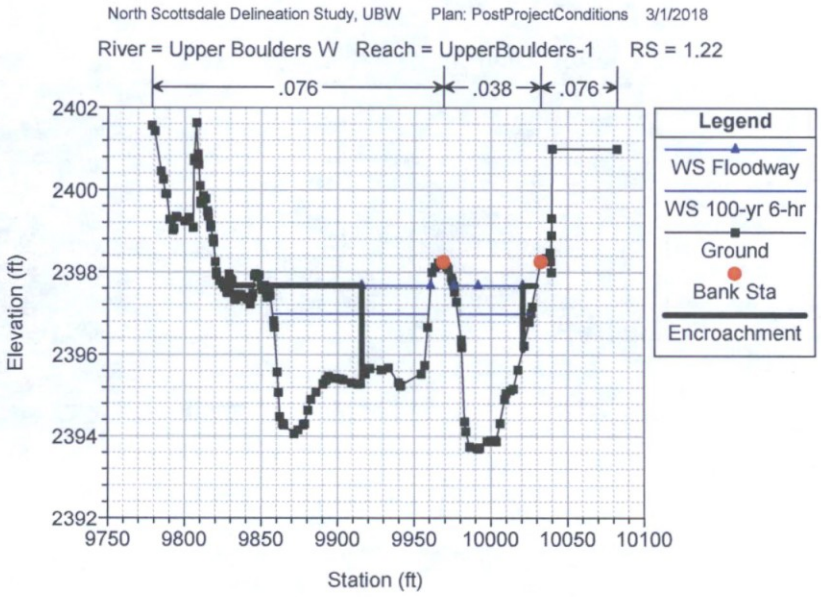
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment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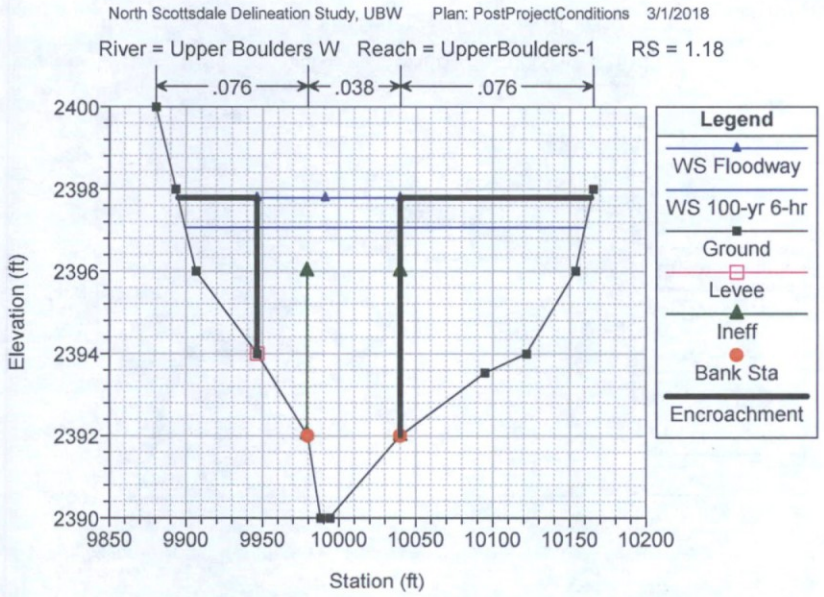
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Bank Sta
Encroachment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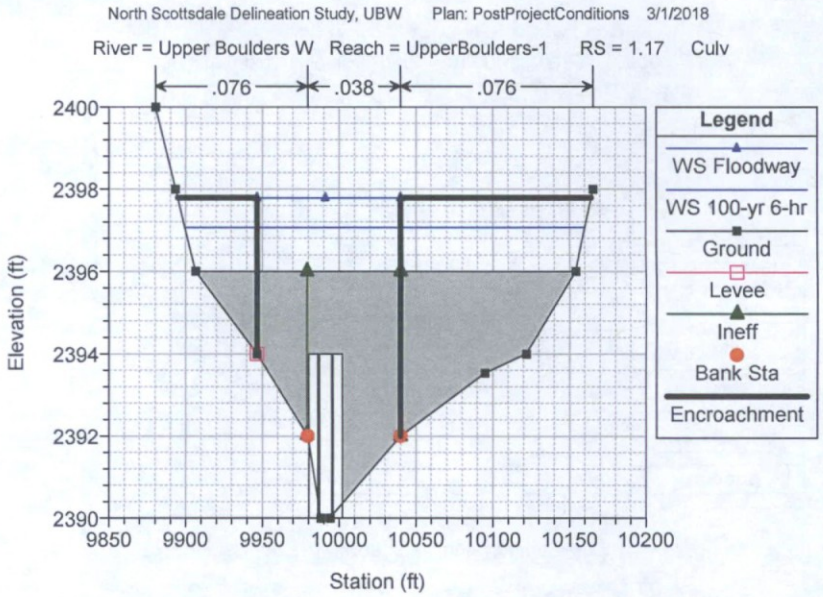
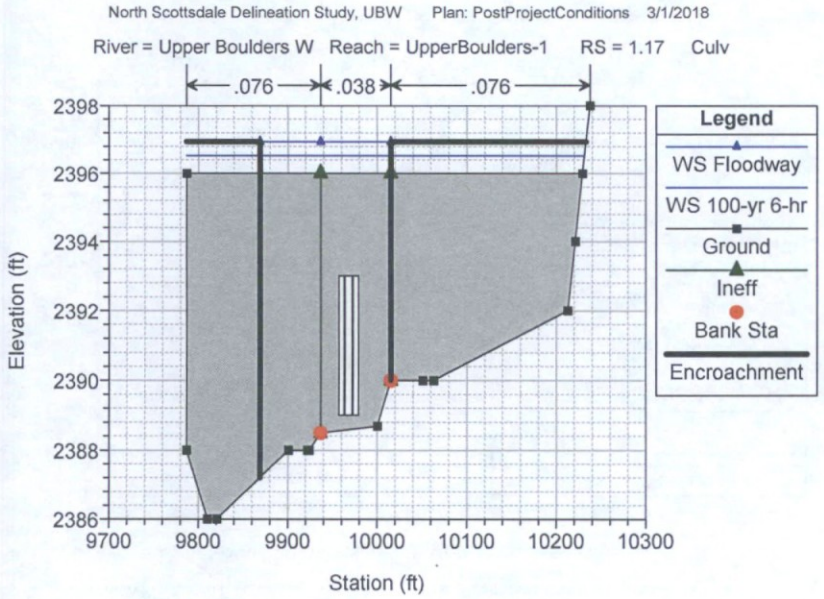
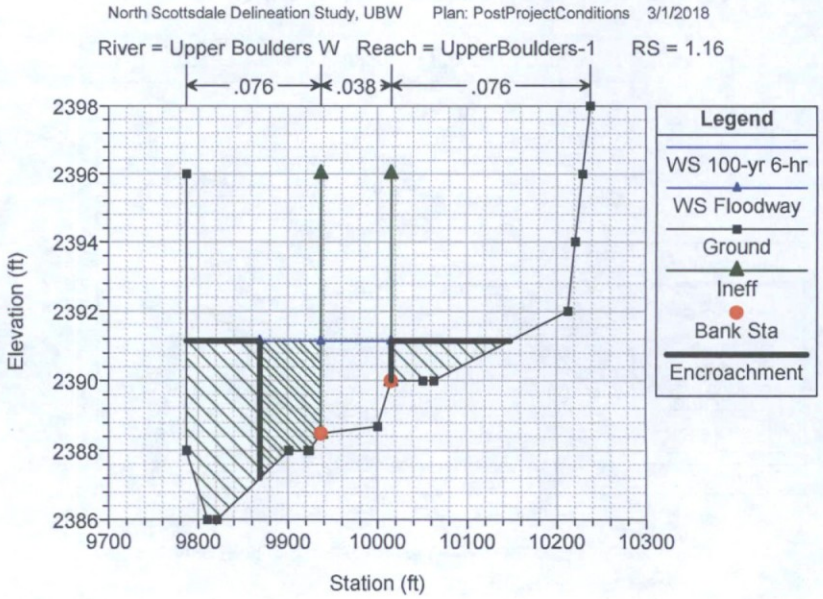
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: PostProjectConditions 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: PostProjectConditions 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.17 Culv
