CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

September 5, 2019

David Soule, P.E.
Rio Grande Engineering
P.O. Box 93924
Albuquerque, NM 87199

RE: 13648 Apache Plume Place NE
Grading and Drainage Plan
Engineer's Stamp Date: 08/25/19
Hydrology File: E23D034

Dear Mr. Soule:

Based upon the information provided in your submittal received 08/26/19, the Grading and Drainage Plan is approved for Building Permit.

Once the grading is complete, a pad certification will be required prior to release of Building Permit. Please attach a copy of this approved plan in the construction sets for Building Permit processing along with a copy of this letter and the pad certification approval letter.

Prior to approval in support of Permanent Release of Occupancy by Hydrology, Engineer Certification per the DPM checklist will be required.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov .

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: 13648 APACHE PLUME Building Permit #:_____ Hydrology File #: _____

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: LOT 67 UNIT 2 THE HIGHLANDS AT HIGH DESERT

City Address: 13648 APACHE PLUME

Applicant: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: RIO GRANDE ENGINEERING Contact: DAVID SOULE

Address: PO BOX 93924 ALB NM 87199

Phone#: 505.321.9099 Fax#: 505.872.0999 E-mail: david@riograndeengineering.com

TYPE OF DEVELOPMENT: ___ PLAT X RESIDENCE ___ DRB SITE ___ ADMIN SITE

Check all that Apply:

DEPARTMENT:

X HYDROLOGY/ DRAINAGE

___ TRAFFIC/ TRANSPORTATION

TYPE OF SUBMITTAL:

___ ENGINEER/ARCHITECT CERTIFICATION

___ PAD CERTIFICATION

___ CONCEPTUAL G & D PLAN

X GRADING PLAN

___ DRAINAGE REPORT

___ DRAINAGE MASTER PLAN

___ FLOODPLAIN DEVELOPMENT PERMIT APPLIC

___ ELEVATION CERTIFICATE

___ CLOMR/LOMR

___ TRAFFIC CIRCULATION LAYOUT (TCL)

___ TRAFFIC IMPACT STUDY (TIS)

___ STREET LIGHT LAYOUT

___ OTHER (SPECIFY) _____

___ PRE-DESIGN MEETING?

IS THIS A RESUBMITTAL?: ___ Yes X No

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

X BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY

___ PRELIMINARY PLAT APPROVAL

___ SITE PLAN FOR SUB'D APPROVAL

___ SITE PLAN FOR BLDG. PERMIT APPROVAL

___ FINAL PLAT APPROVAL

___ SIA/ RELEASE OF FINANCIAL GUARANTEE

___ FOUNDATION PERMIT APPROVAL

___ GRADING PERMIT APPROVAL

___ SO-19 APPROVAL

___ PAVING PERMIT APPROVAL

___ GRADING/ PAD CERTIFICATION

___ WORK ORDER APPROVAL

___ CLOMR/LOMR

___ FLOODPLAIN DEVELOPMENT PERMIT

___ OTHER (SPECIFY) _____

DATE SUBMITTED: _____ By: _____

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED:_____

FEE PAID:_____

DRAINAGE REPORT

For

13648 Apache Plume PL NE
Lot 67 Highlands at High Desert unit2

Albuquerque, New Mexico

Prepared by

Rio Grande Engineering
PO Box 93924
Albuquerque, New Mexico 87199

AUGUST 2019

8/25/19

David Soule P.E. No. 14522

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Map

Site Grading and Drainage Plan

PURPOSE

The purpose of this report is to provide the Drainage Management Plan for the subdivision of a 1.01 acre lot located in phase 2 of The Highlands. The plan shall conform to the Sustainability Guidelines for Estate lots in addition to the High Desert Master Drainage Plan and specifically the Highlands at High Desert grading plan. All historic drainage patterns shall be maintained. The developed flow shall not exceed existing flow rates for the 100-year, 6- hour event. The report shall demonstrate the project will not adversely affect the surrounding properties, nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report, as shown on the Exhibit A, is a 0.77 -acre parcel of land located on the southside of Apache Plume east of Elena Gallegos. The legal description of this site is lot 67 The Highlands at high desert phase 2. As shown on FIRM map35001C0161G, the entire site is located within Flood Zone X. The site is bound on the north by roadways. The site is impacted by upland flow. The site is an undeveloped site.

EXISTING CONDITIONS

The site is currently undeveloped. The site is impacted by 2.85 acres of upland flows. An upland flow of 7.28 cfs enters the site at the North East corner. This flow combines with the existing site flow and discharges at the southwest corner at a peak rate of 9.11 cfs.

Exhibit A- Vicinity Map

PROPOSED CONDITIONS

The proposed improvements consist of new residential structure. The proposed site development will contain 2 basins. Basin A contains the portion of the lot that is un developed or does not rains to the proposed detention pond. The basin generates 0.65 cfs which continues to drain to the west. Basin B contains the entire portion of the lot that drain to the proposed detention pond. This basin generates 1.84cfs. The peak flow is attenuated by the construction of a detention pond that captures 205 cubic feet for water quality and discharges at a routed peak rate of 1.12 cfs

