AMAFCA

Amole-Hubbell

Drainage Master Plan Update

May 2013

Final Report

AMAFCA

WILSON
&COMPANY
ENGINEERS & ARCHITECTS

WHEREAS, July 1999, the Amole Hubbell Drainage Management Plan (DMP) was adopted by the AMAFCA Board of Directors; and

WHEREAS, the DMP identified existing drainage facilities that were to be expanded and new facilities to be constructed to address existing and future runoff quantities; and

WHEREAS, since adoption by the Board, the watershed has experienced rapid growth and many facilities identified in the DMP have been constructed, often in conjunction with development; and

WHEREAS, the aforementioned development has dictated that AMAFCA re-assess the validity of the DMP; and

WHEREAS, in November 2011, the Board engaged Wilson & Company to prepare an update to the Amole Hubbell DMP (DMP Update); and

WHEREAS, the City of Albuquerque (CITY), Bernalillo County (COUNTY) and AMAFCA all have jurisdiction in the watershed; and

WHEREAS, accordingly AMAFCA entered into a funding agreement with the CITY and the COUNTY for the preparation of the DMP Update; and

WHEREAS, AMAFCA, the COUNTY and the CITY desire to address stormwater control through the Amole Hubbell DMP Update; and

WHEREAS, AMAFCA desires to adopt the Amole Hubbell DMP Update, subject to certain limitations.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY THAT:

The improvements recommended by the Amole Hubbell Drainage Management Plan Update, prepared by Wilson & Company, dated November, 2013 are hereby adopted, subject to the following conditions:

1. Modifications to the adopted plan may be made as circumstances dictate, but major deviations shall be approved by the AMAFCA Board of Directors.

2. The DMP Update utilizes various criteria to establish general project priorities from a technical perspective. It identifies drainage and flood control infrastructure necessary to provide protection to the community from storm water runoff. It does not necessarily reflect

the priorities to be used by the AMAFCA Board of Directors for funding and construction. Specific projects, if any, will be funded and scheduled by AMAFCA Board of Directors action based on evaluation of public safety needs, cost sharing benefits, orderly development of flood control infrastructure, overall community needs and regional planning requirements.

PASSED, ADOPTED, AND SIGNED this 23th day of January 2014.

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

____
Danny Hernandez, Chair, Board of Directors

ATTEST:

Bruce M Thomson
____
Bruce M. Thomson, Secretary/Treasurer

AMOLE-HUBBELL DRAINAGE MASTER PLAN UPDATE
NOVEMBER 2013

I, Tyler J. Ashton, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

Tyler J. Ashton, P.E.
State of New Mexico P.E. No. 16205

3-26-14
Date

TYLER J. ASHTON
NEW MEXICO
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LICENSED PROFESSIONAL ENGINEER

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Executive Summary

The objective of the Amole-Hubbell Drainage Master Plan (DMP) Update is to evaluate the 1999 Amole-Hubbell Report's recommendations and determine what has been done to date and what infrastructure is still needed. In 2011 the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) contracted Wilson & Company to update the original 1999 Amole-Hubbell DMP by Leedshill-Herkenhoff, Inc. The contract was separated into two phases. Phase I Services included literature review/as-built collection and existing hydrologic/hydraulic analysis. Phase II Services analyzed existing facilities for adequacy and provided recommendations for proposed drainage facilities identified in the original DMP.

Approximately 20 square miles (sq. mi.) are analyzed and encompass the area generally bounded by Interstate 40 (I-40) to the north, Westgate Dam basin divided to the west, Gun Club Road to the south, and Coors Boulevard to the east. The project area is separated into the following nine basins as in the original DMP:

1. Powerline Channel Basin (PL)
2. South Powerline Basin (SP)
3. Snow Vista Basin (SV)
4. Amole Basin (AA)
5. Amole del Norte Basin (ADN)
6. Borrega Basin (BR)
7. Rio Bravo Basin (RB)
8. Sacate Blanco (SB)
9. Amole-Hubbell Detention (AH)

A total of 80 reports were gathered for the literature review. Key information was taken from these reports, such as sub-basin boundaries, stage-storage-outflow tables, and existing/proposed infrastructure, and these analysis points aided in the existing and proposed condition modeling.

The table below summarizes the recommendations from the 1999 report and also states whether the recommendation has been completed or if it is still needed today.

Table 0-1:Summary of Recommendations from 1999 Amole-Hubbell Report

Project Identification	Description from 1999 Report	Status 2013
1999 Deficiencies Updated Recommendations		
BR1	A 51 ac-ft Borrega Detention Basin	Completed
BR4	Borrega Inlet Freeboard Upgrade	Completed
AA1	Blake Rd. profile regrading	Completed
AA2	Westgate Heights Earthen Channel regrading	Completed
AA3	Earthen channel bank improvements	Completed
SV1A	Snow Vista Channel/Benavides Rd. Inlet	Not completed, still needed
SV1B	Westgate Heights Benavides Rd. Storm Drain	Not completed, still needed
PL2	Powerline Channel Freeboard Upgrade	Not completed, still needed
1999 Amole-Hubbell System Storage Capacity Recommendations		
AH1	Stage 1 Revise emergency spillway, connect Guac and Amole Basins, provide 150 ac-ft additional storage	Not completed, still needed
AH2	Stage 2 Increase Guac storage by 300 ac-ft	Not completed, still needed
AH3	Stage 3 Increase Guac storage to 862 ac-ft	Not completed, still needed
AH4	PMF Spillway improvements at Hubbell Lake Dam	Not completed, still needed
1999 Amole Arroyo Stabilization		
PL1	Additional detention on Powerline Channel (58 ac-ft)	Not completed, still needed
AA4	Stabilize Amole Arroyo mid reach	Completed
AA5	Construct Amole Arroyo below Snow Vista	Completed
SV2	Maintain runoff constraints in Snow Vista Basin	Completed, still needed
SV3	Snow Vista Channel freeboard upgraded	Not completed, still needed
AA6	Construct channel for lower reach of Amole Arroyo	Completed
AA7	Increase freeboard of transition and chute into Amole Basin	Completed
1999 South Powerline Channel/Detention		
SP1	Construct diversion channel with detention basins	Partially completed, still needed
1999 South Rio Bravo Arroyo at Hubbell Lake		
RB1	Convey South Rio Bravo Arroyo discharge across the Gun Club Lateral	Partially completed, still needed
1999 Development Driven Improvements/Facilities		
AD1	Tower/Sage Detention Basin	Completed
SB1	Sacate Blanco Diversion Channel	Not completed, still needed
SB2	S. Sacate Blanco Arroyo Conveyance	Not completed, still needed
SB3	Sacate Blanco Avulsion Conveyance	Not needed
BR2	N. and S. Borrega Arroyo Conveyance	Not completed, still needed
RB2	S. Rio Bravo Arroyo Conveyance	Not needed
BR3	Borrega "6B" Diversion Storm Drain	Partially completed, still needed
ADN	Amole del Norte Basin Controls	Still needed, continued enforcement required

The 20 sq. mi. watershed was reevaluated utilizing the information obtained through the literature review process. Based on the updated data the watershed was divided into seven basins for the updated DMP. The original Sacate Blanco Basin and Amole-Hubbell basin were incorporated into the South Powerline and Amole Basins respectively resulting in the follow basins for evaluation:

1. Powerline Channel Basin (PL)
2. South Powerline Basin (SP)
3. Snow Vista Basin (SV)
4. Amole Basin (AA)
5. Amole del Norte Basin (ADN)
6. Borrega Basin (BR)
7. Rio Bravo Basin (RB)

The updated watershed basins and hydrological analysis for the proposed conditions model resulted in additional recommendations to those presented in the original DMP. . These recommendations, along with the recommendations that are still needed, are summarized in Table 0-2 including conceptual costs by basin.

Table 0-2:Summary of Recommendations for 2013 Amole-Hubbell Update Report

Project Identification	Description of Project	Cost
Powerline Basin		
Pond PL1	Increase Pond storage to 21 ac-ft	$328,200
Sediment Removal PL1-PL6	Remove sediment from existing ponds to design conditions, see Figure 3-1	$/yr- AMAFCA
South Powerline		
Sediment Removal	Remove sediment from existing ponds to design conditions, see Figure 4-1	$/yr- COA
Pond SP8	Construct 17.5 ac-ft pond	$$$/Developer Cost
Pond SP1	Combine ponds SP1A and SP!B	$$$/Developer Cost
Snow Vista Basin		
Sediment Removal	Remove sediment from existing ponds to design conditions, see Figure 5-1	$/yr-AMAFCA/COA
SV4A	Route Basins SV229 and SV230 to Amole Arroyo	$$$ Developer Cost
SV1	Westgate Heights Benavides Rd. Storm Drain	$2,434,000
SV2	Maintain runoff constraints in Snow Vista Basin	Developer Cost
Pond SV8	Increase Pond size to 4 ac-ft, reconstruct outlet structure	$212,500
Pond SV205	Construct 28 ac-ft pond	$1,080,300

Table 0-2:Summary of Recommendations for 2013 Amole-Hubbell Update Report

Project Identification	Description of Project	Cost
Amole Basin		
AH1-4	A GuacAmole/Hubbell Lake System Analysis is needed to address capacity/discharge.	$$$
Amole del Norte Basin		
Pond NE3	Relocate pond spillway	$222,800
Pond Modifications	Install orifice plates in Ponds NE2 and NE3	$
98th & Central Storm Drain	Install Storm drain per Figure 7-1	$$$/Developer Cost
Unser/214 Area		
Basin 202.1 restriction	Restrict future development to 2.0 cfs/ac.	$$
West I-40 Diversion	Complete construction of channel	$3,000,000
Pond U1	Install orificeplate in Pond	$
Unser Storm Drain	Upsize 42" to 60"	$$$
Tierra Bayita		
Pond TB1	Construct detention pond	$$$
Basin 202.1 and 202.2 restrictions	Restrict future developments to 2.05 cfs/ac	Developer cost
Coors N-S Pond	Increase volume to 75 ac-ft.	$$/AMAFCA
Atrisco Business Park Basin		
Basin Restrictions	Continue to restrict all development to 0.1 cfs/ac	Developer cost
Tower/Sage Basin		
Tower Road Storm drain	Complete storm drain	$$$
Pond TS2	Install storm drain in Sage Rd.	$$$
South Amole del Norte		
Pond SA2	5 ac-ft expansion of pond	$175,900
Pond SA3	Increase pond size by 1 ac-ft	$61,800
Borrega Basin		
Pond B1	Construct 6 ac-ft pond	$
Borrega Dam Expansion	Expand Borrega Dam to ultimate condition	$540,700
Rio Bravo Basin		
Amole Hubbell Analysis	GuacAmole/Hubbell System analysis	$$$

$) < $25,000
$$) $25,000 - $100,000
$$$) $100,000 - $300,000

1. Literature Review

The following documents were included in the Phase I Literature Review to develop the existing conditions study and identify critical drainage features in the study area. These resources were revisited to guide and inform proposed recommendations.

1.1 Amole-Hubbell DMP 1999

Wilson & Company, Inc., Engineers & Architects (Wilson & Company) was contracted by Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) to update the Amole-Hubbell Drainage Management Plan (DMP) dated July 1999 (original Amole-Hubbell DMP). The original DMP was prepared by Leedshill-Herkenhoff, Inc. and was prepared for AMAFCA. Four volumes were prepared and include the following:

"Amole-Hubbell Drainage Management Plan Volume I" July 1999

"Amole-Hubbell Drainage Management Plan Volume II" July 1999

"Amole-Hubbell Drainage Management Plan Volume III" July 1999

"Amole-Hubbell Drainage Management Plan Volume IV" July 1999

1.2 Other Researched Documents

Wilson & Company researched documents at City of Albuquerque's (COA's) Drainage Division, COA's Maps and Records, and Bernalillo County Public Works Department.

Continued efforts for investigating drainage patterns and problems at a macro level led to researching site development drainage reports and plans for areas within the Amole-Hubbell Watershed. These reports and plans are not summarized in this section, yet are referenced throughout the text. Valuable insight into the hydrologic patterns and proposed development is provided in these reports and is helpful in sub-basin delineation, as well as in determining the existing and proposed infrastructure. Drainage reports, construction plan sets, and basin maps were acquired to aid in the hydrologic and hydraulic analysis. The list is provided below. The COA categorizes their drainage reports by the zone atlas number, followed by the number that represents the order in which the reports were submitted. For example, a file number of M-09/D023 is a drainage report located in zone M-9 and was the 23rd drainage report submitted in that zone.

1. "Amole-Hubbell Drainage Management Plan Volume I, II, III, & IV" July 1999
2. "Borrega Detention Dam and North Borrega Channel-Design Analysis Report" April 2000
3. "West I-40 DMP" 2006
4. "Final Design Report for Amole Arroyo including Revisions to the Amole-Hubbell Drainage Management Plan" August 2003, File M-09/D023
5. "Drainage Report for Anderson Heights Subdivision" April 2004, File P-08/D003
6. "Anderson Hills Subdivision Drainage Report", File P-09/D002
7. "Drainage Report for Ceja Vista Subdivision" January 9, 2007
8. "El Rancho Subdivisions Drainage Reports"
9. "Rio Bravo Sector Development Plan"
10. "Facility Plan for Arroyos" AMAFCA #376.04.00
11. "Drainage Report for the Amole Channel from Confluence with Snow Vista Channel down to the Amole Dam" July 2004, File J-08
12. "Arenal/Unser Drainage Management Plan" June 1997
13. "Borrega/PaakWeree Village Final Design Report"
14. "Amole del Norte Tower/Sage Drainage Master Plan" April 1995, AMAFCA #359.03
15. "Unser Diversion-Design Analysis Report" September 1993
16. "Drainage Study for Sierra Ranch Subdivision" December 16, 2004, File N-08/D003

17. "Talavera Subdivision Drainage Management Plan" January 2009
18. "Southwest Valley Flood Damage Reduction Study Volume I, II, and III"
19. "Drainage Report for Sunrise Ranch Subdivision" June 2000, File L-09/D006
20. "Final Design Report Amole del Norte Storm Diversion Facilities Tierra Bayita Drainage Facilities Phase III" March 1998
21. "Anderson Heights Grading & Drainage Plan" COA #753981
22. "Anderson Heights Unit 9 Grading and Drainage Plan" COA #753981
23. "Preliminary Design Report for Amole del Norte Storm Diversion Facilities Tierra Bayita Drainage Facilities" October 31, 1990 COA #4076-01
24. "Design Report for Amole del Norte Storm Diversion Facilities Tierra Bayita Drainage Facilities Phase IIIC"
25. "Design Report for Amole Arroyo including Revisions to the Amole-Hubbell Drainage Management Plan" February 2003
26. "El Rancho Grande Units 14 & 15" October 10, 2003, File N-09/D005
27. "Sunrise Ranch Unit 4 Pond Reclamation" August 6, 2002, File L-09/D006
28. "Sunrise Ranch Unit 2 Supplemental Information" November 21, 00, File L-09/D006
29. "Master Drainage Plan Sunrise Terrace Units III, IV, & V" March 1994: Revised June 1994, File L-08/D01A
30. "Drainage Study for Timarron West Subdivision" April 6, 2000, File M-08/D005A
31. "Drainage Study for the Timarron West Subdivision Unit 5" May 25, 2000, File M-08/D005B
32. "Master Drainage Study Gibson Blvd. Corridor Between 118th Street and the Amole Arroyo" May 8, 2003, File N-09
33. "Sierra Ranch Unit 2 Offsite Pond" June 2002, File N-08/D003
34. "Sierra Ranch Subdivision Unit I Grading and Drainage Plan" N-08/D003
35. "Anderson Heights Units 4 & 6" File N-08/D003A
36. "Drainage Study for Sun Gate Subdivision" January 8, 2004, File N-09/D007
37. "Arrowwood Development Phase I Grading and Drainage Plan" COA #747281
38. "Longford at Arrowwood Grading and Drainage Plan" COA #747281
39. "Tracts 29, 30, 31 at Arrowwood Drainage Master Plan" October 11, 2004, File N-09/D008A
40. "Drainage Report for Sun Gate Estates" September 8, 2004, File N-09/D008B
41. "118th Street Powerline Ponds Revisions to Ponds #5 and #6" File P-08/D003
42. "Anderson Heights Grading and Drainage Plan" COA #753981
43. "As-builts for Anderson Heights Grading and Drainage Plan" File P-08/D003
44. "Supplemental Drainage Information for Ceja Vista Unit 1, 2, 3" April 2010, DRB 1004428
45. "Drainage Management Plan for Anderson Hills The Highlands, The Meadows, The Mesa Volume II" August 19, 2003, File P-09/D002
46. "Sunrise Estates Units 2 & 3"
47. "Timarron West Unit 5 Grading & Erosion Control Plan"
48. "Timarron West Unit 4 Grading & Erosion Control Plan"
49. "Drainage Report for Meridian Business Park II A Supplement to the Master Drainage Plan for Atrisco Business Park" August 2007, File J-10/D002G
50. "Master Drainage Plan for Atrisco Business Park" September 1992, File J-10/D002
51. "Master Drainage Plan for Atrisco Business Park" October 1993, File J-10/D002
52. "Unser Towne Crossing Plan Set" COA #26048
53. "Preliminary Drainage Report for Paradise RV Park-Phase I" August 2011, File K-09/D003
54. "Drainage Report for Commercial Development NW Corner of 98th Street & Central Avenue" February 2007, File K-9/D033
55. "Drainage Masterplan for Avalon Subdivision" February 1998, File K-9/D012
56. "Zanios Food Warehouse Addition Phase 4 Grading and Drainage Plan"
57. "Unser Crossing Plan Set"
58. "Central and Unser Site Plan" File K-10/D055
59. "West Ridge Mobile Home Park" October 1997, File K-09/D006
60. "West Ridge Mobile Home Park Detention Pond Grading and Drainage Plan" File K-09/D006
61. "Drainage Analysis for Bluewater Road near 90th Street" December 2001, File K-09/D022
62. "Drainage Report for Clifford West Business Park" September 1997, File K-09/D023
63. "Town of Atrisco Grant, Unit 5 Plan Set" File K-09/D026
64. "Drainage Report for Southwynd Subdivision" January 2002, File L10-D020
65. "Sunset West Unit III Units 17, 18, and 19 Grading and Drainage Plan" File L-09/D012A
66. "Drainage Report & Grading Plan for Valle del Canto Subdivision" August 1997, File L-09/D18
67. "Sunset West, Unit 2 Temporary Retention Pond Reclamation Improvements" File L-09/D004A
68. "Supplemental Information for Sage & Unser Marketplace" File M-10/D019
69. "Truman Middle School Phase I Improvements Grading and Drainage Plan" File M-09/D013
70. "Drainage Report for Sunset West Unit 2" April 1994, File M-09/D004
71. "Drainage Report for Blake Road Subdivision" June 1998, File N-10/D003
72. "Casa del Sueno & Casa de Ver" File N-10/D001
73. "Master Drainage Plan for the West Side Transit Facility" February 2001, File S-9/D016
74. "Revision to the Master Drainage Plan for the Rio Bravo Sector Development Plan"

March 2000, AMAFCA #377.05.03
75. “Final Drainage Report for PaakWeree Village” March 2000, AMAFCA #358.02.05
76. “Westgate Diversion Channels Snow Vista Channel-Phase I”
77. “Westgate Diversion Channels Snow Vista Channel-Phase II & III”
78. “Amole del Norte Storm Diversion Facilities Tierra Bayita Drainage Facilities” June 1995
79. “Master Drainage Report Tracts B, C, & D PaakWeree Bulk Land Plat” County #PWDN 70112
80. “Paradise RV Park Drainage Report” August 2011

2. Hydrologic Analysis

2.1 Methodology

The Arid-lands Hydrologic Model-S4 (AHYMO) was used to calculate the 100-year peak flow rates and volumetric runoff. The unit hydrograph procedure is utilized in the AHYMO program to compute individual sub-basin runoff hydrographs. AHYMO's hydrologic methodology is discussed in the COA's Development Process Manual (DPM), Chapter 22–Drainage, Flood Control and Erosion Control (July 1997). The basin's physical properties input into the command include sub-basin area, percent of land treatment types, rainfall distribution, and the time to peak. Previous computations for the rainfall distribution and time to peak are linked into the command. The "Rainfall" and "Compute LT TP" commands compute the rainfall distribution and the time to peak, respectively. The AHYMO computations for 24-hour storm will be used for volumes; the 6-hour storm computations will be used for peak flow rates.

Hydrographs were routed using the channel, pipe, and reservoir routing commands. A rating curve command, followed by the computed travel time for channels and pipes, was used to account for the discharge relations based on headwater and slope. Ponds were modeled using the route reservoir command. Input of the route reservoir command requires stage, storage, and discharge for each incremental elevation.

2.2 Hydrologic Characteristics

2.2.1 <u>Watershed Delineation</u>

The Amole-Hubbell Watershed is divided into seven sub-basin for evaluation. The following list outlines the seven basins that were delineated:

1. Powerline Basin (PL)
2. South Powerline Basin (SP)
3. Snow Vista Basin (SV)
4. Amole Basin (A)
5. Amole del Norte Basin
   - 98th & Central Basin (NE)
   - Unser/214 Basin (U)
   - Tierra Bayita Basin (TB)
   - Atrisco Business Park Basin (AB)
   - Tower/Sage Basin (TS)
   - South Amole del Norte Basin (SA)
6. Borrega Basin (B)
7. Rio Bravo Basin (RB)

The basin boundaries vary slightly from the original DMP. Basin variations are due to drainage infrastructure realignments, constructed development since the adopted Amole-Hubbell DMP routed runoff differently, and master plans differing from the original DMP. The basin names were kept the same as those used in the original Amole-Hubbell DMP. The existing sub-basin identifications are 100 series; the proposed sub-basin identifications are 200 series.

Resources used to define sub-basins included 2010 Bernalillo County Light Detection and Ranging (LIDAR) mapping data, 2010 Bernalillo County Orthoimagery, and the latest COA parcel shapefile. LIDAR point and breakline files were provided by AMAFCA. By using the mapping data, contour intervals of 2-ft were generated in AutoCAD.

2.2.2 <u>Precipitation</u>

The precipitation depths for the 0.25-, 1-, 6-, and 24-hour storms, 100-year storm frequency were obtained from the original Amole-Hubbell DMP. Rainfall amounts were gathered from the COA DPM and the National Oceanographic and Atmospheric Administration (NOAA), Atlas 14. Table 2-1 lists the precipitation depths used to determine the rainfall distribution.

Table 2-1: NOAA Precipitation Depths	
Storm Duration for 100-Year Frequency (hr)	Precipitation Depth (in)
0.25	1.46
1	1.87
6	2.20
24	2.66

2.2.3 Sediment Bulking

Sediment is gathered into flowing water when the land surface erodes. Sediment bulking factors are applied to both the existing and proposed conditions to account for the increase in runoff due to sediment transport. Two factors influence sediment bulking: pervious area and slope of the terrain. An undeveloped site produces more sediment due to the higher percentage of pervious area. Existing conditions produce a higher bulking factor due to the undeveloped sites. All basins have undeveloped areas, but the basins' undeveloped percentages vary. Basins with a higher percentage of undeveloped sites than developed sites were allocated a 12% bulking factor. These basins include the Powerline Basin, South Powerline Basin, and Borrega Basin. An increase of impervious area reduces land surface erosion. Therefore, a bulking factor of 6% was applied for the basins that have a higher percentage of developed sites than undeveloped sites. These basins include the Amole Basin, Amole del Norte Basin, Rio Bravo Basin, and Snow Vista Basin. An increase of impervious area in a fully-developed watershed reduces land surface erosion.

2.2.4 Land Use

A sub-basin's land condition is recognized in AHYMO by either land treatment or curve number. Land treatment percentages were input into AHYMO_97 under this analysis. COA's 1997 DPM describes and classifies the land treatments into four categories (A, B, C, and D). A 2010 orthoimagery, 2010 LIDAR, digitized parcel base map, and current zoning were used to help determine the land use for the existing condition. Table 2-2 distributes the land treatment percentages accordingly. The right column of the table (Methodology/Notes) presents the procedure used to distribute the land treatment percentages. Land treatment percentages were weighted for sub-basins with two or more land uses. Each basin may contain a land treatment or a mixture of land treatments. For an illustration of the existing land uses, refer to Figure A-2 (Existing Land Use Map). For the proposed conditions, various sector plans were used to determine proposed land uses. Land treatments were determined by using Table 2-2. Refer to Figure 2-2 (Proposed Land Use Map) for an illustration of the proposed land uses.

Table 2-2: Land Treatment Type Percentage Summary					
Layer	Land Treatment Percentages (%)				Methodology/Notes
	Type A	Type B	Type C	Type D	
Land Use 1 Du/Ac	0	41	42	17	DPM for D, Split B & C
Land Use 4 Du/Ac	0	29	29	42	DPM for D, Split B & C
Land Use 5 Du/Ac	0	25	26	49	DPM for D, Split B & C
Land Use 6 Du/Ac	0	21	22	57	DPM for D, Split B & C
Land Use 7 Du/Ac	0	18	18	64	DPM for D, Split B & C
Land Use 8 Du/Ac	0	14	15	71	DPM for D, Split B & C
Land Use 9 Du/Ac	0	10	11	79	DPM for D, Split B & C
Land Use Commercial	0	5	5	90	DPM for D, Split B & C
Land Use Heavy Industrial	0	10	10	80	DPM for D, Split B & C
Land Use Light Industrial	0	15	15	70	DPM for D, Split B & C
Land Use Mobile Homes	0	20	20	60	DPM for D, Split B & C
Land Use Open Space	79	8	8	5	DPM for 5 Ac
Land Use Platted Mass Graded	0	0	95	5	Assumed 5% D, Remaining C
Land Use Platted Undeveloped	79	8	8	5	Treatment from SSCAFCA Table
Land Use School	0	25	25	50	DPM for D, Split B & C
Land Use Townhomes	0	15	15	70	DPM for D, Split B & C
Land Use Slope 0 to 10	100	0	0	0	DPM
Land Use Slope 10 to 20	0	100	0	0	DPM
Land Use SU-1	0	5	5	90	DPM for D, Split B & C
Land Use SU-2	0	5	5	90	DPM for D, Split B & C

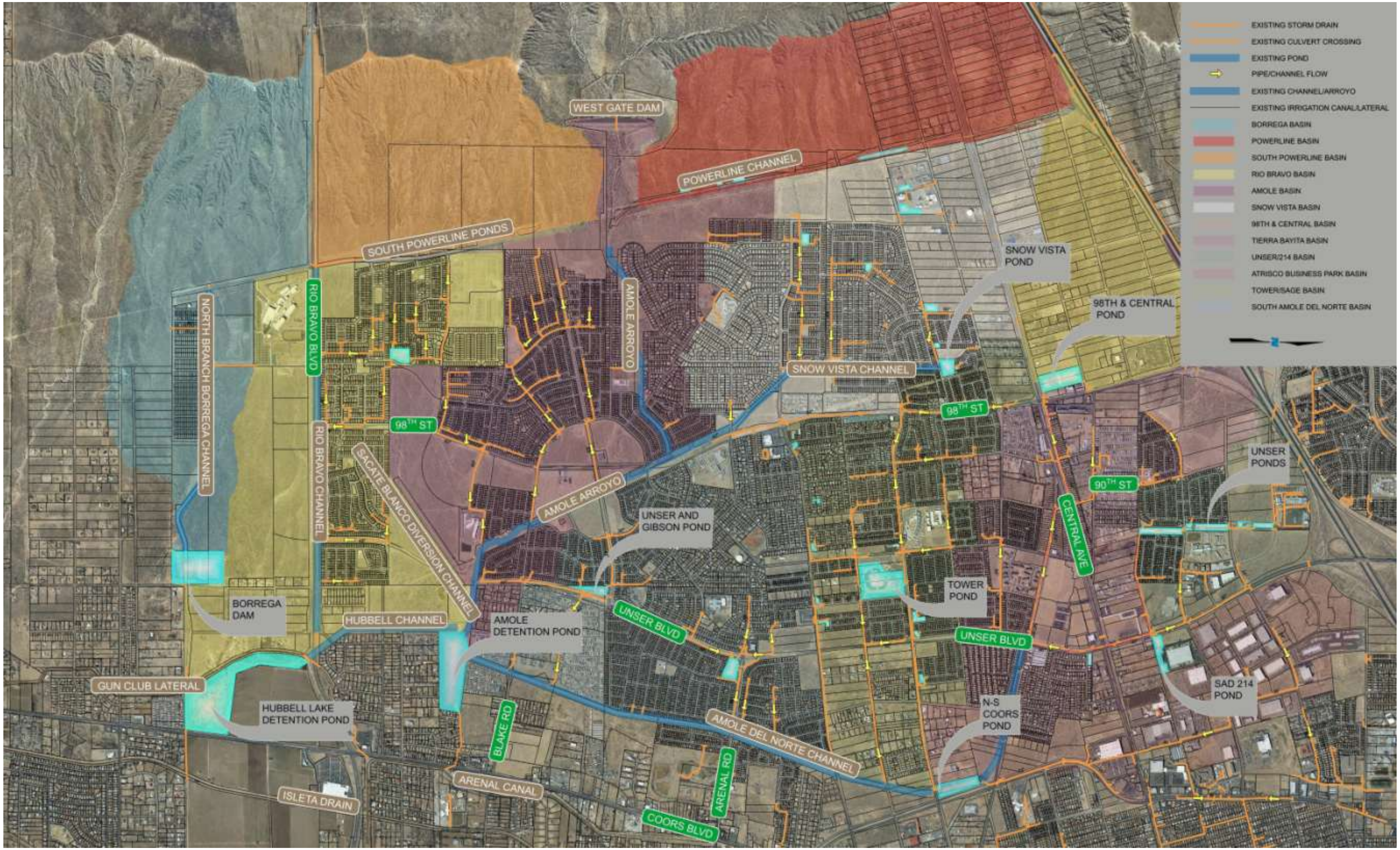

Figure 2-1: Amole-Hubbell Watershed Overall Basin Map

Figure 2-2: Proposed Land Use Map

3. Basin Evaluation

3.1 Powerline Basin

Existing Conditions

Powerline Basin is approximately 1.25 sq. mi. and is illustrated in Figure 3-1. The watershed is bounded by I-40 to the north, Powerline Channel to the east, Amole Arroyo to the south, and escarpment peaks to the west. Per the original DMP, the Powerline channel is currently maintained by AMAFCA. The basin is mostly undeveloped with moderate slopes ranging between 0 to 10 percent on the lower section of the basin, steep slopes between 10 to 20 percent on the upper section, and undeveloped platted lots on the northern half of the basin. The basin generally slopes east towards the Powerline Channel. Powerline Channel conveys the basin's runoff to the Amole Arroyo. Several sediment settling ponds have been constructed on the downstream ends for Sub-Basins P107 through P111. These sediment settling ponds are filled to capacity and were not included in the hydrologic model since the sediment buildup prevents further sediment deposit. There is one detention pond, Pond PL1, which attenuates the peak discharge from 593 cfs to 207 cfs at its downstream location. Refer to Photo 1 for Pond PL1's outlet. The pond is approximately 14 ac-ft and has adequate capacity to detain the 100-year, 24-hour storm event without flow over the emergency spillway. The peak discharge entering the Amole Arroyo from Powerline Basin is approximately 485 cfs. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Photo 1: Pond PL1 Outlet

Proposed Conditions

The northernmost sub-basins will experience large development in the future and will significantly increase the flow in the Powerline Channel. The existing pond is approximately 14 ac-ft and will overtop due to the increased runoff from proposed development in upstream sub-basins. It is recommended that the sediment deposited in the sediment settling ponds be removed, so they may continue collecting sediment as intended and attenuate runoff. Ponds PL2 through PL6 are crucial to help relieve downstream issues and control basin runoff to pre-development levels. Once the recommended facilities are completed the proposed peak discharge entering the Amole Arroyo from Powerline Basin is approximately 287 cfs. Refer to Table 3-1 for hydrologic data and Figure 3-2 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from the 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project PL1:*
  - *Sedimentation Basin Detention* – Still NEEDED based on the soils in the western escarpments which carry sediment in runoff and will fill in existing/proposed ponds
  - *In-Line Detention* – Still NEEDED based on peak flows exiting to Amole Arroyo, which are too high
  - *Interim Ponding* – NOT NEEDED with In-Line Detention and Amole Arroyo design.
- *Project PL2:*
  - *Channel Freeboard* – Still NEEDED with large amounts of proposed development planned in the upper portion of the basin. Depths will increase with development eliminating available freeboard.
  - *Tributary Arroyos* – STILL NEEDED and were NOT ANALYZED for this study, but will be needed to convey peak flows as development occurs.

Additional Recommendations for the basin based on updated basin analysis are below:

- Increase Pond PL1 from 14 ac-ft of storage to 23 ac-ft of storage and increase outlet discharge to approximately 417 cfs to prevent overtopping due to development in upper basins. Cost $328,200.
- Remove all sediment from sediment ponds, restoring to as-built conditions to operate at peak efficiency for existing and proposed conditions. Develop Operations and Maintenance Procedures.

Figure 3-1: Powerline Basin - Proposed Basin Map

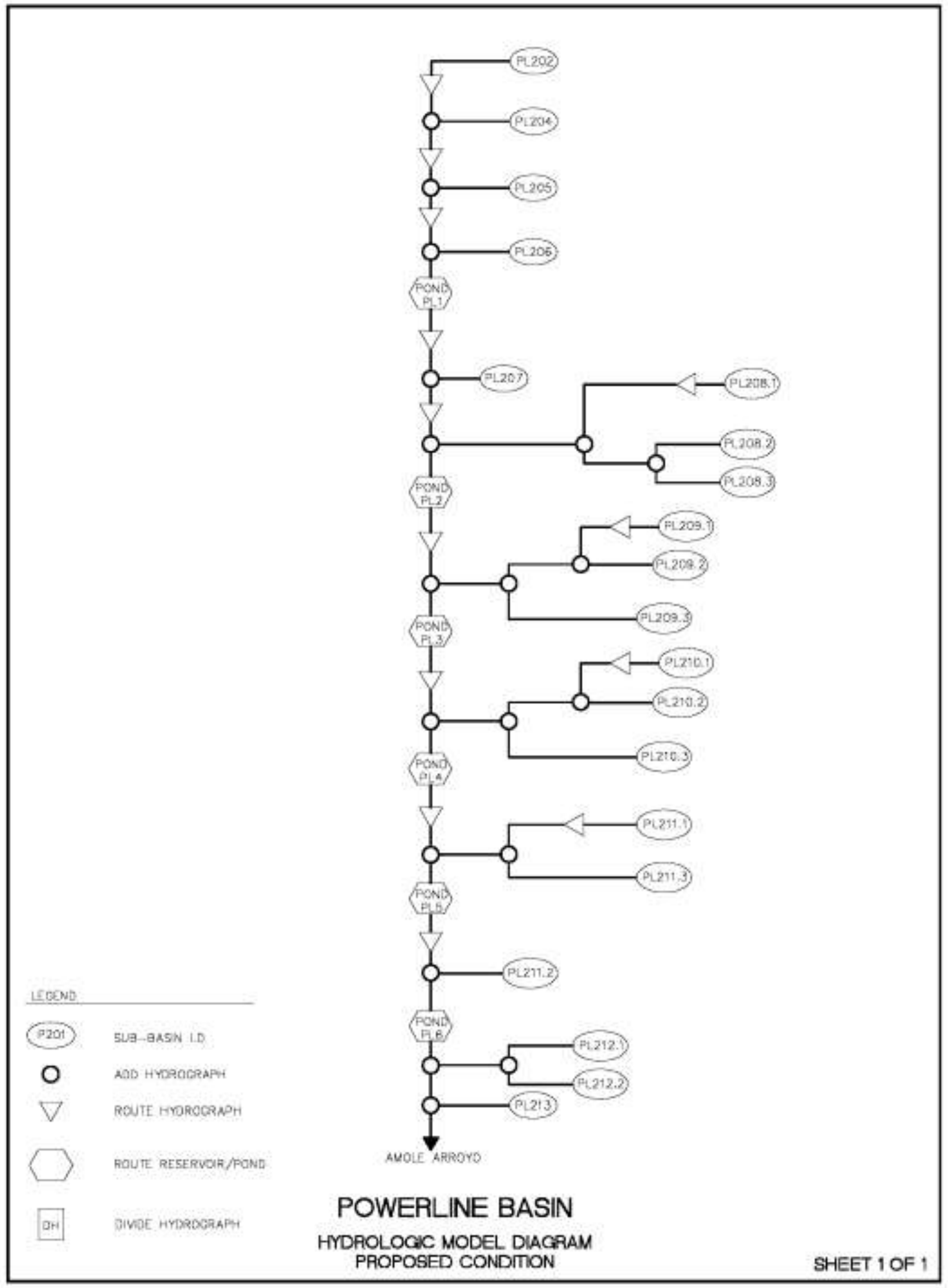

Figure 3-2: Powerline Basin - Proposed Hydrologic Model Diagram

Table 3-1: Powerline Basin - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
PL202	103	283.84	10.553
PL204	99	288.74	10.243
PL205	88	257.09	10.576
PL206	111	274.30	9.878
PL207	63	144.96	4.201
PL208.1	48	106.84	3.118
PL208.2	7	26.78	1.040
PL208.3	15	46.01	1.665
PL209.1	39	87.26	2.506
PL209.2	10	37.67	1.430
PL209.3	6	21.04	0.799
PL210.1	50	103.27	3.038
PL210.2	10	35.84	1.361
PL210.3	6	21.64	0.821
PL211.1	50	99.87	2.919
PL211.2	36	133.00	5.051
PL211.3	7	25.50	0.968
PL212.1	21	77.20	2.932
PL212.2	10	38.14	1.448
PL213	15	55.36	2.102

3.2 South Powerline Basin

Existing Conditions

The South Powerline Basin is approximately 1.0 sq. mi. and is illustrated in Figure 4-1. The primary focus area of the basin is bounded by Senator Dennis Chavez Boulevard to the south, 118th Street to the east, Amole Basin to the north, and escarpment peaks to the west. The basin is mostly undeveloped with moderate slopes ranging between 0 to 10 percent on the lower section of the basin, steep slopes between 10 to 20 percent on the upper section, and undeveloped 100-acre platted lots at the northeast section. The basin generally slopes east towards 118th Street. The basin is partially closed with retention ponds storing runoff from Sub-Basin SP101 through Sub-Basin SP106 and SP103. Retention Pond SP1A and Pond SP1B were designed to retain twice the volume produced by the 100-year, 6-hour storm event. Retention Pond SP2 through Pond SP6 are interconnected and were designed to retain the volume produced by the 100-year, 24-hour storm event. These ponds were constructed as interim condition facilities and have 2 to 4 ft of sediment deposits; however, they still have capacity to meet the storm events which they were designed to retain. The original DMP states that the South Powerline pond facilities are to be maintained by the COA.

Runoff from Sub-Basins SP107 through SP109 are routed through ponds and conveyed via a storm drain pipe, which outfalls to the Rio Bravo Channel. Pond SP7 was designed to have a storage volume of 8.14 ac-ft. By using the 2010 LIDAR and calculating the pond's volume, it has been determined that this pond is full of sediment and does not have the designed volume. A channel along the west side of 118th Street between Pond SP7 and Senator Dennis Chavez Boulevard directs runoff to the storm drain pipe which discharges into the Rio Bravo Channel. The peak flow entering the Rio Bravo Channel from the South Powerline Basin is approximately 309 cfs. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

The ponds have 2 to 4 ft of sediment deposit; however, they still have capacity to meet the storm events which they were designed to retain. It is recommended that the sediment deposit be removed in anticipation of further accumulation. Sub-Basin SP201 through 206 currently have no infrastructure that connects the retention ponds to Sub-Basins SP207 through SP209. As development in the area continues, it is recommended that the ponds are connected with storm drain pipe. Retentions ponds SP1A and SP1B have been combined into one larger detention pond for developed conditions.

Pond SP7 was designed to have a storage volume of 8.14 ac-ft; to ensure sufficient capacity the pond should be restored to its design volume. Due to the proposed land use and the increase in runoff a new pond (SP8) with approximately 17.5 ac-ft of storage is recommended in Basin 208. This pond will reduce the peak flow out of the South Power Line Basin to below 210 cfs allowing existing infrastructure downstream to be used without modifications. Refer to Table 3-2 for hydrologic data and Figure 3-4 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from the 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project SP1:*
  - *Sedimentation/Detention Ponds* – Still NEEDED; sediment to be removed from existing sediment ponds and in-line detention ponds
  - *South Powerline Channel Conveyance System* – Still NEEDED; a portion of the system has been built but the remaining recommended storm drain will still be needed to serve future development

Additional Recommendations for the basin based on updated basin analysis are below:

- Remove all sediment from Ponds SP1 through SP7, restoring to as-built conditions to operate at peak efficiency for existing and proposed conditions. Develop an O&M process for COA maintenance crews to ensure adequate capacity in the system is maintained.
- Pond SP8 - To reduce peak flows leaving the South Powerline Basin, a pond with a volume of approximately 17.5 ac-ft is proposed on the east side of basin SP208.
- Pond SP1 – Combine retention ponds SP1A and SP1B to one large detention pond.