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Ineff
Bank Sta
Encroachment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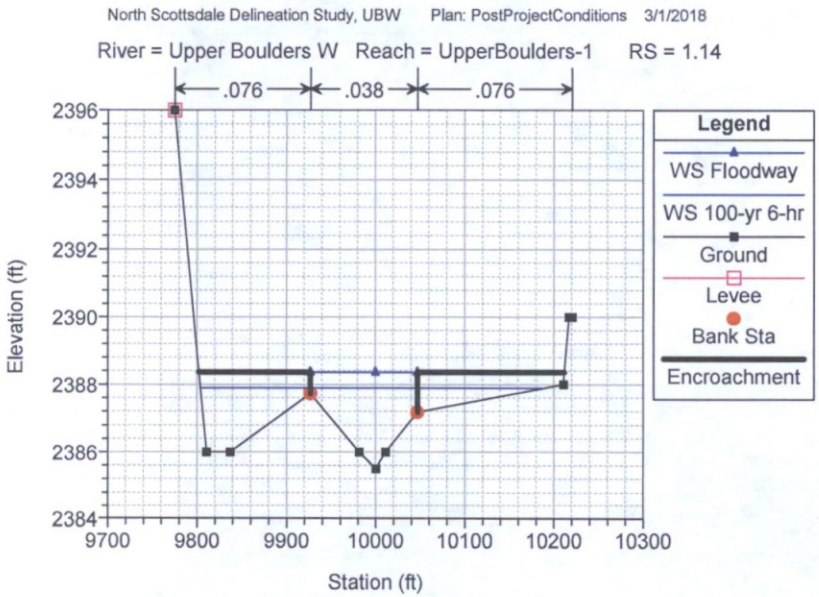
.076
.038
.076
Elevation (ft)
Station (ft)
Legend
WS 100-yr 6-hr
WS Floodway
Ground
Ineff
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: PostProjectConditions 3/1/2018
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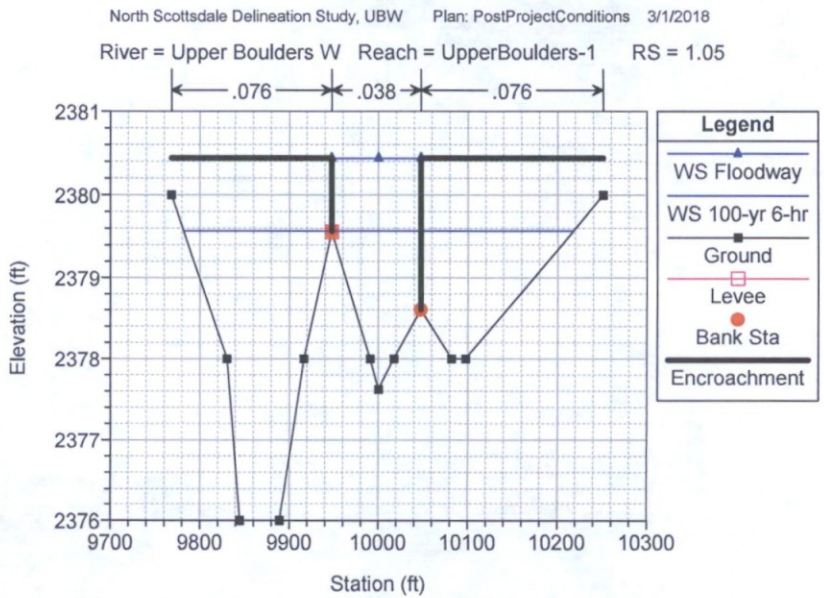
.076
.038
.076
Elevation (ft)
2396
2394
2392
2390
2388
2386
2384
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment