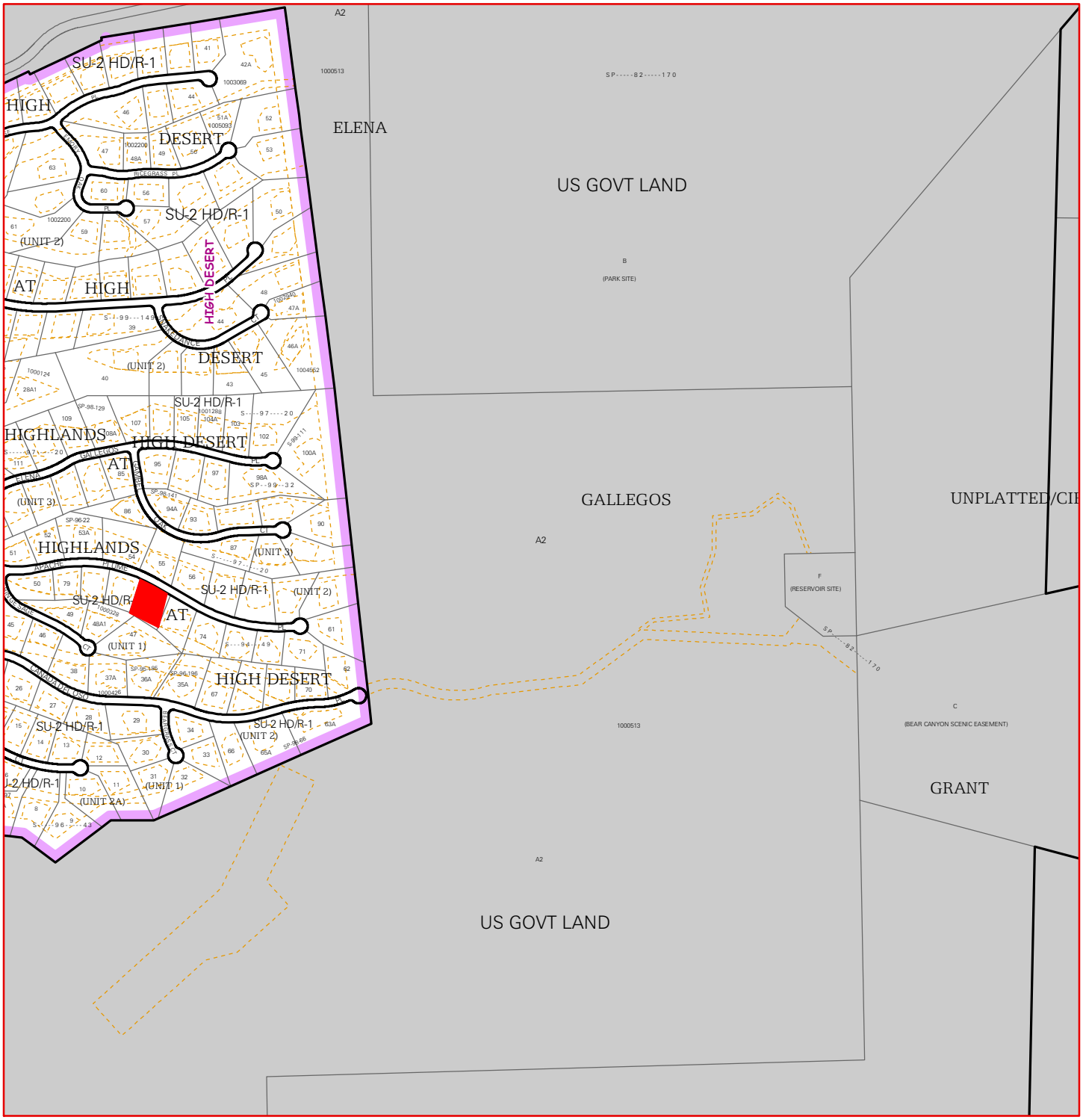
The site has been modeled using AHYMO. The peak flow leaving the site shall be 8.84 cfs which is less than the 9.11 cfs leaving the site currently.

SUMMARY AND RECOMMENDATIONS

This project is located within a fully designed basin of The Highlands drainage plan. The site has been designed to allow existing drainage patterns to remain. The site utilizes detention ponds to provide a peak flow rate of 8.84 CFS and captures 205 cubic feet for water quality. The site has been designed to conform to the Sustainability Guidelines for Estate lots in addition to the High Desert Master Drainage Plan. Since the lot area does exceed 1 acre, erosion and sediment Control Plan shall be required prior to any construction activity.

APPENDIX A

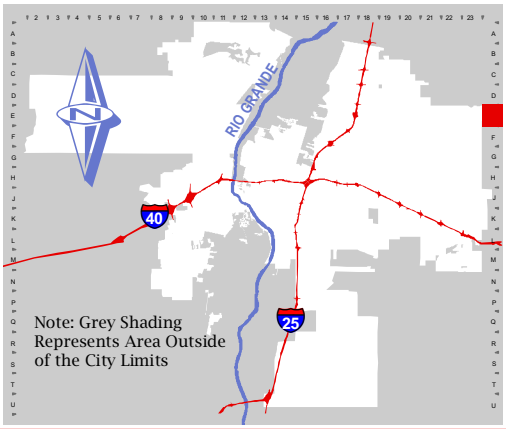
HYDRAULIC MODELING AND CALCULATIONS



For more current information and more details visit: http://www.cabq.gov/gis

Albuquerque Geographic Information System

Map amended through: 2/4/2010



Zone Atlas Page:

E-24-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet

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APPENDIX A

HYDRAULIC MODELING AND CALCULATIONS

CABQMaps - Advanced Map Viewer 2.0

Side Panel | Search | I want to... | Toolbar | Map

Search... | Sign in

Getting Around | Maps & Data Sources | Tasks

Tool Labels

Print | Export

Point | Query | Filter | Find an active survey monument

Find Data

Point

Draw

Polygon | Feet (ft) | Acres (ac) | Enable Snapping | Select Snapping Layers

Advanced Measurement

Edit | Export Drawings

Edit Drawings

Click or tap to draw a multi-sided shape and find area. Double-click/tap to finish.