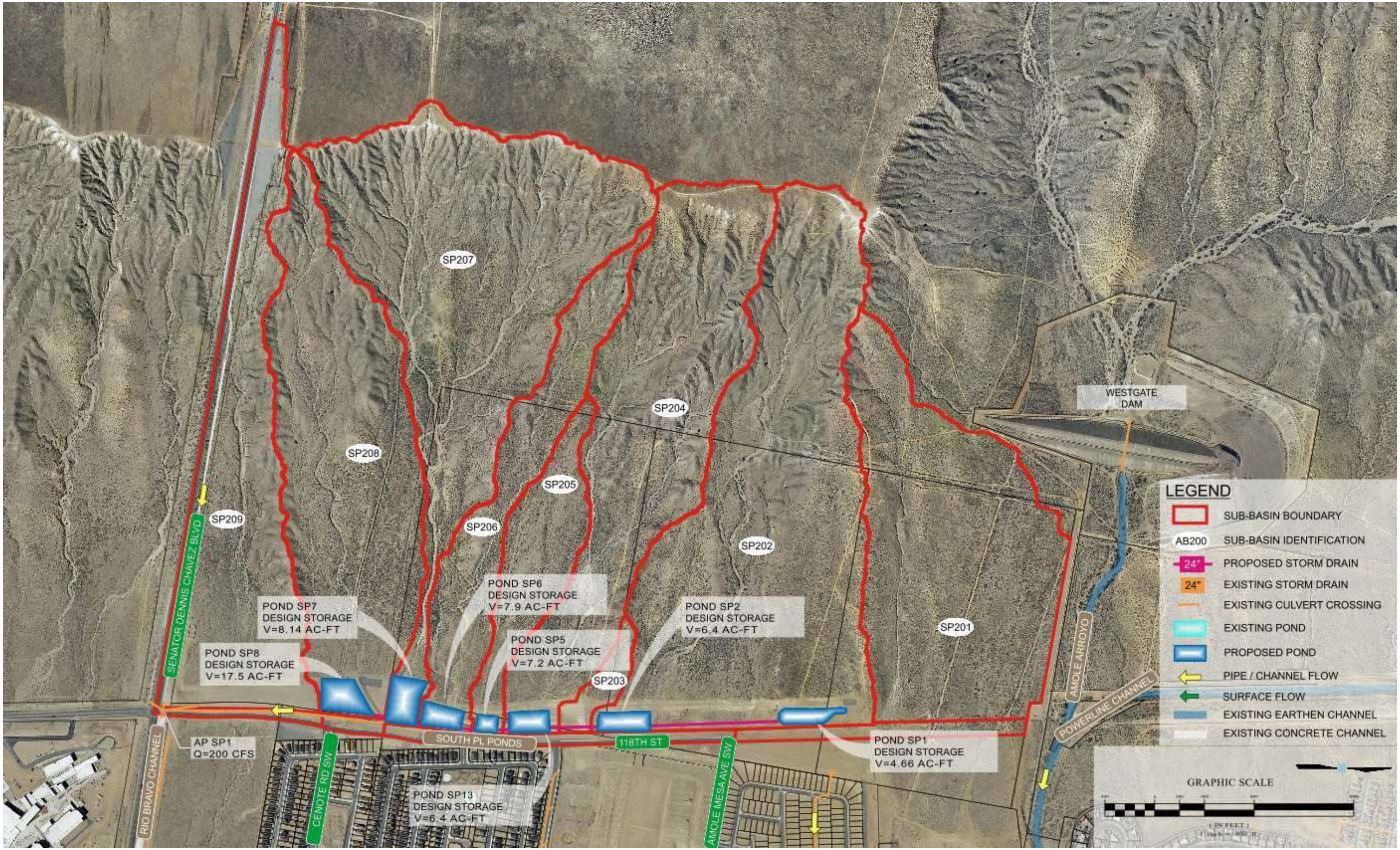

Figure 3-3 South Powerline Basin - Proposed Basin Map

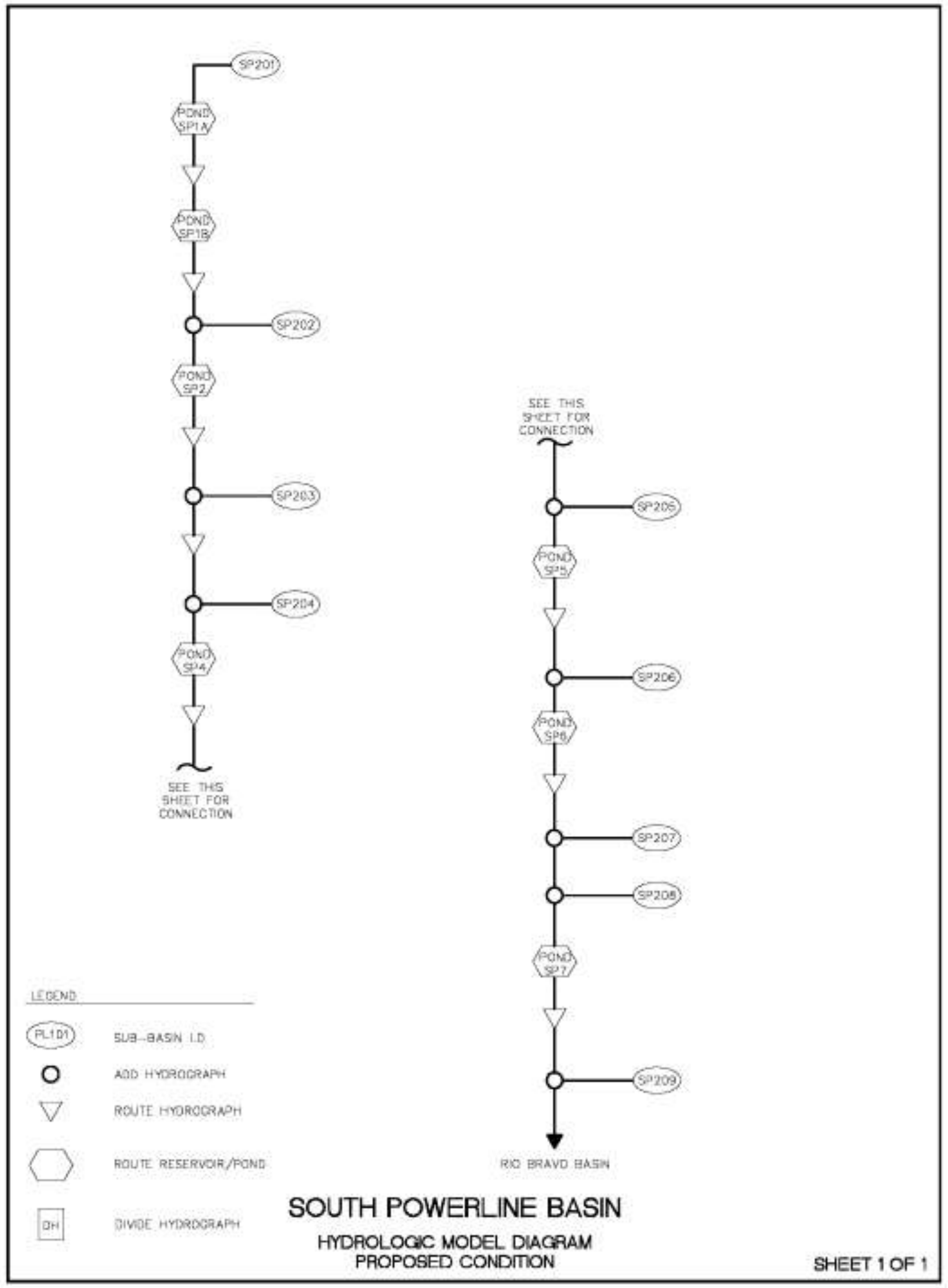

Figure 3-4: South Powerline Basin - Proposed Hydrologic Model Diagram

Table 3-2: South Powerline Basin - Proposed Sub-Basin Peak Discharge and Volumes			
Sub-Basin	**Area (ac)**	**$Q_{100yr-6hr}$ (cfs)**	**$V_{100yr-24hr}$ (ac-ft)**
SP201	87	276.54	10.520
SP202	144	426.51	16.350
SP203	5	18.46	0.700
SP204	87	229.69	8.662
SP205	23	85.16	3.293
SP206	38	113.68	4.350
SP207	116	249.67	8.627
SP208	87	158.63	5.326
SP209	79	140.02	4.707

3.3 Snow Vista Basin

Existing Conditions

The Snow Vista Basin is approximately 1.55 sq. mi. and encompasses the area that discharges to the Snow Vista Channel. The basin is bounded by Snow Vista Channel to the east and Powerline Channel to the west, and is located north of Amole Arroyo and south of I-40. Snow Vista Basin has a mixture of land use containing residential, undeveloped platted lots, and industrial. The undeveloped platted lots are located north of Eucariz Avenue and west of 114th Street. Residential lots vary from four to six dwelling units per acre (du/ac). The original DMP restricts flows to 1.29 cfs per acre

The County and the City have both utilized the original Amole-Hubbell DMP for its drainage guidelines. Some of the problem areas identified in the original DMP still exist, while additional problem areas were identified with the reanalysis of existing and new development. The older community with four du/ac does not have major sub-surface drainage. All the runoff in this community surface flows into the streets. Benavides Road intercepts runoff from the local streets and conveys it to Snow Vista Channel. Benavides Road does not have the capacity for conveying its respective drainage area. Flow was assumed to split equally at the intersection of Benavides Road and Del Rey Road. The flow which was directed to Del Rey Road enters the Amole Basin.

Photo 1: Pond SV10 Inlet

Timarron West Subdivision Unit 5, located south of De Vargas Road and west of Osprey Drive, was supposed to be within the Snow Vista Basin and ultimately discharge to Sub-Basin SV133. However, the ponds built per the subdivision's grading and drainage plan are filled with sediment; thus, they are changing the designed hydraulic flow path. The outlet pipe for Pond SV10 is clogged, adversely causing runoff to overtop the pond and flow south along residential rear yards until reaching the Amole Arroyo. Therefore, Sub-Basin SV129 through Sub-Basin SV131 became part of the Amole Basin under the existing condition. Refer to Photo 2 for Pond SV10's inlet pipe. The ponds protecting Timarron West Subdivision along its western boundary have also been filled with sediment. Ponds SV5 and SV6 connect to the storm drain that runs through Timarron West Subdivision's Unit 1 through Unit 4, located north of De Vargas Road, west of Snow Vista Channel, south of Red Robin Road, and east of 114th Street. Pond SV7 is used as a surge pond for this storm drain. The storm drain runs underneath Pond SV8 and outfalls into the Snow Vista Channel; therefore, it may also be considered a surge pond, since runoff will only enter the pond from surface flow or from the downstream pipe surging runoff into the pond. Refer to Photo 3 for Pond SV8.

Photo 2: Pond SV8

Photo 3: Pond SV4

Sunrise Terrace West Subdivision is another large development within the basin. The subdivision receives off-site runoff from Sub-Basin SV112, which collects on 114th Street and surface flows into the subdivision at Connemara Avenue. The subdivision's storm drain infrastructure includes a large collector pipe in Andalusian Avenue, laterals, and Surge Pond SV4. Runoff may evacuate the pond via two outlet pipes. Its primary outlet pipe is connected to a standpipe and allows runoff to empty once it enters the pond. The secondary outlet pipe serves dual purposes by evacuating the pond once the water depth is over 4 ft; however, the collector pipe may surge runoff back into the pond. Examination concluded that the pond is close to overtopping. Photo 4 shows Pond SV4. The collector pipe connects to a lateral concrete channel connecting to the Snow Vista Channel.

The remaining subdivisions are not as large as Timarron West Subdivision or Sunrise Terrace West Subdivision. These subdivisions connect directly into the Snow Vista Channel or discharge to regional infrastructure that ultimately discharges to the Snow Vista Channel. The regional infrastructure includes Pond SV2, Pond SV3, pipe connecting Pond SV2 to Pond SV3, and Snow Vista Channel. The area on the northwest quadrant of Eucariz Avenue and 106th Street either enters Pond SV2 or bypasses the pond and enters the storm drain system on Eucariz Avenue. A 24" diameter pipe serves as an outlet for Pond SV2, which has an approximate max outflow of 53 cfs, when the hydraulic grade line is at the top of pond. Pond SV2 is undersized and will overtopin the existing condition, approximately 276 cfs, discharging to Tower Road.

Cross-drainage is an issue on the undeveloped platted land. Most of the undeveloped lots are approximately five acres and within the county; however, development may further sub-divide these into one acre lots. Grading and drainage reviews for one acre lots place greater focus on a micro level which may consequently result in a significant change in flow direction if the reviewer overlooks the big picture. A drainage master plan for the undeveloped land is needed. The drainage master plan will give reviewing agencies a better grasp on the drainage requirements providing justification for drainage infrastructure needs and the cost associated with the proposed infrastructure.

Photo 4: Bridge at Benavides Road

Snow Vista Channel is approximately 2,100 ft long, beginning at Eucariz Avenue and ending at the confluence with the Amole Arroyo. The channel's most upstream location is at Pond SV3. Pond SV3 attenuates the flow to 198 cfs from its inflow of 319 cfs. The peak flow rate reduction of approximately 121 cfs prevents freeboard problems for the channel segment upstream of the concrete confluence exiting the park near the vicinity of De Vargas Road. Freeboard in the channel is reduced after the confluence and runoff will overtop the bridge at Benavides Road. Photo 5 shows the bridge at Benavides Road. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

It is recommended that the sediment buildup in Ponds SV5 and SV6 be removed for continued protection. The pond located in SV211 has a capacity of 9.97 ac-ft and is currently sufficient to hold the flows for a 100-year, 24-hour storm event. Once the basin is fully-developed the pond's storage capacity will be exceeded. The basins that are discharging to Benavides Road are accumulating flows of approximately 475 cfs. The storm drain line located in Benavides Road is a 66" RCP with enough capacity to carry the flows. Refer to Table 3-3 for hydrologic data and Figure 3-6 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from the 1999 Amole-Hubbell DMP for the basin along with the status of each recommendation.

- *Project SV1A*:
  - *Benavides Road/Snow Vista Inlet* – Still NEEDED to convey roadway flow into channel.
- *Project SV1B:*
  - *Benavides Storm Drain* – Still NEEDED due to peak flow exceeding street capacity
- *Project SV2:*
  - *Runoff Constraint* – Still NEEDED to prevent excessive flow to Snow Vista Channel and system
- *Project SV3*:
  - *Channel Freeboard* – NOT NEEDED due to proposed drainage improvements and dissipated flow rates

Additional Recommendations for the basin based on updated basin analysis are below:

- Remove all sediment from existing ponds, restoring to as-built conditions to operate at peak efficiency for existing and proposed conditions. AMAFCA maintenance responsibility.
- To reduce the amount of flow on Benavides Road, Basins SV229 and SV230 need to discharge to the detention pond SV10 to the south and discharge through a 24" RCP pipe directly to Amole Arroyo. Developer cost.
- The storm drain in Benavides Road will be expanded and run from Del Rey Road to Snow Vista Channel per the 1999 DMP. The storm drain will also increase in diameter in areas, see Figure 4-6. With the flows from Basins SV229 and SV230 being subtracted and the addition of the new storm drain, Benavides will no longer exceed its maximum capacity. The HEC-RAS model for the Snow Vista Channel shows that the flow in the channel will overtop the bridge at Benavides Road. By moving the point at which the flow from Benavides enters the channel downstream approximately 150 ft, the overtopping no longer occurs. It is recommended that when the storm drain in Benavides is reconstructed, the confluence with the channel also be moved 150 ft south of the current confluence. Cost $2,434,000.
- Increase Pond SV8 to maximum capacity and reconstruct outlet structure. Cost $212,500.
- To reduce the volume in Pond SV3, a proposed pond with a volume of 28 ac-ft on the west side of SV205 is proposed. All the basins to the west and north of Basin SV205, including Basin SV212 will be rerouted to the proposed pond. With the addition of this pond option, Pond SV2 will no longer be necessary and can be removed. The option one pond is sufficient to hold the flow for fully-developed conditions and will extend the hydrograph so Pond SV3 can properly discharge to Snow Vista Channel without exceeding its capacity. Cost $1,080,300.

Figure 3-5: Snow Vista Basin - Proposed Basin Map

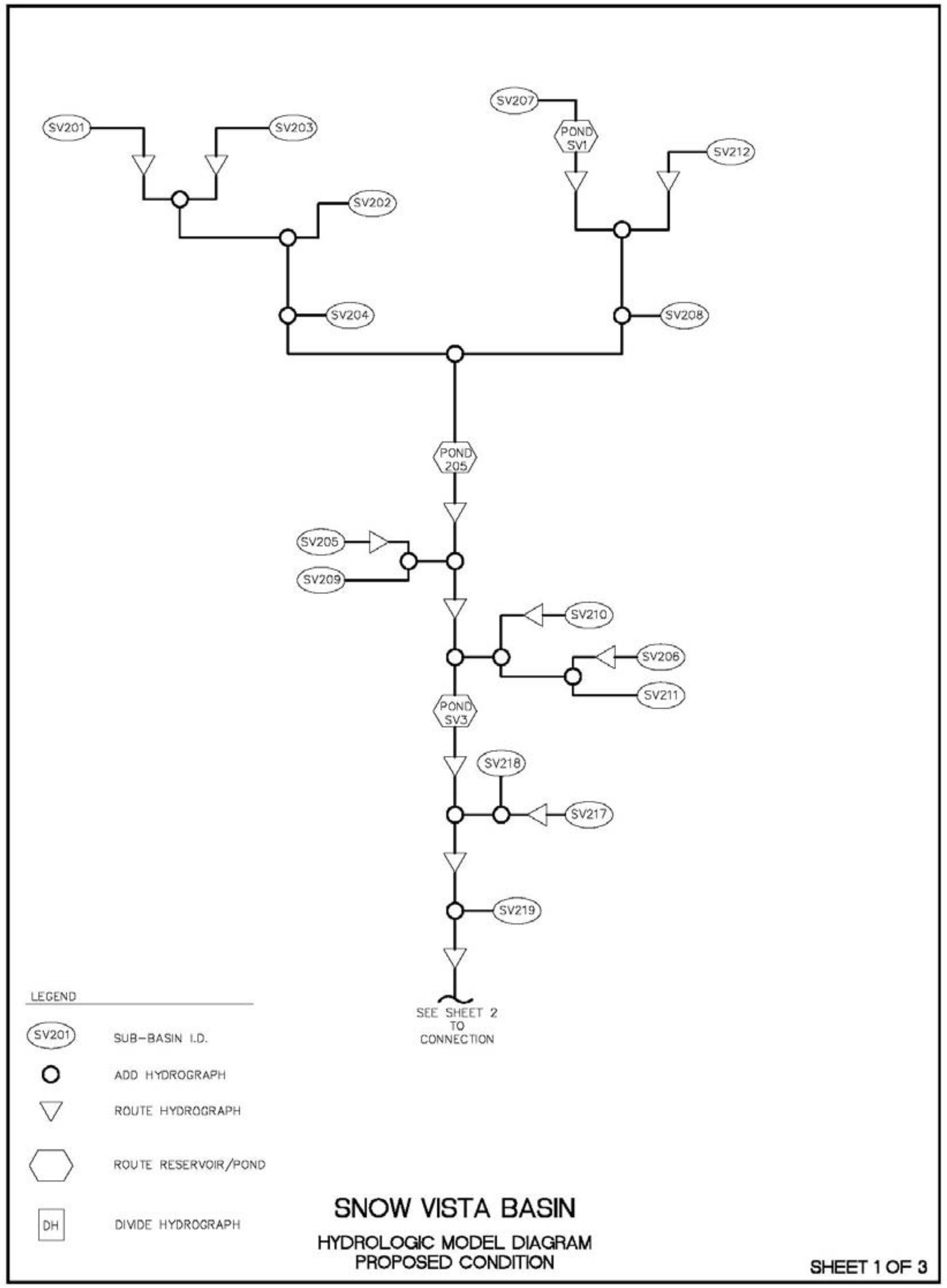

Figure 3-6: Snow Vista Basin - Proposed Hydrologic Model Diagram

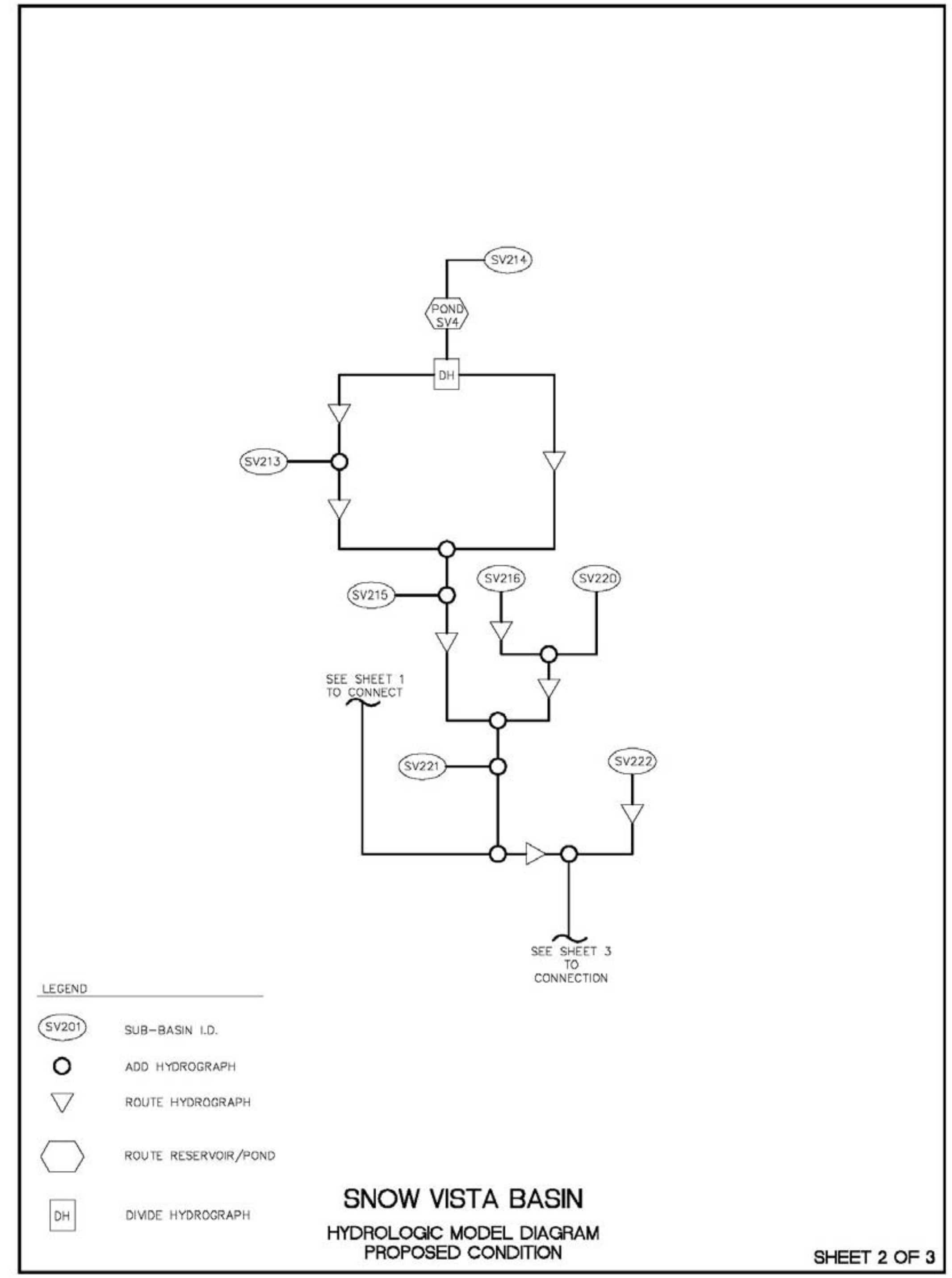

Figure 3-6 Continued: Snow Vista Basin - Proposed Hydrologic Model Diagram

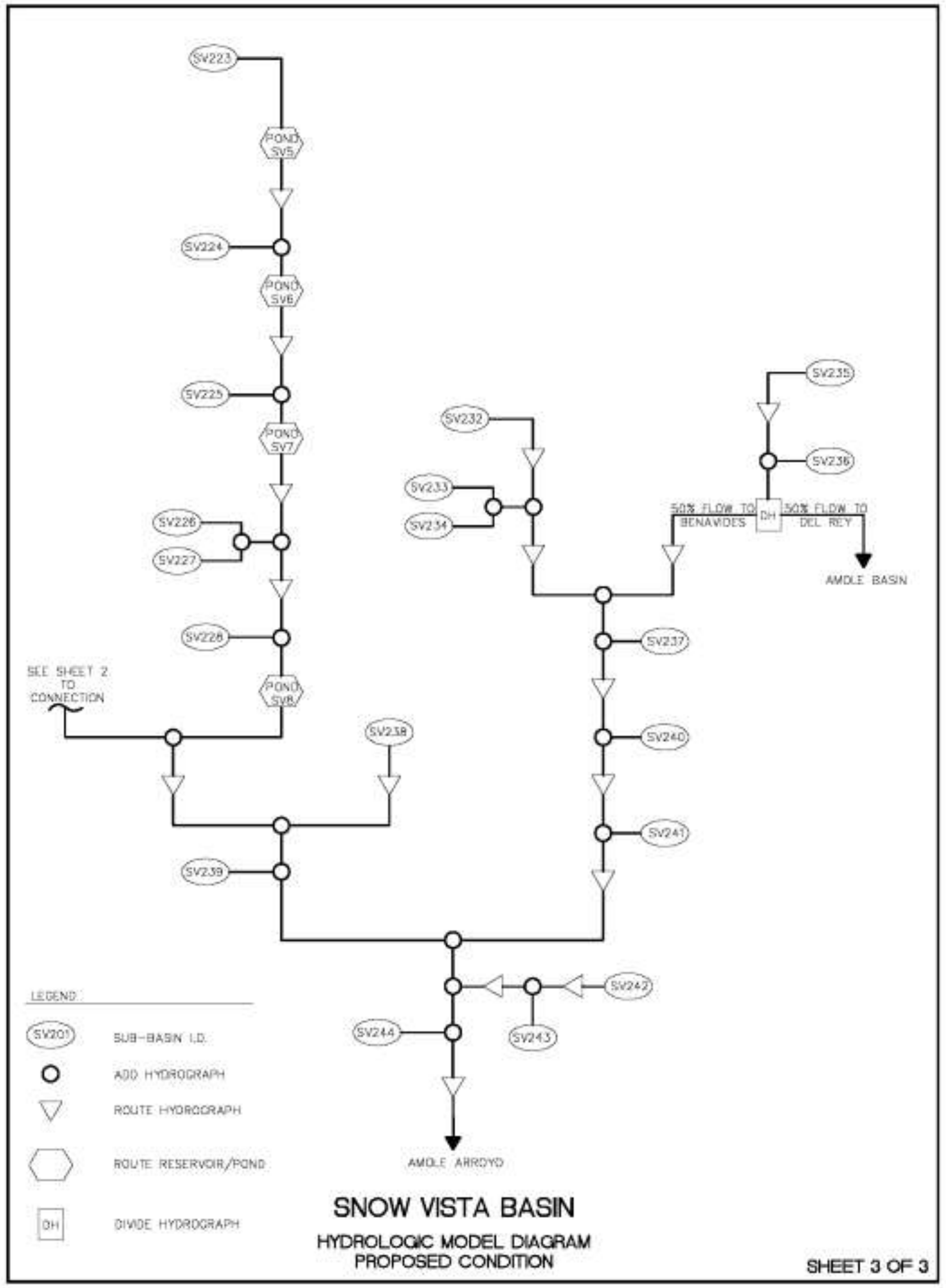

Figure 3-6 Continued: Snow Vista Basin - Proposed Hydrologic Model Diagram

Table 3-3: Snow Vista Basin - Proposed Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr-6hr}$ (cfs)	$V_{100yr-24hr}$ (ac-ft)
SV201	69	230.93	7.433
SV202	24	92.92	3.703
SV203	44	175.50	7.068
SV204	24	75.93	2.452
SV205	27	95.63	3.479
SV206	15	65.81	2.792
SV207	34	131.74	5.758
SV208	34	124.13	4.563
SV209	30	100.61	3.373
SV210	21	81.84	3.280
SV211	12	31.05	1.092
SV212	53	163.38	7.522
SV213	14	51.43	1.953
SV214	34	129.00	4.899
SV215	10	37.69	1.431
SV216	14	53.99	2.050
SV217	17	63.33	2.411
SV218	31	118.49	4.642
SV219	13	47.91	1.819
SV220	19	69.15	2.626
SV221	26	92.33	3.462
SV222	21	83.30	3.318
SV223	10	38.38	1.457
SV224	36	135.82	5.158
SV225	16	62.28	2.390
SV226	25	94.99	3.607
SV227	12	44.85	1.653
SV228	23	99.89	4.316
SV229	19	69.85	2.652
SV230	12	45.29	1.774
SV232	10	38.81	1.520
SV233	25	89.58	3.302
SV234	12	44.60	1.644
SV235	13	45.48	1.676
SV236	19	59.07	2.095
SV237	21	77.17	2.893
SV240	30	109.49	4.036
SV241	27	96.36	3.552
SV242	52	180.79	8.674
SV243	18	80.26	3.430
SV244	18	63.15	2.603

3.4 Amole Basin

Existing Conditions

The Amole Basin is approximately 1.93 sq. mi. and encompasses the area discharging to the Amole Arroyo. The basin is an irregular shape with its area being south of Benavides Road, west of Unser Boulevard, north of Senator Dennis Chavez Boulevard, and east of Westgate Dam. There are three general areas which are undeveloped. The first area is at the basin's western edge near the Westgate Dam. The second area is in the center of the eastern edge near the intersection of Gibson Boulevard and 98th Street. The third area is south and in the vicinity of Sacate Blanco Diversion Channel. Other land uses include mass graded platted lots and residential development with lots varying between four to nine du/ac.

The older residential area north of the Amole Arroyo with four du/ac surface drains to an inlet near the intersection of Del Rey Road and Anaconda Street. The inlets are connected to a storm drain pipe that outlets at the Amole Arroyo. Runoff from the residential area with six du/ac north of the Amole Arroyo is collected in a storm drain pipe which also outlets into the Amole Arroyo. Snow Vista Sub-Basins SV129 through SV131 are currently acting as part of the Amole Basin due to the complete clogging of the outlet pipe in Pond SV10. Westgate Dam outlets a maximum 73 cfs into the Amole Arroyo. For modeling purposes the hydrograph for the Westgate Dam Outfall was taken from the 1999 report and used for both the existing and proposed models. The Powerline channel currently discharges 485 cfs to the Amole Arroyo.

Three retention ponds north of Gibson Boulevard located within Sub-Basins A113 and A114 have been completely filled with sediment. Runoff from these sub-basins will surface flow into the existing development and migrate onto Gibson Boulevard. Gibson Boulevard does have a storm drain west of Messina Drive, but it was not designed to intercept runoff from Sub-Basin A113 or Sub-Basin A114. As a result, approximately 172 cfs will flow east on Gibson Boulevard until reaching the Amole Arroyo. Surge Pond A1 is at the intersection of Messina Drive and Amole Mesa Avenue. The storm drain in Range Avenue is connected to, and will surge into, Surge Pond A1 during the 100-year, 24-hour storm event. This storm drain system will continue on Blake Road until it outlets at Amole Arroyo. Results show that Surge Pond A1 has the capacity to store an additional 5.3 ac-ft, which will likely be used under a fully-developed basin.

Three storm drain systems, whose outlets are on the following corridors, receive free discharge from their respective drainage areas and outlet into the Amole Arroyo: Gibson Boulevard, a private road on Rudolfo Anaya Elementary School grounds, and Unser Boulevard. The respective drainage area and amount produced for these storm drain systems seems reasonable. Sacate Blanco Diversion Channel conveys runoff produced from Sub-Basin A132 and Sub-Basin A133. The diversion channel discharges into a pipe, which outlets to the Amole Arroyo just downstream of Unser Boulevard. The total peak flow just downstream of this intersection in the Amole Arroyo is 3,713 cfs. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Amole and Hubbell Dam Existing Characteristics

Currently, the Amole Dam has a primary principal spillway and a secondary principal/emergency spillway. The primary principal spillway is a 30" diameter outlet that is gated and normally closed. This outlet pipe drains into the Arenal Main Canal, owned and operated by the Middle Rio Grande Conservancy District. In order to start using this outlet, permission must be obtained. The secondary principal spillway is a 420 ft wide and 6.25 ft high weir at elevation 4,996.75 (NGVD 29), which spills into the Hubbell Channel and is conveyed then discharged into Hubbell Lake Dam. The capacity of the dam at the secondary spillway elevation is 490 AF. The capacity at top-of-dam is 583 ac-ft. The dam filing

Table 3-4: Amole Analysis Characteristics

Dam	Flow In cfs	Vol In ac-ft	Peak Flow Out cfs	Dam Volume ac-ft	Dam Volume Needed ac-ft	Principal Spillway Discharge cfs	Secondary Spillway Discharge cfs	Principal Spillway Cap cfs	Secondary Spillway Cap cfs	Dam Volume at Top of Dam ac-ft	Total Volume ac-ft
99 AH DMP	8331	1578	214	492	862*	64	<150	157	10159	-	492
2013 Update	7696	1063	1159**	492	492-1500**	34	1125**	157	10159	582	492

*With Guac Basin
**To be determined by system analysis

Table 3-5: Amole Design Characteristics

Dam	Flow In cfs	Vol In ac-ft	Peak Flow Out cfs	Dam Volume ac-ft	Principal Spillway Discharge cfs	Secondary Spillway Discharge cfs	Principal Spillway Cap cfs	Secondary Spillway Cap cfs	Dam Volume at Top of Dam ac-ft	Total Volume ac-ft
1976 Report	4236	1115	1107	492	60 avg.	950	157	10159	-	492
1978 Report	4235	735*	1107	492	60 avg.	950	157	10159	-	492
Dam Filing Sheet	4235	735	Varies based on WSEL	492	Varies based on WSEL	Varies based on WSEL	157	10159	582	492

*Westgate to hold 425 ac-ft

sheet states the capacity of the principal spillway is 157 cfs. The capacity of the secondary spillway at elevation 5,000.37(NGVD 29) is 10,159 cfs. The Hubbell Channel has a capacity of 9,710 cfs (with 2 ft of freeboard). The total inflow to Amole dam is 6,429 cfs and 1,107 ac-ft.

The Hubbell Lake Dam has a 36" diameter principal spillway and an emergency spillway. The primary principal spillway is a 36" diameter outlet that is gated and normally closed. This outlet pipe drains into the Isleta Drain, owned and operated by the Middle Rio Grande Conservancy District. The emergency spillway is a 1,200 ft wide and 3.5 ft high weir at elevation 4,935.5 (NGVD 29). The capacity of the dam at the emergency spillway elevation is 480 ac-ft, 270 ac-ft of which is below the outlet and is considered dead storage. The capacity at top-of-dam is 650 ac-ft. The capacity of the primary spillway outlet is 55 cfs. Total inflow to dam is 7,184 cfs and 1,267 ac-ft.

Proposed Conditions

The three retention ponds located north of Gibson Boulevard and within Sub-Basins A213 and A214 need re-grading for the full runoff retention of Sub-Basin 113 and Sub-Basin 114, to prevent runoff from damaging property and flooding Gibson Boulevard. Gibson Boulevard does have a storm drain west of Messina Drive, but it was not designed to intercept runoff from Sub-Basin A213 or Sub-Basin A214. In proposed conditions, the majority of area runoff from existing Sub-Basin A213 and A214 is collected within South Powerline Basin and is conveyed to Rio Bravo Channel. This helps relieve the stress on Gibson Boulevard to contain all runoff from these sub-basins due to pond failure. Refer to Table 3-8 for hydrologic data and Figure 3-8 for proposed hydrologic model diagram.

Amole and Hubbell Dam Proposed Characteristics

The Navajo ES project designed a gravity (ungated) outlet for the Amole Dam to empty into the Isleta Drain as part of the SWVFRP iteration 1. The project proposed to allow 34 cfs from the Amole Dam, allow for 20 cfs for local flows, and release 54 cfs. At analysis point IS14, which is located on the Isleta Drain between Blake Rd. and Barcelona Rd., capacity is 208 cfs.

Also based on SWVFRP iteration 1, allowable discharge from the Hubbell Dam is approximately 35 cfs. Further study is needed to determine if this may be increased to the spillway capacity of 55 cfs.

Table 3-6: Hubbell Design Characteristics

Dam	Flow In Cfs	Vol In ac-ft	Peak Flow Out cfs	Dam Volume ac-ft	Principal Spillway Discharge cfs	Emergency Spillway Discharge cfs	Principal Spillway Cap cfs	Emergency Spillway Cap cfs	Dam Volume at Top of Dam ac-ft	Total Volume ac-ft
1976 Report	1919	471.76	55	480	55	0	55	19854	-	480
1978 Report	1919	471.76	55	480	27 avg.	0	55	19854	-	480
Dam Filing Sheet	1919	397	Varies based on WSEL	480	Varies based on WSEL	Varies based on WSEL	55	19854	631	480

Table 3-7: Hubbell Analysis Characteristics

Dam	Flow In cfs		Vol In ac-ft		Dam Volume ac-ft	Dam Volume Needed ac-ft	Principal Spillway Discharge cfs	Emergency Spillway Discharge cfs	Principal Spillway Cap cfs	Emergency Spillway Cap cfs
	Borrega Channel	Hubbell Channel	Borrega Channel	Hubbell Channel						
99 AH DMP	868	457	-	455	480	0	0+	471+	55	19854
2013 Update	189	1884-1910*	128	177-619*	480	0-139*	55	*	55	19854

*To be determined by system analysis
+As modeled

Recommendations:

Below are the recommendations from the 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project AH1:*
    - *Guac Basin Stage 1* Construction GuacAmole Connection, Revise Emergency Spillway, Provide 150 ac-ft Storage – Still NEEDED – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project AH2:*
    - *Enlarge Guac Basin to 300* ac-ft – Still NEEDED – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project AH3:*
    - *Enlarge Guac Basin to 862* ac-ft – Still NEEDED – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project AH4:*
    - Extend Hubbell Lake Emergency Spillway from 1,250 ft to 3,338 ft – Still NEEDED – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project AH5:*
    - *Hubbell Lake Expansion Alternative* – Relocate Existing North and East Berm. Construct 3,338-ft Emergency Spillway – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project AH6*:
    - *Salsa Basin Alternative 270 ac-ft Storage* – A GuacAmole/Hubbell Lake System Analysis is needed
- *Project SB1:*
- *Sacate Blanco Diversion Channel* – Still NEEDED as part of developed conditions but is not necessary immediately due to lack of development in basin area. A 72" RCP pipe may be used as an alternative to the proposed channel as development in area increases
- *Project SB2:*
    - *South Sacate Blanco Arroyo* – Still NEEDED as part of the developed conditions but is not necessary immediately due to lack of development in basin area. A 54" RCP pipe can be used instead of the proposed channel as development in area increases
- *Project SB3:*
    - *Sacate Blanco Avulsion Conveyance* – NOT NEEDED

Additional Recommendations for the basin based on updated basin analysis are below:

- GuacAmole/Hubbell Lake System Analysis; this includes Rio Bravo Sub-Basins 208, 209.1, and 209.2.