North Scottsdale Delineation Study, UBW Plan: PostProjectConditions 3/1/2018
River = Upper Boulders W Reach = UpperBoulders-1 RS = 1.05
.076
.038
.076
Elevation (ft)
2381
2380
2379
2378
2377
2376
9700
9800
9900
10000
10100
10200
10300
Station (ft)
Legend
WS Floodway
WS 100-yr 6-hr
Ground
Levee
Bank Sta
Encroachment

Kimley»Horn
Expect More. Experience Better.

Sheet No. 1 of 1

Job Estates at Hayden Subject Erosion Setbacks Job No. 291104000

Designed By CEO Date 3/2018 Checked By _____ Date _____

Upper Boulders Wash

Q_{100} (from FIS) = 1628 cfs

Setback = $1.0 * Q_{100}^{0.5}$

Setback = $1628^{0.5}$ = **40 ft**

Appendix D – Stormwater Storage

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 3/1/2018 **Project Name** Estates at Hayden

Project Location South of East Black Mountain Road, east of North Hayden Road, west of North 81st Street, north of East Westland Road

Applicant Contact Zach Schmidt, P.E., CFM **Company Name** Kimley-Horn

Phone 602-906-1116 Fax _____ E-mail zach.schmidt@kimley-horn.com

Address 7740 N. 16th Street, Suite 300, Phoenix, AZ 85020

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☐ 2. The development is on a parcel less than one-half acre in size.

☑ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

Partial waivers are available for projects or portions of properties within the Environmentally Sensitive Lands Zoning Overlay District, not meeting any of the three full waiver criteria above, if post-development peak discharge rates do not exceed pre-development conditions, based on the 10- and 100-year storm events.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

_____ _____

Engineer Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name _____

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

☐ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: _____

_____

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: _____

Explain: _____

_____

Recommended Conditions of Waiver:
- ☐ All storage requirements waived.
- ☐ Post-development peak discharge rates do not exceed pre-development conditions.
- ☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

☐ **Waiver denied.**

_____ _____

Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $1.87 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Estates at Hayden

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = 0.23
ΔC = 0.10
A = 439109
V = 9990
V_p = 3705
V_w = 6285

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $1.87 per cubic foot = $11,753

☐ An in-kind contribution will be made, as follows:

_____

_____

_____

☐ No in-lieu fee is required. Reason:

_____

_____

Approved by:

Zachary Schmidt

Floodplain Administrator or Designee

03/02/18

Date

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7781

Appendix E. Disclaimer and Liability

Appendix 4-1C

WARNING & DISCLAIMER OF LIABILITY

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

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

WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22
"The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by man-made or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder."

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

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

Plan Check No.	Zachary Schmidt Owner or Agent	03/02/18 Date	