Layers

All Available Layers

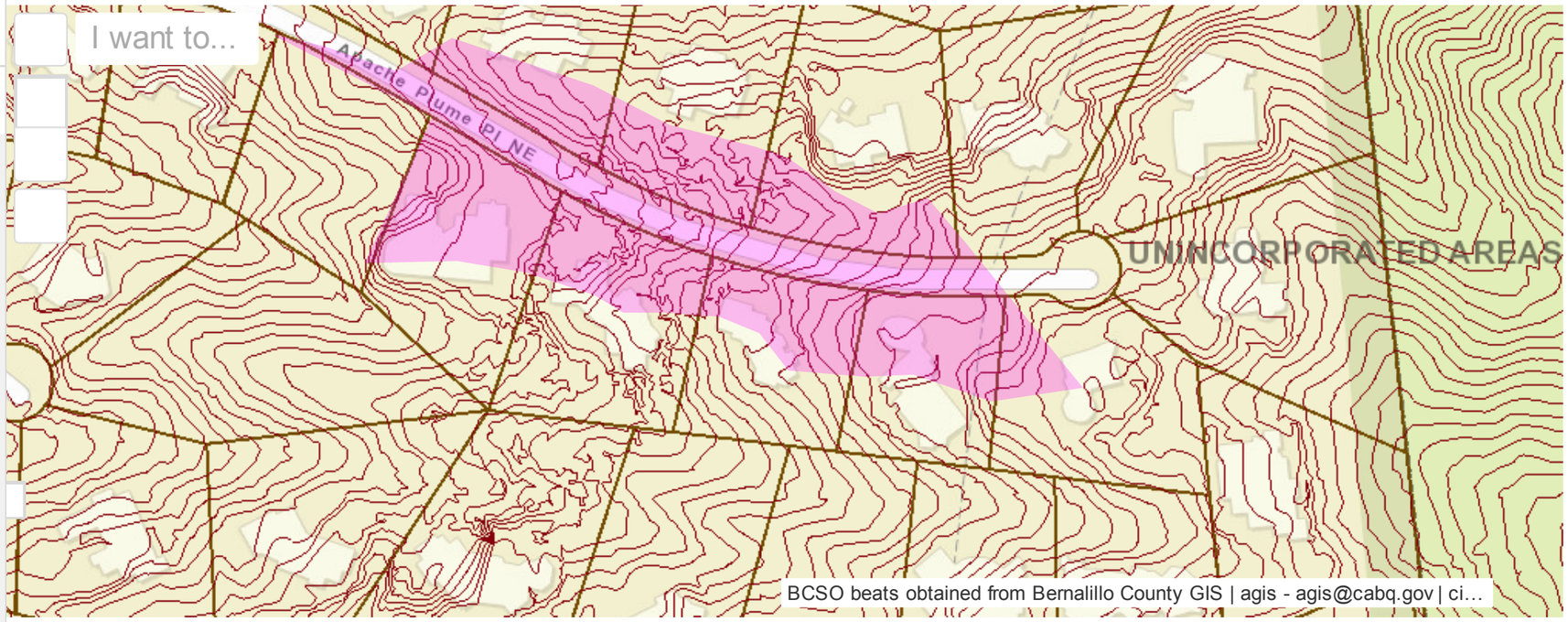
Filter Layers... | Filter

- Sites
- Environment
- Public Schools
- Traffic Barricades
- Traffic Engineering
- 2ft Contours
- Municipal Limits

Base Maps

- 2018 Aerial
- 2016 Aerial
- 2014 Aerial
- 2012 Aerial
- 1959 Aerial
- World Topo Map

Layers



World S…

0 100 200ft

VOLUME CALCULATIONS

pond b

	ACTUAL ELEV.	DEPTH (FT)	AREA SF	VOLUME PER UNIT	VOLUME CUMULATIVE	VOLUME AC-FT	Q (CFS)
	57.00	0.00	62.00	0	0	0.000	0.00
	58.00	0.00	189.00	125.50	125.5	0.001	0.00
OUTLET	58.35	0.00	268.00	79.98	205.475	0.005	0.00
	59.00	0.65	545.00	264.23	469.7	0.011	0.76
	59.85	1.50	689.00	524.45	994.15	0.023	1.16

Orifice Equation

Q = CA SQRT(2gH)

C =	0.6
Diameter (in)	6
Area (ft^2)=	0.196349541
g =	32.2
H (Ft) =	Depth of water above center of orifice
Q (CFS)=	Flow

```
        AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.01a - Rel: 01a
             RUN DATE (MON/DAY/YR) = 08/26/2019
             START TIME (HR:MIN:SEC) = 13:40:57     USER NO.=
RioGrandeSingleA41963517
             INPUT FILE = ments and Settings\Owner\Desktop\2019 JOBS\19161-APACHE
PLUME\pondrout082519.txt


    *S     AHYMO -  DETENTION-APACHE PLUME

    *S             POND ROUTING

    START               TIME=0.0  PUNCH CODE=0


    RAINFALL            TYPE=2
                        QUARTER=0.0    ONE= 1.85 IN
                        SIX=2.44 IN   DAY= 2.90 IN   DT = 0.05 HR



                    24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE
AREAS (NM & AZ) - D1
                    DT =   0.050000 HOURS       END TIME =    24.000002 HOURS
                      0.0000  0.0039  0.0080  0.0123  0.0170  0.0218  0.0273
                      0.0350  0.0473  0.0605  0.0742  0.0891  0.1041  0.1196
                      0.1355  0.1517  0.1696  0.1883  0.2083  0.2329  0.2596
                      0.2955  0.3361  0.3863  0.4532  0.5285  0.6585  0.8606
                      1.2070  1.4505  1.6425  1.7389  1.8235  1.8843  1.9326
                      1.9747  2.0056  2.0339  2.0573  2.0777  2.0966  2.1136
                      2.1297  2.1439  2.1574  2.1706  2.1833  2.1938  2.1997
                      2.2054  2.2110  2.2163  2.2216  2.2267  2.2317  2.2367
                      2.2414  2.2460  2.2506  2.2551  2.2595  2.2637  2.2679
                      2.2720  2.2761  2.2801  2.2839  2.2877  2.2915  2.2952
                      2.2988  2.3024  2.3060  2.3095  2.3130  2.3164  2.3198
                      2.3232  2.3265  2.3298  2.3330  2.3362  2.3394  2.3425
                      2.3456  2.3487  2.3518  2.3548  2.3577  2.3607  2.3636
                      2.3665  2.3694  2.3722  2.3750  2.3778  2.3805  2.3833
                      2.3860  2.3886  2.3913  2.3939  2.3965  2.3991  2.4017
                      2.4042  2.4068  2.4093  2.4117  2.4142  2.4166  2.4191
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                      2.4377  2.4400  2.4423  2.4445  2.4468  2.4490  2.4512
                      2.4535  2.4557  2.4579  2.4601  2.4623  2.4645  2.4667
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                      2.5832  2.5850  2.5869  2.5888  2.5907  2.5925  2.5944
                      2.5962  2.5981  2.5999  2.6018  2.6036  2.6054  2.6073
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                    2.7692  2.7704  2.7717  2.7729  2.7741  2.7753  2.7765
                    2.7777  2.7789  2.7801  2.7813  2.7825  2.7836  2.7848
                    2.7860  2.7871  2.7883  2.7894  2.7906  2.7917  2.7928
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                    2.8422  2.8431  2.8439  2.8447  2.8456  2.8464  2.8472
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                    2.8686  2.8692  2.8699  2.8705  2.8711  2.8718  2.8724
                    2.8730  2.8736  2.8742  2.8748  2.8754  2.8760  2.8766
                    2.8772  2.8778  2.8783  2.8789  2.8795  2.8800  2.8806
                    2.8811  2.8816  2.8822  2.8827  2.8832  2.8837  2.8842
                    2.8847  2.8852  2.8857  2.8862  2.8867  2.8872  2.8876
                    2.8881  2.8886  2.8890  2.8895  2.8899  2.8903  2.8908
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                    2.8940  2.8944  2.8948  2.8951  2.8955  2.8958  2.8962
                    2.8965  2.8969  2.8972  2.8976  2.8979  2.8982  2.8985
                    2.8988  2.8991  2.8994  2.8997  2.9000

    *Basin ONSITE FREE DISCHARGE
    COMPUTE NM HYD      ID=1  HYD NO=101  DA= .0004404 SQ MI
                        PER A=40  PER B=48 PER C=8  PER D=4
                        TP=-.138 MASSRAIN=-1


         K =  0.075210HR    TP =  0.138000HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
         UNIT PEAK =  0.67180E-01CFS   UNIT VOLUME =   0.8928       B =   526.28
 P60 = 1.8500
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INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.050000


         K =  0.147925HR    TP =  0.138000HR    K/TP RATIO =  1.071921     SHAPE
CONSTANT, N =  3.294865
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 P60 = 1.8500
         AREA =     0.000423 SQ MI    IA =   0.55000 INCHES    INF =   1.39000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.050000

    PRINT HYD           ID=1  CODE=3

                                       PARTIAL HYDROGRAPH   101.00

         TIME      FLOW           TIME      FLOW           TIME      FLOW
TIME      FLOW           TIME      FLOW
          HRS       CFS             HRS       CFS            HRS       CFS
HRS       CFS             HRS       CFS
         0.000       0.0          0.750       0.0          1.500       0.6
2.250       0.0          3.000       0.0
```

```
        0.150       0.0          0.900       0.0          1.650       0.4
2.400       0.0
        0.300       0.0          1.050       0.0          1.800       0.2
2.550       0.0
        0.450       0.0          1.200       0.0          1.950       0.1
2.700       0.0
        0.600       0.0          1.350       0.1          2.100       0.1
2.850       0.0

        RUNOFF VOLUME =     0.87240 INCHES     =       0.0205 ACRE-FEET
        PEAK DISCHARGE RATE =       0.65 CFS  AT   1.550 HOURS   BASIN AREA =
0.0004 SQ. MI.




    *Basin ONSITE ROUTED
    COMPUTE NM HYD      ID=2  HYD NO=102  DA= .00081479 SQ MI
                        PER A=9  PER B=20 PER C=23  PER D=48
                        TP=-.138  MASSRAIN=-1


        K =  0.075210HR    TP =  0.138000HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
        UNIT PEAK =   1.4915    CFS   UNIT VOLUME =   0.9912       B =   526.28
 P60 = 1.8500
        AREA =     0.000391 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.050000


        K =  0.130091HR    TP =  0.138000HR    K/TP RATIO =  0.942685     SHAPE
CONSTANT, N =  3.750422
        UNIT PEAK =   1.0383    CFS   UNIT VOLUME =   0.9888       B =   338.18
 P60 = 1.8500
        AREA =     0.000424 SQ MI    IA =   0.45962 INCHES    INF =   1.13692
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.050000

    PRINT HYD           ID=2  CODE=3

                                    PARTIAL HYDROGRAPH   102.00

        TIME      FLOW          TIME      FLOW          TIME      FLOW
TIME      FLOW          TIME      FLOW
         HRS       CFS           HRS       CFS           HRS       CFS
HRS       CFS           HRS       CFS
        0.000       0.0          4.950       0.0          9.900       0.0
14.850       0.0          19.800       0.0
        0.150       0.0          5.100       0.0         10.050       0.0
15.000       0.0          19.950       0.0
        0.300       0.0          5.250       0.0         10.200       0.0
15.150       0.0          20.100       0.0
        0.450       0.0          5.400       0.0         10.350       0.0
15.300       0.0          20.250       0.0
        0.600       0.0          5.550       0.0         10.500       0.0
15.450       0.0          20.400       0.0
        0.750       0.0          5.700       0.0         10.650       0.0
15.600       0.0          20.550       0.0
        0.900       0.1          5.850       0.0         10.800       0.0
15.750       0.0          20.700       0.0
        1.050       0.1          6.000       0.0         10.950       0.0
```