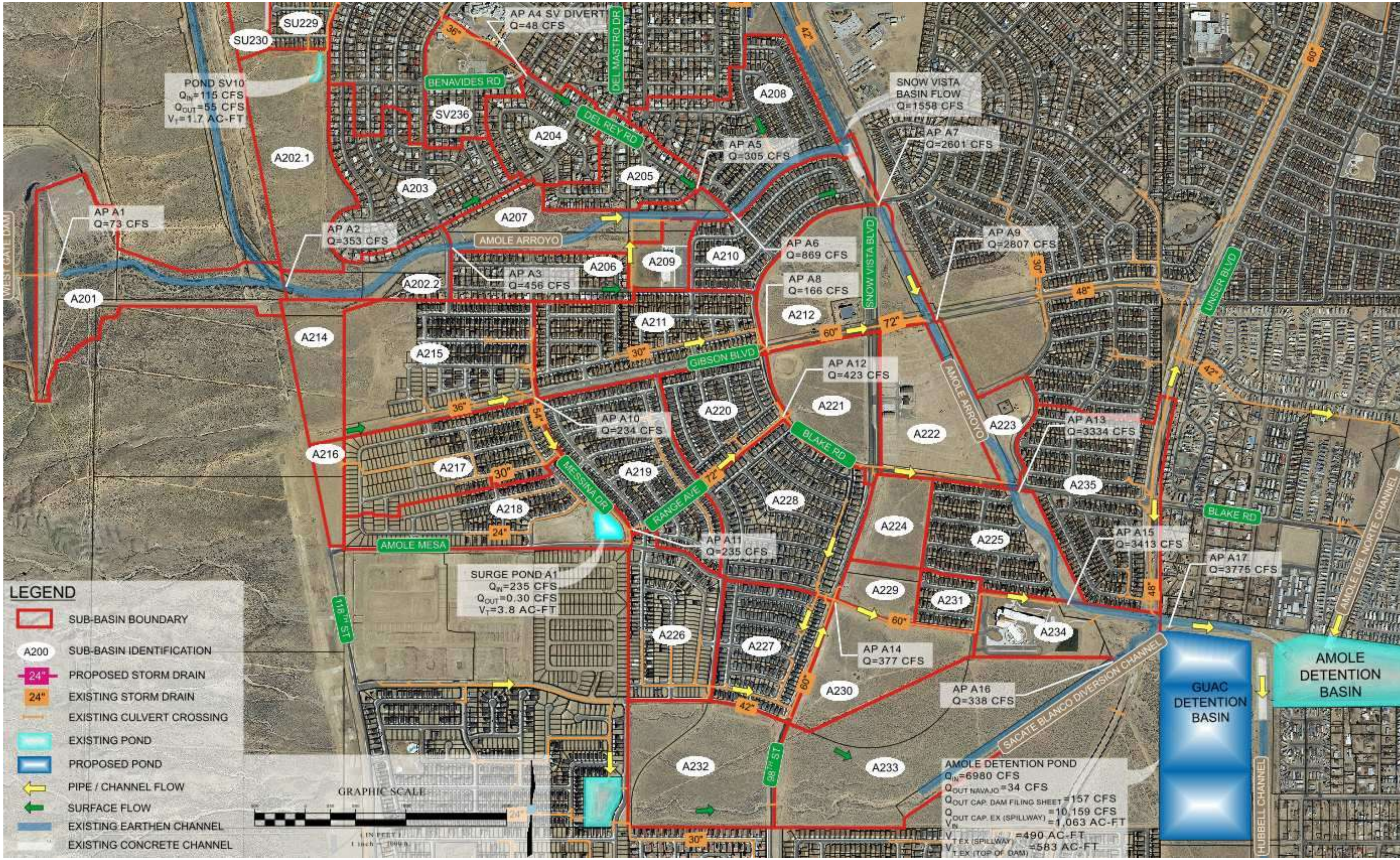

Figure 3-7: Amole Basin - Proposed Basin Map

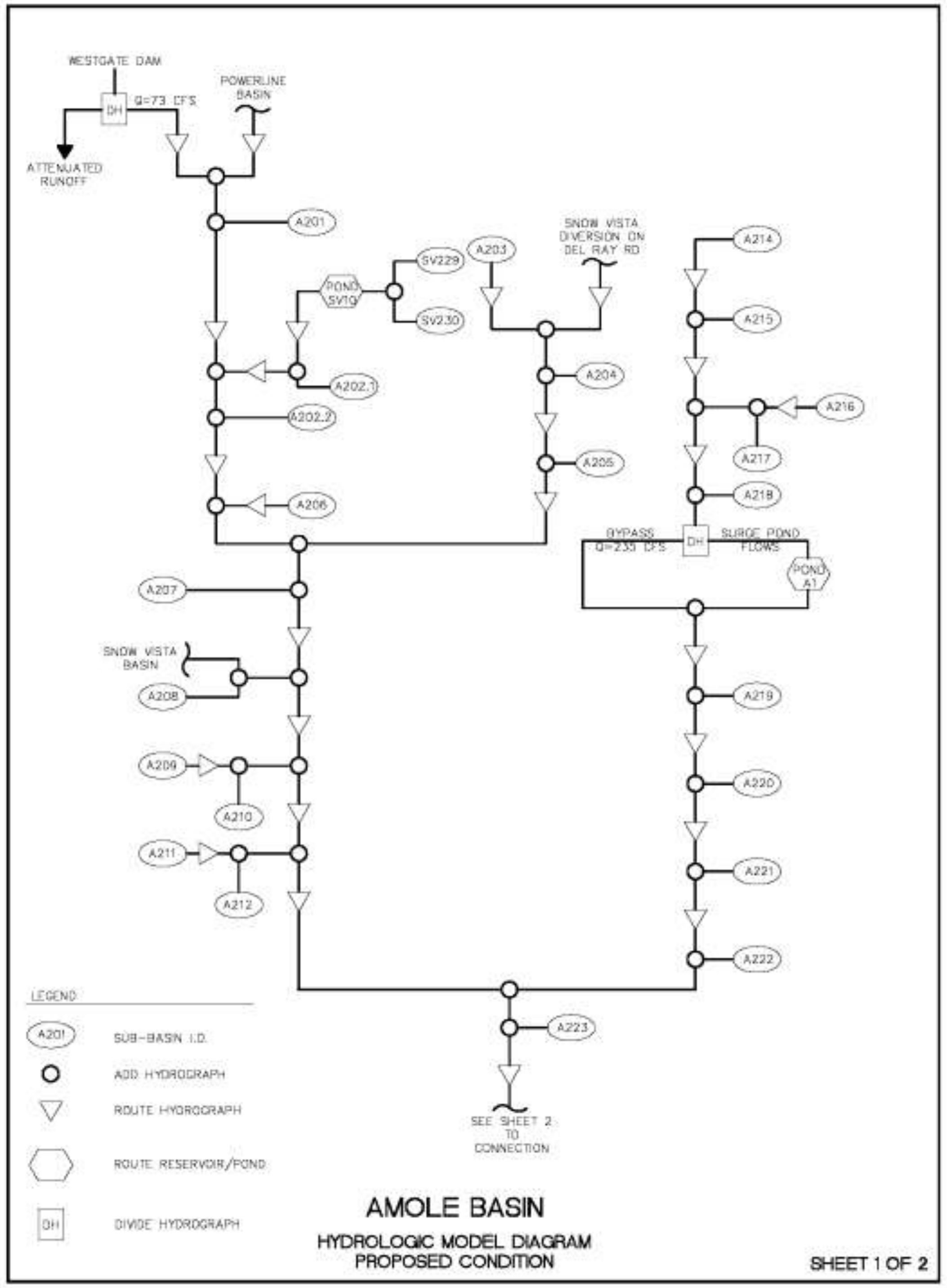

Figure 3-8: Amole Basin - Proposed Hydrologic Model Diagram

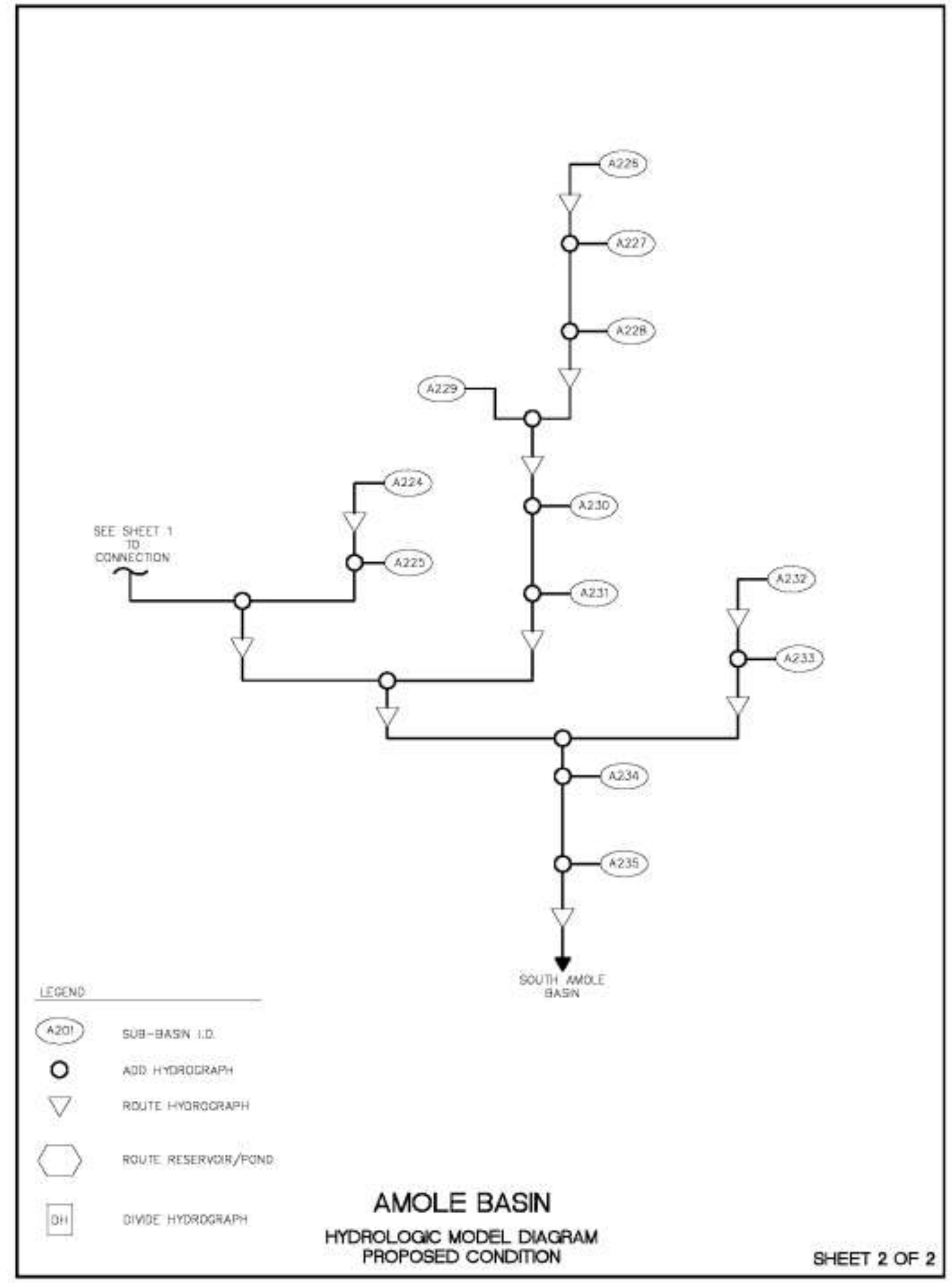

Figure 3-8 Continued: Amole Basin - Proposed Hydrologic Model Diagram

Table 3-8: Amole Basin - Proposed Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
A201	46	122.09	4.373
A202.1	38	60.67	3.969
A202.2	17	53.58	1.938
A203	40	143.75	5.299
A204	22	78.99	2.908
A205	18	61.77	2.435
A206	20	74.47	2.828
A207	26	60.01	1.945
A208	43	164.52	6.375
A209	8	18.08	0.571
A210	28	111.71	4.491
A211	42	165.76	6.637
A212	40	174.78	7.656
A214	16	61.49	2.335
A215	51	191.61	7.261
A216	6	21.87	0.830
A217	37	133.19	4.615
A218	36	128.79	4.429
A219	41	159.68	6.256
A220	23	89.59	3.514
A221	27	118.26	5.098
A222	29	128.19	5.539
A223	13	57.77	2.479
A224	13	48.08	1.826
A225	30	119.33	4.782
A226	31	122.90	4.929
A227	28	104.57	4.474
A228	45	167.59	6.379
A229	9	33.43	1.269
A230	28	112.97	4.625
A231	8	30.23	1.209
A232	42	171.36	7.021
A233	73	245.20	12.206
A234	23	89.40	3.501
A235	52	194.03	7.857

3.5 Amole Del Norte

3.5.1 98th & Central Basin

Existing Conditions

The 98th & Central Basin is approximately 0.81 sq. mi. This sub-area is generally bounded on the east by 98th Street and north by I-40, while on the south by Central Avenue and the west by the Powerline Channel. A two cell pond made up of Pond NE2 and Pond NE3 receives the area's runoff. The land uses in 98th & Central Area are platted undeveloped, industrial, commercial, and low density residential. Cross-lot drainage is the sub-area's main drainage issue due to the large undeveloped land. No off-site runoff enters the sub-area north of I-40.

Pond NE1 was designed to retain Sub-Basin NE105; however, hydrologic analyses concludes this pond is close to overtopping during the 100-year, 24-hour storm event; therefore, runoff will overflow the pond onto Avalon Road. This sub-area lacks drainage conveyance infrastructure. Without the conveyance infrastructure in place, developed and undeveloped lots experience large amounts of cross-lot drainage. There is only one storm drain system in the sub-area, beginning near the intersection of Volcano Road and 98th Street and runs through Pond NE2 outletting into Pond NE3. Since the majority of the sub-area is not conveyed via a sub-surface drainage system, large amounts of runoff spill into the pond. The two-cell pond outlets into a storm drain system located in the Tierra Bayita Area, which ultimately connects to the Tierra Bayita Channel. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

The proposed land uses in 98th & Central Area are platted mass graded, industrial, commercial, high and low dense residential, and school. Proposed conditions and development have added a sub-surface storm drainage system to collect runoff and convey it to basin ponds to prevent excessive street flow. No off-site runoff enters the sub-area north of I-40.

The proposed conditions assume that the pond NE1 is abandoned and proposed storm drainage is allowed to collect and flow along the surface to Pond NE2 and NE3. As stated above, this surface flow shall be addressed with the residential development plans. A drainage conveyance system shall be installed to collect runoff from the area and convey it to Pond NE2 and NE3. To help alleviate flows to the Coors N-S pond, we recommend the use of an 18" orifice plate at the outlet structures of these ponds. Shallow cross-lot drainage will remain in upstream portions of this basin, although it is the intent of the plan to eliminateas much of the cross-lot drainage as possible with the proposed system. After development, the runoff from the area will be conveyed through drainage conveyance systems eliminating excess flow to the pond. Refer to Table 3-9 for hydrologic data and Figure 3-10 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project AD1: Tower Sage Detention Basin and Outfall* – COMPLETED

Additional Recommendations for the basin based on updated basin analysis are below:

- Relocate the spillway for Pond NE2 to discharge to the south onto Central Avenue. Cost $222,800.
- Install storm drain system proposed in 98th & Central Basin per this DMP.
- Install 18" orifice in the outlet structures of ponds NE2 and NE3.

Figure 3-9 - 98th & Central Basin Proposed Basin Map

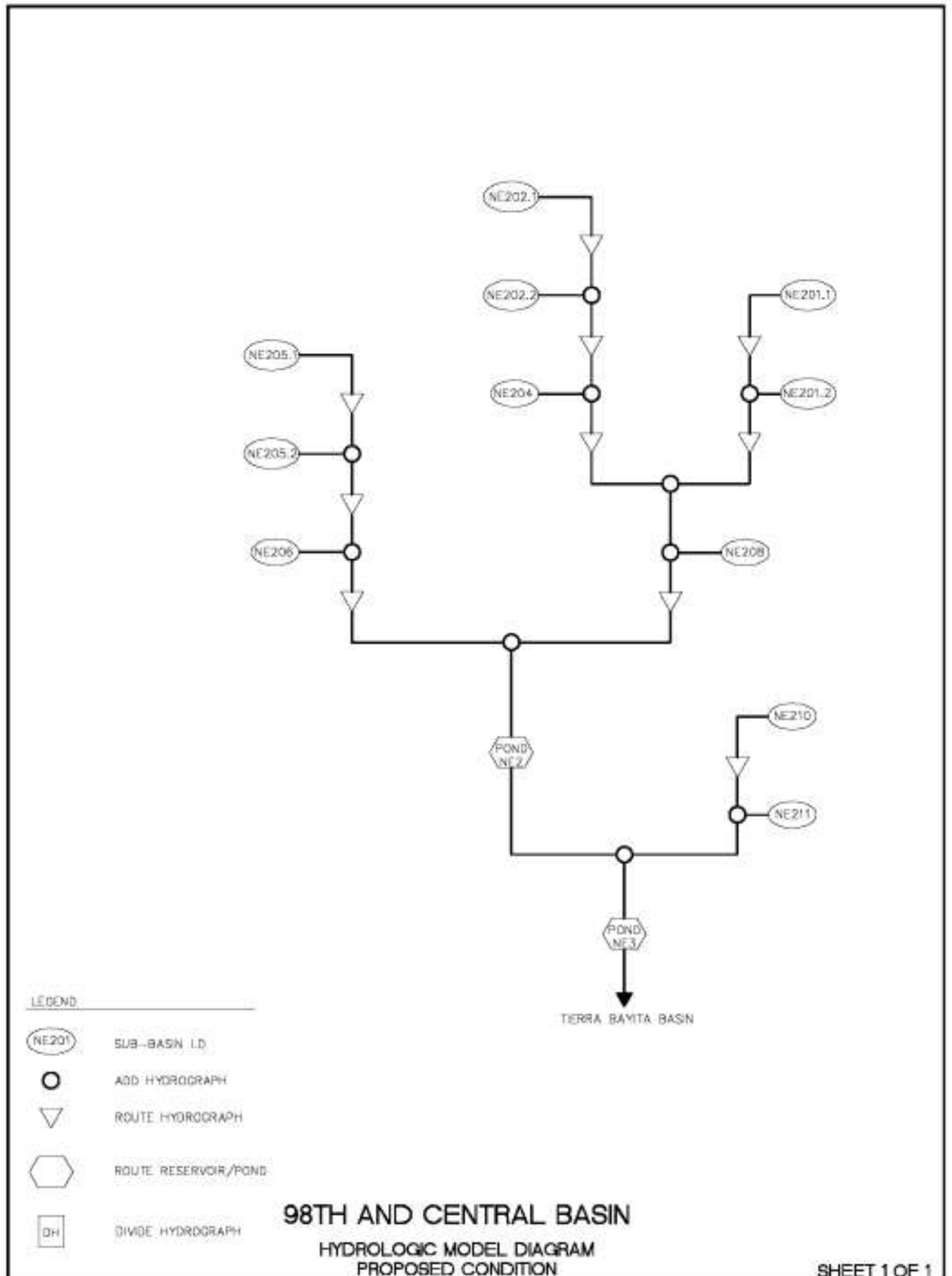

Figure 3-10: 98th & Central Area - Proposed Hydrologic Model Diagram

Table 3-9: 98th & Central Area - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
NE201.1	54	173.30	5.566
NE201.2	28	88.97	2.860
NE202.1	54	172.80	5.550
NE202.2	40	126.52	4.067
NE204	57	183.06	5.878
NE205.1	48	152.77	4.909
NE205.2	39	123.59	3.976
NE206	28	114.85	4.691
NE208	65	197.57	6.772
NE210	61	216.65	9.433
NE211	50	186.95	7.421

3.5.2 Unser/214 Basin

Existing Conditions

The Unser/214 Area is the smallest sub-basin in the Amole del Norte Basin, with approximately 0.57 sq. mi. It is generally bound by Avalon Road to the south, Unser Boulevard to the east, I-40 to the north, and 98th Street to the west. Off-site runoff enters the sub-area at a peak rate equal to 108 cfs from the culvert crossing on the I-40 Diversion Channel. The hydrograph was obtained from the West I-40 DMP by Bohannon Huston, 2013. Land uses in the sub-area include industrial, residential, undeveloped platted lots, and mass graded platted lots. There are seven regional ponds, six of which are in a series and referred to as the Unser Ponds. The seventh pond is Pond U214. Major storm drain systems are located on Avalon Road and Unser Boulevard.

The off-site runoff is conveyed via an incised arroyo, which discharges into Pond U5. The residential area in Sub-Basin U103 has free discharge to Unser Ponds, while the residential area in Sub-Basin U104 controls runoff via a private pond (Pond U7) prior to releasing runoff to the Unser Ponds. Pond U1 through Pond U3 discharge at the same rate as the inflow; thus, not attenuating the runoff. Pond U6 outlets into a storm drain system on Avalon Road, which is connected to the storm drain system on Unser Boulevard. A storm drain system on Bluewater Road intercepts runoff from the industrial area located in Sub-Basin U106. This system also ties into the storm drain system on Unser Boulevard. The analysis point at the intersection of Unser Boulevard and Bluewater Road seems to be high for the downstream pipe size. The pipe size on Unser Boulevard between Bluewater Road and Avalon Road is 42" diameter. Further analysis is needed to confirm if the peak discharge at the analysis point is correct, or the pipe should be analyzed for its conveyance capacity. The peak discharge may not be correct if the industrial area in Sub-Basin U106 has restricted runoff. Pond U214 accepts water from the storm drain system in Unser Boulevard from north of Avalon Road and basin U209. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

The off-site runoff is currently conveyed through an incised arroyo discharging into Pond U5. We recommend the offsite flow be cut off and redirected to the La Presa Detention Basin. To accomplish this, the West I-40 channel needs to be completed from 98th St to La Presa Dam. The Dam was designed to take this flow. This diversion will eliminate the need for additional storage volume downstream in the Unser/214 basin. Recommendations for storm drainage ponds and infrastructure can be found below. Refer to Table 3-10 for hydrologic data and Figure 3-12 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- No recommendations from the 1999 Amole Hubbell DMP

Additional Recommendations for the basin based on updated basin analysis are below:

- Due to the current zoning of SU-1 in Basin 202.1, Ponds U5 and U6 will need to remain and the basin needs to have a runoff restriction of 2.0 cfs per acre to avoid downstream improvements. Previous reports have modeled the basin as residential and once the basin is developed hydrology should be redone to determine if the runoff restriction is still valid. Developer cost.
- Remove the offsite flow by eliminating the pipe connection north of I-40 and completing the construction of the West I-40 channel to La Presa Dam.
- Install a 30" orifice plate in the outlet structure on pond U1 to restrict flows to the storm drain system.
- Increase Storm drain size in Unser Blvd from a 42" to a 60" from Bluewater Rd to Avalon Rd

Figure 3-11: Unser/214 - Proposed Basin Map

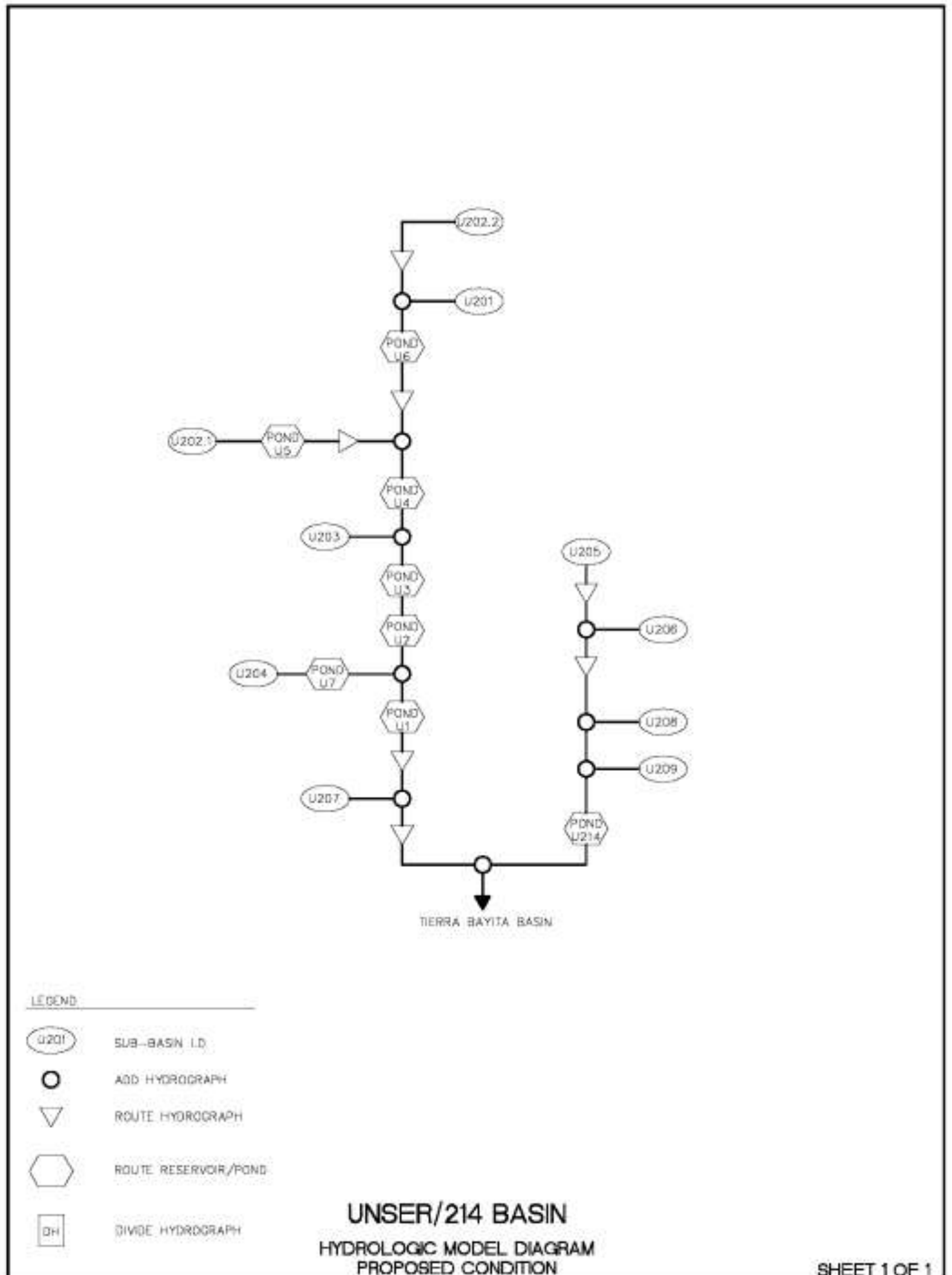

Figure 3-12: Unser/214 Area - Proposed Hydrologic Model Diagram

Table 3-10: Unser/214 Area - Proposed Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
U201	23	99.89	4.316
U202.1	43	176.49	7.502
U202.2	30	104.70	4.227
U203	34	124.07	4.784
U204	32	113.17	4.334
U205	51	176.04	8.550
U206	62	189.28	10.116
U207	29	114.77	4.610
U208	25	98.33	3.902
U209	21	85.47	3.341

3.5.3 Tierra Bayita Area

Existing Conditions

The Tierra Bayita Basin is approximately 1.40 sq. mi. and is irregularly shaped with I-40 bounding the north, 98th Street bounding the west, Eucariz Avenue being the most southern boundary, and Coors Boulevard being the most eastern boundary. Several land uses in Tierra Bayita Basin include industrial, commercial, undeveloped platted lots, mass graded platted lots, and residential. Main storm drain systems have been constructed in the Tierra Bayita Basin. Stub-outs have been set along the storm drain portion on Bluewater Road. Most developments are allowed free discharge to the public storm drain. The developments in Sub-Basin TB103 and TB105 were required to construct Pond TB2 and Pond TB3, respectively. There are three major storm drain systems which convey runoff to the Tierra Bayita Channel.

Runoff from Sub-Basin TB101 and Sub-Basin TB102 is retained in Pond TB1. Once these sub-basins are developed, the storm drain on Bluewater Road will intercept its controlled runoff release. From the Bluewater Road and 90th Street intersection, this storm drain system bends 90 degrees and follows 90th Street to Volcano Road, then bends at 90th Street to Bridge, then finally it runs along Bridge Boulevard until outletting into the Tierra Bayita Channel. Pond TB2 and TB3 release a controlled rate into this system. A lateral is extended from 90th Street on Central Avenue to the two cell pond located in the 98th & Central Area.

The second major storm drain in the Tierra Bayita Basin is on Sunset Garden Road, which begins near its intersection with 86th Street and runs east to Unser Boulevard, then north on Unser Boulevard until emptying into the Tierra Bayita Channel. This system receives free discharge from its respective drainage area. The third system begins in the Unser/214 Area. The portion in the Tierra Bayita Basin is in Unser Boulevard from Avalon Road to Tierra Bayita Channel. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

Per the Bluewater Road near 90th Street Drainage Analysis by Tierra West dated 12-20-01 basins 202.1 and 202.2 have been restricted to 2.05 cfs/ac. To achieve this restriction, ponds were created in AHYMO to reduce runoff to the restricted rate. Also, in the proposed condition TB 101 has been shifted to the 98th & Central Basin. The Coors North South pond in the proposed condition is overtopping. The pond needs to be increased in size to hold 75 ac-ft of runoff. Refer to Table 3-11 for hydrologic data and Figure 3-14 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation:

- No recommendations from the 1999 Amole Hubbell DMP

Additional Recommendations for the basin based on updated basin analysis are below:

- Restrict future basin flows to 2.5 cfs/acre for basins 202.1 and 202.2.
- Increase volume of Coors N-S Pond to 75 ac-ft.

Figure 3-13: Tierra Bayita Area - Proposed Basin Map

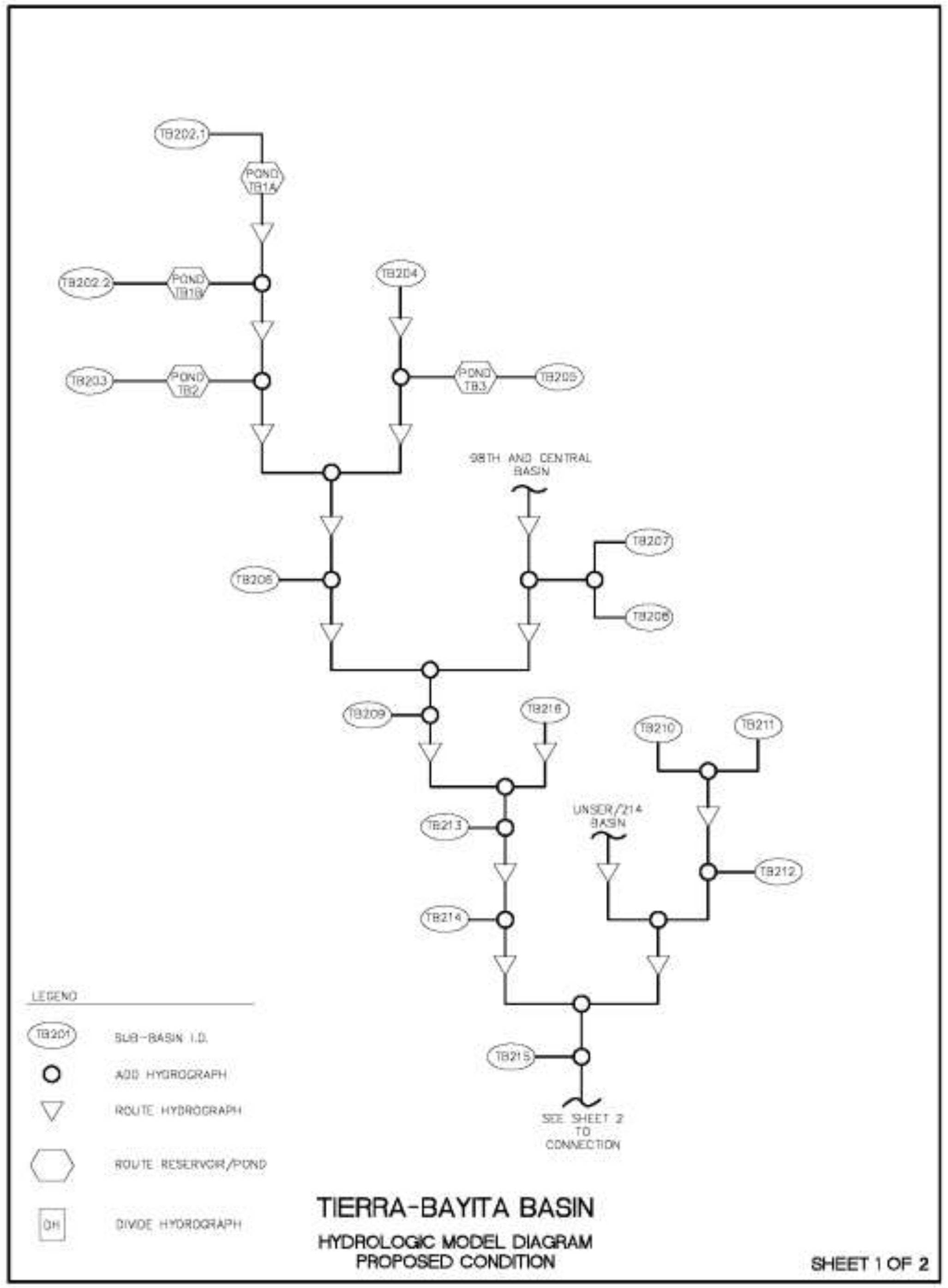

Figure 3-14: Tierra Bayita Basin - Proposed Hydrologic Model Diagram

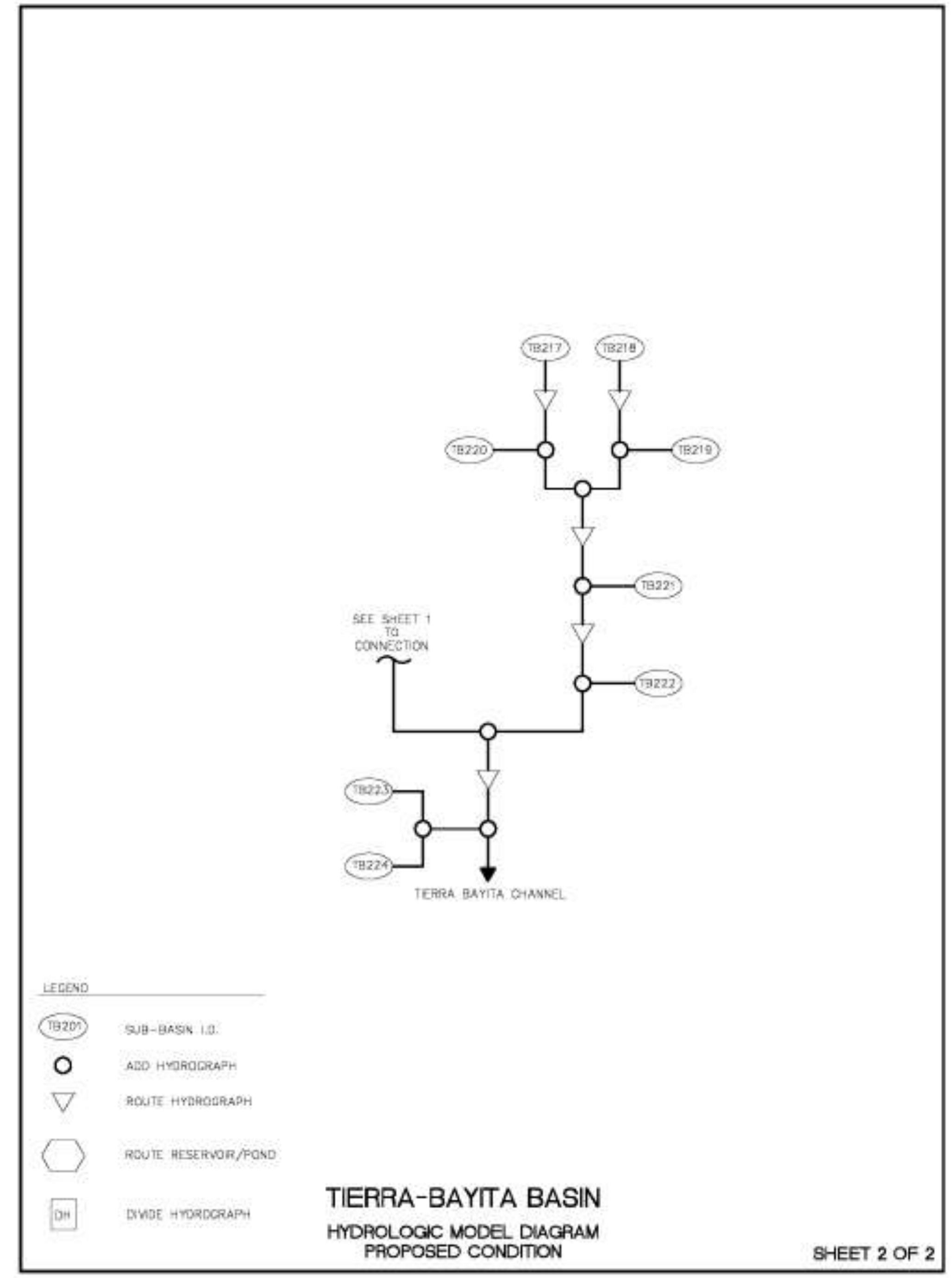

Figure 3-14: Tierra Bayita Basin - Proposed Hydrologic Model Diagram

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
TB202.1	88	286.10	11.871
TB202.2	56	234.77	9.208
TB203	32	123.90	4.854
TB204	25	106.80	4.584
TB205	29	115.37	4.583
TB206	16	64.63	2.570
TB207	44	180.99	7.480
TB208	32	125.02	5.303
TB209	20	85.75	3.659
TB210	47	175.08	7.917
TB211	15	66.05	2.870
TB212	44	159.66	7.680
TB213	30	133.59	5.771
TB214	17	68.55	2.713
TB215	72	195.06	9.623
TB216	21	89.82	3.817
TB217	12	50.87	2.147
TB218	23	73.14	2.353
TB219	15	58.43	2.347
TB220	24	96.97	3.995
TB221	37	137.45	5.770
TB222	45	155.17	7.233
TB223	46	129.70	6.937
TB224	102	236.51	15.234
TB202.1	88	286.10	11.871

Table 3-11: Tierra Bayita Area - Proposed Sub-Basin Peak Discharge and Volumes

3.5.4 Atrisco Business Park Basin

Existing Conditions

The Atrisco Business Park Area is approximately 0.89 sq. mi. Land uses in this sub-area include undeveloped platted lots, platted mass graded, industrial, and commercial. There is one storm drain system that is approximately 9,800 ft long. It begins near Gallatin Place on Los Volcanes Road running east to Airport Drive, then south on Airport Drive to Central Avenue, then south through a private property to Coors Boulevard, then finally south on Coors until penetrating into Pond N-S Coors. The entire sub-area discharges into this one system.

The original Amole-Hubbell DMP set a maximum allowed discharge rate equal to 0.1 cfs/ac. There are high density developments in this basin. The model limits the sub-area, discharge of Sub-Basins AB101 through AB103 to 0.1 cfs/acre. Sub-Area AB104 is mostly undeveloped, so the max release criterion has not been applied. The total flow into Pond N-S Coors from Atrisco Business Park Area is 225 cfs. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

The proposed model is built with the assumption that all basins are restricted to the 0.1 cfs/acre. The total flow into the Coors N-S pond from the Atrisco Business Area is 50 cfs. Refer to Table 3-12 for hydrologic data and Figure 3-16 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- No recommendations from the 1999 Amole Hubbell DMP

Additional Recommendations for the basin based on updated basin analysis are below:

- Enforce the 0.1 cfs/acre max release criterion with adequate documentation to verify compliance with the master plan models.

Figure 3-15: Atrisco Business Park Area - Proposed Basin Map

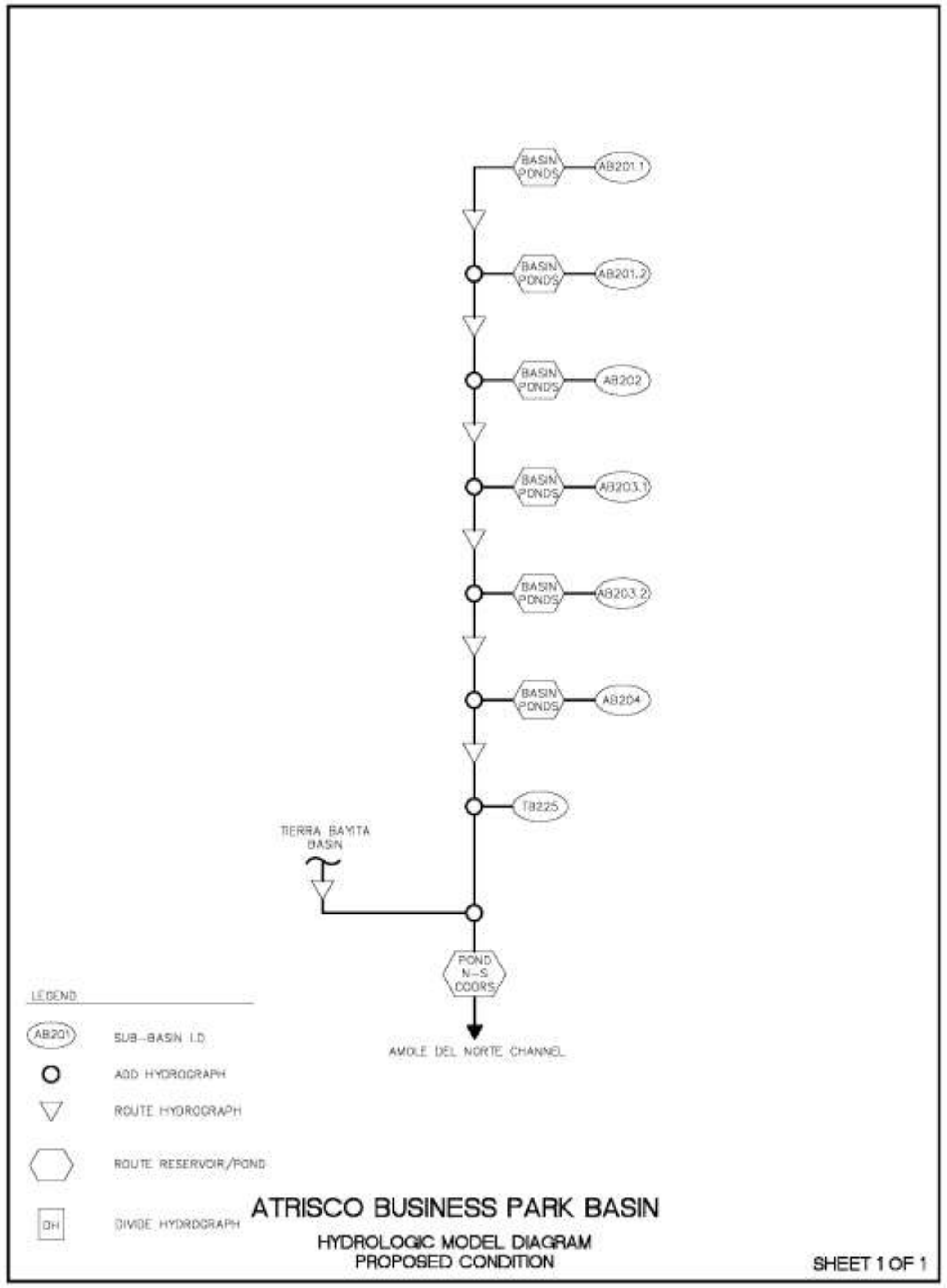

Figure 3-16: Atrisco Business Park Area - Proposed Hydrologic Model Diagram

Table 3-12: Atrisco Business Park Area - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	Allowable Discharge (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
AB201.1	76	299.35	7.6	12.710
AB201.2	62	227.97	6.2	10.343
AB202	117	320.85	11.7	19.669
AB203.1	71	233.36	7.1	12.849
AB203.2	66	160.41	6.6	10.776
AB204	103	291.27	10.3	17.730

3.5.5 Tower/Sage Area

Existing Conditions

The Tower/Sage Area is approximately 1.28 sq. mi. with its sub-area north of Sage Road and east of the Snow Vista Channel. The sub-area drains to Amole del Norte Channel. Pond TS1, Tower Pond, attenuates runoff that is generated from 425 acres west of 86th Street. Land uses in the sub-area include high and low density residential, open space, undeveloped platted lots, commercial, Industrial, and schools.

Tower Pond is a multi-use facility and serves as an area for outdoor recreation and flood control. It reduces the peak discharge entering the Amole del Norte Channel from the Tower/Sage Area. 2010 LIDAR was used for determining the pond's volume, which was calculated at 54.3 ac-ft. 50 ac-ft will be stored at the pond's hydraulic grade line during the 100-year, 24-hour storm event. Two storm drain systems enter Tower Pond. Surge structures connect the inlet pipes to the outfall pipe that connects to the storm drain system on San Ygnacio Road.

The system on San Ygnacio Road which discharges into Tower Pond begins at 90th Street running east until discharging into Tower Pond. Recently, a lateral on 86th was constructed which connects to the storm drain system on San Ygnacio Road. The lateral begins near 90th Street on Sage Road, running east to 86th Street, then north to the storm drain on San Ygnacio Road. This lateral allowed the removal of a temporary pond in Sub-Basin TS108. It also gave TS107 and TS108 free discharge to Tower Pond.