15.900	0.0	20.850	0.0				
1.200	0.2	6.150	0.0	11.100	0.0		
16.050	0.0	21.000	0.0				
1.350	0.5	6.300	0.0	11.250	0.0		
16.200	0.0	21.150	0.0				
1.500	1.8	6.450	0.0	11.400	0.0		
16.350	0.0	21.300	0.0				
1.650	1.1	6.600	0.0	11.550	0.0		
16.500	0.0	21.450	0.0				
1.800	0.5	6.750	0.0	11.700	0.0		
16.650	0.0	21.600	0.0				
1.950	0.3	6.900	0.0	11.850	0.0		
16.800	0.0	21.750	0.0				
2.100	0.2	7.050	0.0	12.000	0.0		
16.950	0.0	21.900	0.0				
2.250	0.1	7.200	0.0	12.150	0.0		
17.100	0.0	22.050	0.0				
2.400	0.1	7.350	0.0	12.300	0.0		
17.250	0.0	22.200	0.0				
2.550	0.0	7.500	0.0	12.450	0.0		
17.400	0.0	22.350	0.0				
2.700	0.0	7.650	0.0	12.600	0.0		
17.550	0.0	22.500	0.0				
2.850	0.0	7.800	0.0	12.750	0.0		
17.700	0.0	22.650	0.0				
3.000	0.0	7.950	0.0	12.900	0.0		
17.850	0.0	22.800	0.0				
3.150	0.0	8.100	0.0	13.050	0.0		
18.000	0.0	22.950	0.0				
3.300	0.0	8.250	0.0	13.200	0.0		
18.150	0.0	23.100	0.0				
3.450	0.0	8.400	0.0	13.350	0.0		
18.300	0.0	23.250	0.0				
3.600	0.0	8.550	0.0	13.500	0.0		
18.450	0.0	23.400	0.0				
3.750	0.0	8.700	0.0	13.650	0.0		
18.600	0.0	23.550	0.0				
3.900	0.0	8.850	0.0	13.800	0.0		
18.750	0.0	23.700	0.0				
4.050	0.0	9.000	0.0	13.950	0.0		
18.900	0.0	23.850	0.0				
4.200	0.0	9.150	0.0	14.100	0.0		
19.050	0.0	24.000	0.0				
4.350	0.0	9.300	0.0	14.250	0.0		
19.200	0.0						
4.500	0.0	9.450	0.0	14.400	0.0		
19.350	0.0						
4.650	0.0	9.600	0.0	14.550	0.0		
19.500	0.0						
4.800	0.0	9.750	0.0	14.700	0.0		
19.650	0.0						

RUNOFF VOLUME = 1.74744 INCHES = 0.0759 ACRE-FEET
PEAK DISCHARGE RATE = 1.80 CFS AT 1.500 HOURS BASIN AREA = 0.0008 SQ. MI.

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*Basin ONSITE EXISTING
COMPUTE NM HYD      ID=3  HYD NO=103  DA= .0012552 SQ MI
                    PER A=42  PER B=40 PER C=14  PER D=4
                    TP=-.138  MASSRAIN=-1
```

K = 0.075210HR TP = 0.138000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 0.19147 CFS UNIT VOLUME = 0.9442 B = 526.28 P60 = 1.8500
AREA = 0.000050 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.050000

K = 0.146970HR TP = 0.138000HR K/TP RATIO = 1.065003 SHAPE CONSTANT, N = 3.315776
UNIT PEAK = 2.6775 CFS UNIT VOLUME = 0.9955 B = 306.64 P60 = 1.8500
AREA = 0.001205 SQ MI IA = 0.54375 INCHES INF = 1.37250 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.050000

PRINT HYD ID=3 CODE=3

PARTIAL HYDROGRAPH 103.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.700	0.0	5.400	0.0
8.100	0.0	10.800	0.0		
0.150	0.0	2.850	0.0	5.550	0.0
8.250	0.0	10.950	0.0		
0.300	0.0	3.000	0.0	5.700	0.0
8.400	0.0	11.100	0.0		
0.450	0.0	3.150	0.0	5.850	0.0
8.550	0.0	11.250	0.0		
0.600	0.0	3.300	0.0	6.000	0.0
8.700	0.0	11.400	0.0		
0.750	0.0	3.450	0.0	6.150	0.0
8.850	0.0	11.550	0.0		
0.900	0.0	3.600	0.0	6.300	0.0
9.000	0.0	11.700	0.0		
1.050	0.0	3.750	0.0	6.450	0.0
9.150	0.0	11.850	0.0		
1.200	0.0	3.900	0.0	6.600	0.0
9.300	0.0	12.000	0.0		
1.350	0.3	4.050	0.0	6.750	0.0
9.450	0.0	12.150	0.0		
1.500	1.8	4.200	0.0	6.900	0.0
9.600	0.0	12.300	0.0		
1.650	1.2	4.350	0.0	7.050	0.0
9.750	0.0	12.450	0.0		
1.800	0.5	4.500	0.0	7.200	0.0
9.900	0.0	12.600	0.0		
1.950	0.2	4.650	0.0	7.350	0.0
10.050	0.0	12.750	0.0		
2.100	0.1	4.800	0.0	7.500	0.0
10.200	0.0				
2.250	0.1	4.950	0.0	7.650	0.0
10.350	0.0				
2.400	0.1	5.100	0.0	7.800	0.0
10.500	0.0				
2.550	0.1	5.250	0.0	7.950	0.0
10.650	0.0				

RUNOFF VOLUME = 0.88097 INCHES = 0.0590 ACRE-FEET
PEAK DISCHARGE RATE = 1.84 CFS AT 1.550 HOURS BASIN AREA =

0.0013 SQ. MI.

* ONSITE ROUTED THRU POND-

* ROUTE THE TOTAL FLOW THROUGH THE PROPOSED RESERVOIR
ROUTE RESERVOIR ID=4 HYD NO=104 INFLOW=3 CODE=3

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEV(FT)
0.00	0.005	58.35
0.76	0.011	59.00
1.16	0.023	59.85

* * * * * * * * * * * * * * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	58.35	0.005	0.00
0.15	0.00	58.35	0.005	0.00
0.30	0.00	58.35	0.005	0.00
0.45	0.00	58.35	0.005	0.00
0.60	0.00	58.35	0.005	0.00
0.75	0.01	58.35	0.005	0.00
0.90	0.01	58.36	0.005	0.01
1.05	0.01	58.36	0.005	0.01
1.20	0.02	58.37	0.005	0.02
1.35	0.33	58.45	0.006	0.11
1.50	1.84	59.21	0.014	0.86
1.65	1.23	59.77	0.022	1.12
1.80	0.48	59.52	0.018	1.01
1.95	0.22	59.03	0.011	0.77
2.10	0.14	58.60	0.007	0.30
2.25	0.10	58.48	0.006	0.15
2.40	0.07	58.43	0.006	0.10
2.55	0.05	58.41	0.006	0.07
2.70	0.04	58.39	0.005	0.05
2.85	0.03	58.38	0.005	0.03
3.00	0.02	58.37	0.005	0.02
3.15	0.01	58.36	0.005	0.02
3.30	0.01	58.36	0.005	0.01
3.45	0.00	58.36	0.005	0.01
3.60	0.00	58.35	0.005	0.00

PEAK DISCHARGE = 1.120 CFS - PEAK OCCURS AT HOUR 1.65
MAXIMUM WATER SURFACE ELEVATION = 59.765
MAXIMUM STORAGE = 0.0218 AC-FT INCREMENTAL TIME= 0.050000HRS

*Basin DEVELOPED UPLAND
COMPUTE NM HYD ID=5 HYD NO=105 DA= .004453 SQ MI
PER A=60 PER B=9 PER C=4 PER D=27
TP=-.138 MASSRAIN=-1

K = 0.075210HR TP = 0.138000HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 4.5851 CFS UNIT VOLUME = 0.9962 B = 526.28 P60 = 1.8500
AREA = 0.001202 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.050000

K = 0.162464HR TP = 0.138000HR K/TP RATIO = 1.177274 SHAPE CONSTANT, N = 3.013732
UNIT PEAK = 6.6650 CFS UNIT VOLUME = 0.9969 B = 282.95 P60 = 1.8500
AREA = 0.003251 SQ MI IA = 0.61507 INCHES INF = 1.57219 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.050000

PRINT HYD ID=5 CODE=3

PARTIAL HYDROGRAPH 105.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0	14.850	0.0
0.150	0.0	5.100	0.0	10.050	0.0	15.000	0.0
0.300	0.0	5.250	0.0	10.200	0.0	15.150	0.0
0.450	0.0	5.400	0.0	10.350	0.0	15.300	0.0
0.600	0.0	5.550	0.0	10.500	0.0	15.450	0.0
0.750	0.1	5.700	0.0	10.650	0.0	15.600	0.0