The Tower/Sage Area has three outfalls into the Amole del Norte Channel. These outfalls are from storm drain systems on Tower Road, San Ygnacio Road, and Sage Road. The outfall from the Tower Road storm drain begins near Unser Boulevard and runs east until penetrating into the Amole del Norte Channel. The Tower Pond outlet pipe connects to the San Ygnacio Road storm drain that outlets into the Amole del Norte Channel. This storm drain runs from Tower Pond to Amole del Norte Channel within San Ygnacio Road. The three outfalls begin near 82nd Street on Sage Road and run east on Sage Road until penetrating into the Amole del Norte Channel. The respective flows in these systems seem adequate. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

Currently basin TS206 runoff remains within the basin. A storm drain system is needed to convey this basin's runoff to Sage Rd. The storm drain system in Tower Rd. between Stinson and Autumn View needs to be completed so temporary retention ponds maybe removed. Refer to Table 3-13 for hydrologic data and Figure 3-18 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project AD1*:
  - *Tower/Sage Detention Basin and Outfall* – COMPLETED

Additional Recommendations for the basin based on updated basin analysis are below:

- Complete Tower Road storm drain to allow for the removal of temporary retention ponds between Stinson Street and Autumn View Street.
- Pond TS2 storm drain to be installed in Sage Road

Figure 3-17: Tower/Sage Area - Proposed Basin Map

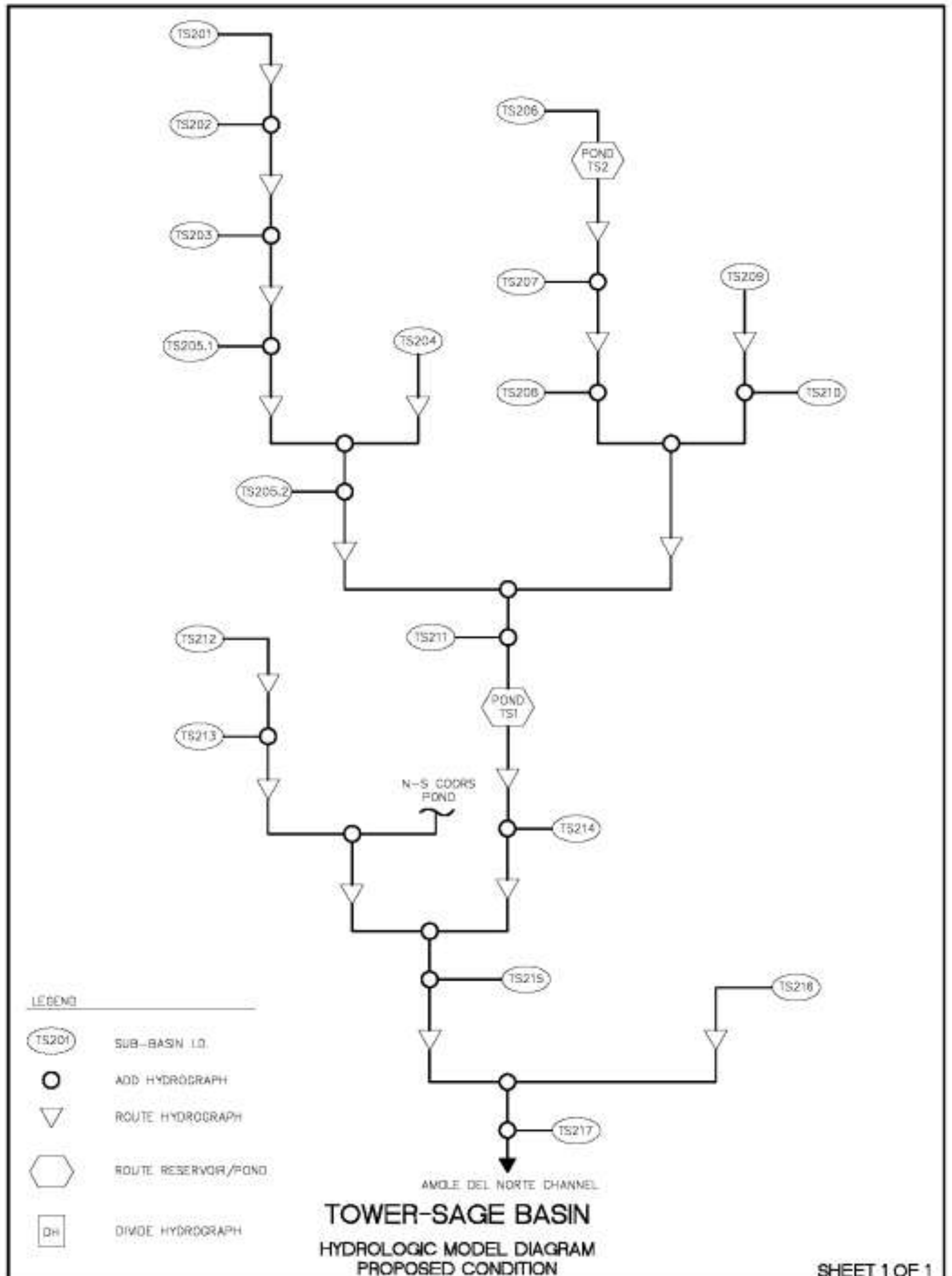

Figure 3-18: Tower/Sage Area - Proposed Hydrologic Model Diagram

Table 3-13: Tower/Sage Area - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
TS201	41	164.37	7.700
TS202	56	212.99	8.918
TS203	68	228.00	11.034
TS204	30	108.73	4.364
TS205.1	26	99.98	3.908
TS205.2	40	143.52	5.947
TS207	46	154.09	6.516
TS208	38	113.66	5.546
TS209	41	147.00	6.724
TS210	39	134.31	6.030
TS211	29	65.75	2.124
TS212	60	185.71	9.702
TS213	42	165.63	6.529
TS214	31	92.13	4.560
TS215	96	240.67	12.607
TS216	49	131.92	7.482
TS217	90	246.00	12.146

3.5.6 South Amole del Norte Basin

Existing Conditions

The South Amole del Norte Area is approximately 1.60 sq. mi., discharging to the Amole del Norte Channel. It is bound at the east by Amole del Norte and north by Sage Road, and is located north of Amole Arroyo and east of Amole Arroyo and Snow Vista Channel. Land uses in the basin include high and low density residential, mobile homes, schools, platted undeveloped lots, and open space. The basin runoff is discharged to the Amole del Norte Channel through several pipe penetrations. Residential housing units along the Amole del Norte have their own penetrations into Amole del Norte Channel. There are two regional storm drain systems that including storm drain pipes and ponds that ultimately discharge to the channel. The Amole del Norte Channel discharges into the Amole Detention Pond directly downstream of the South Amole del Norte Basin.

The northwest portion of the basin does not have sub-surface drainage; therefore, runoff is conveyed via the street. The flow at the analysis point at the intersection of 86th Street and Arenal Road is 254 cfs. The storm drain system near Corriz Drive on Arenal Road runs east in Arenal Road and outlets into Pond SA2. This system cannot intercept the entire runoff on Arenal, so it is assumed that the bypassed runoff enters Pond SA2 by overflowing into the pond. A storm drain system north of Gibson Boulevard on Unser Boulevard runs north along Unser Boulevard until discharging into Pond SA2. Pond SA2 will overtop during a 100-year, 24-hour storm event with an overflow of 380 cfs. The pond's principal spillway connects to a storm drain system on Arenal that outlets into the Amole del Norte.

Pond SA3 receives runoff from 288 acres. A major storm drain system with its outfall at the pond's northeast corner may not intercept the entire runoff in its respective corridor. It is assumed that the bypass flow will overflow into the pond. One other pipe outfalls into the pond; this pipe is in Sub-Basin SA126, which collects the subdivision's runoff. Pond SA3 outlet runs east through private property until discharging into Amole del Norte Channel. Analysis concludes that the hydraulic grade line in the pond is at the top of pond elevation with minimal to no freeboard. We recommend that the pond and the connecting systems be further analyzed by incorporating accurate information from as-builts into hydraulic and hydrologic models. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

The northwest portion of the area does not have sub-surface drainage; therefore, runoff is conveyed via the street. The flow at the analysis point at the intersection of 86th Street and Arenal Road is 305 cfs. Arenal Road does not have the capacity for conveying the runoff from the upstream basins. Pond SA2 will overtop during a 100-year, 24-hour storm event with an overflow of 460 cfs. The pond's principal spillway connects to a storm drain system in Arenal that discharges into the Amole del Norte.

Pond SA3 receives runoff from 221 acres. A major storm drain system with its outfall at the pond's northeast corner may not intercept the entire runoff in its respective corridor. It is assumed that the bypass will overflow into the pond. One other pipe outfalls into the pond; this pipe is in Sub-Basin SA226, which collects the subdivision's runoff. Pond SA3 outlet runs east through private property until discharging into Amole del Norte Channel. As in the existing condition model analysis, the proposed conditions indicate the pond will overtop. Refer to Table 3-14 for hydrologic data and Figure 3-20 for proposed hydrologic model diagram.

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Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- No recommendations from the 1999 Amole Hubbell DMP

Additional Recommendations for the basin based on updated basin analysis are below:

- Increase Pond SA2 to a volume of 20 ac-ft.
- Increase Pond SA3 to a volume of 18 ac-ft.

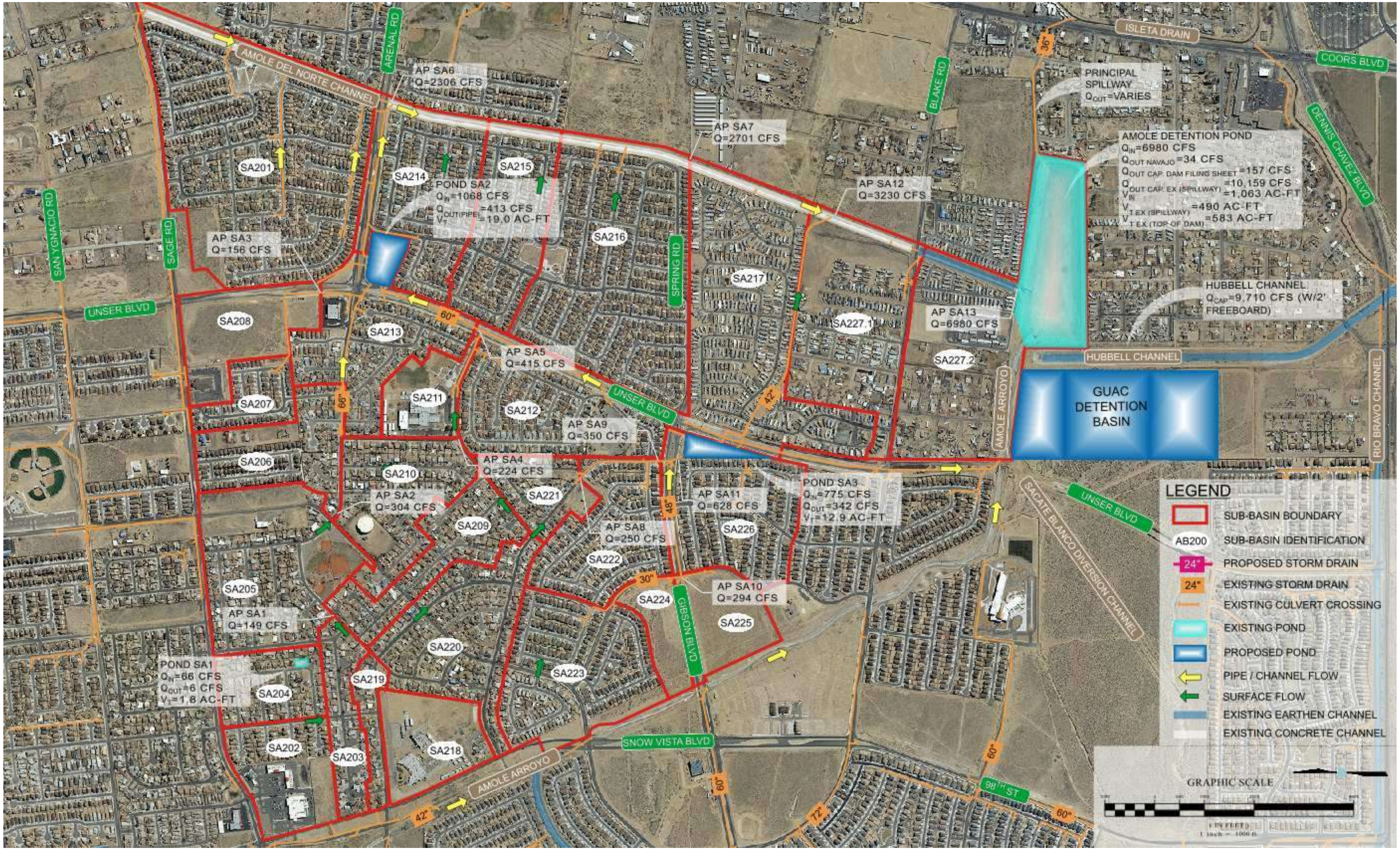

Figure 3-19: South Amole del Norte Area - Proposed Basin Map

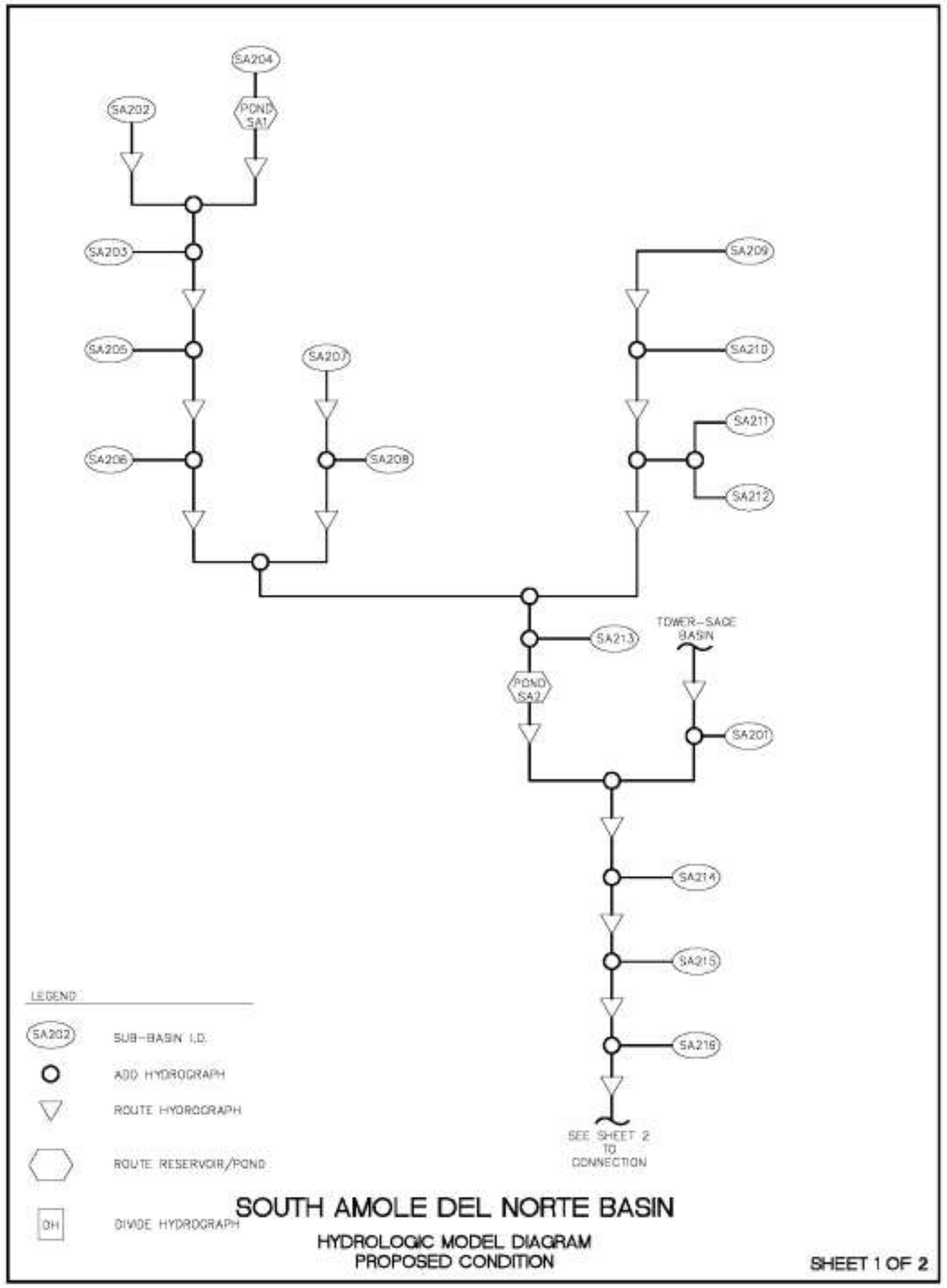

Figure 3-20: South Amole del Norte - Proposed Hydrologic Model Diagram

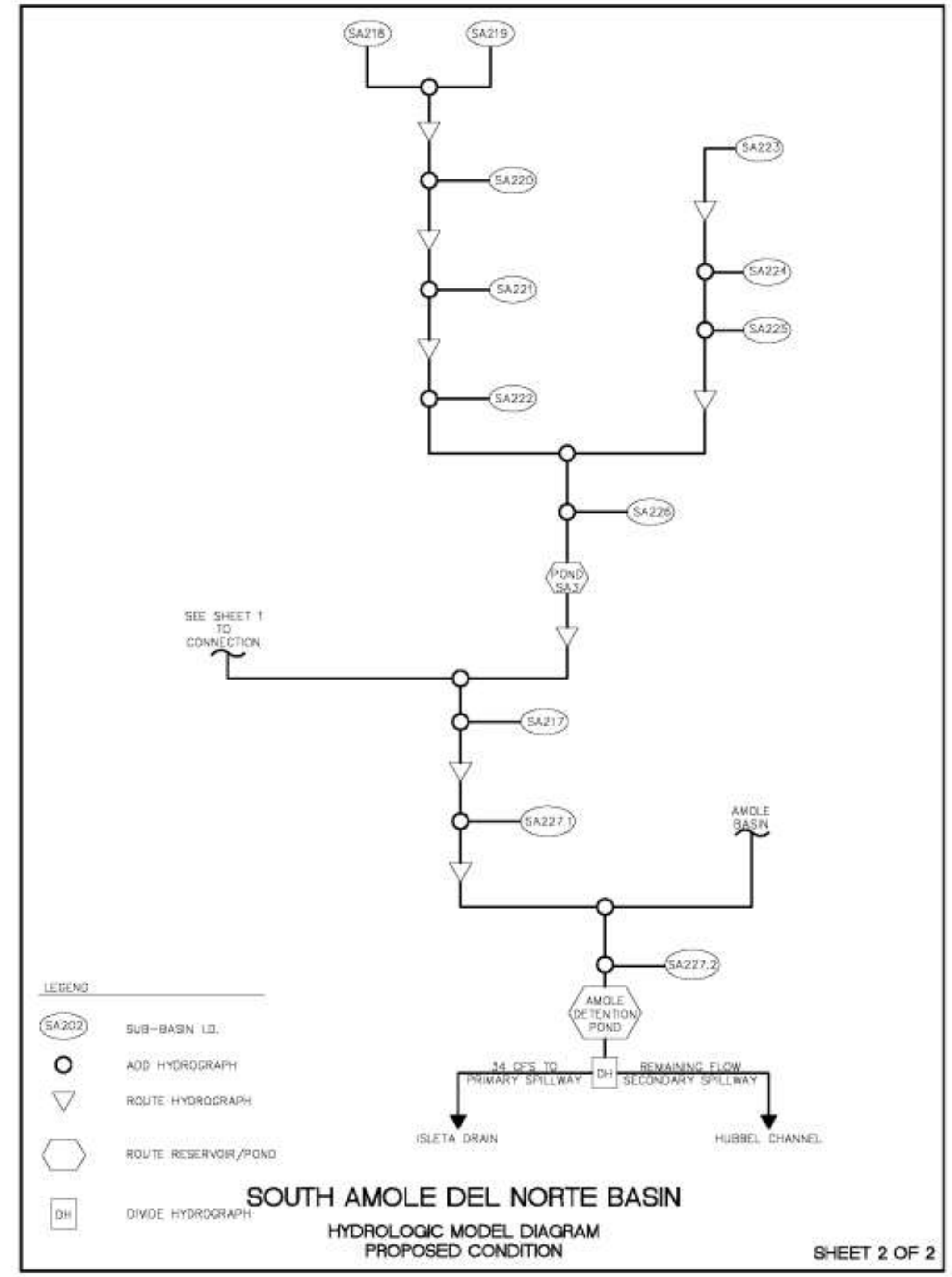

Figure 3-20 Continued: South Amole del Norte - Proposed Hydrologic Model Diagram

Table 3-14: South Amole del Norte Area - Proposed Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
SA201	107	309.58	16.338
SA202	24	95.83	3.882
SA203	15	55.23	2.035
SA204	18	66.16	2.501
SA205	50	154.79	6.232
SA206	27	101.98	3.950
SA207	12	48.84	1.962
SA208	25	106.90	4.608
SA209	24	98.39	4.701
SA210	33	131.15	5.863
SA211	14	49.88	1.867
SA212	43	145.65	6.184
SA213	39	136.03	5.280
SA214	43	123.59	6.676
SA215	35	112.89	5.292
SA216	84	263.18	12.990
SA217	77	230.86	11.964
SA218	21	78.87	3.008
SA219	8	29.09	1.098
SA220	40	159.66	7.686
SA221	5	21.53	0.919
SA222	32	121.15	4.876
SA223	45	171.74	6.866
SA224	11	48.30	2.074
SA225	19	75.31	3.052
SA226	40	154.48	6.052
SA227.1	51	170.52	7.337
SA227.2	80	237.70	8.173

3.6 Borrega Basin

Existing Conditions

Borrega Basin is approximately 1.98 sq. mi. and is generally bound on the north by Senator Dennis Chavez Boulevard, on the west by the peaks at the escarpment, north of Lisa Road and west of Coors Boulevard. Borrega Basin discharges to the Borrega Detention Dam. Land uses include high density residential, sloped and undeveloped platted lots, mass graded platted lots, open space, and school. Major drainage conveying infrastructure include the North Branch Borrega Channel; a 60" diameter pipe beginning at Pavo Street and running north to the North Branch Borrega Channel; an earth channel along the west side of 118th Street; and a pipe from Atrisco Heritage Academy High School to the North Branch Borrega Channel.

The earthen channel along the west side of 118th Street collects runoff from Sub-Basin B101 through B103 and crosses 118th Street via a large culvert to the North Branch Borrega Channel. The 60" diameter pipe collects runoff from Sub-Basin 104 and Sub-Basin 105 and conveys it to the North Branch Borrega Channel. Runoff in Sub-Basin B107 is also conveyed to the channel via a pipe along the eastern edge of Sub-Basin B108. The residential development with four du/ac discharges via pipe penetrations to the North Branch Borrega Channel. Concrete rundowns intercept runoff from Sub-Basin B110 and Sub-Basin B111. Borrega Detention Dam discharges approximately 60 cfs to the Amole-Hubbell Lake Detention Basin. The detention basin is only half utilized under the existing condition. Every structure in the Borrega Basin is adequate for its respective flows. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

Sub-Basins B210 through B212 have been completely adjusted in proposed conditions due to increases in area and proposed new development. Due to proposed runoff rates, a new pond, B1, located in basin B205, is needed to reduce runoff in the existing 60" pipe. Currently the dam is excavated to Phase I project construction volumes. With the proposed conditions the dam will need to be excavated to Phase II or ultimate volume.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project BR1:*
  - *Borrega Detention Pond Limiting Flow to 225 cfs at Inlet* – COMPLETED
- *Project BR2:*
  - *North and South Borrega Arroyo Conveyance* – COMPLETED
- *Project BR3:*
  - *"Area 6B" Storm Drain* – Partially completed, remaining storm drain will be NEEDED as development occurs
- *Project BR4:*
  - *Freeboard at Inlet* – COMPLETED

Additional recommendations for the basin based on updated basin analysis are below:

- Pond B1 – Add pond to reduce flow into existing 60" pipe. Developer Cost.
- Increase Borrega Dam's storage to ultimate build out of 99.3 ac-ft. Cost $540,700.

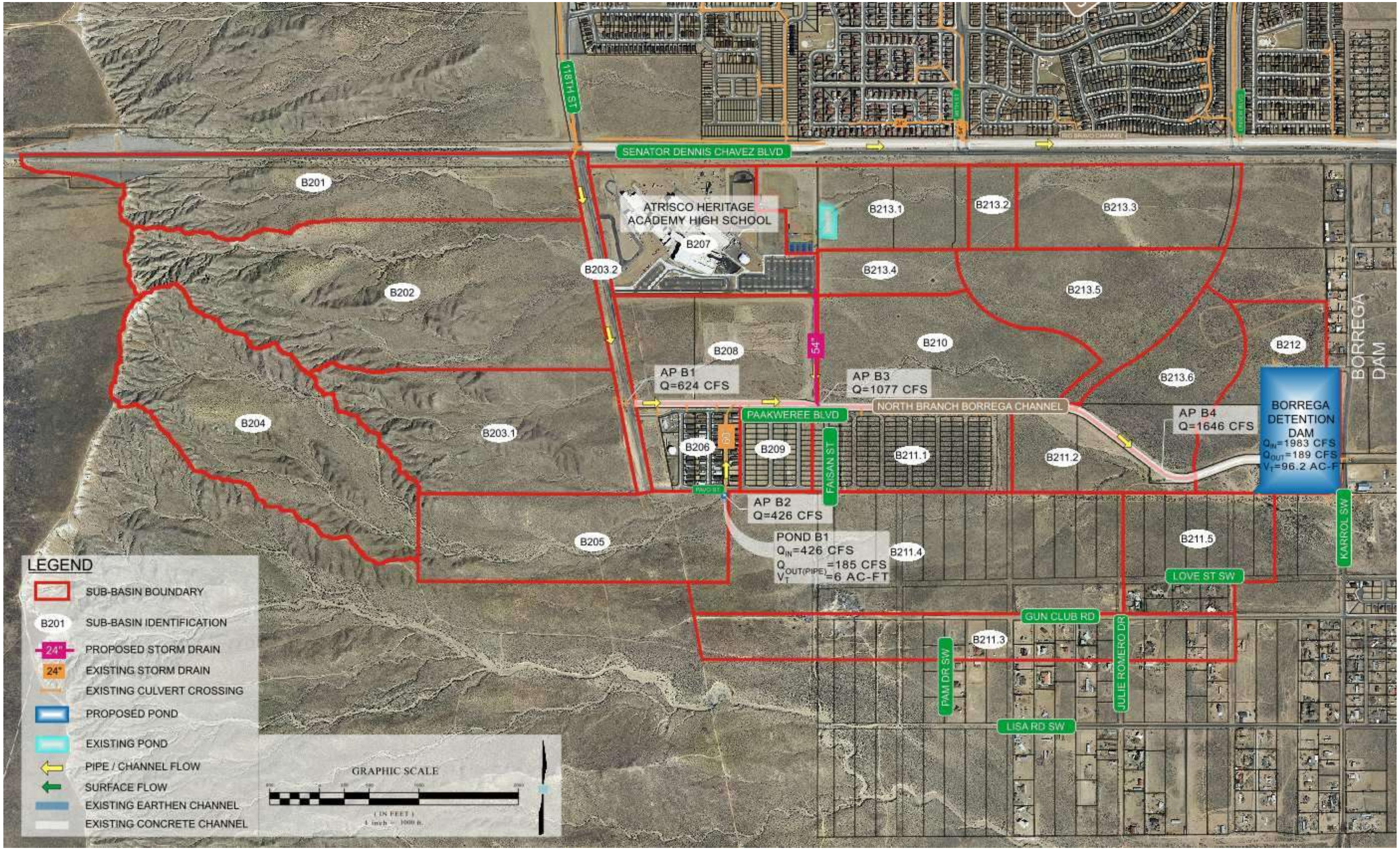

Figure 3-21: Borrega Basin - Proposed Basin Map

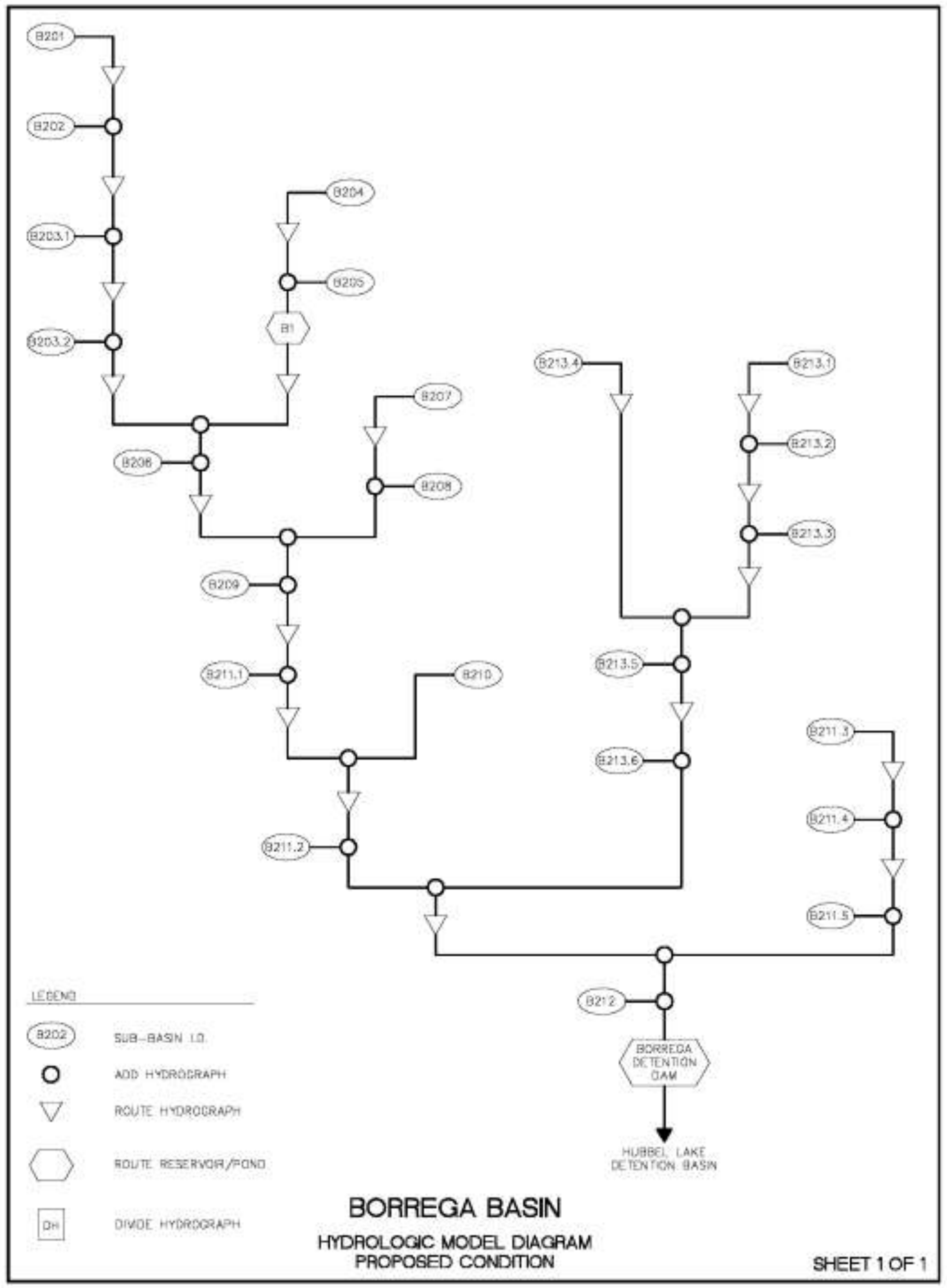

Figure 3-22: Borrega Basin - Proposed Hydrologic Model Diagram

Table 3-15: Borrega Basin - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
B201	117	205.48	7.629
B202	144	304.29	9.163
B203.1	71	144.97	4.336
B203.2	13	34.05	1.160
B204	151	339.36	9.813
B205	68	116.11	3.857
B206	18	70.27	2.783
B207	55	185.81	7.946
B208	48	169.09	6.820
B209	34	109.34	3.572
B210	61	206.54	8.703
B211.1	39	144.26	5.323
B211.2	24	85.41	3.445
B211.3	31	92.71	3.498
B211.4	114	322.23	13.693
B211.5	32	117.91	4.478
B212	52	151.47	5.366
B213.1	39	55.50	2.107
B213.2	9	35.00	1.329
B213.3	43	155.41	6.092
B213.4	15	55.50	2.107
B213.5	50	172.15	7.170
B213.6	37	138.74	5.269

3.7 Rio Bravo Basin

Existing Conditions

Rio Bravo Basin is approximately 1.41 sq. mi. and generally bounded east by Hubbell Diversion Channel, south by North Branch Borrega Channel, west by 118th Street, and north by Sacate Blanco Diversion Channel and Amole Mesa Avenue. Land uses include high and low density residential, undeveloped platted lots, mass graded platted lots, and open space. The Rio Bravo Channel bisects the basin. The sub-basins north of the Rio Bravo Channel discharge into the channel along with the off-site flow from the South Powerline Basin. The Rio Bravo Channel is perched above the land south of the channel. Runoff in Sub-Basin RB110 and RB112 flows into an incised arroyo which outfalls into the Hubbell Lake Detention Basin.

The sub-area's dense residential development is north of the Rio Bravo Channel. The storm drain systems in these subdivisions outfall into the Rio Bravo Channel and have the capacity for conveying flows associated with each pipe. Sub-Basin RB101 has been mass graded and is an enclosed sub-basin with several ponds retaining its developed runoff. Sub-Basin RB108 and Sub-RB109 direct runoff into the Hubbell Diversion Channel. Amole Detention Basin overflow spills into the Hubbell Diversion Channel, which conveys flow to the Hubbell Lake Detention Basin. Gun Club Lateral borders the west edge of Hubbell Lake Detention Basin.

Borrega Detention Dam outlet system also connects into the Hubbell Lake Detention Basin. The Amole-Hubbell Watershed's drainage area is approximately 20 sq. mi. and it ultimately discharges to the Hubbell Lake Detention Basin with the exception of the few enclosed drainage areas. Hubbell Lake Detention Basin outlets via a 36" diameter pipe to the Isleta Drain. There is not enough capacity in the Hubbell Lake Detention Basin to outlet the entire watershed via the 36" principal spillway causing pond to spill through the secondary spillway. Refer to Appendix A for hydrologic data and existing hydrologic model diagram.

Proposed Conditions

Due to the complexity of the Amole-Hubbell Lake system further analysis of that system is recommended. With the analysis, Basins 208, 209.1 and 209.2 should also be analyzed due to the fact that they drain directly to the Hubbell Channel. Refer to Table 3-16 for hydrologic data and Figure 3-24 for proposed hydrologic model diagram.

Recommendations:

Below are the recommendations from 1999 Amole-Hubbell DMP for the basin along with the status of the recommendation.

- *Project RB1:*
  - *South Rio Bravo Arroyo Entrance into Hubbell Lake* – Not completed, still NEEDED
  - *Rio Bravo Channel* – COMPLETED – Concrete channel parallels Rio Bravo Blvd.
- *Project RB2:*
  - *South Rio Bravo Arroyo* – Not completed, still NEEDED

*Additional Recommend*ations for the basin based on updated basin analysis are below:

- GuacAmole/Hubbell Lake System Analysis; this includes Rio Bravo Sub-Basins 208, 209.1, and 209.2.

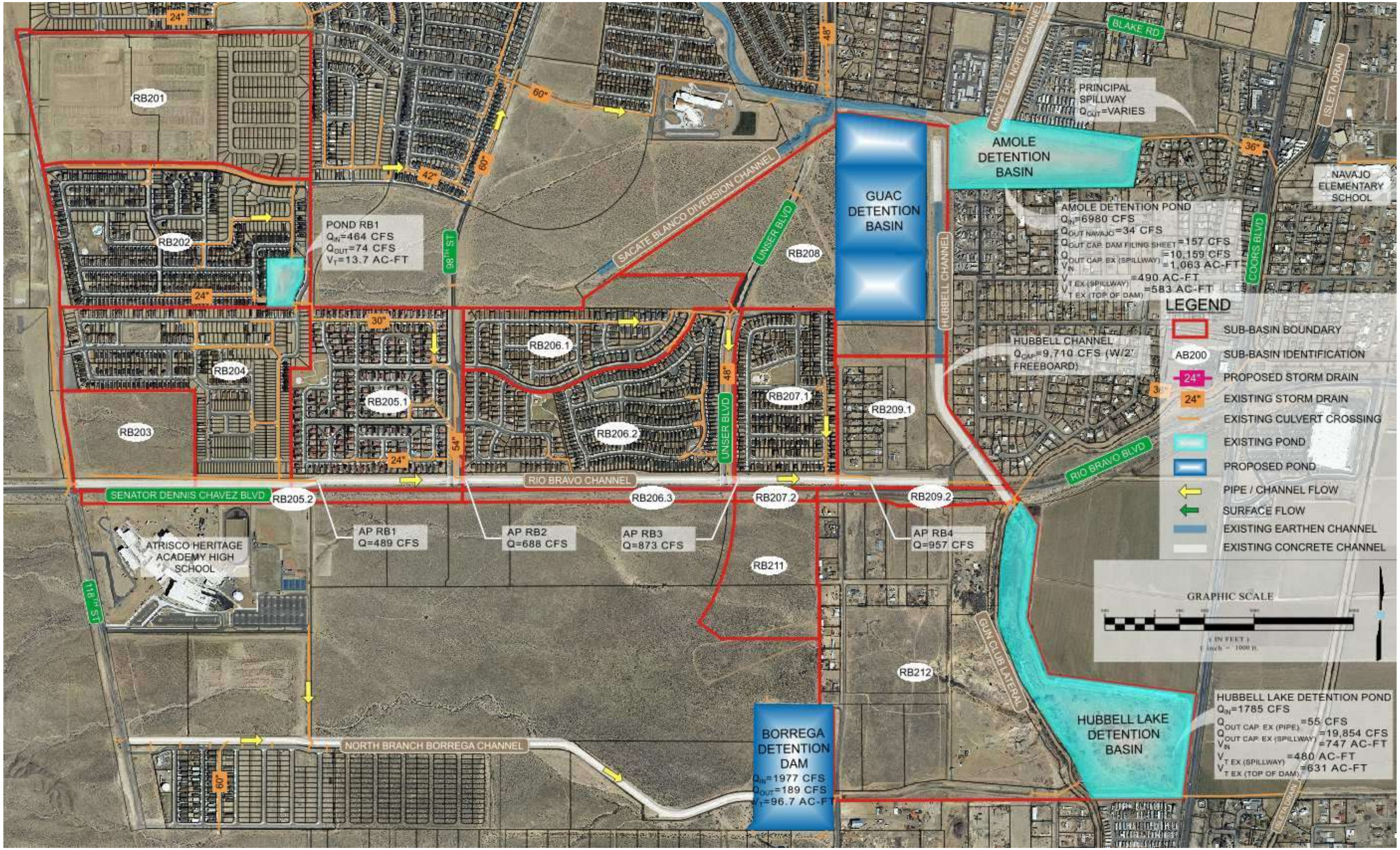

Figure 3-23: Rio Bravo Basin - Proposed Basin Map

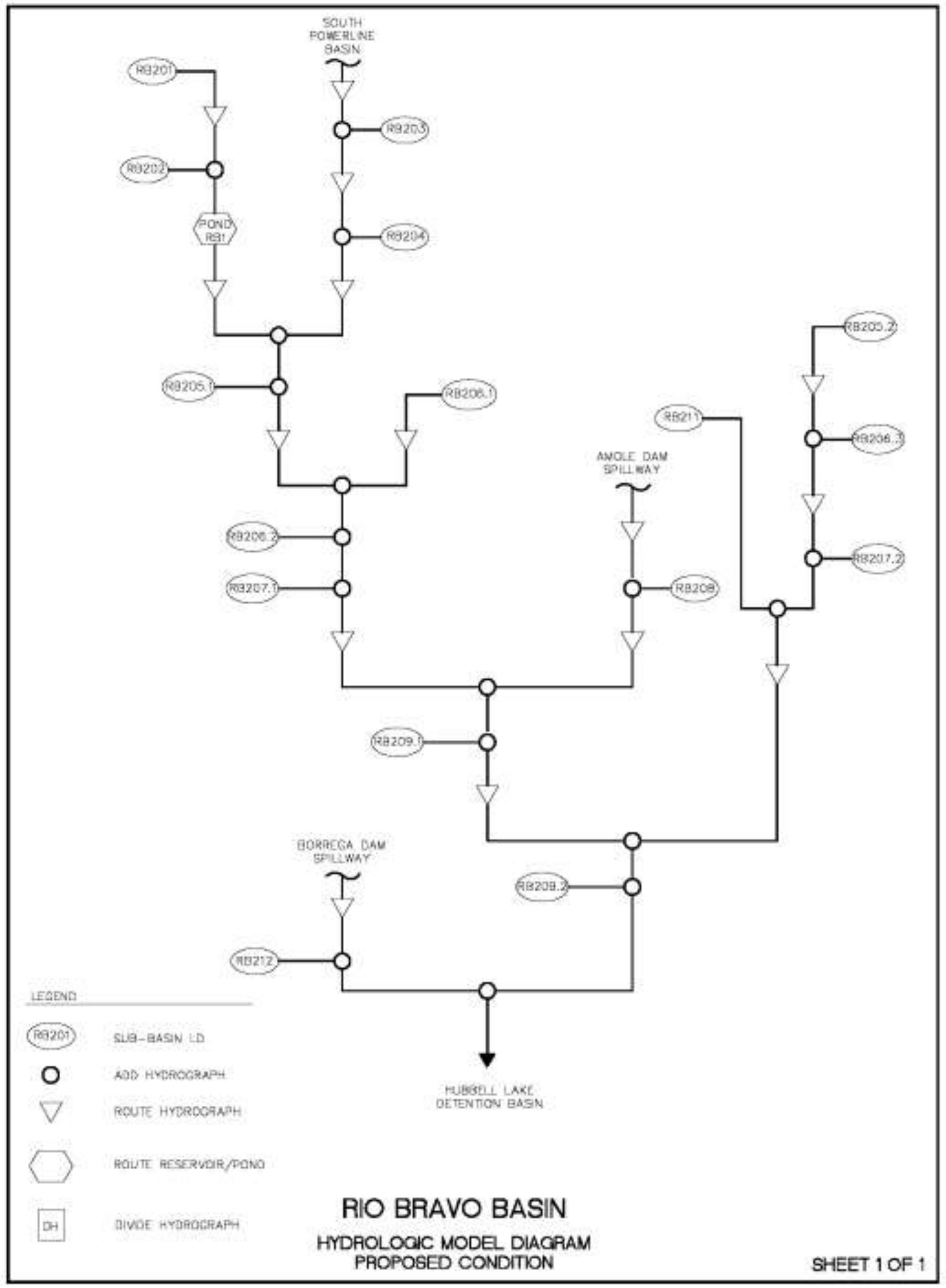

Figure 3-24: Rio Bravo Basin - Proposed Hydrologic Model Diagram

Table 3-16: Rio Bravo Basin - Proposed Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
RB201	88	208.11	8.679
RB202	83	281.52	12.159
RB203	29	130.48	5.643
RB204	75	235.03	9.263
RB205.1	67	209.87	9.031
RB205.2	11	35.13	1.574
RB206.1	45	173.51	6.797
RB206.2	80	282.64	11.995
RB206.3	8	28.70	1.125
RB207.1	42	150.52	6.743
RB207.2	2	9.07	0.344
RB208	107	220.47	12.253
RB209.1	39	90.63	3.845
RB209.2	7	21.94	0.768
RB211	31	112.01	4.345
RB212	187	414.32	21.068