0.900	0.2	5.850	0.0	10.800	0.0	15.750	0.0
1.050	0.3	6.000	0.0	10.950	0.0	15.900	0.0
1.200	0.5	6.150	0.0	11.100	0.0	16.050	0.0
1.350	1.7	6.300	0.0	11.250	0.0	16.200	0.0
1.500	7.3	6.450	0.0	11.400	0.0	16.350	0.0
1.650	4.8	6.600	0.0	11.550	0.0	16.500	0.0
1.800	2.2	6.750	0.0	11.700	0.0	16.650	0.0
1.950	1.1	6.900	0.0	11.850	0.0	16.800	0.0
2.100	0.7	7.050	0.0	12.000	0.0	16.950	0.0
2.250	0.5	7.200	0.0	12.150	0.0	17.100	0.0
2.400	0.4	7.350	0.0	12.300	0.0	17.250	0.0
2.550	0.2	7.500	0.0	12.450	0.0	17.400	0.0
2.700	0.2	7.650	0.0	12.600	0.0	17.550	0.0
2.850	0.1	7.800	0.0	12.750	0.0	17.700	0.0
3.000	0.1	7.950	0.0	12.900	0.0	17.850	0.0
3.150	0.1	8.100	0.0	13.050	0.0	18.000	0.0
3.300	0.1	8.250	0.0	13.200	0.0	18.150	0.0
3.450	0.1	8.400	0.0	13.350	0.0	18.300	0.0
3.600	0.1	8.550	0.0	13.500	0.0	18.450	0.0
3.750	0.1	8.700	0.0	13.650	0.0	18.600	0.0
3.900	0.1	8.850	0.0	13.800	0.0	18.750	0.0
4.050	0.1	9.000	0.0	13.950	0.0	18.900	0.0
4.200	0.1	9.150	0.0	14.100	0.0	19.050	0.0
4.350	0.1	9.300	0.0	14.250	0.0	19.200	0.0
4.500	0.1	9.450	0.0	14.400	0.0	19.350	0.0
4.650	0.1	9.600	0.0	14.550	0.0	19.500	0.0
4.800	0.1	9.750	0.0	14.700	0.0	19.650	0.0

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
3.600	0.0	8.550	0.0	13.500	0.0
18.450	0.0	23.400	0.0		
3.750	0.0	8.700	0.0	13.650	0.0
18.600	0.0	23.550	0.0		
3.900	0.0	8.850	0.0	13.800	0.0
18.750	0.0	23.700	0.0		
4.050	0.0	9.000	0.0	13.950	0.0
18.900	0.0	23.850	0.0		
4.200	0.0	9.150	0.0	14.100	0.0
19.050	0.0	24.000	0.0		
4.350	0.0	9.300	0.0	14.250	0.0
19.200	0.0	24.150	0.0		
4.500	0.0	9.450	0.0	14.400	0.0
19.350	0.0				
4.650	0.0	9.600	0.0	14.550	0.0
19.500	0.0				
4.800	0.0	9.750	0.0	14.700	0.0
19.650	0.0				

RUNOFF VOLUME = 1.23312 INCHES = 0.2929 ACRE-FEET
PEAK DISCHARGE RATE = 7.28 CFS AT 1.500 HOURS BASIN AREA = 0.0045 SQ. MI.

*TOTAL EXISTING

ADD HYD ID=6 HYD NO=106 ID I=3 ID II=5
PRINT HYD ID=6 CODE=3

PARTIAL HYDROGRAPH 106.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.150	0.0	5.100	0.0	10.050	0.0
15.000	0.0	19.950	0.0		
0.300	0.0	5.250	0.0	10.200	0.0
15.150	0.0	20.100	0.0		
0.450	0.0	5.400	0.0	10.350	0.0
15.300	0.0	20.250	0.0		
0.600	0.0	5.550	0.0	10.500	0.0
15.450	0.0	20.400	0.0		
0.750	0.1	5.700	0.0	10.650	0.0
15.600	0.0	20.550	0.0		
0.900	0.2	5.850	0.0	10.800	0.0
15.750	0.0	20.700	0.0		
1.050	0.3	6.000	0.0	10.950	0.0
15.900	0.0	20.850	0.0		
1.200	0.6	6.150	0.0	11.100	0.0
16.050	0.0	21.000	0.0		
1.350	2.0	6.300	0.0	11.250	0.0
16.200	0.0	21.150	0.0		
1.500	9.1	6.450	0.0	11.400	0.0
16.350	0.0	21.300	0.0		
1.650	6.0	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.800	2.6	6.750	0.0	11.700	0.0
16.650	0.0	21.600	0.0		
1.950	1.3	6.900	0.0	11.850	0.0
16.800	0.0	21.750	0.0		

2.100	0.9	7.050	0.0	12.000	0.0
16.950	0.0	21.900	0.0		
2.250	0.6	7.200	0.0	12.150	0.0
17.100	0.0	22.050	0.0		
2.400	0.5	7.350	0.0	12.300	0.0
17.250	0.0	22.200	0.0		
2.550	0.3	7.500	0.0	12.450	0.0
17.400	0.0	22.350	0.0		
2.700	0.2	7.650	0.0	12.600	0.0
17.550	0.0	22.500	0.0		
2.850	0.2	7.800	0.0	12.750	0.0
17.700	0.0	22.650	0.0		
3.000	0.1	7.950	0.0	12.900	0.0
17.850	0.0	22.800	0.0		
3.150	0.1	8.100	0.0	13.050	0.0
18.000	0.0	22.950	0.0		
3.300	0.1	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.450	0.1	8.400	0.0	13.350	0.0
18.300	0.0	23.250	0.0		
3.600	0.0	8.550	0.0	13.500	0.0
18.450	0.0	23.400	0.0		
3.750	0.0	8.700	0.0	13.650	0.0
18.600	0.0	23.550	0.0		
3.900	0.0	8.850	0.0	13.800	0.0
18.750	0.0	23.700	0.0		
4.050	0.0	9.000	0.0	13.950	0.0
18.900	0.0	23.850	0.0		
4.200	0.0	9.150	0.0	14.100	0.0
19.050	0.0	24.000	0.0		
4.350	0.0	9.300	0.0	14.250	0.0
19.200	0.0	24.150	0.0		
4.500	0.0	9.450	0.0	14.400	0.0
19.350	0.0				
4.650	0.0	9.600	0.0	14.550	0.0
19.500	0.0				
4.800	0.0	9.750	0.0	14.700	0.0
19.650	0.0				

RUNOFF VOLUME = 1.15380 INCHES = 0.3513 ACRE-FEET
PEAK DISCHARGE RATE = 9.11 CFS AT 1.500 HOURS BASIN AREA = 0.0057 SQ. MI.

*TOTAL PROPOSED

ADD HYD ID=7 HYD NO=107 ID I=1 ID II=4
ADD HYD ID=8 HYD NO=108 ID I=5 ID II=7

PRINT HYD ID=8 CODE=3