Appendix A

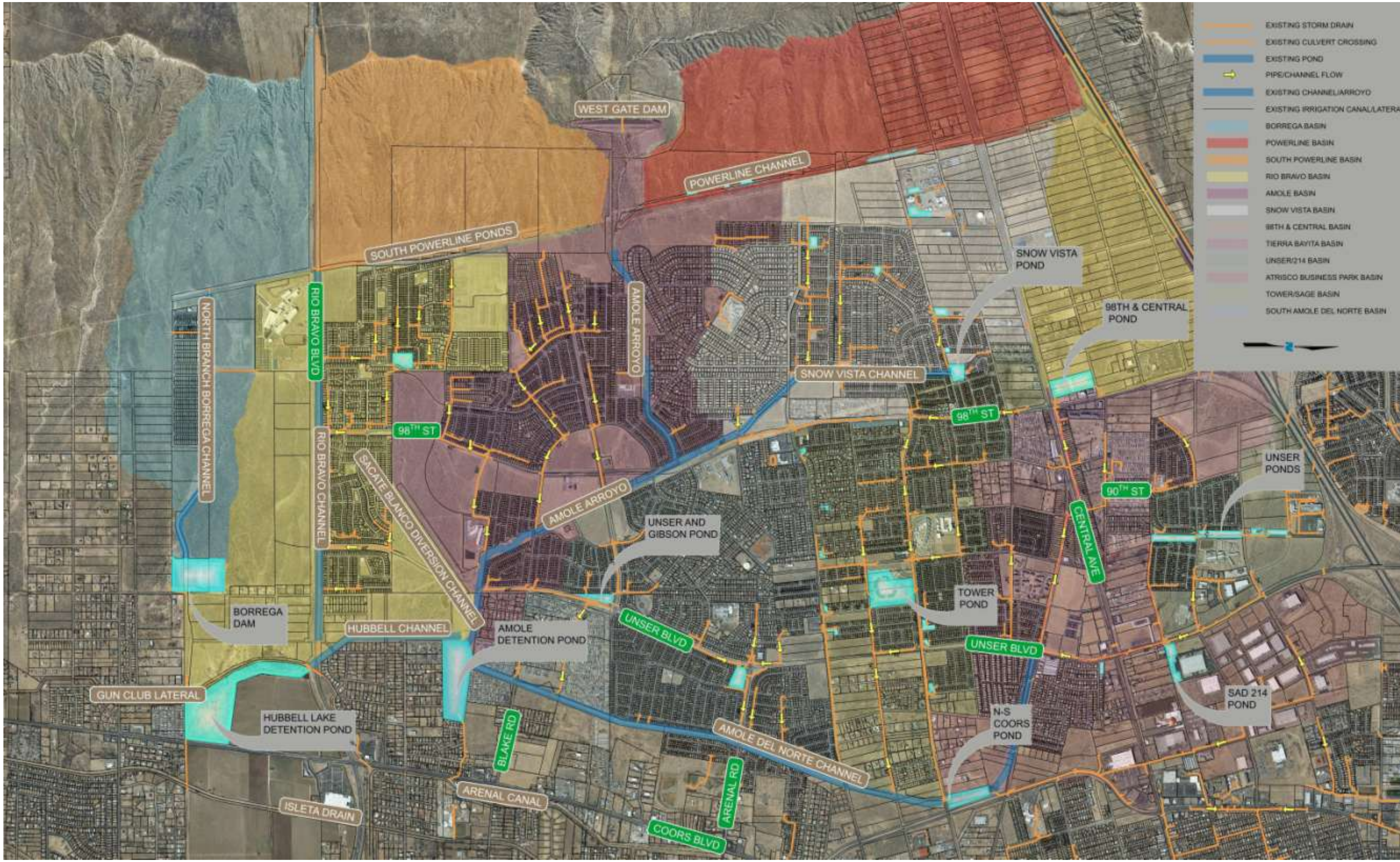

Figure A-1: Existing Amole-Hubbell Watershed Overall Basin Map


LEGEND
COMMERCIAL
HEAVY INDUSTRIAL
LIGHT INDUSTRIAL
RESIDENTIAL ESTATES 4 DU/AC
RESIDENTIAL ESTATES 5 DU/AC
RESIDENTIAL ESTATES 6 DU/AC
RESIDENTIAL ESTATES 7 DU/AC
RESIDENTIAL ESTATES 8 DU/AC
RESIDENTIAL ESTATES 9 DU/AC
PLATTED UNDEVELOPED LOTS
PLATTED MASS GRADED LOTS
ESCARPMENT 0 TO 10% SLOPES
ESCARPMENT 10 TO 20% SLOPES
WEST GATE DAM
POWERLINE CHANNEL
SOUTH POWERLINE PONDS
SNOW VISTA POND
98TH & CENTRAL POND
SNOW VISTA CHANNEL
AMOLE ARROYO
RIO BRAVO BLVD
NORTH BRANCH BORREGA CHANNEL
RIO BRAVO CHANNEL
98TH ST
SACATE BLANCO DIVERSION CHANNEL
UNSER AND GIBSON POND
90TH ST
CENTRAL AVE
UNSER PONDS
TOWER POND
BORREGA DAM
HUBBELL CHANNEL
AMOLE DETENTION POND
UNSER BLVD
GUN CLUB LATERAL
HUBBELL LAKE DETENTION POND
BLAKE RD
ARENAL RD
N-S COORS POND
SAD 214 POND
AMOLE DEL NORTE CHANNEL
ISLETA DRAIN
ARENAL CANAL

Figure A-2: Existing Land Use Map

Figure A-3: Powerline Basin - Existing Basin Map

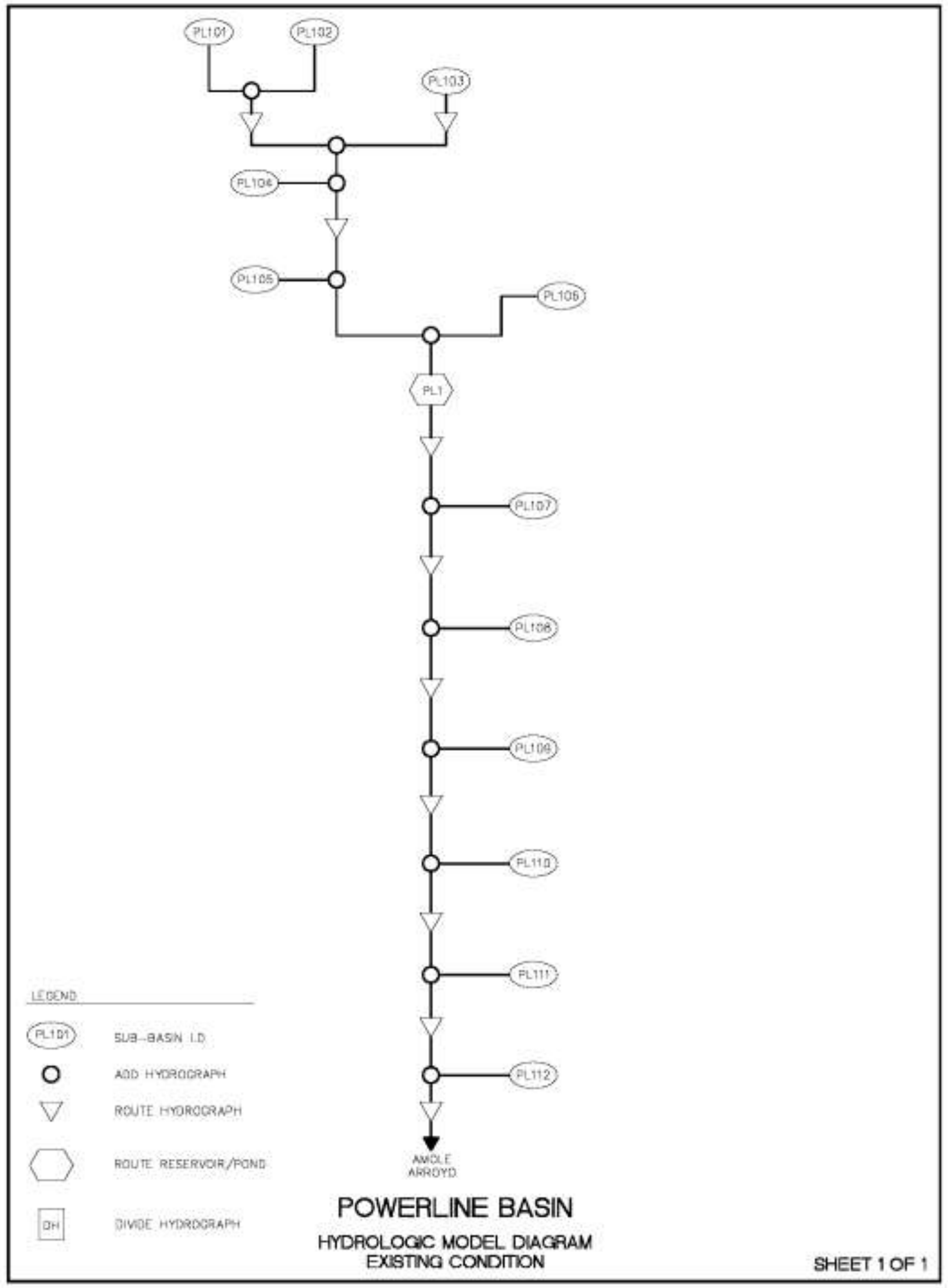

Figure A-4: Powerline Basin - Existing Hydrologic Model Diagram

Table A-1: Powerline Basin - Existing Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
PL101	46	86.26	2.563
PL102	96	133.09	5.333
PL103	34	62.32	1.860
PL104	23	42.91	1.281
PL105	99	129.15	5.453
PL106	104	154.3	5.746
PL107	66	108.81	3.643
PL108	57	95.29	3.171
PL109	61	101.03	3.389
PL110	65	89.14	3.578
PL111	59	83.12	3.239
PL112	39	71.72	2.174

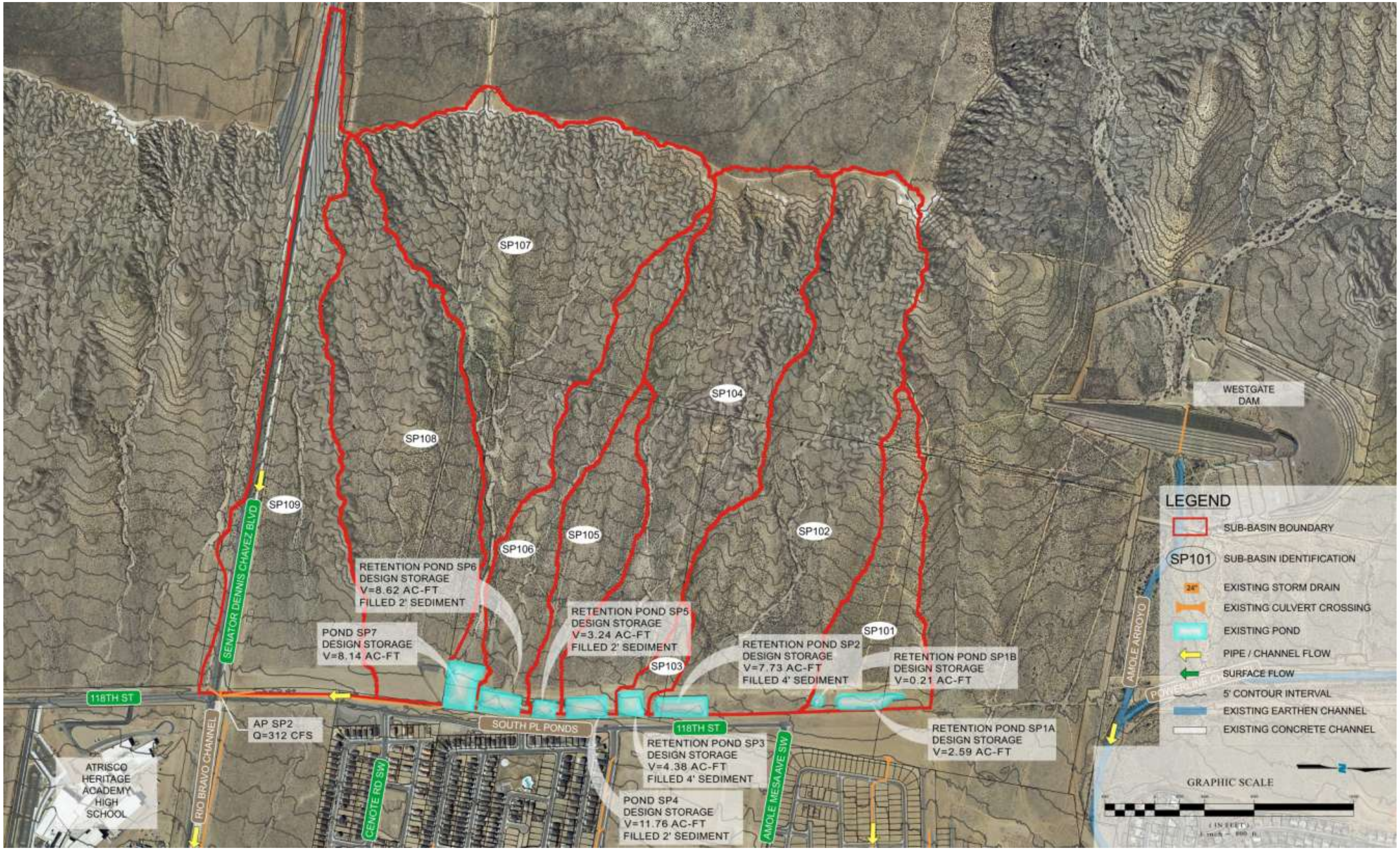

Figure A-5: South Powerline Basin - Existing Basin Map

Table A-2: South Powerline Basin - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
SP101	30	71	2.179
SP102	102	254	7.387
SP103	5	11	0.351
SP104	87	211	6.151
SP105	23	55	1.689
SP106	37	86	2.590
SP107	117	252.78	7.208
SP108	87	174.70	5.076
SP109	75	138.06	4.430

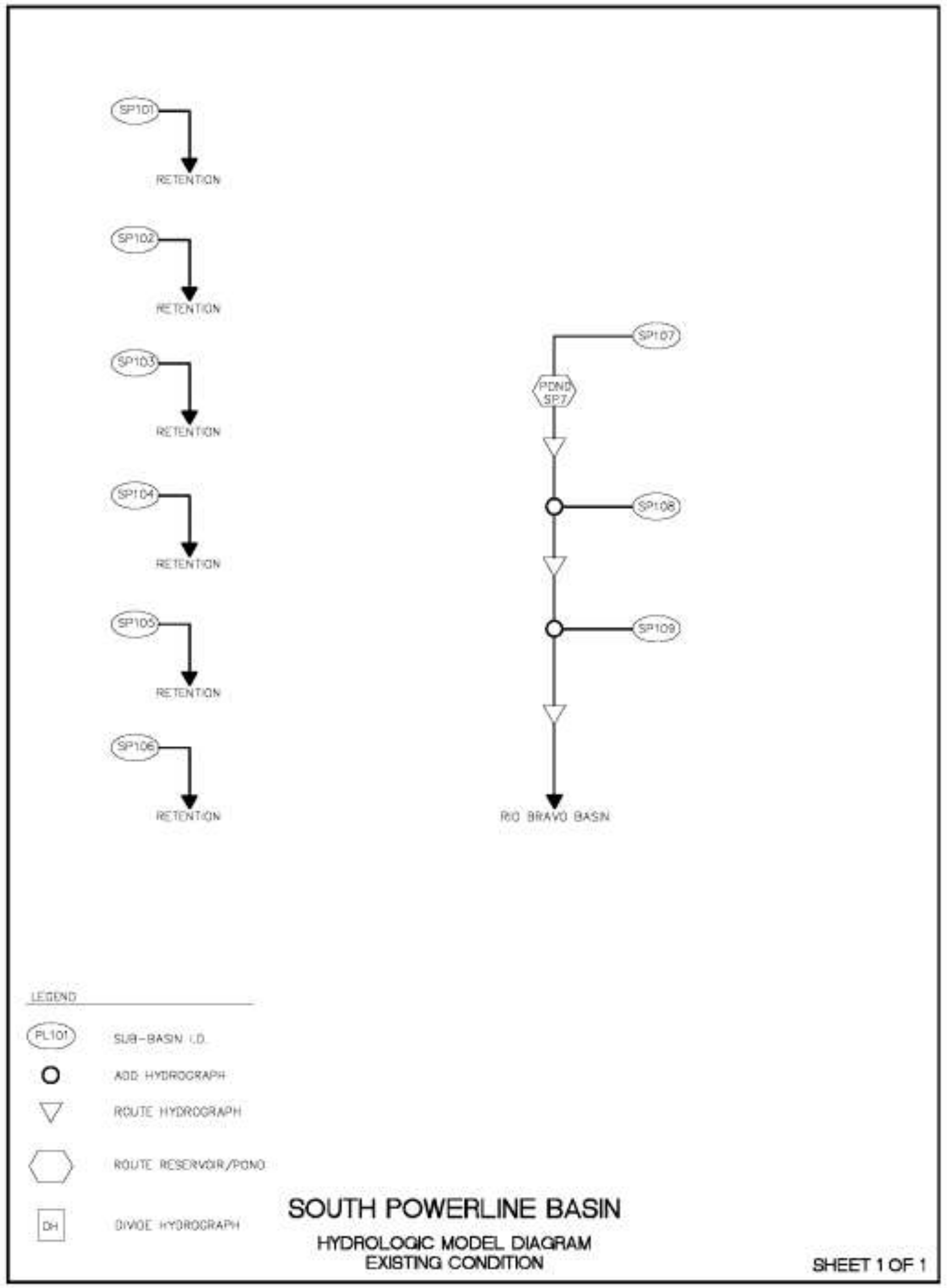

Figure A-6: South Powerline Basin - Existing Hydrologic Model Diagram

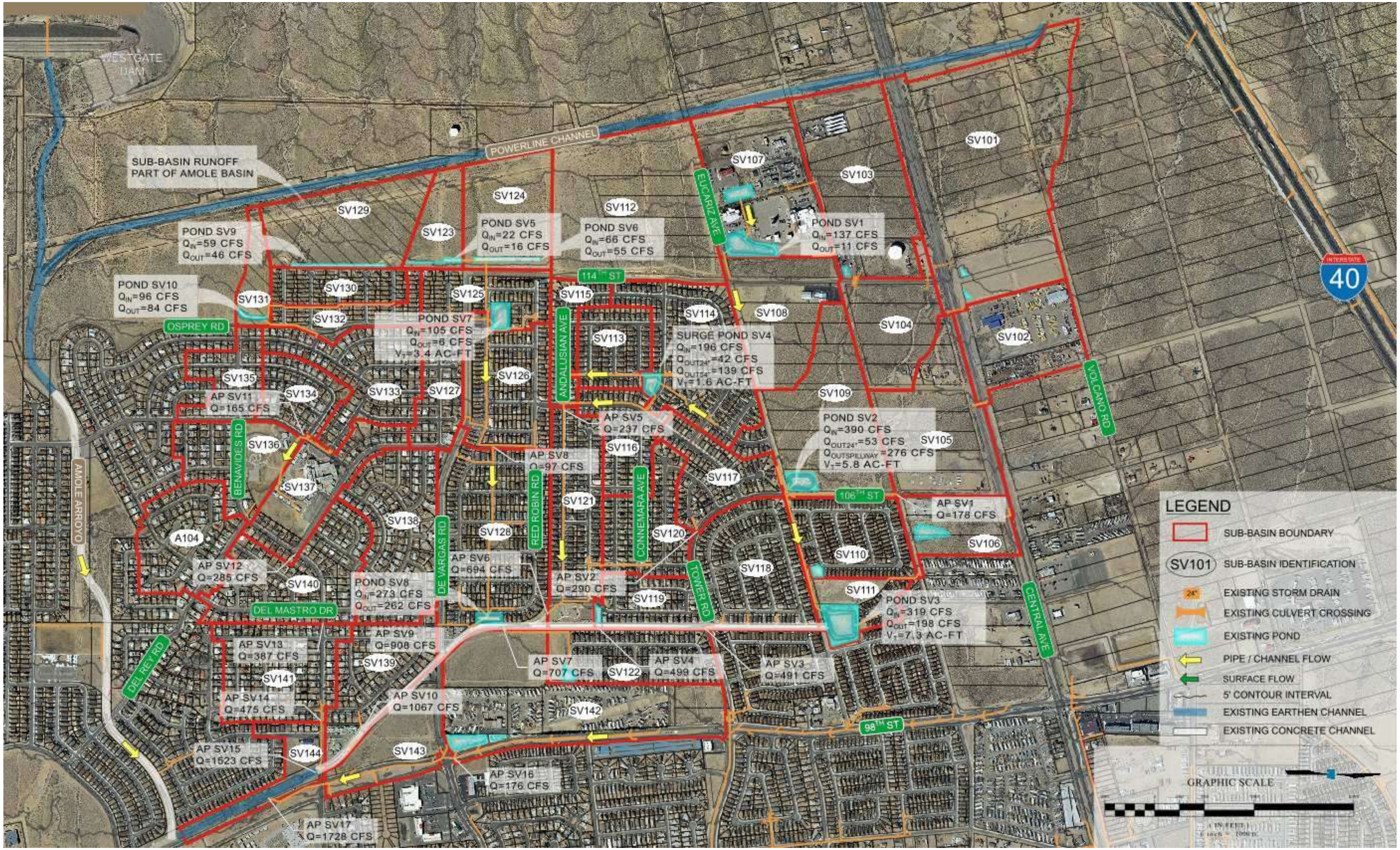

Figure A-7: Snow Vista Basin - Existing Basin Map

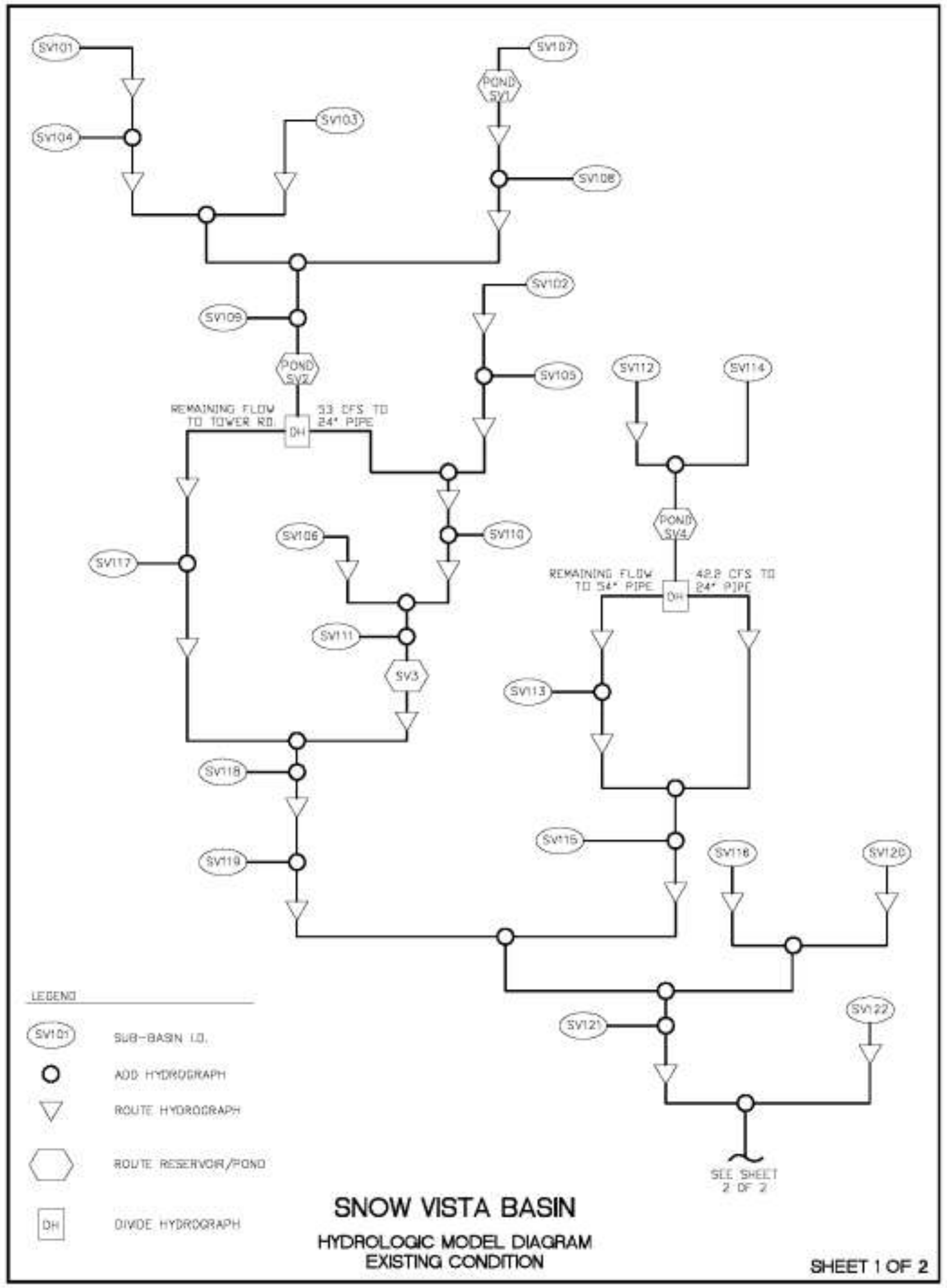

Figure A-8: Snow Vista Basin - Existing Hydrologic Model Diagram

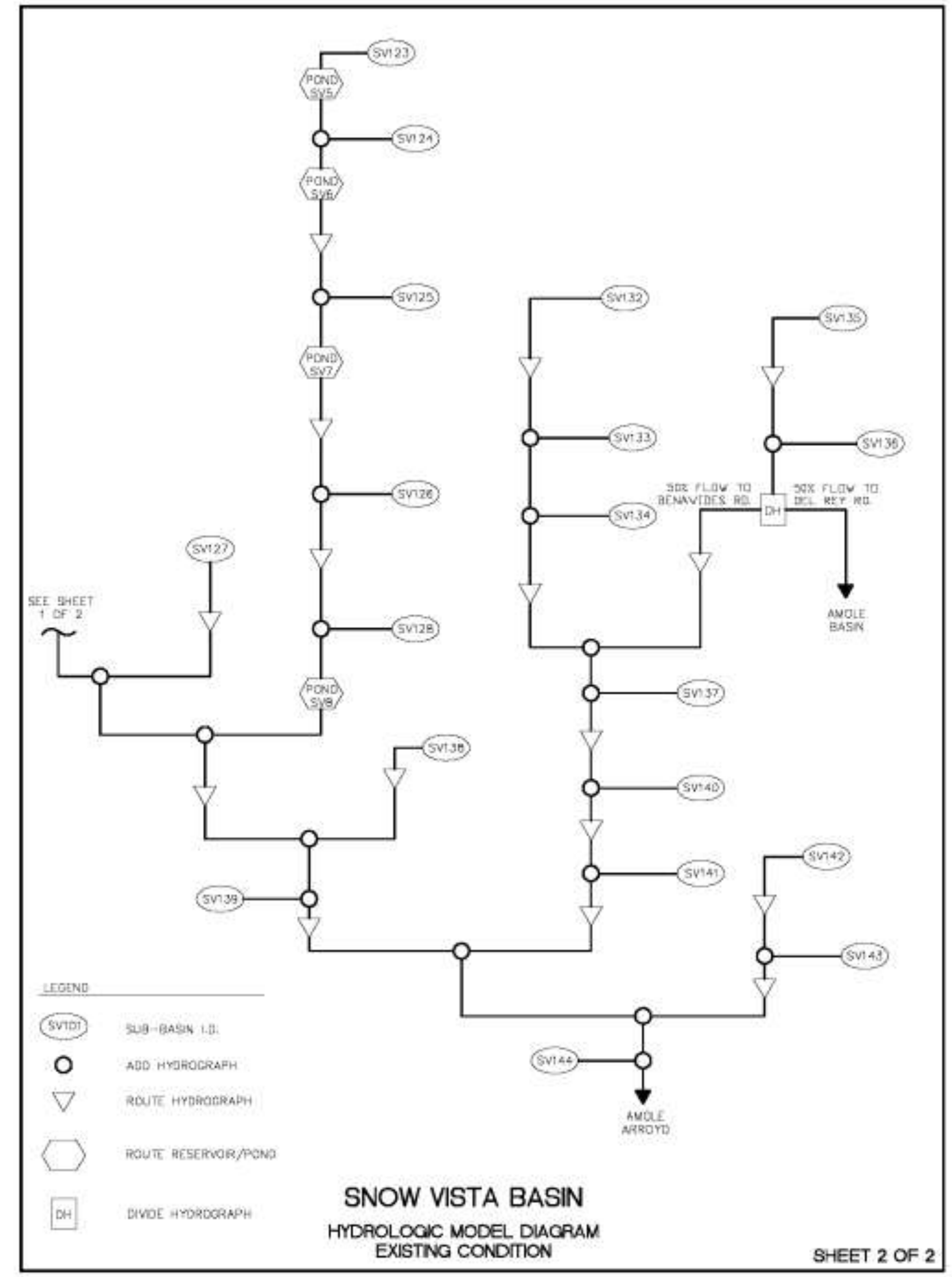

Figure A-8 Continued: Snow Vista Basin - Existing Hydrologic Model Diagram

Table A-3: Snow Vista Basin - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr-6hr}$ (cfs)	$V_{100yr-24hr}$ (ac-ft)
SV101	85	175.69	6.571
SV102	24	97.01	3.939
SV103	40	109.91	3.905
SV104	21	50.67	1.675
SV105	34	86.91	3.485
SV106	15	41.18	1.610
SV107	38	137.39	5.548
SV108	26	62.89	2.103
SV109	39	92.62	3.031
SV110	21	81.68	3.274
SV111	12	31.05	1.092
SV112	54	93.12	3.757
SV113	14	51.43	1.953
SV114	34	128.99	4.899
SV115	10	37.69	1.431
SV116	14	53.99	2.050
SV117	17	63.47	2.417
SV118	31	118.51	4.643
SV119	13	48.10	1.826
SV120	19	69.32	2.632
SV121	26	92.33	3.462
SV122	21	76.39	2.939
SV123	10	21.85	0.677
SV124	23	49.33	1.529
SV125	16	62.28	2.390
SV126	25	94.99	3.607
SV127	12	44.85	1.653
SV128	50	186.99	7.144
SV129	28	59.23	1.835
SV130	12	45.29	1.774
SV131	7	14.64	.0453
SV132	10	38.81	1.520
SV133	25	89.55	3.301
SV134	12	44.60	1.644
SV135	13	45.50	1.677
SV136	19	59.07	2.095
SV137	21	77.10	2.893
SV138	30	109.74	4.045
SV139	22	81.25	3.045
SV140	30	109.49	4.036
SV141	27	96.36	3.552
SV142	52	138.37	6.285
SV143	18	45.16	1.531
SV144	12	31.42	1.217

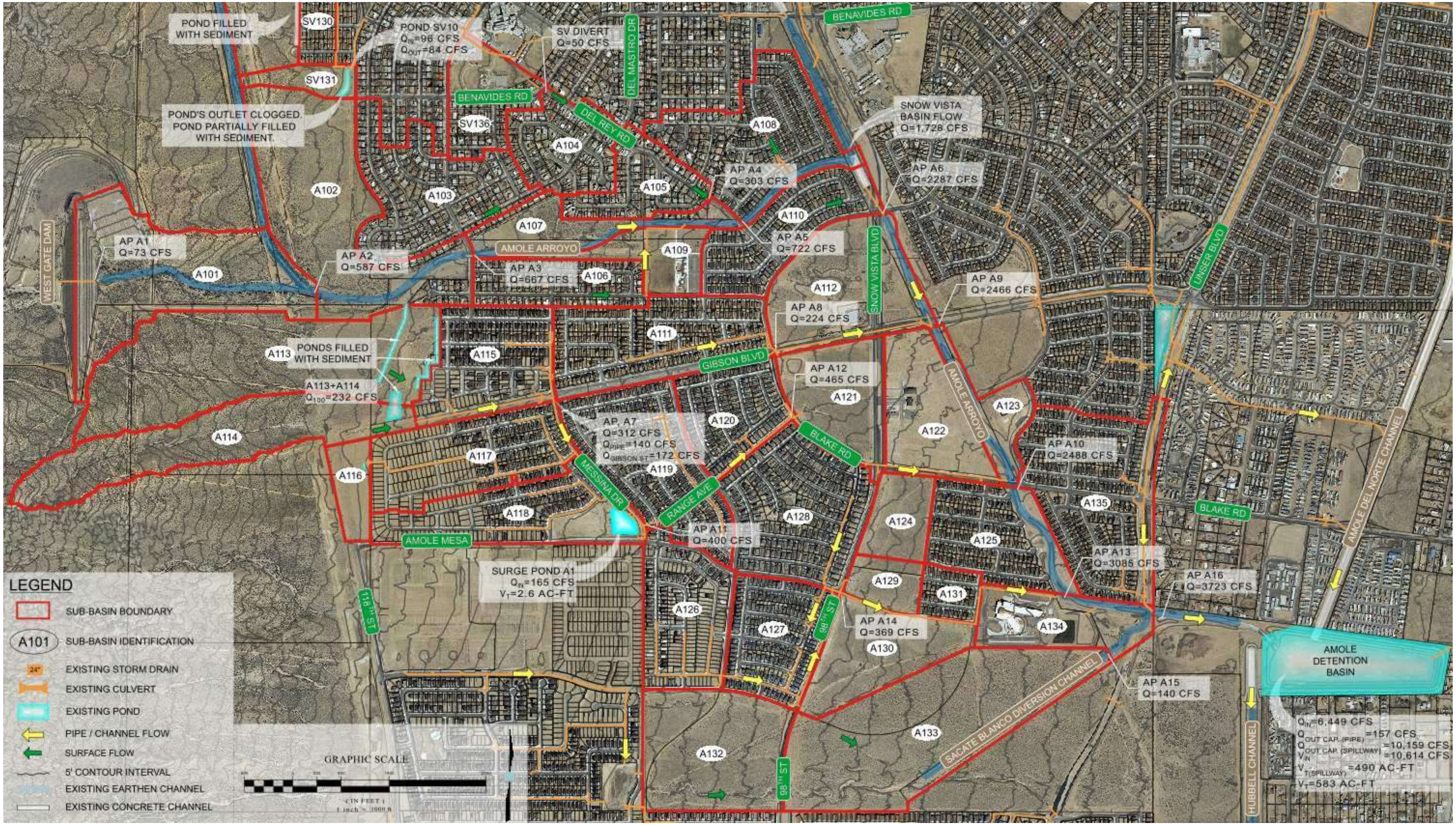

Figure A-9: Amole Basin - Existing Basin Map

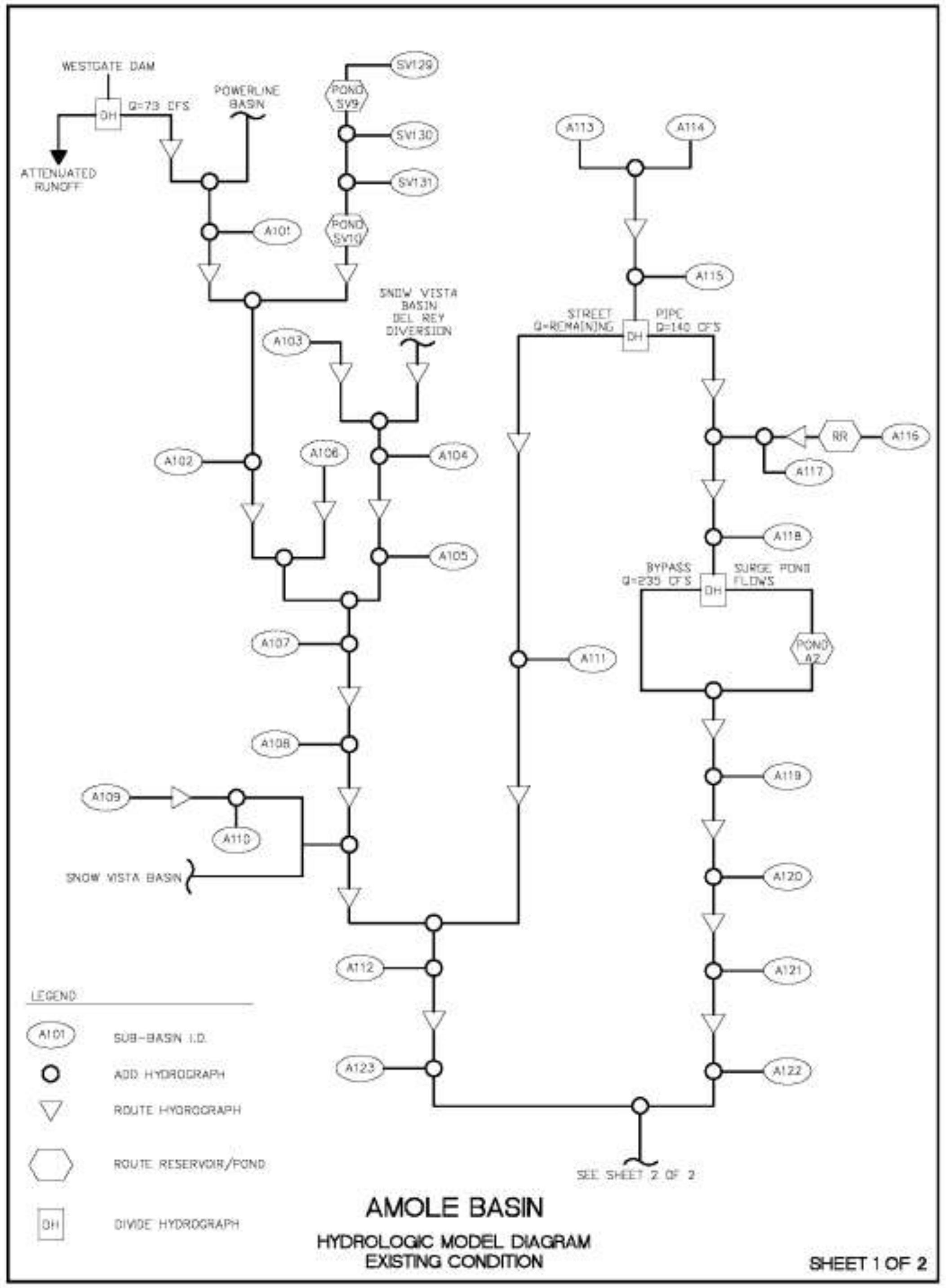

Figure A-10: Amole Basin - Existing Hydrologic Model Diagram

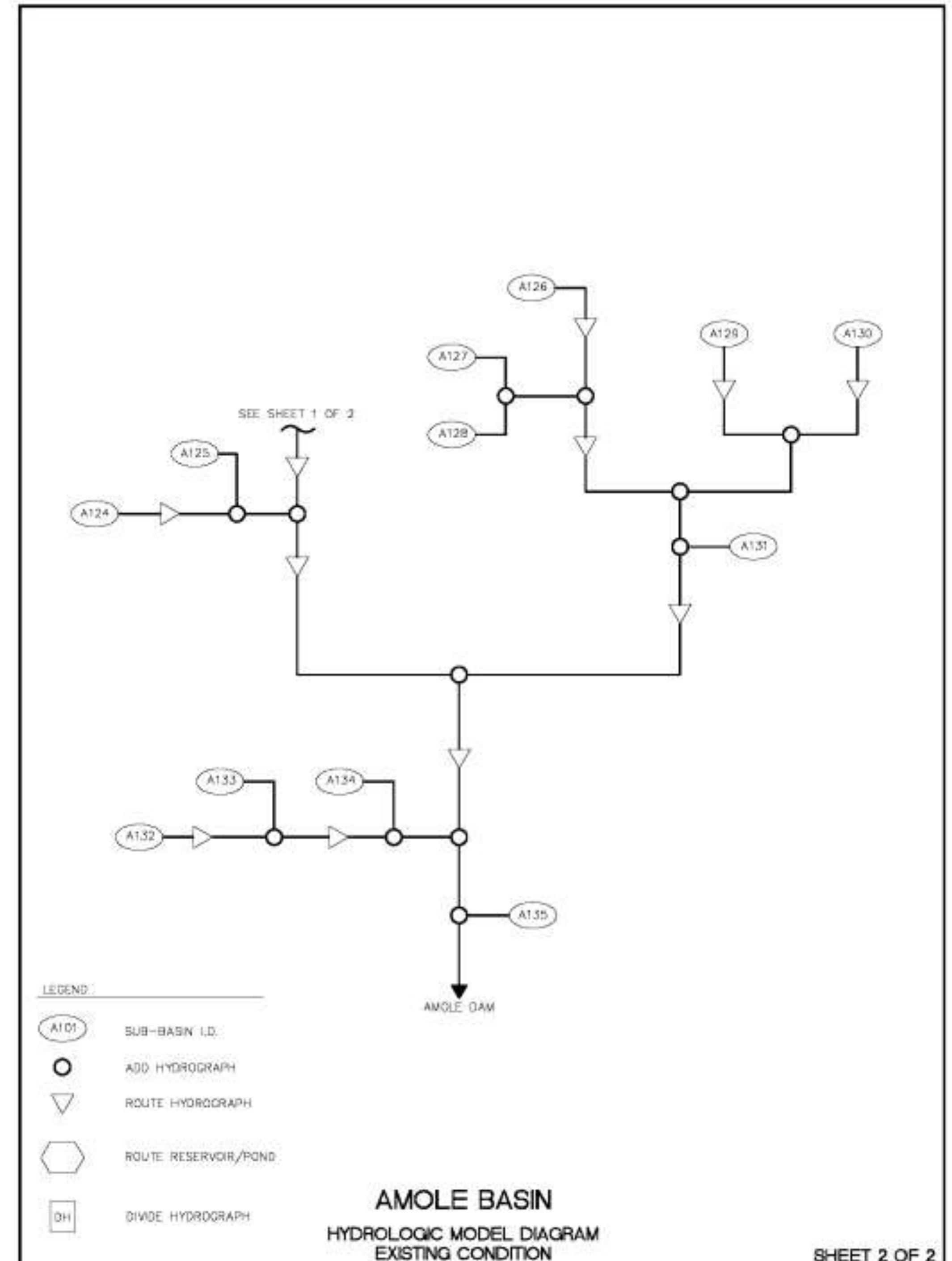

Figure A-10 Continued: Amole Basin - Existing Hydrologic Model Diagram

Table A-4: Amole Basin - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
A101	60	122.18	3.931
A102	65	130.42	4.610
A103	40	143.74	5.299
A104	22	78.82	2.895
A105	18	66.11	2.437
A106	20	74.47	2.828
A107	20	47.20	1.554
A108	43	164.51	6.375
A109	14	30.51	0.971
A110	28	110.79	4.440
A111	42	165.77	6.636
A112	40	83.14	2.661
A113	77	140.18	5.054
A114	46	91.94	3.193
A115	33	124.54	4.756
A116	9	18.54	0.574
A117	37	133.03	4.608
A118	36	128.93	4.441
A119	41	159.70	6.658
A120	23	89.17	3.484
A121	27	60.61	1.878
A122	29	95.93	2.821
A123	13	38.03	1.186
A124	13	27.37	0.848
A125	30	119.48	4.794
A126	31	123.12	4.946
A127	28	99.67	4.227
A128	45	163.64	6.187
A129	9	19.03	0.589
A130	28	58.87	1.825
A131	8	30.28	1.212
A132	42	89.19	2.761
A133	73	113.51	4.800
A134	23	73.71	2.697
A135	52	193.80	7.838

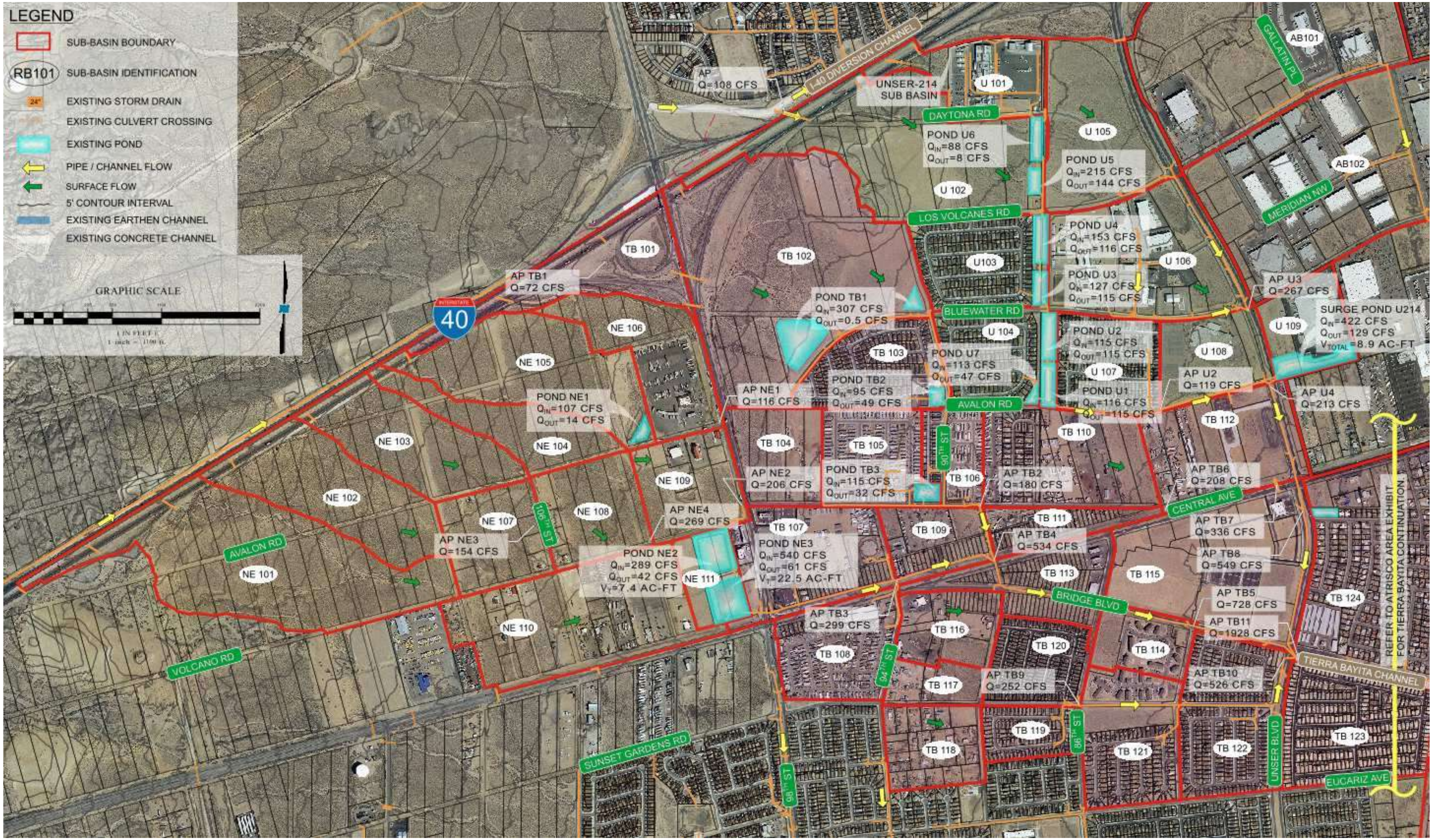

Figure A-11: 98th & Central, Unser/214 and Tierra Bayita Area - Existing Basin Map

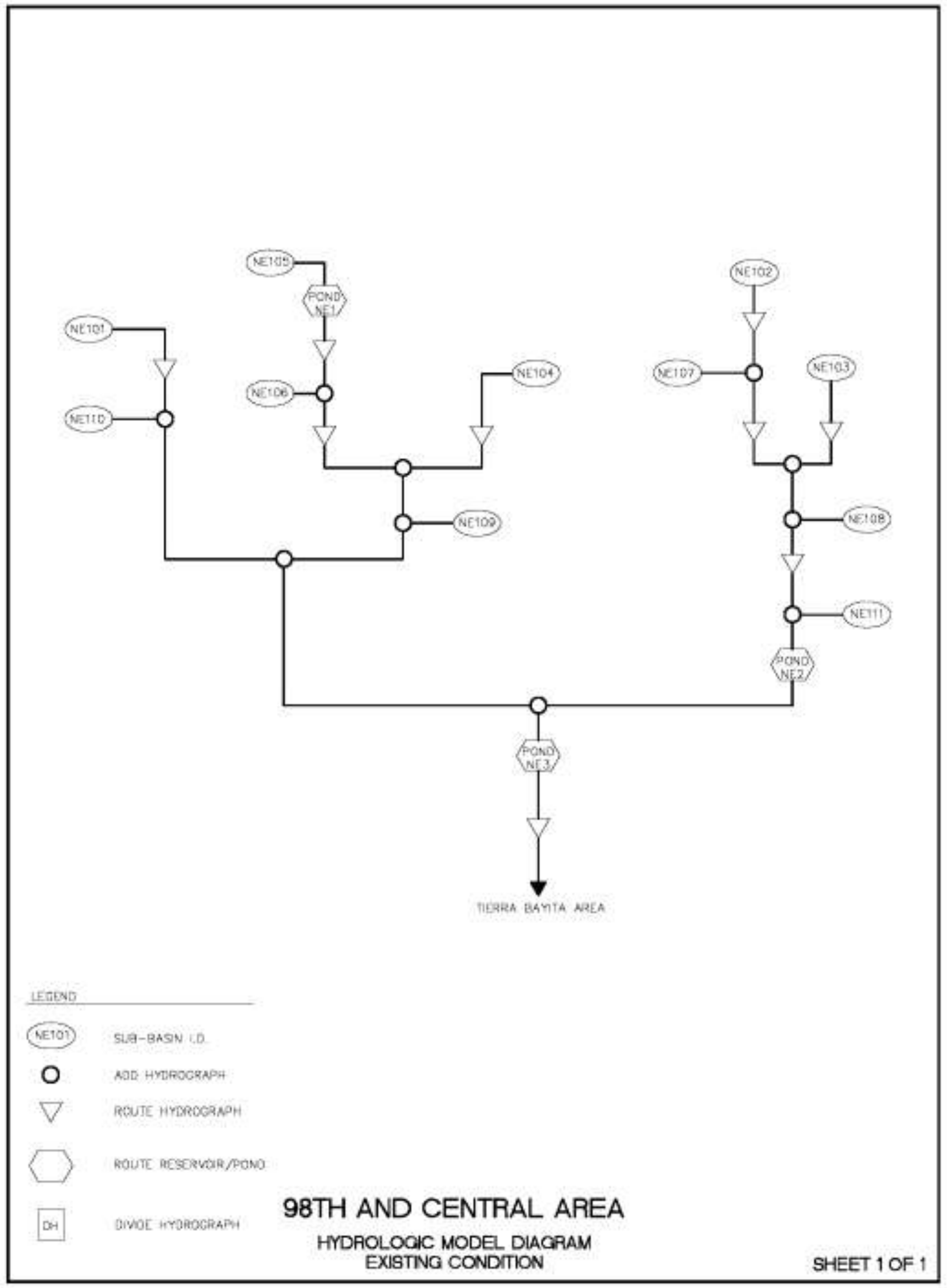

Figure A-12: 98th & Central Area - Existing Hydrologic Model Diagram

Table A-5: 98th & Central Area - Existing Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr-6hr}$ (cfs)	$V_{100yr-24hr}$ (ac-ft)
NE101	92.9344	174.96	6.135
NE102	48.6656	104.16	3.213
NE103	41.2224	86.91	2.721
NE104	26.8608	50.09	1.773
NE105	54.0096	107.10	3.565
NE106	36.7424	112.05	4.958
NE107	27.68	62.04	1.933
NE108	28.9408	66.03	2.060
NE109	27.7504	70.00	2.429
NE110	83.104	226.50	11.018
NE111	15.0784	21.87	0.995

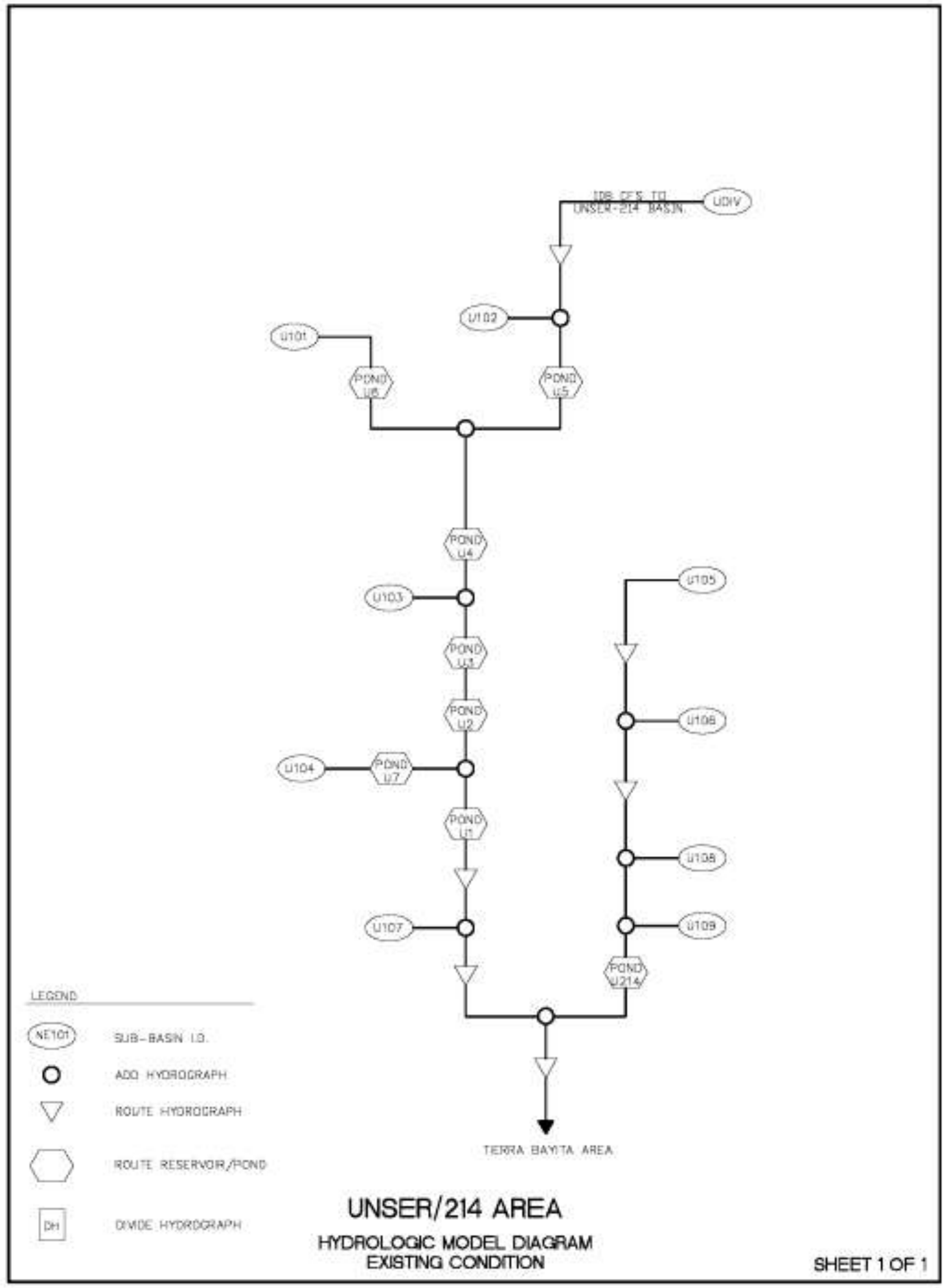

Figure A-13: Unser/214 Area - Existing Hydrologic Model Diagram

Table A-6: Unser/214 Area - Existing Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr-6hr}$ (cfs)	$V_{100yr-24hr}$ (ac-ft)
U101	29	87.84	3.250
U102	83	210.77	6.342
U103	34	124.08	4.785
U104	32	113.20	4.336
U105	50	87.38	3.688
U106	62	185.29	8.330
U107	29	114.78	4.611
U108	25	100.24	3.901
U109	21	85.46	3.341

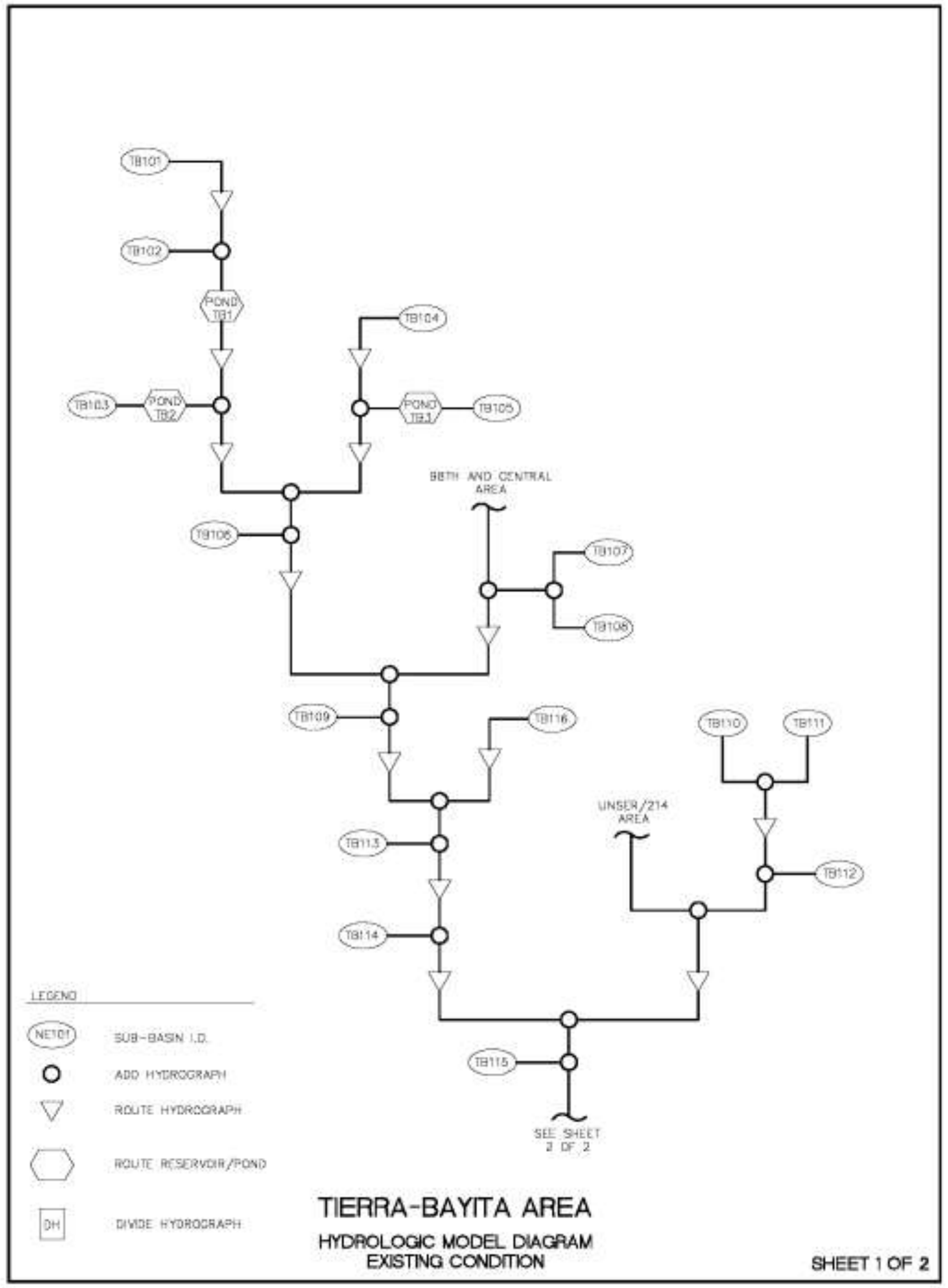

Figure A-14: Tierra Bayita Area - Existing Hydrologic Model Diagram

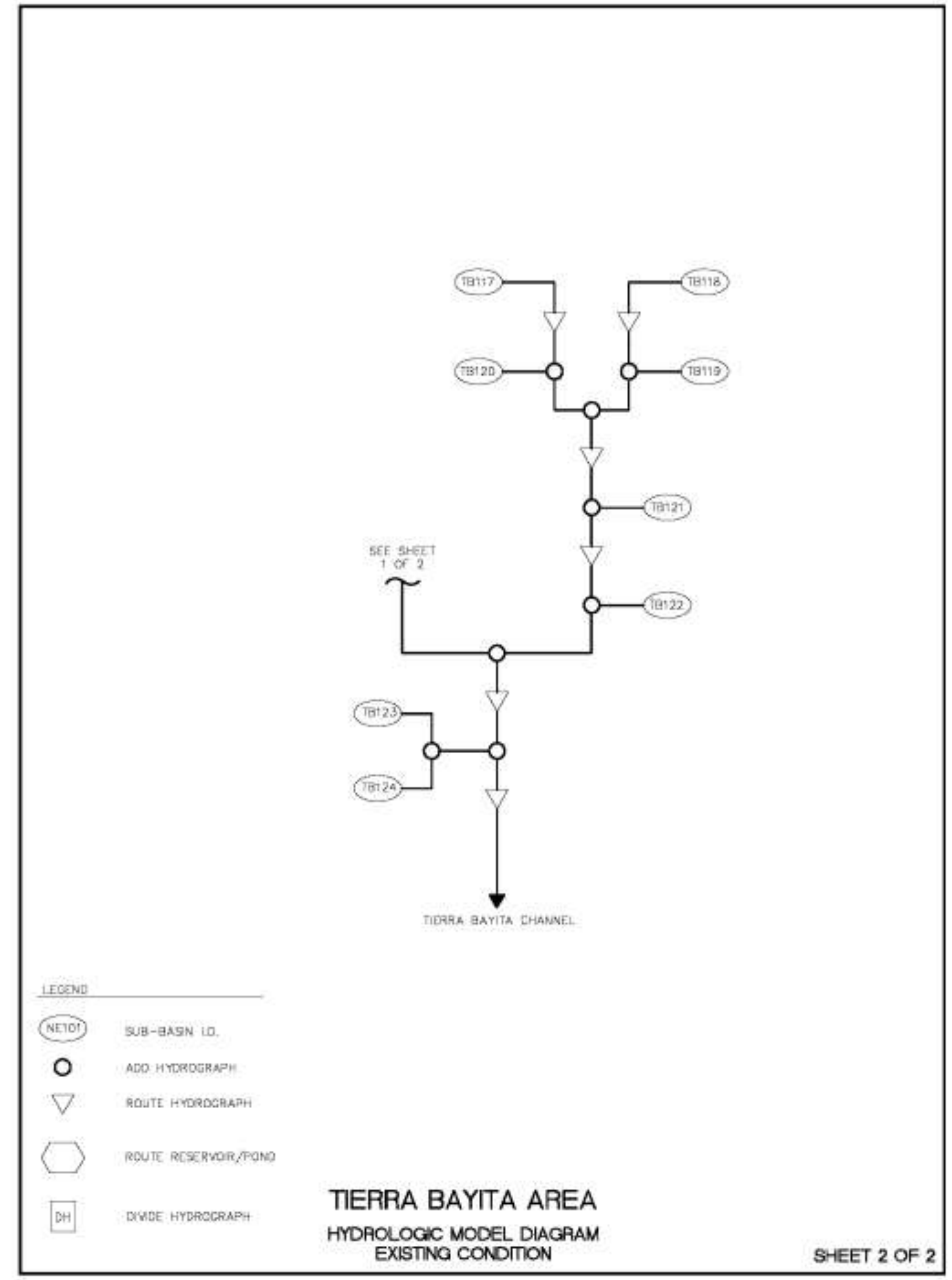

Figure A-14 Continued: Tierra Bayita Area - Existing Hydrologic Model Diagram

Table A-7: Tierra Bayita Area - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
TB101	38	72.00	2.541
TB102	127	262.15	9.045
TB103	32	95.47	3.466
TB104	25	65.34	2.276
TB105	29	114.69	4.547
TB106	16	63.21	2.493
TB107	44	167.57	6.744
TB108	32	125.04	5.303
TB109	20	64.51	2.501
TB110	47	151.15	6.595
TB111	15	59.32	2.489
TB112	44	129.57	6.200
TB113	30	81.29	2.917
TB114	17	68.45	2.708
TB115	72	161.37	8.077
TB116	21	72.69	2.883
TB117	12	36.81	1.381
TB118	23	73.05	2.350
TB119	15	58.42	2.347
TB120	24	96.96	3.996
TB121	37	126.91	5.266
TB122	45	155.20	7.233
TB123	46	129.72	6.937
TB124	102	229.28	14.742
TB125	84	193.74	6.855

Figure A-15: Atrisco Business Park Area - Existing Basin Map

Table A-8: Atrisco Business Park Area - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
AB101	113	273.59	13.097
AB102	118	345.52	21.593
AB103	136	315.69	22.521
AB104	103	266.70	14.051

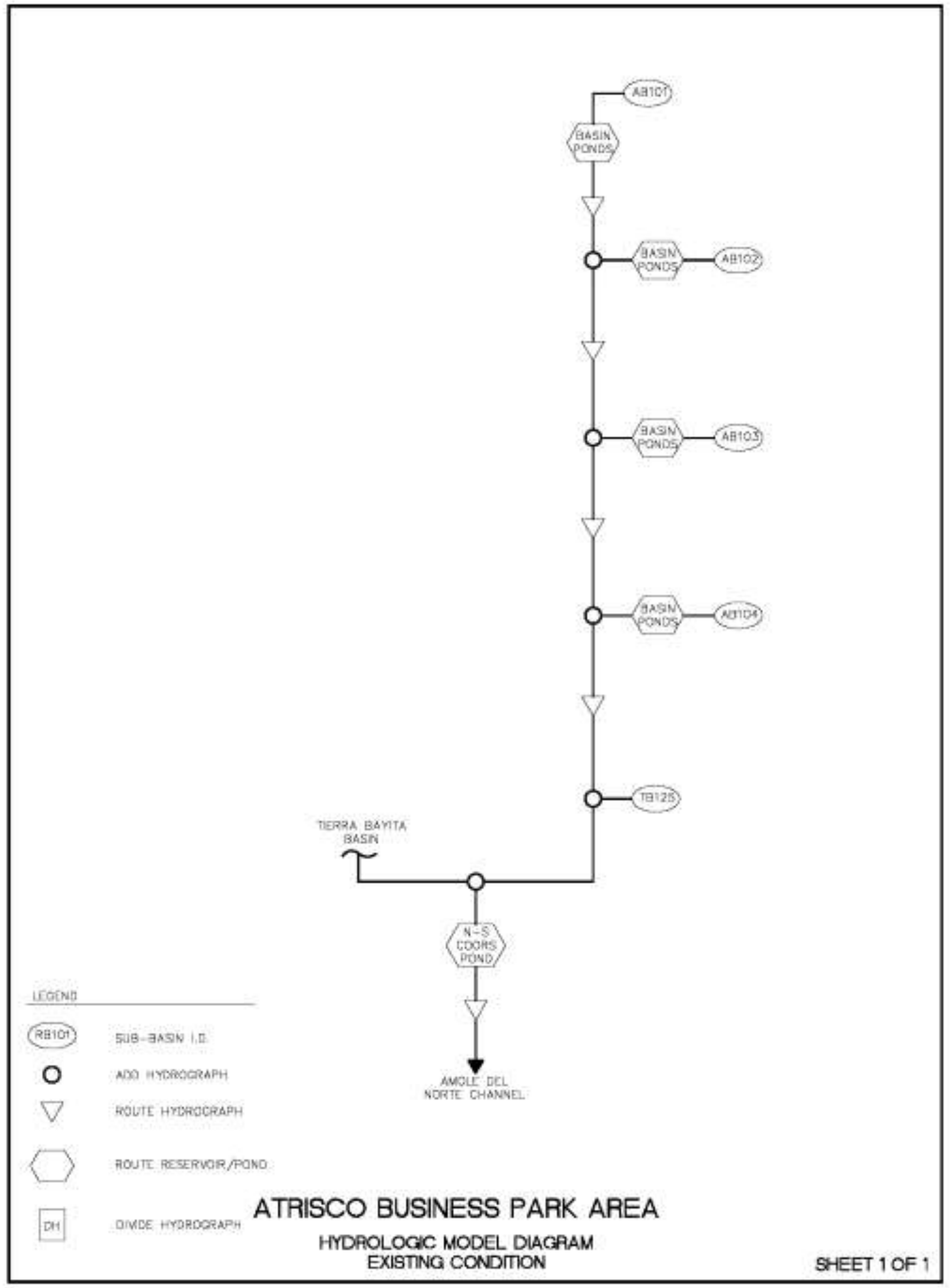

Figure A-16: Atriisco Business Park Area - Existing Hydrologic Model Diagram

Figure A-17: Tower/Sage Area - Existing Basin Map

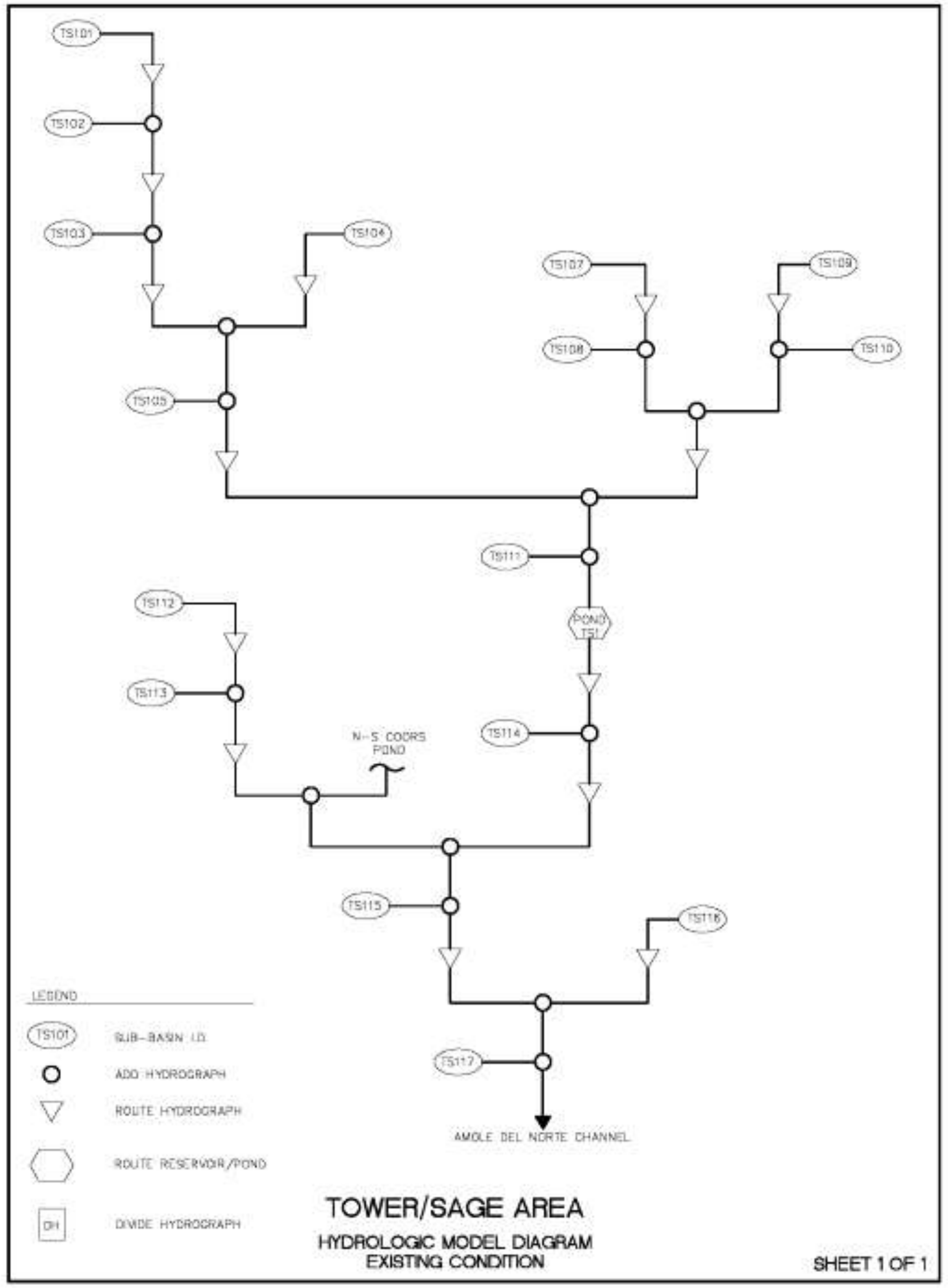

Figure A-18: Tower/Sage Area - Existing Hydrologic Model Diagram

Table A-9: Tower/Sage Area - Existing Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
TS101	41	154.50	6.204
TS102	56	213.03	8.920
TS103	68	224.92	10.858
TS104	30	108.74	4.364
TS105	66	229.00	9.697
TS107	46	154.70	6.563
TS108	38	103.39	4.924
TS109	41	136.59	6.047
TS110	39	120.76	5.208
TS111	29	65.75	2.124
TS112	60	183.31	9.563
TS113	42	100.89	4.938
TS114	31	89.51	4.425
TS115	96	176.56	9.965
TS116	48	84.70	4.760
TS117	89	144.24	7.154

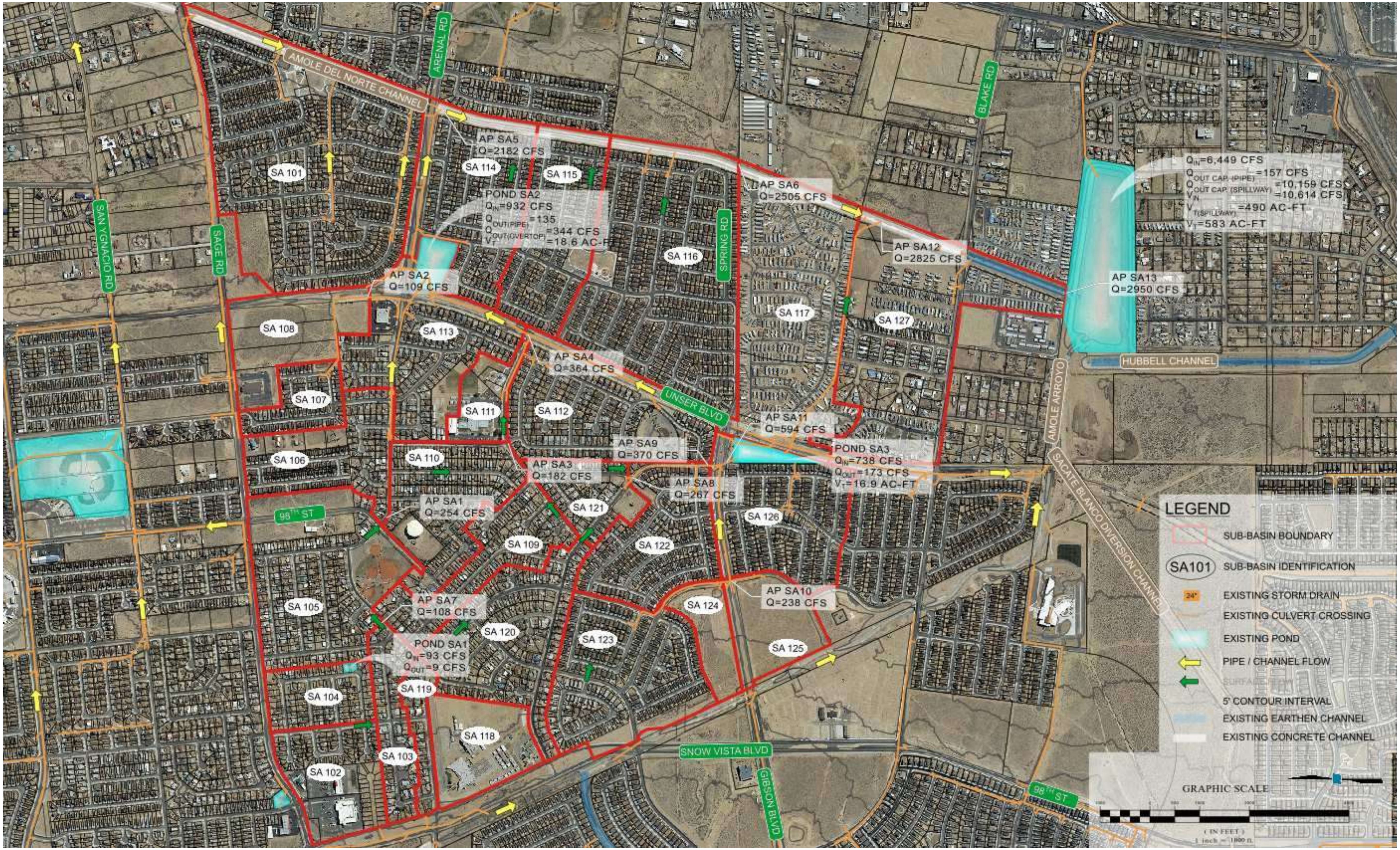

Figure A-19: South Amole del Norte Area - Existing Basin Map

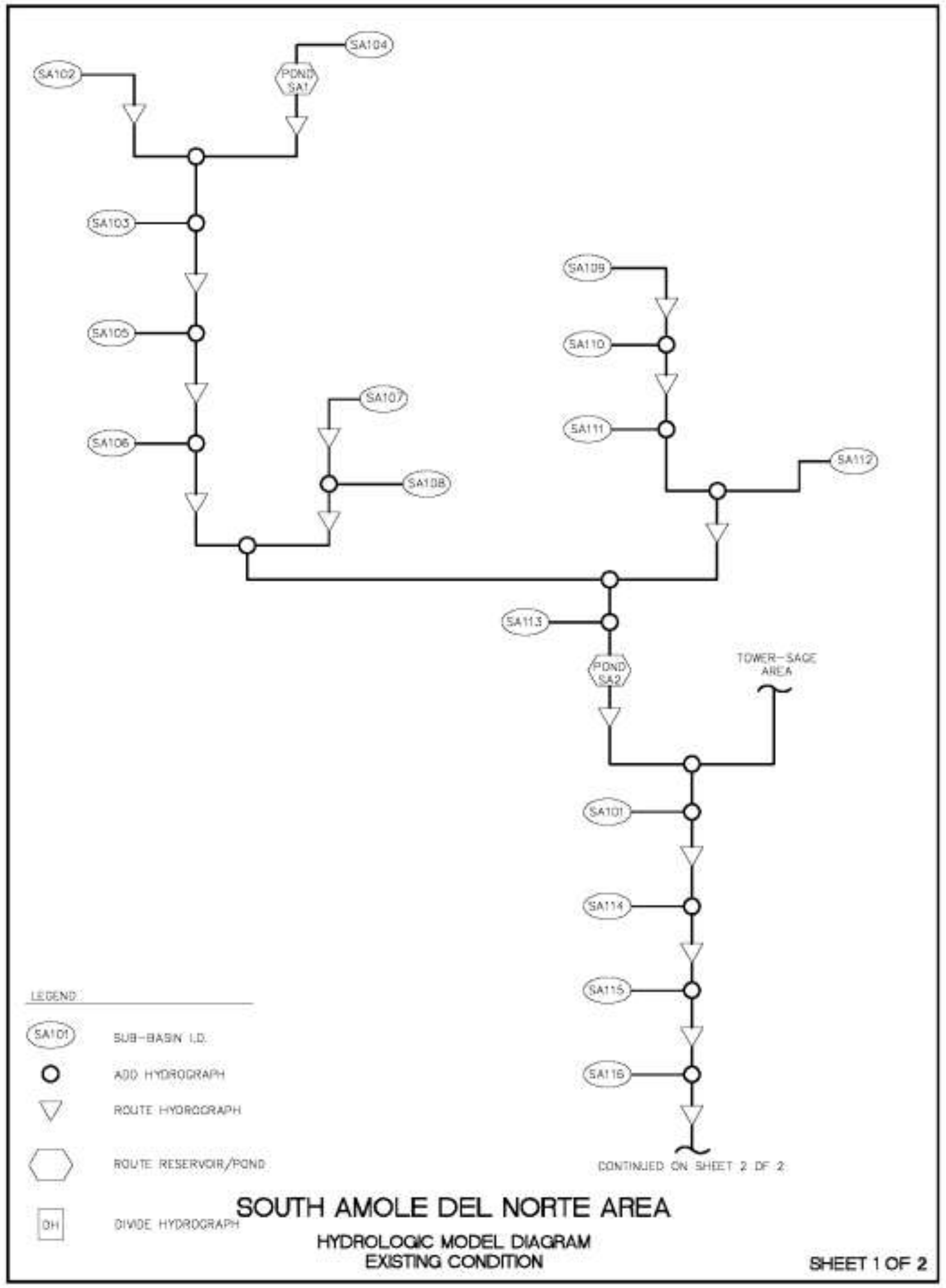

Figure A-20: South Amole del Norte Area - Existing Hydrologic Model Diagram

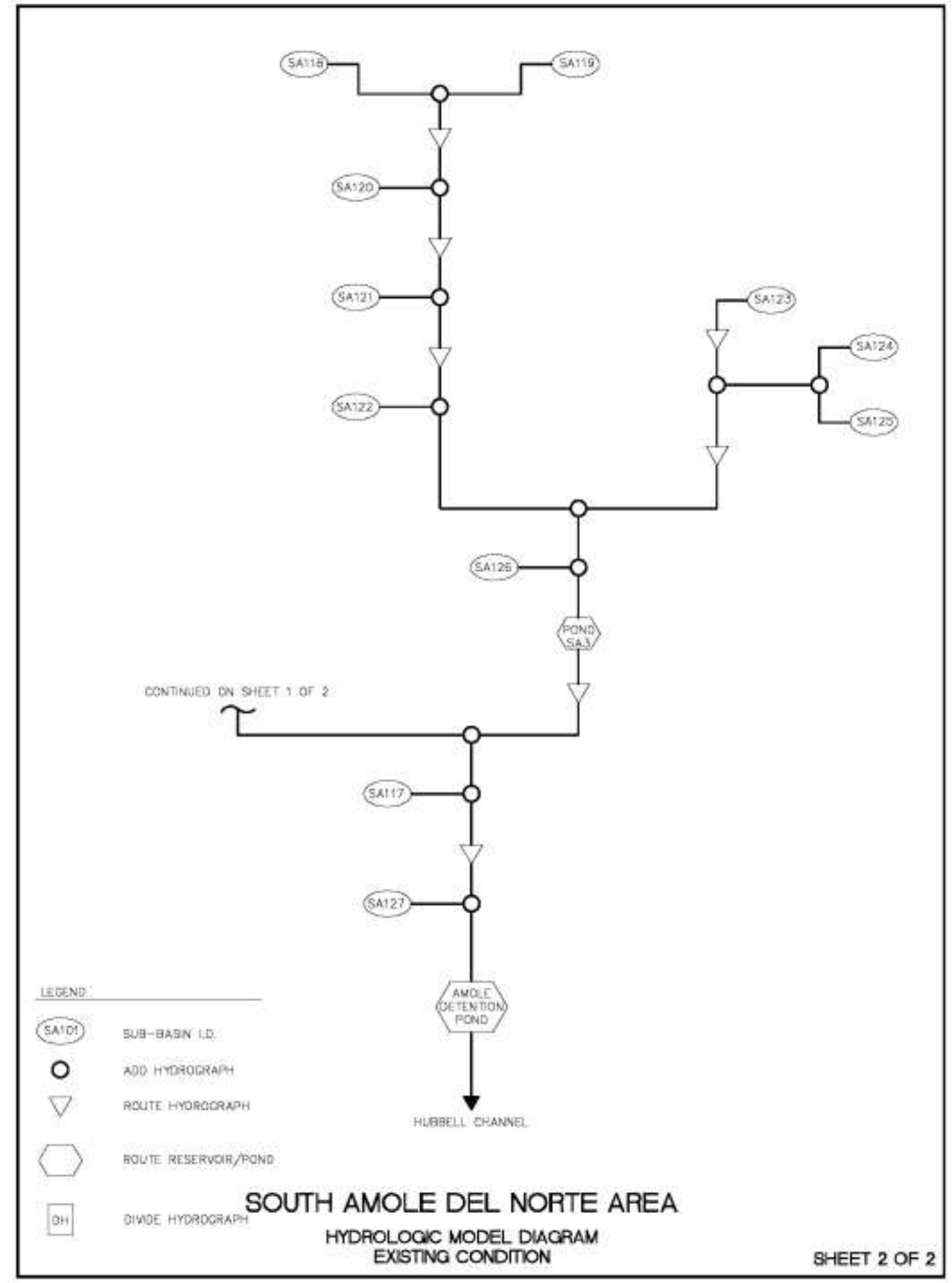

Figure A-20 Continued: South Amole del Norte Area - Existing Hydrologic Model Diagram

Table A-10: South Amole del Norte Area - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
SA101	107	300.00	15.734
SA102	14	52.30	2.006
SA103	15	55.23	2.036
SA104	25	92.88	3.527
SA105	53	156.04	6.204
SA106	27	102.08	3.953
SA107	12	48.84	1.962
SA108	25	60.26	2.092
SA109	24	77.79	3.259
SA110	33	106.09	4.122
SA111	10	35.10	1.303
SA112	44	150.89	6.410
SA113	45	159.08	6.177
SA114	43	122.93	6.628
SA115	35	113.14	5.309
SA116	84	263.67	13.032
SA117	68	190.87	10.603
SA118	21	78.87	3.008
SA119	8	28.68	1.066
SA120	40	126.25	5.328
SA121	15	50.06	1.827
SA122	32	121.14	4.871
SA123	45	171.75	6.866
SA124	11	25.20	0.814
SA125	19	42.11	1.349
SA126	40	154.47	6.052
SA127	70	206.02	10.227