PARTIAL HYDROGRAPH 108.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.150	0.0	5.100	0.0	10.050	0.0
15.000	0.0	19.950	0.0		
0.300	0.0	5.250	0.0	10.200	0.0
15.150	0.0	20.100	0.0		

0.450	0.0	5.400	0.0	10.350	0.0
15.300	0.0	20.250	0.0		
0.600	0.0	5.550	0.0	10.500	0.0
15.450	0.0	20.400	0.0		
0.750	0.1	5.700	0.0	10.650	0.0
15.600	0.0	20.550	0.0		
0.900	0.2	5.850	0.0	10.800	0.0
15.750	0.0	20.700	0.0		
1.050	0.3	6.000	0.0	10.950	0.0
15.900	0.0	20.850	0.0		
1.200	0.6	6.150	0.0	11.100	0.0
16.050	0.0	21.000	0.0		
1.350	1.9	6.300	0.0	11.250	0.0
16.200	0.0	21.150	0.0		
1.500	8.8	6.450	0.0	11.400	0.0
16.350	0.0	21.300	0.0		
1.650	6.3	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.800	3.3	6.750	0.0	11.700	0.0
16.650	0.0	21.600	0.0		
1.950	2.0	6.900	0.0	11.850	0.0
16.800	0.0	21.750	0.0		
2.100	1.1	7.050	0.0	12.000	0.0
16.950	0.0	21.900	0.0		
2.250	0.7	7.200	0.0	12.150	0.0
17.100	0.0	22.050	0.0		
2.400	0.5	7.350	0.0	12.300	0.0
17.250	0.0	22.200	0.0		
2.550	0.3	7.500	0.0	12.450	0.0
17.400	0.0	22.350	0.0		
2.700	0.2	7.650	0.0	12.600	0.0
17.550	0.0	22.500	0.0		
2.850	0.2	7.800	0.0	12.750	0.0
17.700	0.0	22.650	0.0		
3.000	0.1	7.950	0.0	12.900	0.0
17.850	0.0	22.800	0.0		
3.150	0.1	8.100	0.0	13.050	0.0
18.000	0.0	22.950	0.0		
3.300	0.1	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.450	0.1	8.400	0.0	13.350	0.0
18.300	0.0	23.250	0.0		
3.600	0.0	8.550	0.0	13.500	0.0
18.450	0.0	23.400	0.0		
3.750	0.0	8.700	0.0	13.650	0.0
18.600	0.0	23.550	0.0		
3.900	0.0	8.850	0.0	13.800	0.0
18.750	0.0	23.700	0.0		
4.050	0.0	9.000	0.0	13.950	0.0
18.900	0.0	23.850	0.0		
4.200	0.0	9.150	0.0	14.100	0.0
19.050	0.0	24.000	0.0		
4.350	0.0	9.300	0.0	14.250	0.0
19.200	0.0	24.150	0.0		
4.500	0.0	9.450	0.0	14.400	0.0
19.350	0.0				
4.650	0.0	9.600	0.0	14.550	0.0
19.500	0.0				
4.800	0.0	9.750	0.0	14.700	0.0
19.650	0.0				

RUNOFF VOLUME = 1.13193 INCHES = 0.3712 ACRE-FEET
PEAK DISCHARGE RATE = 8.84 CFS AT 1.550 HOURS BASIN AREA = 0.0061 SQ. MI.

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FINISH
    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 13:40:57
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*S     AHYMO -  DETENTION-APACHE PLUME
*S              POND ROUTING

START               TIME=0.0  PUNCH CODE=0


RAINFALL            TYPE=2
                    QUARTER=0.0    ONE= 1.85 IN
                    SIX=2.44 IN   DAY= 2.90 IN   DT = 0.05 HR



*Basin ONSITE FREE DISCHARGE
COMPUTE NM HYD      ID=1  HYD NO=101  DA= .0004404 SQ MI


                    PER A=40  PER B=48 PER C=8  PER D=4
                    TP=-.138 MASSRAIN=-1




PRINT HYD           ID=1  CODE=3



*Basin ONSITE ROUTED
COMPUTE NM HYD      ID=2  HYD NO=102  DA= .00081479 SQ MI


                    PER A=9  PER B=20 PER C=23  PER D=48
                    TP=-.138  MASSRAIN=-1

PRINT HYD           ID=2  CODE=3


*Basin ONSITE EXISTING
COMPUTE NM HYD      ID=3  HYD NO=103  DA= .0012552 SQ MI


                    PER A=42  PER B=40 PER C=14  PER D=4
                    TP=-.138  MASSRAIN=-1

PRINT HYD           ID=3  CODE=3


*  ONSITE ROUTED THRU POND-

* ROUTE THE TOTAL FLOW THROUGH THE PROPOSED RESERVOIR
ROUTE RESERVOIR     ID=4   HYD NO=104   INFLOW=3   CODE=3
                    OUTFLOW(CFS)    STORAGE(AC-FT)    ELEV(FT)
                       0.00             0.005         58.35
                       0.76             0.011         59.00
                       1.16             0.023         59.85


*Basin DEVELOPED UPLAND
COMPUTE NM HYD      ID=5  HYD NO=105  DA= .004453 SQ MI


                    PER A=60  PER B=9 PER C=4  PER D=27
                    TP=-.138 MASSRAIN=-1
```
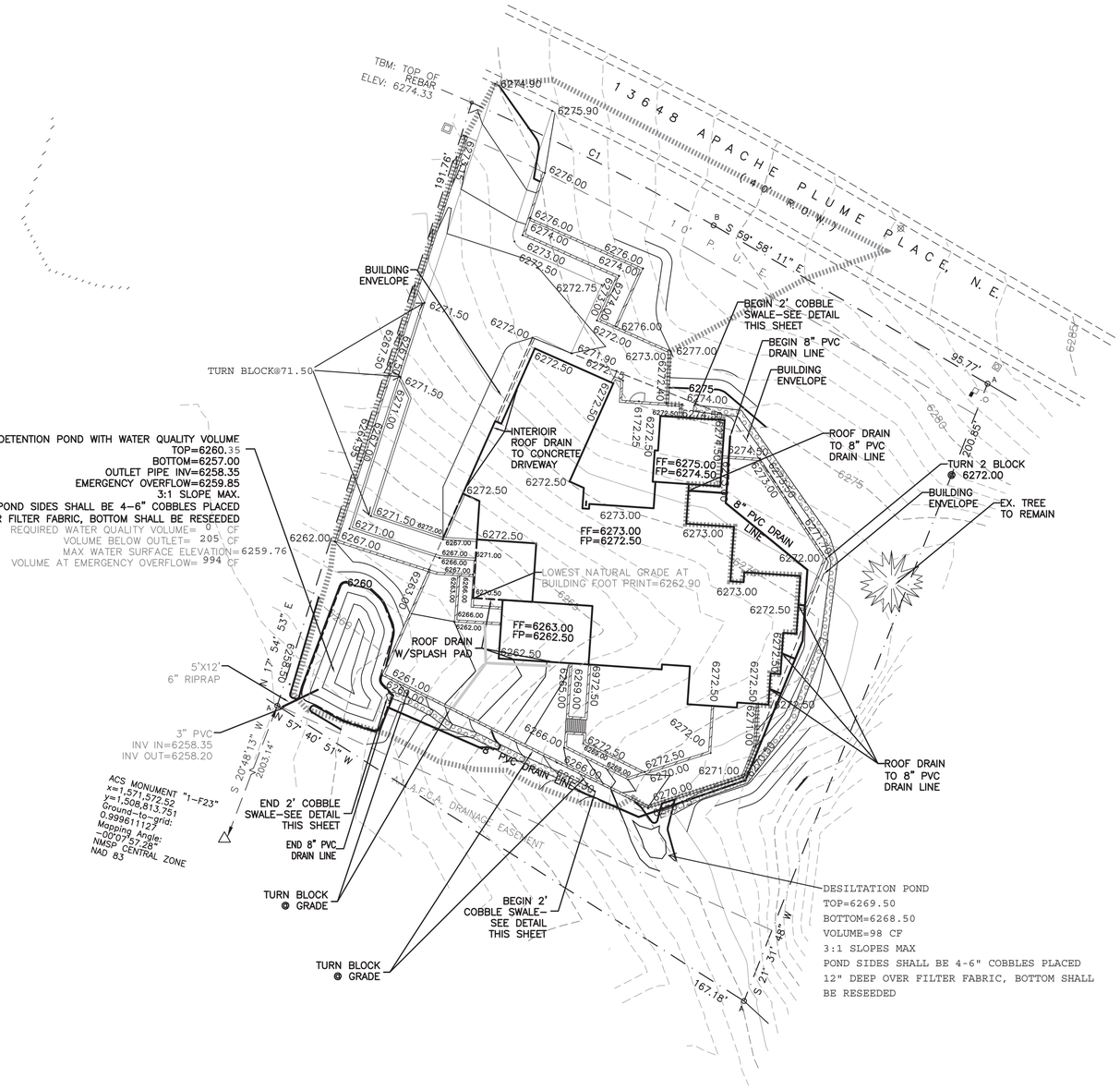

```
PRINT HYD           ID=5  CODE=3

*TOTAL EXISTING
ADD HYD             ID=6  HYD NO=106  ID I=3 ID II=5

PRINT HYD           ID=6  CODE=3

*TOTAL PROPOSED
ADD HYD             ID=7  HYD NO=107  ID I=1 ID II=4

ADD HYD             ID=8  HYD NO=108  ID I=5 ID II=7
PRINT HYD           ID=8  CODE=3


FINISH
```

CAUTION:

EXISTING UTILITIES ARE NOT SHOWN. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO ANY EXCAVATION TO DETERMINE THE ACTUAL LOCATION OF UTILITIES & OTHER IMPROVEMENTS.



EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.

2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.

3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.

4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT FLOWLINE ELEVATION UNLESS OTHERWISE NOTED.

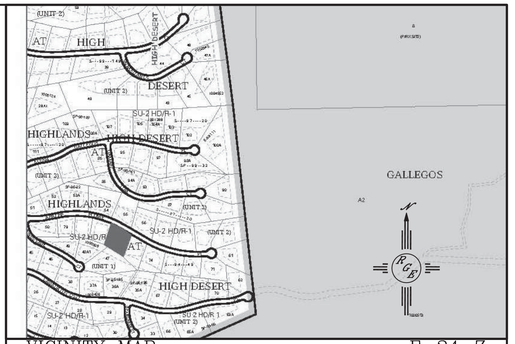
2. ALL ROOF DRAINS SHALL HAVE A SLASH PAD AND 2' COBBLE SWALE THAT SHALL TIE TO MAIN COBBLES SWALES AROUND THE HOUSE PER DETAIL THIS SHEET..

3. ALL DISTURBED AREAS SHALL BE RESEEDED WITH APPROVED HIGH DESERT MIX WITHIN 30 DAYS AFTER THE END OF DISTURBANCE.

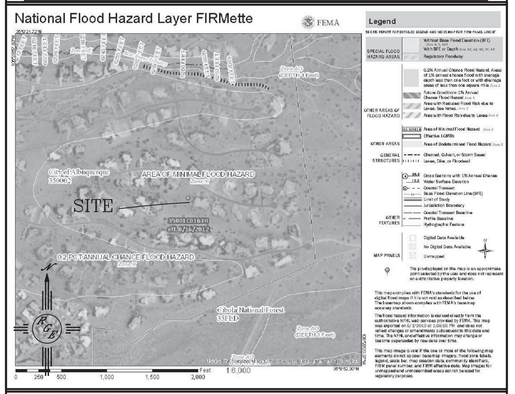
4. ALL SLOPES SHALL BE 3:1 MAX. AND GRAVEL OR NATIVE SEEDING PRIOR TO CO.

5. SURVEY PROVIDED BY COMMUNITY SCIENCES CORPORATION, BASED UPON NAVD 1988 DATUM.

6. ALL ROOF DRAINS SHALL CONNECT TO 8" UNDERGROUND DRAIN. LINE SHALL HAVE AIR GAP AT HOUSE AND DISCHARGE TO POND. INVERT OUT @ 6259



VICINITY MAP: E-24-Z



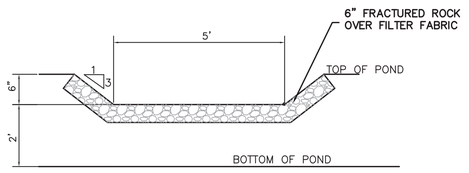
FIRM MAP:

LEGAL DESCRIPTION:

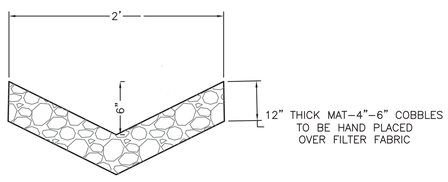
LOT 76, THE HIGHLANDS, AT HIGH DESERT UNIT 2

LEGEND

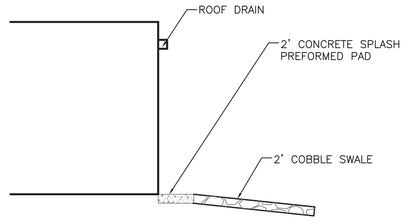
- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED CONTOUR
- PROPOSED INDEX CONTOUR
- SLOPE TIE
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- BOUNDARY
- CENTERLINE
- RIGHT-OF-WAY
- PROPOSED CURB AND GUTTER
- EXISTING EDGE OF ASPHALT
- PROPOSED 1'-2 LANDSCAPE WALL
- 2' COBBLE SWALE-SEE DETAIL THIS SHEET
- BASIN LIMITS



EMERGENCY OVERFLOW DETAIL
NTS



COBBLE SWALE DETAIL
NTS



ROOF DRAIN SPLASH PAD DETAIL
NTS

SCALE: 1"=20'

ENGINEER'S SEAL
DAVID SOULE NEW MEXICO 14522 REGISTERED PROFESSIONAL ENGINEER
8/25/19
DAVID SOULE P.E. #14522

13648 APACHE PLUME

GRADING AND DRAINAGE PLAN

Rio Grande Engineering
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DRAWN BY WCWJ
DATE 8-12-19
2109064-LAYOUT-8-12-19
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JOB # 2109064