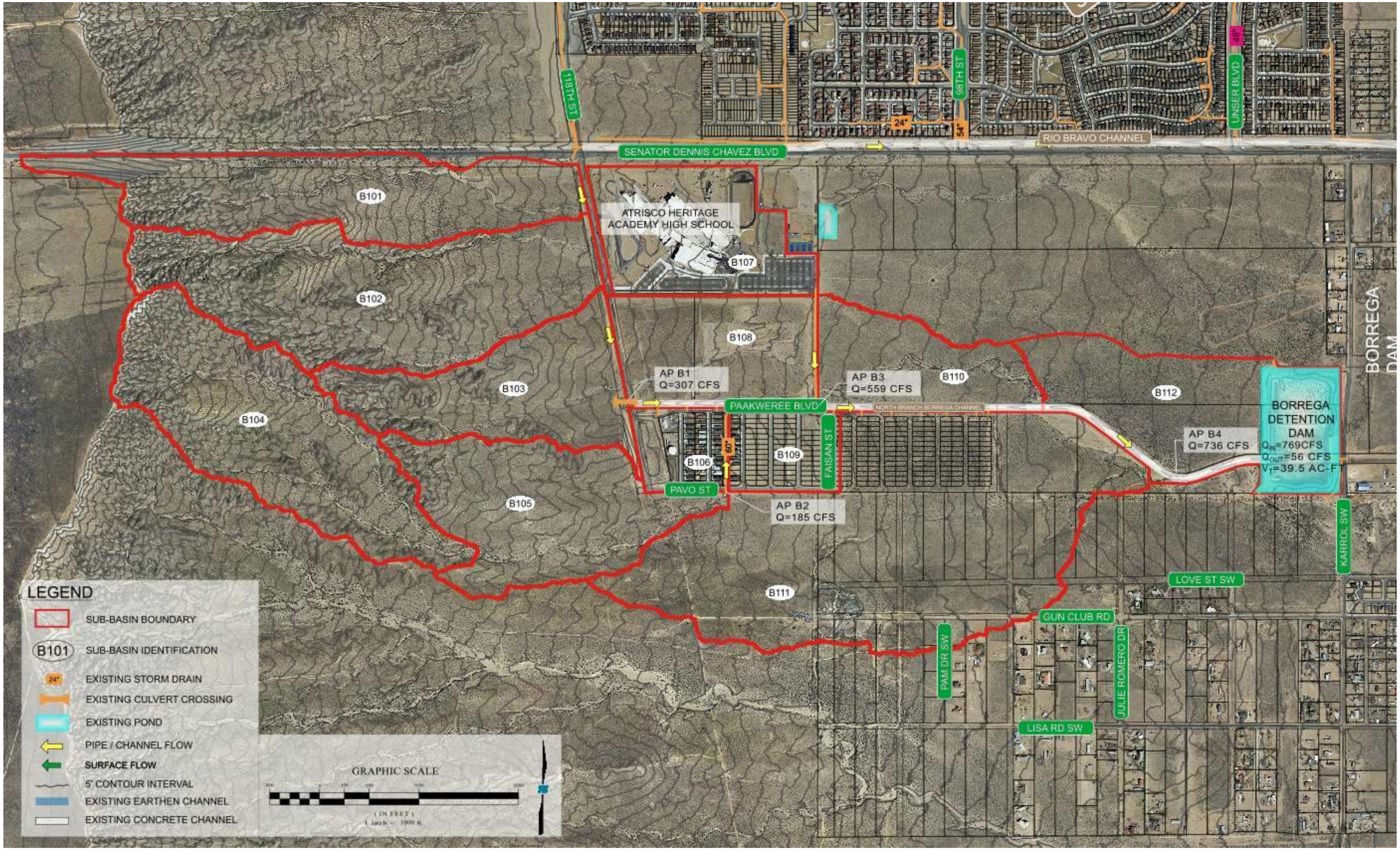

Figure A-21: Borrega Basin - Existing Basin Map

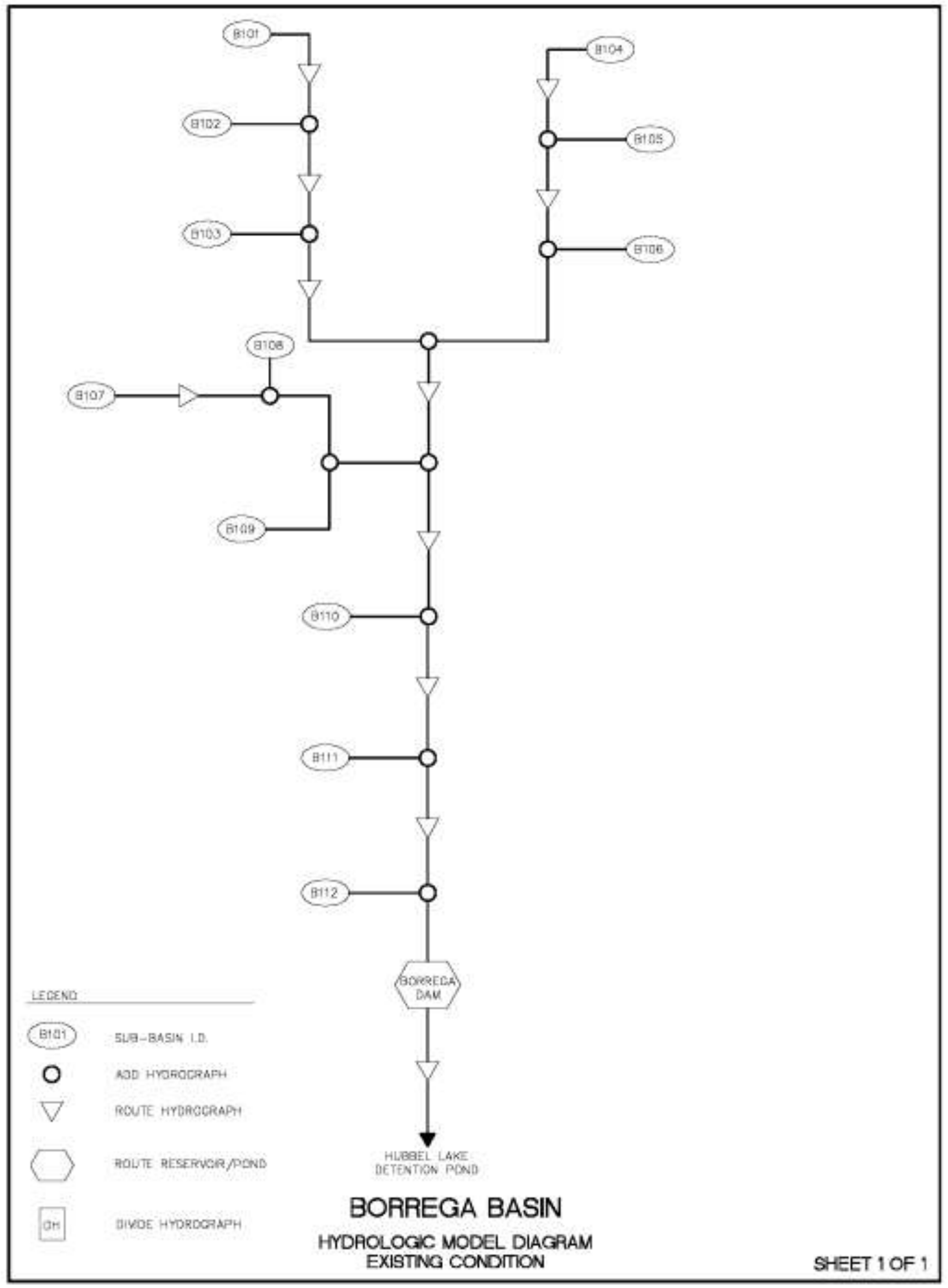

Figure A-22: Borrega Basin - Existing Hydrologic Model Diagram

Table A-11: Borrega Basin - Existing Sub-Basin Peak Discharge and Volumes

Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
B101	85	91.74	4.694
B102	118	147.05	6.512
B103	63	107.80	3.504
B104	99	139.03	5.498
B105	76	121.10	4.201
B106	18	33.18	0.990
B107	42	42.40	2.346
B108	52	97.48	2.884
B109	22	39.88	1.190
B110	43	52.31	2.356
B111	193	191.42	10.699
B112	79	121.21	4.354

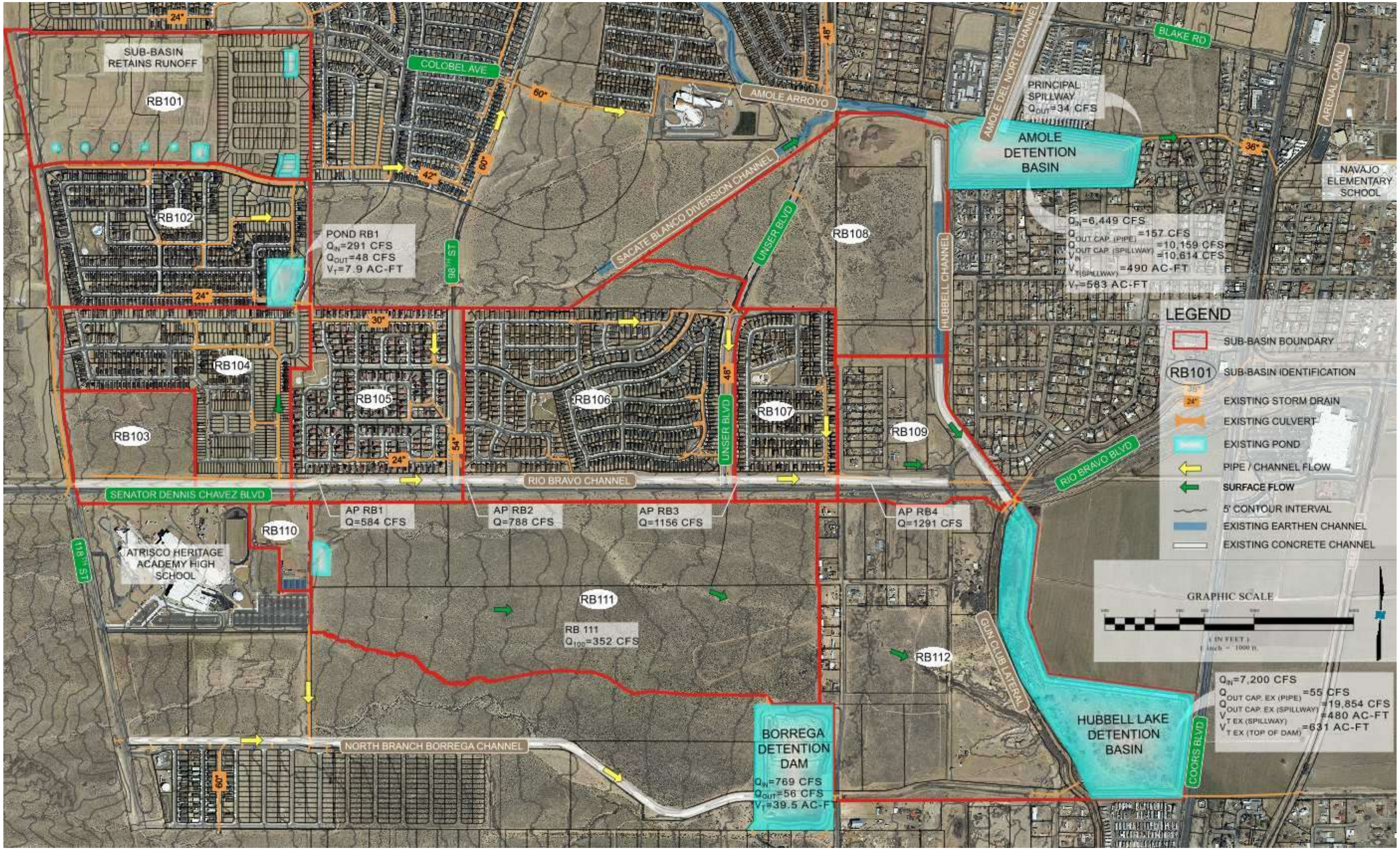

Figure A-23: Rio Bravo Basin - Existing Basin Map

Table A-12: Rio Bravo Basin - Existing Sub-Basin Peak Discharge and Volumes			
Sub-Basin	Area (ac)	$Q_{100yr\text{-}6hr}$ (cfs)	$V_{100yr\text{-}24hr}$ (ac-ft)
RB102	87	290.63	12.529
RB103	33	75.81	2.444
RB104	72	225.68	8.875
RB105	75	226.50	9.704
RB106	136	402.59	18.255
RB107	45	156.00	6.943
RB108	105	143.90	6.941
RB109	45	134.52	4.700
RB111	207	351.58	13.660
RB112	187	292.40	13.279

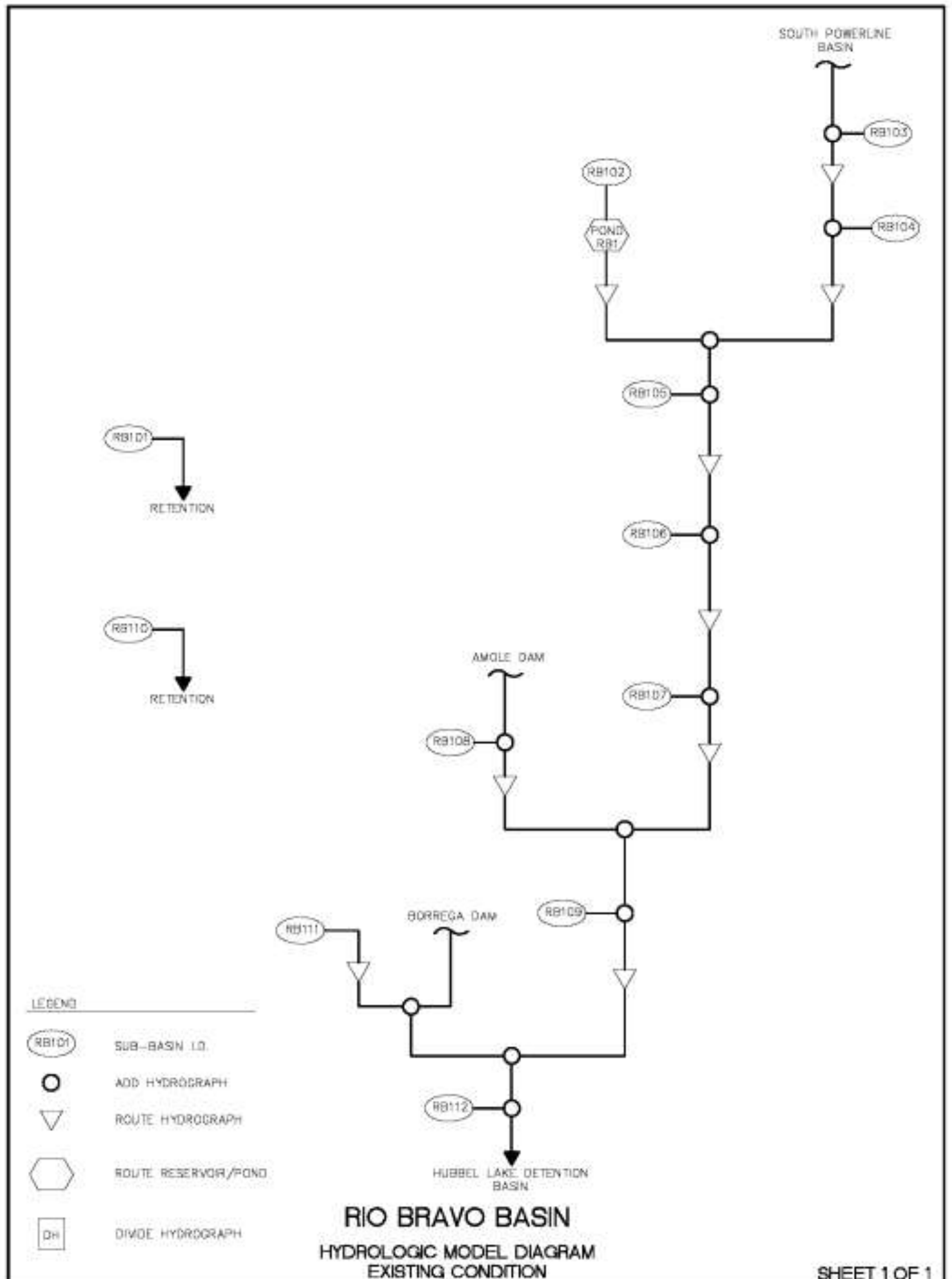

Figure A-24: Rio Bravo Basin - Existing Hydrologic Model Diagram

Appendix B

```
AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4)                  - Ver. S4.01a, Rel: 01a     RUN DATE (MON/DAY/YR) =03/25/2014
INPUT FILE = M:\IFS\11-600-044-00\AE_DATA\CALCS\Ahymo\Proposed\PHubbellDam 24hr.txt    USER NO.= WilsonCoANMSiteA96476897

                                FROM  TO                    PEAK       RUNOFF                TIME TO    CFS      PAGE =   1
                  HYDROGRAPH    ID    ID        AREA      DISCHARGE    VOLUME     RUNOFF      PEAK      PER
COMMAND        IDENTIFICATION   NO.   NO.      (SQ MI)      (CFS)      (AC-FT)   (INCHES)   (HOURS)    ACRE      NOTATION

*S "PROPOSED" CONDITION MODEL FOR AMOLE HUBBELL
START                                                                                                 TIME=       0.00
LOCATION                    ALBUQUERQUE
*S                    RAINFALL DATA FROM NOAA ATLAS 14
*S*************************************************************************
*S  100 YEAR 24HR STORM
RAINFALL  TYPE= 2 NOAA 14                                                                             RAIN24=    2.570
SEDIMENT BULK                                                                                         PK BF =     1.06
*S*************************************************************************
*S***********         98TH AND CENTRAL BASIN
*S*************************************************************************
COMPUTE NM HYD        NE202.1   -     1      0.08439     172.80      5.550     1.23306     1.533    3.199 PER IMP=  17.00
ROUTE MCUNGE        NE202.1RT   1     2      0.08439     170.40      5.542     1.23124     1.567    3.155 CCODE =     0.1
COMPUTE NM HYD        NE202.2   -     1      0.06185     126.52      4.067     1.23306     1.533    3.196 PER IMP=  17.00
ADD HYD            NE202.2SUM  2& 1   1      0.14624     296.40      9.609     1.23200     1.533    3.167
*S APNE3
ROUTE MCUNGE     NE202.2SUMRt   1     2      0.14624     295.66      9.607     1.23172     1.567    3.159 CCODE =     0.2
COMPUTE NM HYD          NE204   -     1      0.08938     183.06      5.878     1.23306     1.533    3.200 PER IMP=  17.00
ADD HYD             NE204SUM  2& 1   1      0.23562     467.35     15.485     1.23223     1.567    3.099
ROUTE MCUNGE      NE204SUMRT   1    10      0.23562     466.86     15.475     1.23148     1.567    3.096 CCODE =     0.1
COMPUTE NM HYD        NE201.1   -     1      0.08463     173.30      5.566     1.23306     1.533    3.200 PER IMP=  17.00
ROUTE MCUNGE        NE201.1RT   1     2      0.08463     171.13      5.558     1.23135     1.567    3.160 CCODE =     0.1
COMPUTE NM HYD        NE201.2   -     1      0.04349      88.97      2.860     1.23306     1.533    3.196 PER IMP=  17.00
ADD HYD           NE201.2SUMA  2& 1   1      0.12812     259.25      8.418     1.23193     1.533    3.162
*S APNE1
ROUTE MCUNGE     NE201.2SUMAR   1     3      0.12812     256.54      8.393     1.22830     1.600    3.129 CCODE =     0.1
ADD HYD            NE208SUMA 10& 3   1      0.36374     721.39     23.868     1.23036     1.600    3.099
COMPUTE NM HYD          NE208   -     2      0.10104     197.57      6.772     1.25668     1.533    3.055 PER IMP=  18.60
ADD HYD            NE208SUMB  1& 2   1      0.46478     906.52     30.640     1.23608     1.567    3.048
*S APNE2
ROUTE MCUNGE      NE208SUMBRt   1    10      0.46478     906.52     30.640     1.23608     1.567    3.048 CCODE =     0.0
COMPUTE NM HYD        NE205.1   -     1      0.07464     152.77      4.909     1.23306     1.533    3.198 PER IMP=  17.00
ROUTE MCUNGE        NE205.1RT   1     2      0.07464     150.12      4.898     1.23046     1.567    3.143 CCODE =     0.1
COMPUTE NM HYD        NE205.2   -     1      0.06038     123.59      3.976     1.23479     1.533    3.198 PER IMP=  17.12
ADD HYD            NE205.2SUM  1& 2   1      0.13502     266.04      8.875     1.23239     1.567    3.079
ROUTE MCUNGE     NE205.2SUMRT   1     2      0.13502     262.30      8.862     1.23059     1.600    3.035 CCODE =     0.1
COMPUTE NM HYD          NE206   -     1      0.04398     114.85      4.691     1.99993     1.533    4.081 PER IMP=  69.03
ADD HYD             NE206SUM  2& 1   1      0.17900     367.45     13.553     1.41961     1.567    3.207
*S APNE4
ROUTE MCUNGE      NE206SUMRT   1     2      0.17900     365.02     13.552     1.41951     1.567    3.186 CCODE =     0.2
ADD HYD            NE211SUMA 10& 2   1      0.64378    1271.54     44.192     1.28708     1.567    3.086
ROUTE RESERVOIR      PondNE2   1    40      0.64378      30.30     44.192     1.28708     2.600    0.074 AC-FT=   37.605
*S  RATING CURVE FROM PLAN SET ADN SD FACILITIES
*S  TB DRAINAGE FACILITIES PHASE IIIC JUNE 1995
COMPUTE NM HYD          NE210   -     1      0.09526     216.65      9.433     1.85665     1.567    3.554 PER IMP=  59.30
ROUTE MCUNGE          NE210RT   1     2      0.09526     215.34      9.425     1.85508     1.567    3.532 CCODE =     0.1
COMPUTE NM HYD          NE211   -     1      0.07784     186.95      7.421     1.78758     1.533    3.753 PER IMP=  57.40
ADD HYD           PondNE3SUM  2& 1   1      0.17310     391.00     16.846     1.82472     1.533    3.529
ADD HYD            NE211SUMB 40& 1   1      0.81688     408.71     61.038     1.40101     1.567    0.782
```



```
                                FROM  TO                    PEAK       RUNOFF                TIME TO    CFS      PAGE =   2
                  HYDROGRAPH    ID    ID        AREA      DISCHARGE    VOLUME     RUNOFF      PEAK      PER
COMMAND        IDENTIFICATION   NO.   NO.      (SQ MI)      (CFS)      (AC-FT)   (INCHES)   (HOURS)    ACRE      NOTATION

ROUTE RESERVOIR      PondNE3   1    41      0.81688      21.80     61.038     1.40101    14.732    0.042 AC-FT=   22.387
*S*************************************************************************
*S*************         END OF 98TH AND CENTRAL BASIN
*S*************************************************************************
*S*************************************************************************
*S**********          UNSER-214 BASIN
*S*************************************************************************
COMPUTE NM HYD         U202.2   -     1      0.04661     104.70      4.227     1.70029     1.533    3.510 PER IMP=  56.00
ROUTE MCUNGE      U202.2SUMRT   1     2      0.04661     103.84      4.220     1.69740     1.567    3.481 CCODE =     0.1
COMPUTE NM HYD           U201   -     1      0.03522      99.89      4.316     2.29751     1.500    4.431 PER IMP=  89.19
ADD HYD              U201SUM  2& 1   1      0.08183     195.86      8.535     1.95568     1.567    3.740
ROUTE RESERVOIR       PondU6   1    30      0.08183      51.96      8.535     1.95568     1.866    0.992 AC-FT=    4.094
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
ROUTE MCUNGE        PONDU6Rt  30     2      0.08183      51.95      8.535     1.95559     1.900    0.992 CCODE =     0.2
COMPUTE NM HYD         U202.1   -     1      0.06636     176.49      7.502     2.11955     1.533    4.156 PER IMP=  79.20
ROUTE RESERVOIR       PondU5   1    30      0.06636     118.53      7.502     2.11955     1.633    2.791 AC-FT=    2.192
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
ROUTE MCUNGE        PONDu5Rt  30     1      0.06636     114.97      7.444     2.10323     1.667    2.707 CCODE =     0.2
ADD HYD           U202.1SUM  2& 1   1      0.14819     163.15     15.978     2.02169     1.700    1.720
ROUTE RESERVOIR       PondU4   1    31      0.14819      85.46     15.978     2.02169     2.033    0.901 AC-FT=    3.928
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
COMPUTE NM HYD           U203   -     1      0.05311     124.07      4.784     1.68899     1.533    3.650 PER IMP=  50.45
ADD HYD              U203SUM 31& 1   1      0.20130     149.78     20.762     1.93384     1.533    1.163
*S APU1
ROUTE RESERVOIR       PondU3   1    30      0.20130      92.03     20.762     1.93384     2.166    0.714 AC-FT=    2.989
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
ROUTE RESERVOIR       PondU2  30    31      0.20130      46.51     20.457     1.90544     3.566    0.361 AC-FT=    6.963
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
COMPUTE NM HYD           U204   -     1      0.04966     113.17      4.334     1.63633     1.533    3.561 PER IMP=  47.85
ROUTE RESERVOIR       PondU7   1    30      0.04966      47.51      4.334     1.63633     1.733    1.495 AC-FT=    1.553
*S  Pond Rating Curve from Avalon Report Feb. 1998 stated pond release of 35.8cf
*S  Sub-Basin U104 drains to pond in analysis; however,
*S  The pond respective watershed is smaller, thus the higher release from pond.
*S
ADD HYD              U204SUM 31&30   1      0.25096      64.33     24.791     1.85219     2.200    0.401
ROUTE RESERVOIR       PondU1   1    30      0.25096      44.41     24.741     1.84845     4.533    0.277 AC-FT=    3.641
*S  USED STAGE-STORAGE-DISCHARGE RATING CURVE FROM MDP FOR THE WEST SIDE TRANSIT
*S
ROUTE MCUNGE       PondU1Rt  30     1      0.25096      44.41     24.740     1.84841     4.566    0.277 CCODE =     0.2
COMPUTE NM HYD           U207   -     2      0.04489     114.77      4.610     1.92566     1.533    3.995 PER IMP=  64.00
ADD HYD              U207SUM  1& 2   1      0.29585     122.92     29.350     1.86013     1.533    0.649
ROUTE MCUNGE       U207SUMRt   1    10      0.29585     122.12     29.347     1.85994     1.567    0.645 CCODE =     0.2
COMPUTE NM HYD           U205   -     1      0.07980     176.04      8.550     2.00899     1.600    3.447 PER IMP=  69.67
ROUTE MCUNGE          U205Rt   1     2      0.07980     175.31      8.546     2.00788     1.633    3.433 CCODE =     0.2
COMPUTE NM HYD           U206   -     1      0.09646     189.28     10.116     1.96638     1.633    3.066 PER IMP=  66.70
ADD HYD              U206SUM  2& 1   1      0.17626     364.59     18.662     1.98517     1.633    3.232
*S APU2
```

PAGE = 3

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	U206SUMRt	1	2	0.17626	344.43	18.512	1.96923	1.667	3.053	CCODE = 0.2
COMPUTE NM HYD	U208	-	1	0.03976	98.33	3.902	1.84009	1.533	3.864	PER IMP= 56.50
ADD HYD	U208SUMB	2& 1	1	0.21602	411.84	22.414	1.94546	1.633	2.979	
COMPUTE NM HYD	U209	-	2	0.03339	85.47	3.341	1.87591	1.533	4.000	PER IMP= 58.20
ADD HYD	U209SUM	1& 2	1	0.24941	480.60	25.754	1.93614	1.567	3.011	
ROUTE RESERVOIR	PONDU214	1	30	0.24941	137.74	25.754	1.93614	2.000	0.863	AC-FT= 11.990
ADD HYD	U208SUMA	10&30	42	0.54526	226.00	55.103	1.89483	1.600	0.648	
*S APU3										
*S**										
*S********** END OF UNSER-214 BASIN										
*S**										
*S**										
*S*********** TIERRA BAYITA BASIN										
*S**										
COMPUTE NM HYD	TB202.1	-	1	0.13801	286.10	13.441	1.82608	1.567	3.239	PER IMP= 63.00
ROUTE RESERVOIR	PondTB1A	1	30	0.13801	180.05	13.441	1.82608	1.733	2.038	AC-FT= 2.194
ROUTE MCUNGE	PONDTB1RT	30	1	0.13801	180.05	13.438	1.82563	1.766	2.038	CCODE = 0.1
COMPUTE NM HYD	TB202.2	-	2	0.08784	234.77	10.586	2.25974	1.533	4.176	PER IMP= 86.90
ROUTE RESERVOIR	PondTB1B	2	30	0.08784	114.06	10.586	2.25973	1.733	2.029	AC-FT= 2.530
ADD HYD	TB202.2SUM	1&30	1	0.22585	294.11	24.024	1.99446	1.733	2.035	
ROUTE MCUNGE	TB202.2SUMRT	1	2	0.22585	293.91	23.863	1.98114	1.933	2.033	CCODE = 0.2
COMPUTE NM HYD	TB103	-	1	0.04991	123.90	4.854	1.82356	1.533	3.879	PER IMP= 57.00
ROUTE RESERVOIR	PondTB2	1	30	0.04991	66.57	4.854	1.82355	1.667	2.084	AC-FT= 1.918
*S Outflow equals to 49.4 cfs From "DMP for Avalon Subdivision" on Pg 3										
ADD HYD	PONDTB2SUM	2&30	1	0.27576	355.53	28.717	1.95261	1.733	2.014	
ROUTE MCUNGE	PONDTB2SUMRT	1	2	0.27576	344.83	28.170	1.91538	1.900	1.954	CCODE = 0.2
COMPUTE NM HYD	TB204	-	1	0.03918	106.93	4.584	2.19364	1.533	4.265	PER IMP= 83.50
ROUTE MCUNGE	TB204RT	1	3	0.03918	106.92	4.583	2.19316	1.533	4.264	CCODE = 0.2
COMPUTE NM HYD	TB205	-	1	0.04575	115.37	4.583	1.87843	1.533	3.940	PER IMP= 60.80
ROUTE RESERVOIR	PondTB3	1	30	0.04575	31.73	4.583	1.87842	1.800	1.084	AC-FT= 2.420
*S Pond never graded per proposed G&D with date 12-7-10										
*S Pond likely will be modified per plan, but left as existing										
*S Assumed existing 30" RCP outlet with 0.5% slope										
ADD HYD	PONDTB3SUM	3&30	1	0.08493	129.96	9.166	2.02348	1.567	2.391	
ROUTE MCUNGE	PondTB3SUMRT	1	3	0.08493	129.92	9.166	2.02347	1.567	2.390	CCODE = 0.2
ADD HYD	TB206SUMA	2& 3	1	0.36069	407.53	37.335	1.94083	1.800	1.765	
ROUTE MCUNGE	TB206SUMART	1	2	0.36069	400.53	36.930	1.91978	1.833	1.735	CCODE = 0.2
COMPUTE NM HYD	TB206	-	1	0.02559	64.63	2.570	1.88298	1.533	3.946	PER IMP= 61.10
ADD HYD	TB206SUMB	2& 1	1	0.38628	417.80	39.500	1.91734	1.766	1.690	
*S APTB1										
ROUTE MCUNGE	TB206SUMBRT	1	10	0.38628	412.09	39.069	1.89639	1.833	1.667	CCODE = 0.2
ROUTE MCUNGE	NEBASINRT	41	1	0.81688	21.80	61.037	1.40100	14.765	0.042	CCODE = 0.2
COMPUTE NM HYD	TB207	-	2	0.06805	180.99	7.480	2.06089	1.533	4.156	PER IMP= 72.90
COMPUTE NM HYD	TB208	-	3	0.05040	125.02	5.303	1.97290	1.533	3.876	PER IMP= 67.20
ADD HYD	TB208SUMA	2& 3	2	0.11845	306.01	12.783	2.02344	1.533	4.037	
ADD HYD	TB208SUMB	1& 2	1	0.93533	315.55	73.820	1.47983	1.533	0.527	
*S APTB2										
ROUTE MCUNGE	TB208SUMBRT	1	2	0.93533	314.41	73.819	1.47981	1.533	0.525	CCODE = 0.2
ADD HYD	TB209SUMA	10& 2	1	1.32161	677.91	112.888	1.60156	1.567	0.801	
COMPUTE NM HYD	TB209	-	2	0.03089	85.75	3.659	2.22091	1.500	4.338	PER IMP= 84.00
ADD HYD	TB209SUMB	1& 2	1	1.35250	757.08	116.547	1.61571	1.567	0.875	
ROUTE MCUNGE	TB209SUMBRT	1	2	1.35250	723.70	116.383	1.61345	1.633	0.836	CCODE = 0.2

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	TB216	-	1	0.03257	89.82	3.817	2.19729	1.533	4.309	PER IMP= 82.40
ROUTE MCUNGE	TB216RT	1	3	0.03257	89.27	3.809	2.19265	1.600	4.283	CCODE = 0.1
ADD HYD	TB213SUMA	2& 3	1	1.38507	809.90	120.192	1.62707	1.633	0.914	
*S APTB3										
COMPUTE NM HYD	TB213	-	2	0.04712	133.59	5.771	2.29632	1.500	4.430	PER IMP= 89.10
ADD HYD	TB213SUMB	1& 2	1	1.43219	915.95	125.963	1.64909	1.600	0.999	
ROUTE MCUNGE	TB213SUMBRT	1	2	1.43219	884.55	125.699	1.64563	1.633	0.965	CCODE = 0.2
COMPUTE NM HYD	TB214	-	1	0.02685	68.55	2.713	1.89453	1.533	3.989	PER IMP= 60.76
ADD HYD	TB214SUM	2& 1	1	1.45904	931.52	128.412	1.65021	1.633	0.998	
*S APTB7										
ROUTE MCUNGE	TB214SUMRT	1	10	1.45904	887.60	127.822	1.64264	1.667	0.951	CCODE = 0.2
ROUTE MCUNGE	UNBASINRT	42	11	0.54526	224.57	55.089	1.89435	1.633	0.644	CCODE = 0.1
COMPUTE NM HYD	TB210	-	1	0.07272	175.08	7.917	2.04123	1.567	3.762	PER IMP= 71.83
COMPUTE NM HYD	TB211	-	2	0.02330	66.05	2.870	2.30948	1.533	4.429	PER IMP= 90.00
ADD HYD	TB211SUM	1& 2	1	0.09602	238.63	10.787	2.10631	1.533	3.883	
*S APTB4										
ROUTE MCUNGE	TB211SUMRT	1	2	0.09602	236.24	10.769	2.10288	1.600	3.844	CCODE = 0.1
COMPUTE NM HYD	TB212	-	1	0.06855	159.66	7.680	2.10058	1.567	3.639	PER IMP= 75.20
ADD HYD	TB212SUMA	1& 2	1	0.16457	394.32	18.449	2.10191	1.600	3.744	
*S APTB5										
ADD HYD	TB212SUMB	11& 1	1	0.70983	615.80	73.537	1.94247	1.600	1.356	
*S APTB6										
ROUTE MCUNGE	TB212SUMBRT	1	2	0.70983	612.49	73.532	1.94232	1.633	1.348	CCODE = 0.2
ADD HYD	TB215SUMA	10& 2	1	2.16887	1491.18	201.351	1.74069	1.633	1.074	
COMPUTE NM HYD	TB215	-	2	0.11272	195.06	9.623	1.60072	1.633	2.704	PER IMP= 36.70
ADD HYD	TB215SUMB	1& 2	10	2.28159	1686.25	210.974	1.73378	1.633	1.155	
COMPUTE NM HYD	TB217	-	1	0.01861	50.87	2.147	2.16346	1.533	4.271	PER IMP= 80.10
ROUTE MCUNGE	TB217RT	1	2	0.01861	50.80	2.145	2.16146	1.567	4.266	CCODE = 0.1
COMPUTE NM HYD	TB220	-	1	0.03690	96.97	3.995	2.03023	1.533	4.106	PER IMP= 71.00
ADD HYD	TB220SUM	2& 1	1	0.05551	143.04	6.141	2.07421	1.533	4.026	
COMPUTE NM HYD	TB218	-	2	0.03573	73.14	2.353	1.23479	1.533	3.198	PER IMP= 17.12
ROUTE MCUNGE	TB218RT	2	3	0.03573	71.94	2.347	1.23144	1.567	3.146	CCODE = 0.1
COMPUTE NM HYD	TB219	-	2	0.02285	58.43	2.347	1.92566	1.533	3.995	PER IMP= 64.00
ADD HYD	TB219SUM	2& 3	2	0.05858	126.10	4.693	1.50222	1.567	3.363	
ADD HYD	TB221SUMA	1& 2	1	0.11409	267.16	10.834	1.78052	1.533	3.659	
*S APTB8										
ROUTE MCUNGE	TB221SUMART	1	2	0.11409	267.14	10.823	1.77867	1.567	3.659	CCODE = 0.1
COMPUTE NM HYD	TB221	-	1	0.05769	137.45	5.770	1.87544	1.533	3.723	PER IMP= 60.54
ADD HYD	TB221SUMB	2& 1	1	0.17178	401.85	16.593	1.81116	1.567	3.655	
ROUTE MCUNGE	TB221SUMBRT	1	2	0.17178	396.95	16.569	1.80854	1.600	3.611	CCODE = 0.2
COMPUTE NM HYD	TB222	-	1	0.07064	155.17	7.233	1.91976	1.567	3.432	PER IMP= 63.60
ADD HYD	TB222SUMA	2& 1	1	0.24242	550.22	23.802	1.84094	1.600	3.546	
*S APTB9										
ADD HYD	TB222SUMB	10& 1	1	2.52401	2210.89	234.776	1.74407	1.633	1.369	
*S APTB10										
ROUTE MCUNGE	TB222SUMBRT	1	2	2.52401	2205.93	234.732	1.74375	1.633	1.366	CCODE = 0.1
COMPUTE NM HYD	TB223	-	1	0.07133	129.70	6.937	1.82355	1.633	2.841	PER IMP= 57.00
COMPUTE NM HYD	TB224	-	3	0.15974	236.51	15.234	1.78814	1.733	2.313	PER IMP= 54.40
ADD HYD	TB224SUMA	1& 3	1	0.23107	355.12	22.171	1.79907	1.700	2.401	
ADD HYD	TB224SUMB	2& 1	43	2.75508	2549.14	256.903	1.74838	1.667	1.446	
*S**										
*S************** END OF TIERRA BAYITA BASIN										
*S**										

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S**										
*S*************** ATRISCO BUSINESS PARK BASIN										
*S**										
ROUTE MCUNGE	TB222SUMBRT	43	20	2.75508	2542.52	256.846	1.74800	1.667	1.442	CCODE = 0.1
COMPUTE NM HYD	AB201.1	-	1	0.11831	299.35	12.710	2.01424	1.533	3.953	PER IMP= 70.00
ROUTE RESERVOIR	PONDAB201.2	1	30	0.11831	7.56	12.710	2.01423	2.566	0.100	AC-FT= 9.770
ROUTE MCUNGE	PONDAB201.1R	30	1	0.11831	7.56	12.709	2.01419	2.600	0.100	CCODE = 0.1
COMPUTE NM HYD	AB201.2	-	2	0.09628	227.97	10.343	2.01424	1.567	3.700	PER IMP= 70.00
ROUTE RESERVOIR	PONDAB201.2	2	30	0.09628	6.15	10.343	2.01423	2.666	0.100	AC-FT= 7.926
ADD HYD	AB201.2SUM	30& 1	1	0.21459	13.72	23.052	2.01419	2.633	0.100	
*S APAB1										
ROUTE MCUNGE	Pond201.2SUM	1	2	0.21459	13.72	23.051	2.01413	2.733	0.100	CCODE = 0.1
COMPUTE NM HYD	AB202	-	1	0.18317	320.85	19.669	2.01337	1.700	2.737	PER IMP= 69.90
ROUTE RESERVOIR	PondAB202	1	30	0.18317	11.72	19.669	2.01337	3.066	0.100	AC-FT= 14.526
ADD HYD	POND202SUM	2&30	1	0.39776	25.44	42.720	2.01377	2.900	0.100	
*S APAB2										
ROUTE MCUNGE	Pond202SUMRt	1	2	0.39776	25.44	42.719	2.01374	2.966	0.100	CCODE = 0.1
COMPUTE NM HYD	AB203.1	-	1	0.11159	233.36	12.849	2.15891	1.633	3.268	PER IMP= 79.80
ROUTE RESERVOIR	PondAB203.1	1	30	0.11159	7.13	12.849	2.15890	2.933	0.100	AC-FT= 9.625
ADD HYD	POND202SUM	2&30	1	0.50935	32.57	55.568	2.04554	2.966	0.100	
ROUTE MCUNGE	AB203.1Rt	1	2	0.50935	32.57	55.567	2.04550	3.000	0.100	CCODE = 0.1
COMPUTE NM HYD	AB203.2	-	1	0.10280	160.41	10.776	1.96549	1.766	2.438	PER IMP= 64.60
ROUTE RESERVOIR	PondAB203.2	1	30	0.10280	6.57	10.776	1.96548	3.266	0.100	AC-FT= 7.955
ADD HYD	PondAB203.2S	2&30	1	0.61215	39.14	66.343	2.03206	3.033	0.100	
ROUTE MCUNGE	PondAB203.2S	1	2	0.61215	39.14	66.340	2.03199	3.166	0.100	CCODE = 0.1
*S APAB3										
COMPUTE NM HYD	AB204	-	1	0.16122	291.27	17.730	2.06200	1.667	2.823	PER IMP= 73.47
ROUTE RESERVOIR	PondAB204	1	30	0.16122	10.32	17.730	2.06199	3.066	0.100	AC-FT= 13.109
ADD HYD	PondAB204SUM	2&30	1	0.77337	49.46	84.070	2.03824	3.166	0.100	
*S APAB4										
ROUTE MCUNGE	PondAB204SUM	1	2	0.77337	49.46	84.070	2.03824	3.133	0.100	CCODE = 0.2
COMPUTE NM HYD	TB225	-	1	0.13043	203.16	9.502	1.36592	1.633	2.434	PER IMP= 26.00
ADD HYD	TB225SUMA	2& 1	1	0.90380	237.95	93.572	1.94121	1.633	0.411	
ADD HYD	TB225SUMB	1&20	1	3.65888	2779.40	350.418	1.79572	1.667	1.187	
ROUTE RESERVOIR	PondNSCOORS	1	44	3.65888	988.87	350.402	1.79564	2.200	0.422	AC-FT= 73.531
*S**										
*S*********** END OF ATRISCO BUSINESS PARK BASIN										
*S**										
*S**										
*S*********** TOWER-SAGE BASIN										
*S**										
COMPUTE NM HYD	TS201	-	1	0.06441	164.37	7.700	2.24158	1.567	3.987	PER IMP= 85.40
ROUTE MCUNGE	TS201Rt	1	2	0.06441	164.10	7.697	2.24062	1.600	3.981	CCODE = 0.2
COMPUTE NM HYD	TS202	-	1	0.08686	212.99	8.918	1.92497	1.533	3.831	PER IMP= 64.04
ADD HYD	TS202SUM	2& 1	1	0.15127	365.11	16.614	2.05937	1.567	3.771	
*S APTS1										
ROUTE MCUNGE	TS202SUMRt	1	2	0.15127	362.25	16.611	2.05897	1.600	3.742	CCODE = 0.2
COMPUTE NM HYD	TS203	-	1	0.10639	228.00	11.034	1.94461	1.600	3.349	PER IMP= 65.20
ADD HYD	TS203SUM	2& 1	1	0.25766	590.25	27.645	2.01174	1.600	3.579	
*S APTS2										
ROUTE MCUNGE	TS203SUMRt	1	2	0.25766	589.43	27.640	2.01137	1.600	3.574	CCODE = 0.2

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	TS205.1	-	1	0.04038	99.98	3.908	1.81470	1.533	3.869	PER IMP= 56.40
ADD HYD	TS205.1SUM	2& 1	1	0.29804	670.72	31.548	1.98472	1.600	3.516	
ROUTE MCUNGE	TS205.1SUMRt	1	2	0.29804	656.58	31.483	1.98063	1.633	3.442	CCODE = 0.2
COMPUTE NM HYD	TS204	-	1	0.04639	108.73	4.364	1.76374	1.533	3.662	PER IMP= 55.10
ROUTE MCUNGE	TS204Rt	1	3	0.04639	105.20	4.349	1.75776	1.567	3.543	CCODE = 0.2
ADD HYD	TS205.2SUMA	2& 3	1	0.34443	753.81	35.832	1.95061	1.600	3.420	
COMPUTE NM HYD	TS205.5	-	2	0.06260	143.52	5.947	1.78124	1.533	3.582	PER IMP= 54.20
ADD HYD	TS205.1SUMB	1& 2	1	0.40703	884.32	41.779	1.92456	1.600	3.395	
*S APTS3										
ROUTE MCUNGE	TS205.2SUMBR	1	10	0.40703	880.00	41.736	1.92259	1.600	3.378	CCODE = 0.1
COMPUTE NM HYD	TS206	-	1	0.02972	81.72	3.463	2.18487	1.533	4.296	PER IMP= 81.50
ROUTE RESERVOIR	PondTS2	1	30	0.02972	39.05	3.463	2.18485	1.700	2.053	AC-FT= 1.272
ROUTE MCUNGE	PONDTS2RT	30	1	0.02972	38.99	3.463	2.18483	1.733	2.050	CCODE = 0.2
COMPUTE NM HYD	TS207	-	2	0.07155	154.09	6.516	1.70766	1.567	3.365	PER IMP= 49.15
ADD HYD	TS207SUM	2& 1	1	0.10127	183.29	9.979	1.84769	1.567	2.828	
ROUTE MCUNGE	TS207SUMRt	1	2	0.10127	178.32	9.952	1.84266	1.633	2.751	CCODE = 0.2
COMPUTE NM HYD	TS208	-	1	0.05907	113.66	5.546	1.76036	1.600	3.007	PER IMP= 52.75
ADD HYD	TS208SUM	2& 1	1	0.16034	290.47	15.498	1.81234	1.633	2.831	
COMPUTE NM HYD	TS209	-	2	0.06455	147.00	6.724	1.95322	1.567	3.558	PER IMP= 65.80
ROUTE MCUNGE	TS209Rt	2	3	0.06455	146.29	6.722	1.95246	1.600	3.541	CCODE = 0.2
COMPUTE NM HYD	TS210	-	2	0.06151	134.31	6.030	1.83807	1.567	3.412	PER IMP= 58.00
ADD HYD	TS210SUMA	3& 2	2	0.12606	277.13	12.751	1.89664	1.600	3.435	
ADD HYD	TS210SUMB	1& 2	1	0.28640	565.38	28.250	1.84944	1.600	3.085	
*S APTS4										
ROUTE MCUNGE	TS210SUMBRt	1	2	0.28640	562.23	28.248	1.84931	1.600	3.067	CCODE = 0.2
ADD HYD	TS211SUMA	10& 2	1	0.69343	1442.23	69.984	1.89232	1.600	3.250	
COMPUTE NM HYD	TS211	-	2	0.04503	65.75	2.124	0.88456	1.533	2.281	PER IMP= 9.90
ADD HYD	TS211SUMB	1& 2	1	0.73846	1497.81	72.108	1.83087	1.600	3.169	
ROUTE RESERVOIR	PondTS1	1	30	0.73846	90.45	72.108	1.83087	2.533	0.191	AC-FT= 52.351
ROUTE MCUNGE	PondTS1RT	30	1	0.73846	90.28	72.055	1.82953	2.733	0.191	CCODE = 0.2
COMPUTE NM HYD	TS214	-	2	0.04836	92.13	4.560	1.76804	1.600	2.977	PER IMP= 54.20
ADD HYD	TS214SUM	1& 2	1	0.78682	133.43	76.615	1.82575	1.633	0.265	
*S APTS5										
ROUTE MCUNGE	TS214SUMRT	1	2	0.78682	132.43	76.611	1.82564	1.700	0.263	CCODE = 0.2
COMPUTE NM HYD	TS212	-	1	0.09315	185.71	9.702	1.95299	1.633	3.115	PER IMP= 65.83
ROUTE MCUNGE	TS212RT	1	3	0.09315	184.08	9.693	1.95113	1.667	3.088	CCODE = 0.2
COMPUTE NM HYD	TS213	-	1	0.06630	165.63	6.529	1.84644	1.533	3.903	PER IMP= 58.60
ADD HYD	TS213SUMA	3& 1	1	0.15945	311.33	16.222	1.90759	1.567	3.051	
*S APTS6										
ROUTE MCUNGE	TS213SUMRT	1	3	0.15945	309.61	16.216	1.90689	1.600	3.034	CCODE = 0.2
ADD HYD	TS213SUMB	3&44	1	3.81833	1089.47	366.618	1.80028	1.833	0.446	
ROUTE MCUNGE	TS215SUMBRT	1	3	3.81833	1088.98	366.618	1.80029	1.900	0.446	CCODE = 0.2
*s APTS7										
ADD HYD	TS215SUMA	2& 3	1	4.60515	1204.44	443.228	1.80462	1.800	0.409	
COMPUTE NM HYD	TS215	-	2	0.14947	240.67	12.607	1.58145	1.667	2.516	PER IMP= 40.60
ADD HYD	TS215SUMB	1& 2	1	4.75462	1389.01	455.835	1.79760	1.766	0.456	
ROUTE MCUNGE	TS215SUMBRT	1	2	4.75462	1388.14	455.834	1.79760	1.766	0.456	CCODE = 0.2
COMPUTE NM HYD	TS216	-	1	0.07651	131.92	7.482	1.83352	1.667	2.694	PER IMP= 57.70
*S APTS8										
ROUTE MCUNGE	TS216Rt	1	3	0.07651	115.50	7.253	1.77749	1.933	2.359	CCODE = 0.2
ADD HYD	TS217SUMA	2& 3	1	4.83113	1479.34	463.087	1.79728	1.800	0.478	
COMPUTE NM HYD	TS217	-	2	0.14062	246.00	12.146	1.61959	1.633	2.733	PER IMP= 43.20

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	TSBASIN	1& 2	45	4.97175	1657.26	475.233	1.79225	1.733	0.521	
*S APTS9										
*S**										
*S*********** END OF TOWER-SAGE BASIN										
*S**										
*S**										
*S*********** POWERLINE BASIN										
*S**										
COMPUTE NM HYD	PL202	-	1	0.16047	283.84	10.553	1.23306	1.567	2.764	PER IMP= 17.00
ROUTE MCUNGE	PL202Rt	1	2	0.16047	282.61	10.551	1.23281	1.600	2.752	CCODE = 0.2
COMPUTE NM HYD	PL204	-	3	0.15501	288.74	10.243	1.23897	1.567	2.911	PER IMP= 17.40
ADD HYD	PL204sum	2& 3	1	0.31548	555.12	20.794	1.23583	1.567	2.749	
*S APPL1										
ROUTE MCUNGE	PL204sumRt	1	2	0.31548	551.74	20.786	1.23535	1.633	2.733	CCODE = 0.2
COMPUTE NM HYD	PL205	-	3	0.13707	257.09	10.576	1.44675	1.567	2.931	PER IMP= 31.50
ADD HYD	PL205sum	2& 3	1	0.45255	804.40	31.362	1.29938	1.600	2.777	
ROUTE MCUNGE	PL205sumRt	1	2	0.45255	798.07	31.360	1.29929	1.633	2.755	CCODE = 0.2
COMPUTE NM HYD	PL206	-	3	0.17377	274.30	9.878	1.06587	1.567	2.466	PER IMP= 11.30
ADD HYD	PL206sum	2& 3	1	0.62632	1061.96	41.238	1.23453	1.600	2.649	
ROUTE RESERVOIR	PondPL1	1	30	0.62632	417.17	41.012	1.22776	1.866	1.041	AC-FT= 20.686
*S Increased Pond Storage and Outlet Discharge to Prevent Overtopping.										
*S Same Outlet Configuration as downstream Detention Ponds.										
ROUTE MCUNGE	PONDPL1RT	30	2	0.62632	380.74	40.725	1.21917	2.066	0.950	CCODE = 0.2
COMPUTE NM HYD	PL207	-	3	0.09881	144.96	4.201	0.79709	1.533	2.292	PER IMP= 0.00
ADD HYD	PL207sumA	2& 3	1	0.72513	392.35	44.925	1.16166	2.066	0.845	
ROUTE MCUNGE	PL207SUMRt	1	5	0.72513	392.32	44.921	1.16154	2.066	0.845	CCODE = 0.2
COMPUTE NM HYD	PL208.1	-	1	0.07570	106.84	3.118	0.77220	1.533	2.205	PER IMP= 0.00
ROUTE MCUNGE	PL208.1Rt	1	2	0.07570	106.44	3.120	0.77272	1.567	2.197	CCODE = 0.2
COMPUTE NM HYD	PL208.2	-	1	0.01112	26.78	1.040	1.75419	1.533	3.763	PER IMP= 53.60
COMPUTE NM HYD	PL208.3	-	3	0.02338	46.01	1.665	1.33522	1.533	3.075	PER IMP= 31.80
ADD HYD	PL208.3sumA	1& 3	1	0.03450	72.78	2.705	1.47024	1.533	3.296	
ADD HYD	PL208.3sumB	1& 2	1	0.11020	177.11	5.825	0.99109	1.533	2.511	
ADD HYD	PL208.3sumC	1& 5	1	0.83533	409.11	50.746	1.13906	2.066	0.765	
ROUTE RESERVOIR	PondPL2	1	30	0.83533	343.52	50.736	1.13883	2.333	0.643	AC-FT= 13.202
ROUTE MCUNGE	PONDPL2Rt	30	10	0.83533	343.52	50.736	1.13883	2.333	0.643	CCODE = 0.0
COMPUTE NM HYD	PL209.1	-	1	0.06028	87.26	2.506	0.77957	1.533	2.262	PER IMP= 0.00
ROUTE MCUNGE	PL209.1Rt	1	2	0.06028	87.19	2.509	0.78033	1.567	2.260	CCODE = 0.2
COMPUTE NM HYD	PL209.2	-	1	0.01575	37.67	1.430	1.70212	1.533	3.737	PER IMP= 48.85
ADD HYD	PL209.2sum	1& 2	1	0.07603	122.23	3.938	0.97127	1.567	2.512	
COMPUTE NM HYD	PL209.3	-	2	0.00878	21.04	0.799	1.70546	1.533	3.745	PER IMP= 49.00
ADD HYD	PL209.3sumA	1& 2	1	0.08481	142.61	4.737	1.04727	1.533	2.627	
ADD HYD	PL209.3sumB	10& 1	1	0.92014	350.98	55.473	1.13039	2.300	0.596	
ROUTE RESERVOIR	PondPL3	1	30	0.92014	328.87	55.466	1.13025	2.500	0.558	AC-FT= 8.468
ROUTE MCUNGE	UPONDPL3Rt	30	10	0.92014	328.87	55.466	1.13025	2.500	0.558	CCODE = 0.0
COMPUTE NM HYD	PL210.1	-	1	0.07778	103.27	3.038	0.73233	1.533	2.075	PER IMP= 0.00
ROUTE MCUNGE	PL210.1Rt	1	2	0.07778	102.62	3.040	0.73286	1.567	2.062	CCODE = 0.2
COMPUTE NM HYD	PL210.2	-	1	0.01496	35.84	1.361	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	PL210.2sum	1& 2	1	0.09274	135.96	4.401	0.88974	1.567	2.291	
COMPUTE NM HYD	PL210.3	-	2	0.00903	21.64	0.821	1.70546	1.533	3.745	PER IMP= 49.00
ADD HYD	PL210.3sumA	1& 2	1	0.10177	156.08	5.222	0.96212	1.567	2.396	
ADD HYD	PL210.3sumB	10& 1	1	1.02191	334.49	60.688	1.11351	2.500	0.511	
ROUTE RESERVOIR	PondPL4	1	30	1.02191	316.59	60.680	1.11336	2.700	0.484	AC-FT= 8.391

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	PONDPL4Rt	30	10	1.02191	316.59	60.680	1.11336	2.700	0.484	CCODE = 0.0
COMPUTE NM HYD	PL211.1	-	1	0.07867	99.87	2.919	0.69570	1.533	1.983	PER IMP= 0.00
ROUTE MCUNGE	PL211.1Rt	1	2	0.07867	99.69	2.922	0.69636	1.567	1.980	CCODE = 0.2
COMPUTE NM HYD	PL211.3	-	1	0.01064	25.50	0.968	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	PL211.3sumA	1& 2	1	0.08931	123.40	3.890	0.81657	1.567	2.159	
ADD HYD	PL211.3sumB	10& 1	1	1.11122	319.84	64.569	1.08950	2.666	0.450	
ROUTE RESERVOIR	PondPL5	1	30	1.11122	302.04	64.561	1.08937	2.900	0.425	AC-FT= 8.959
ROUTE MCUNGE	PONDPL5Rt	30	10	1.11122	302.04	64.561	1.08937	2.900	0.425	CCODE = 0.0
COMPUTE NM HYD	PL211.2	-	1	0.05553	133.00	5.051	1.70546	1.533	3.742	PER IMP= 49.00
ADD HYD	PL211.2sum	10& 1	1	1.16675	303.21	69.612	1.11869	2.900	0.406	
ROUTE RESERVOIR	PondPL6	1	30	1.16675	286.40	69.603	1.11854	3.100	0.384	AC-FT= 9.368
COMPUTE NM HYD	PL212.1	-	1	0.03223	77.20	2.932	1.70546	1.533	3.743	PER IMP= 49.00
COMPUTE NM HYD	PL212.2	-	2	0.01592	38.14	1.448	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	PL212.2sumA	1& 2	1	0.04815	115.34	4.380	1.70544	1.533	3.743	
ADD HYD	PL212.2sumB	30& 1	1	1.21490	287.08	73.983	1.14180	3.100	0.369	
COMPUTE NM HYD	PL213	-	2	0.02311	55.36	2.102	1.70546	1.533	3.743	PER IMP= 49.00
ADD HYD	PLBASIN	1& 2	46	1.23801	287.41	76.085	1.15232	3.100	0.363	
*S APPL2										
*S**										
*S*********** END OF POWERLINE BASIN										
*S**										
*S**										
*S*********** SNOW VISTA BASIN										
*S**										
COMPUTE NM HYD	SV201	-	1	0.10812	230.93	7.433	1.28905	1.533	3.337	PER IMP= 18.00
ROUTE MCUNGE	SV201Rt	1	2	0.10812	230.08	7.435	1.28938	1.567	3.325	CCODE = 0.2
COMPUTE NM HYD	SV203	-	1	0.06845	175.50	7.068	1.93612	1.533	4.006	PER IMP= 64.70
ROUTE MCUNGE	SV203Rt	1	3	0.06845	174.06	7.051	1.93146	1.600	3.973	CCODE = 0.1
ADD HYD	SV202SUMA	2& 3	2	0.17657	392.44	14.486	1.53829	1.567	3.473	
COMPUTE NM HYD	SV202	-	1	0.03670	92.92	3.703	1.89183	1.533	3.956	PER IMP= 61.70
ADD HYD	SV202SUMB	1& 2	1	0.21327	478.62	18.189	1.59913	1.567	3.507	
COMPUTE NM HYD	SV204	-	2	0.03698	75.93	2.452	1.24313	1.533	3.208	PER IMP= 17.68
ADD HYD	SV204SUM	2& 1	10	0.25025	549.82	20.641	1.54652	1.567	3.433	
COMPUTE NM HYD	SV207	-	1	0.05374	131.74	5.267	1.83783	1.533	3.830	PER IMP= 60.26
ROUTE RESERVOIR	PondSV1	1	30	0.05374	10.78	5.267	1.83782	2.133	0.314	AC-FT= 3.671
ROUTE MCUNGE	PondSV1Rt	30	1	0.05374	10.78	5.267	1.83771	2.200	0.314	CCODE = 0.2
COMPUTE NM HYD	SV212	-	2	0.08270	163.38	7.522	1.70546	1.600	3.087	PER IMP= 49.00
ROUTE MCUNGE	SV208SUMARt	2	3	0.08270	163.05	7.523	1.70553	1.633	3.081	CCODE = 0.2
ADD HYD	SV208SUMA	1& 3	1	0.13644	170.77	12.790	1.75758	1.633	1.956	
COMPUTE NM HYD	SV208	-	2	0.05371	124.13	4.563	1.59277	1.533	3.611	PER IMP= 41.40
ADD HYD	SV208SUMB	2& 1	1	0.19015	270.25	17.352	1.71103	1.600	2.221	
ADD HYD	SV208SUMC	10& 1	1	0.44040	819.34	37.993	1.61755	1.567	2.907	
ROUTE RESERVOIR	PondSV205	1	30	0.44040	23.46	37.993	1.61755	2.800	0.083	AC-FT= 27.408
ROUTE MCUNGE	SVPOND205Rt	30	10	0.44040	23.45	37.992	1.61752	2.833	0.083	CCODE = 0.2
COMPUTE NM HYD	SV205	-	1	0.04181	95.63	3.479	1.56029	1.533	3.574	PER IMP= 39.20
ROUTE MCUNGE	SVPOND205Rt	1	2	0.04181	95.33	3.478	1.55980	1.567	3.562	CCODE = 0.1
COMPUTE NM HYD	SV209	-	1	0.04749	100.61	3.373	1.33185	1.533	3.310	PER IMP= 23.70
ADD HYD	SV205SUMA	2& 1	1	0.08930	195.07	6.851	1.43856	1.533	3.413	
*S APSV1										
ADD HYD	SV205SUMB	10& 1	1	0.52970	211.51	44.844	1.58735	1.533	0.624	
ROUTE MCUNGE	SVPOND205Rt	1	10	0.52970	210.21	44.844	1.58736	1.567	0.620	CCODE = 0.2
COMPUTE NM HYD	SV210	-	1	0.03230	81.84	3.280	1.90398	1.533	3.959	PER IMP= 62.90

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	SV210Rt	1	2	0.03230	81.44	3.279	1.90318	1.567	3.939	CCODE = 0.1
COMPUTE NM HYD	SV206	-	1	0.02392	65.81	2.792	2.18843	1.533	4.299	PER IMP= 81.80
ROUTE MCUNGE	SV206Rt	1	3	0.02392	65.76	2.789	2.18639	1.567	4.296	CCODE = 0.1
COMPUTE NM HYD	SV211	-	1	0.01797	31.05	1.092	1.13960	1.533	2.699	PER IMP= 23.30
ADD HYD	SV211SUMA	3& 1	1	0.04189	95.00	3.881	1.73732	1.567	3.543	
ADD HYD	SV211SUMB	2& 1	1	0.07419	176.44	7.160	1.80952	1.567	3.716	
ADD HYD	SV211SUMC	10& 1	1	0.60389	386.64	52.004	1.61465	1.567	1.000	
ROUTE RESERVOIR	PondSV3	1	30	0.60389	195.34	52.004	1.61465	1.733	0.505	AC-FT= 7.239
*S RATING CURVE OBTAINED BY 2' LIDAR FOR VOLUME AND CALCULATING OUTFLOW WITH CU										
*S FOR ORFICES AND USING CIPOLETTI WEIR EQUATION FOR SPILLWAY										
*S										
ROUTE MCUNGE	PondSV3Rt	30	10	0.60389	192.07	51.974	1.61372	1.800	0.497	CCODE = 0.1
COMPUTE NM HYD	SV217	-	1	0.02636	63.33	2.411	1.71506	1.533	3.754	PER IMP= 49.65
*S APSV2										
ROUTE MCUNGE	SV217Rt	1	2	0.02636	62.98	2.410	1.71412	1.600	3.733	CCODE = 0.1
COMPUTE NM HYD	SV218	-	1	0.04773	118.49	4.642	1.82356	1.533	3.879	PER IMP= 57.00
ADD HYD	SV218SUMA	2& 1	1	0.07409	174.44	7.052	1.78461	1.533	3.679	
ADD HYD	SV218SUMB	10& 1	1	0.67798	250.24	59.026	1.63240	1.800	0.577	
*S APSV3										
ROUTE MCUNGE	SV218SUMBRT	1	2	0.67798	249.39	59.010	1.63197	1.833	0.575	CCODE = 0.1
COMPUTE NM HYD	SV219	-	1	0.02000	47.91	1.819	1.70546	1.533	3.743	PER IMP= 49.00
ADD HYD	SV219SUM	2& 1	1	0.69798	260.69	60.829	1.63408	1.833	0.584	
*S APSV4										
ROUTE MCUNGE	SV219SUMRT	1	10	0.69798	260.19	60.830	1.63408	1.833	0.582	CCODE = 0.2
COMPUTE NM HYD	SV214	-	1	0.05386	129.00	4.899	1.70546	1.533	3.742	PER IMP= 49.00
ROUTE RESERVOIR	PondSV4	1	30	0.05386	98.64	4.899	1.70545	1.600	2.862	AC-FT= 1.329
*s ****DIVIDE 42.2 CFS TO 24" PIPE AND REMAINING TO 54" SURGE PIPE										
DIVIDE HYD	PONDSV4RT1	30	1	0.04347	42.20	3.954	1.70545	1.533	1.517	
	PONDSV4RT2	and	2	0.01039	56.44	0.945	1.70545	1.600	8.488	
ROUTE MCUNGE	PondSV4Rt1	1	5	0.04347	42.20	3.951	1.70418	1.600	1.517	CCODE = 0.1
ROUTE MCUNGE	PondSV4Rt2	2	4	0.01039	55.83	0.948	1.71012	1.600	8.396	CCODE = 0.2
COMPUTE NM HYD	SV213	-	2	0.02147	51.43	1.953	1.70546	1.533	3.743	PER IMP= 49.00
ADD HYD	SV213SUM	2& 4	1	0.03186	97.77	2.900	1.70695	1.600	4.795	
ROUTE MCUNGE	SV213SUMRt	1	2	0.03186	96.48	2.897	1.70482	1.633	4.732	CCODE = 0.1
ADD HYD	SV215SUMA	5& 2	1	0.07533	138.68	6.848	1.70444	1.633	2.877	
COMPUTE NM HYD	SV215	-	2	0.01573	37.69	1.431	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	SV215SUMB	1& 2	1	0.09106	164.67	8.279	1.70461	1.633	2.826	
*S APSV5										
ROUTE MCUNGE	SV115SUMBRT	1	20	0.09106	162.68	8.274	1.70367	1.700	2.791	CCODE = 0.1
COMPUTE NM HYD	SV216	-	1	0.02254	53.99	2.050	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	SV216RT	1	2	0.02254	53.54	2.049	1.70409	1.633	3.712	CCODE = 0.1
COMPUTE NM HYD	SV220	-	1	0.02887	69.15	2.626	1.70546	1.533	3.743	PER IMP= 49.00
ADD HYD	SV220SUM	2& 1	1	0.05141	112.21	4.674	1.70484	1.567	3.410	
ROUTE MCUNGE	SV120RT	1	2	0.05141	111.74	4.674	1.70484	1.600	3.396	CCODE = 0.2
ADD HYD	SV221SUMA	20& 2	1	0.14247	245.70	12.948	1.70408	1.667	2.695	
COMPUTE NM HYD	SV221	-	2	0.04057	92.33	3.462	1.59997	1.533	3.556	PER IMP= 44.10
ADD HYD	SV221SUMB	1& 2	1	0.18304	308.27	16.410	1.68100	1.600	2.632	
ADD HYD	SV221SUMC	10& 1	1	0.88102	526.82	77.240	1.64383	1.600	0.934	
*S APSV6										
ROUTE MCUNGE	SV221SUMBRT	1	2	0.88102	523.83	77.226	1.64353	1.633	0.929	CCODE = 0.1
COMPUTE NM HYD	SV222	-	1	0.03288	83.30	3.318	1.89225	1.533	3.958	PER IMP= 61.66
ROUTE MCUNGE	SV222RT	1	3	0.03288	82.10	3.310	1.88769	1.567	3.902	CCODE = 0.1

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	SV222SUM	2& 3	10	0.91390	597.76	80.536	1.65231	1.600	1.022	
*S APSV7										
COMPUTE NM HYD	SV223	-	1	0.01602	38.38	1.457	1.70546	1.533	3.744	PER IMP= 49.00
ROUTE RESERVOIR	PondSV5	1	30	0.01602	14.58	1.457	1.70544	1.733	1.422	AC-FT= 0.584
ROUTE MCUNGE	PondSV5RT	30	1	0.01602	14.58	1.457	1.70543	1.733	1.422	CCODE = 0.2
COMPUTE NM HYD	SV224	-	2	0.05671	135.82	5.158	1.70546	1.533	3.742	PER IMP= 49.00
ADD HYD	SV224SUM	1& 2	1	0.07273	147.08	6.615	1.70544	1.533	3.160	
ROUTE RESERVOIR	PondSV6	1	30	0.07273	36.93	6.615	1.70544	1.900	0.793	AC-FT= 2.936
ROUTE MCUNGE	PondSV6RT	30	1	0.07273	36.93	6.615	1.70544	1.933	0.793	CCODE = 0.2
COMPUTE NM HYD	SV225	-	2	0.02569	62.28	2.390	1.74455	1.533	3.788	PER IMP= 51.65
ADD HYD	SV225SUM	1& 2	1	0.09842	90.23	9.006	1.71564	1.533	1.432	
ROUTE RESERVOIR	PondSV7	1	30	0.09842	29.75	9.006	1.71564	2.800	0.472	AC-FT= 2.936
ROUTE MCUNGE	PondSV7RT	30	1	0.09842	29.75	9.006	1.71565	2.833	0.472	CCODE = 0.2
COMPUTE NM HYD	SV226	-	2	0.03966	94.99	3.607	1.70546	1.533	3.742	PER IMP= 49.00
COMPUTE NM HYD	SV227	-	3	0.01936	44.85	1.653	1.60089	1.533	3.620	PER IMP= 42.00
ADD HYD	SV227SUMA	2& 3	2	0.05902	139.85	5.260	1.67115	1.533	3.702	
ADD HYD	SV227SUMB	1& 2	1	0.15744	158.05	14.266	1.69896	1.533	1.569	
*S APSV8										
ROUTE MCUNGE	SV227SUMBRT	1	2	0.15744	155.98	14.258	1.69807	1.600	1.548	CCODE = 0.1
COMPUTE NM HYD	SV228	-	1	0.03522	99.89	4.316	2.29751	1.500	4.431	PER IMP= 89.19
ADD HYD	SV228SUM	2& 1	1	0.19266	247.95	18.574	1.80765	1.567	2.011	
ROUTE RESERVOIR	PondSV8	1	30	0.19266	215.51	18.574	1.80765	1.633	1.748	AC-FT= 3.553
ADD HYD	PondSV8SUM	10&30	1	1.10656	808.88	99.110	1.67935	1.633	1.142	
*S APSV9										
ROUTE MCUNGE	PondSV8SUMRT	1	2	1.10656	795.54	99.088	1.67900	1.667	1.123	CCODE = 0.1
COMPUTE NM HYD	SV238	-	1	0.04738	109.75	4.045	1.60089	1.533	3.619	PER IMP= 42.00
ROUTE MCUNGE	SV238RT	1	3	0.04738	109.17	4.044	1.60018	1.567	3.600	CCODE = 0.1
ADD HYD	SV239SUMA	2& 3	1	1.15394	870.55	103.132	1.67576	1.667	1.179	
COMPUTE NM HYD	SV239	-	2	0.03445	81.29	3.048	1.65914	1.533	3.687	PER IMP= 45.95
ADD HYD	SV239SUMB	1& 2	10	1.18839	917.04	106.180	1.67528	1.667	1.206	
*S APSV10										
COMPUTE NM HYD	SV232	-	1	0.01563	38.81	1.520	1.82355	1.533	3.880	PER IMP= 57.00
ROUTE MCUNGE	SV232SUMRT	1	2	0.01563	38.61	1.521	1.82425	1.633	3.860	CCODE = 0.2
*S										
*S From Drainage Study for the Timarron W. Subdivision										
*S Unit 5 only 26.6 cfs was supposed to be released to El Moro.										
*S Analysis diverts Sub-basin SV129, SV130, and SV131 S. to Amole.										
*S These sub-basins suppose to discharge to El Moro via pipe.										
*S										
COMPUTE NM HYD	SV233	-	1	0.03867	89.58	3.302	1.60089	1.533	3.619	PER IMP= 42.00
COMPUTE NM HYD	SV234	-	3	0.01925	44.60	1.644	1.60089	1.533	3.620	PER IMP= 42.00
ADD HYD	SV234SUMA	1& 3	1	0.05792	134.18	4.945	1.60088	1.533	3.620	
ADD HYD	SV234SUMB	1& 2	1	0.07355	165.48	6.466	1.64834	1.533	3.515	
*S APSV11										
ROUTE MCUNGE	SV234SUMBRT	1	20	0.07355	164.10	6.466	1.64837	1.533	3.486	CCODE = 0.2
COMPUTE NM HYD	SV235	-	1	0.01963	45.48	1.676	1.60089	1.533	3.620	PER IMP= 42.00
ROUTE MCUNGE	SV235RT	1	2	0.01963	45.00	1.673	1.59830	1.600	3.582	CCODE = 0.1
COMPUTE NM HYD	SV236	-	1	0.03000	59.07	2.095	1.30926	1.533	3.076	PER IMP= 29.07
ADD HYD	SV236SUM	2& 1	1	0.04963	96.08	3.768	1.42357	1.567	3.025	
*S										
*S ****DIVIDE Hyd SV136SUM by Half. Half of flow turns SW down Del Rey Road										
*S ****Flow diverted to Del Rey Road (SV136SUM2) is added in Amole Basin										
*S										

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                              FROM  TO                   PEAK      RUNOFF              TIME TO   CFS      PAGE =  11
                 HYDROGRAPH    ID   ID       AREA      DISCHARGE   VOLUME     RUNOFF     PEAK    PER
COMMAND        IDENTIFICATION  NO.  NO.    (SQ MI)      (CFS)      (AC-FT)   (INCHES)  (HOURS)   ACRE      NOTATION

DIVIDE HYD          SV136DIV1   1    3     0.02482      48.04       1.884    1.42357    1.567    3.025
                    SV136DIV2  and  48     0.02481      48.04       1.884    1.42357    1.567    3.025
ROUTE MCUNGE      SV236SUM1RT   3    1     0.02482      47.86       1.884    1.42375    1.600    3.014 CCODE =     0.2
ADD HYD             SV237SUMA 20& 1  1     0.09837     210.99       8.350    1.59170    1.567    3.352
COMPUTE NM HYD          SV237   -    2     0.03272      77.17       2.893    1.65779    1.533    3.685 PER IMP=  45.85
ADD HYD             SV237SUMB 1& 2   1     0.13109     284.73      11.243    1.60819    1.533    3.394
*S APSV12
ROUTE MCUNGE      SV237SUMBRT   1    2     0.13109     284.55      11.237    1.60734    1.567    3.392 CCODE =     0.1
COMPUTE NM HYD          SV240   -    1     0.04727     109.49       4.036    1.60089    1.533    3.619 PER IMP=  42.00
ADD HYD              SV240SUM 2& 1   1     0.17836     386.55      15.273    1.60563    1.567    3.386
*S APSV13
ROUTE MCUNGE       SV240sumRT   1    2     0.17836     385.67      15.278    1.60614    1.567    3.379 CCODE =     0.2
COMPUTE NM HYD          SV241   -    1     0.04160      96.36       3.552    1.60089    1.533    3.619 PER IMP=  42.00
ADD HYD              SV241SUM 2& 1   1     0.21996     475.43      18.830    1.60514    1.567    3.377
*S APSV14
ROUTE MCUNGE       SV241SUMRT   1    2     0.21996     475.19      18.829    1.60511    1.567    3.376 CCODE =     0.2
ADD HYD             SV243SUMA 10& 2 10     1.40835    1295.82     125.010    1.66432    1.667    1.438
*S APSV15
COMPUTE NM HYD          SV242   -    1     0.08119     180.79       8.674    2.00317    1.567    3.479 PER IMP=  70.13
*S APSV16
ROUTE MCUNGE          SV242RT   1    2     0.08119     180.38       8.668    2.00188    1.600    3.471 CCODE =     0.2
COMPUTE NM HYD          SV243   -    1     0.02884      80.26       3.430    2.22977    1.500    4.348 PER IMP=  84.60
ADD HYD             SV243SUMB 1& 2   1     0.11003     245.97      12.098    2.06160    1.567    3.493
*S APSV17
ROUTE MCUNGE      SV243SUMBRT   1    2     0.11003     246.02      12.091    2.06042    1.600    3.494 CCODE =     0.2
ADD HYD             SV243SUMC 10& 2  1     1.51838    1514.48     137.101    1.69302    1.667    1.558
COMPUTE NM HYD          SV244   -    2     0.02736      63.15       2.603    1.78376    1.533    3.607 PER IMP=  54.35
ADD HYD              SV244SUM 1& 2   1     1.54574    1558.48     139.704    1.69463    1.633    1.575
*S APSV18
ROUTE MCUNGE          SVBASIN   1   47     1.54574    1558.48     139.704    1.69463    1.633    1.575 CCODE =     0.0
*S*************************************************************************
*S*******   END OF SNOW VISTA BASIN
*S*************************************************************************
*S*************************************************************************
*S*******   AMOLE BASIN
*S*************************************************************************
*S
*S RECALL HYD Below From ORIGINAL DMP AHYMO Files under
*S Folder EX Amole Hubbell Basins File WGEXIST.PUN
*S Offsite flows from Westgate Dam flow into the Amole Basin
*S
RECALL HYD              WGDAM   -   70    18.68360      73.15     167.311    0.16791   11.250    0.006
*S
*S END of RECALL HYD
*S
ROUTE MCUNGE        PLBASINRT  46    2     1.23801     287.41      76.085    1.15232    3.100    0.363 CCODE =     0.0
DIVIDE HYD           ADIVSUMA  70    1    18.67907      73.00     167.271    0.16791    9.150    0.006
                     ADIVSUMB  and  91     0.00453       0.15       0.041    0.16792   11.250    0.051
ROUTE MCUNGE       ADIVSUMART   1    3    18.67907      73.00     167.271    0.16791    9.150    0.006 CCODE =     0.0
*S APA1
ADD HYD              A201SUMA 3& 2   1    19.91708     352.16     243.188    0.22894    3.100    0.028
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                              FROM  TO                   PEAK      RUNOFF              TIME TO   CFS      PAGE =  12
                 HYDROGRAPH    ID   ID       AREA      DISCHARGE   VOLUME     RUNOFF     PEAK    PER
COMMAND        IDENTIFICATION  NO.  NO.    (SQ MI)      (CFS)      (AC-FT)   (INCHES)  (HOURS)   ACRE      NOTATION

COMPUTE NM HYD           A201   -    2     0.07236     122.09       4.373    1.13307    1.533    2.636 PER IMP=  21.72
ADD HYD              A201SUMB 1& 2   1    19.98944     353.26     247.561    0.23221    3.100    0.028
*S APA2
ROUTE MCUNGE       A201SUMBRt   1   10    19.98944     353.26     247.561    0.23221    3.100    0.028 CCODE =     0.0
COMPUTE NM HYD          SV229   -    1     0.02916      69.85       2.652    1.70546    1.533    3.743 PER IMP=  49.00
COMPUTE NM HYD          SV230   -    2     0.01824      45.29       1.774    1.82355    1.533    3.880 PER IMP=  57.00
ADD HYD              SV230SUM 1& 2   1     0.04740     115.14       4.426    1.75089    1.533    3.795
ROUTE RESERVOIR      PondSV10   1   30     0.04740      55.05       4.426    1.75089    1.700    1.815 AC-FT=    1.734
ROUTE MCUNGE       SV230SUMRT  30    1     0.04740      54.85       4.419    1.74802    1.766    1.808 CCODE =     0.2
COMPUTE NM HYD         A202.1   -    2     0.05920      60.67       3.969    1.25702    1.733    1.601 PER IMP=  28.49
ADD HYD           SV202.1SUMA 2& 1   1     0.10660     114.85       8.388    1.47534    1.733    1.683
ROUTE MCUNGE     A202.1SUMARt   1    2     0.10660     114.85       8.388    1.47534    1.733    1.683 CCODE =     0.0
ADD HYD           A202.1SUMB 10& 2   1    20.09604     402.82     255.949    0.23881    1.567    0.031
COMPUTE NM HYD         A202.2   -    2     0.02663      53.58       1.938    1.36468    1.533    3.144 PER IMP=  32.70
ADD HYD            A202.2SUM 1& 2    1    20.12267     455.77     257.887    0.24030    1.533    0.035
*S APA3
ROUTE MCUNGE      A202.2SUMRt   1    2    20.12267     455.75     257.882    0.24029    1.633    0.035 CCODE =     0.2
COMPUTE NM HYD           A206   -    1     0.03109      74.47       2.828    1.70546    1.533    3.743 PER IMP=  49.00
ROUTE MCUNGE           A206Rt   1    3     0.03109      73.94       2.824    1.70334    1.533    3.716 CCODE =     0.1
ADD HYD               A206SUM 2& 3  10    20.15376     517.33     260.707    0.24255    1.600    0.040
ROUTE MCUNGE      SV236SUM2Rt  48    1     0.02481      47.91       1.883    1.42270    1.633    3.017 CCODE =     0.1
*S APA4
COMPUTE NM HYD           A203   -    2     0.06206     143.75       5.299    1.60089    1.533    3.619 PER IMP=  42.00
ROUTE MCUNGE           A203Rt   2    3     0.06206     142.23       5.290    1.59827    1.600    3.581 CCODE =     0.1
ADD HYD              A204SUMA 3& 1   2     0.08687     189.27       7.173    1.54810    1.633    3.404
COMPUTE NM HYD           A204   -    1     0.03430      78.99       2.908    1.58949    1.533    3.598 PER IMP=  41.50
ADD HYD              A204SUMB 2& 1   1     0.12118     252.56      10.081    1.55982    1.600    3.257
ROUTE MCUNGE       A204SumBRt   1    2     0.12118     251.47      10.080    1.55974    1.633    3.243 CCODE =     0.2
COMPUTE NM HYD           A205   -    1     0.02852      61.77       2.435    1.60089    1.533    3.384 PER IMP=  42.00
ADD HYD               A205Sum 2& 1   1     0.14970     305.30      12.515    1.56758    1.600    3.187
*S APA5
ROUTE MCUNGE          A205SumRt   1  2     0.14970     305.28      12.516    1.56773    1.633    3.186 CCODE =     0.2
ADD HYD              A207SUMA 10& 2  1    20.30345     819.61     273.223    0.25232    1.633    0.063
COMPUTE NM HYD           A207   -    2     0.04014      60.01       1.945    0.90836    1.533    2.336 PER IMP=  10.71
ADD HYD              A207SUMB 1& 2   1    20.34359     868.78     275.168    0.25361    1.600    0.067
*S APA6
ROUTE MCUNGE       A207SUMBRT   1    2    20.34359     867.19     275.163    0.25361    1.633    0.067 CCODE =     0.2
COMPUTE NM HYD           A208   -    1     0.06723     164.52       6.375    1.77804    1.533    3.824 PER IMP=  54.00
ADD HYD              A208SUMA 47& 1  1     1.61297    1686.85     146.079    1.69810    1.600    1.634
ADD HYD              A208SUMB 2& 1   1    21.95656    2538.88     421.242    0.35972    1.633    0.181
ROUTE MCUNGE       A208SUMBRt   1    2    21.95656    2533.06     421.237    0.35972    1.667    0.180 CCODE =     0.2
COMPUTE NM HYD           A209   -    1     0.01282      18.08       0.571    0.83568    1.533    2.203 PER IMP=   7.30
ROUTE MCUNGE           A209Rt   1    3     0.01282      17.37       0.566    0.82788    1.900    2.116 CCODE =     0.1
COMPUTE NM HYD           A210   -    1     0.04365     111.71       4.491    1.92914    1.533    3.999 PER IMP=  64.24
ADD HYD              A210SUMA 3& 1   1     0.05647     112.03       5.057    1.67912    1.533    3.100
ADD HYD              A210SUMB 2& 1   1    22.01303    2601.00     426.294    0.36310    1.633    0.185
*S APA7
ROUTE MCUNGE       A210SUMBRT   1    2    22.01303    2575.77     426.171    0.36300    1.667    0.183 CCODE =     0.1
COMPUTE NM HYD           A211   -    1     0.06511     165.76       6.637    1.91115    1.533    3.978 PER IMP=  63.00
*S APA8
ROUTE MCUNGE           A211Rt   1    3     0.06511     164.68       6.623    1.90740    1.567    3.952 CCODE =     0.1
COMPUTE NM HYD           A212   -    1     0.06224     174.78       7.656    2.30653    1.533    4.388 PER IMP=  89.80
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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	A212SUMA	3& 1	1	0.12735	328.91	14.280	2.10246	1.567	4.036	
ADD HYD	A212SUMB	2& 1	1	22.14038	2806.84	440.451	0.37300	1.667	0.198	
*S APA9										
ROUTE MCUNGE	A212SUMBRT	1	10	22.14038	2796.09	440.460	0.37301	1.667	0.197	CCODE = 0.2
COMPUTE NM HYD	A214	-	1	0.02567	61.49	2.335	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	A214RT	1	2	0.02567	61.05	2.333	1.70423	1.633	3.716	CCODE = 0.1
COMPUTE NM HYD	A215	-	1	0.07926	191.61	7.261	1.71772	1.533	3.777	PER IMP= 49.00
ADD HYD	A215SUM	2& 1	1	0.10493	233.66	9.594	1.71441	1.533	3.479	
*S APA10										
ROUTE MCUNGE	A215SUMRt	1	2	0.10493	220.08	9.490	1.69570	1.600	3.277	CCODE = 0.2
COMPUTE NM HYD	A216	-	1	0.00913	21.87	0.830	1.70410	1.533	3.743	PER IMP= 48.90
ROUTE MCUNGE	A216Rt	1	3	0.00913	21.60	0.827	1.69876	1.633	3.696	CCODE = 0.1
COMPUTE NM HYD	A217	-	1	0.05761	133.19	4.615	1.50215	1.533	3.613	PER IMP= 31.10
ADD HYD	A117SUMA	3& 1	1	0.06674	144.72	5.443	1.52903	1.533	3.388	
ADD HYD	A217SUMB	1& 2	1	0.17167	360.59	14.932	1.63091	1.567	3.282	
ROUTE MCUNGE	A217SUMBRt	1	2	0.17167	329.24	14.600	1.59467	1.633	2.997	CCODE = 0.2
COMPUTE NM HYD	A218	-	1	0.05592	128.79	4.429	1.48500	1.533	3.599	PER IMP= 29.70
ADD HYD	A218SUMA	2& 1	1	0.22759	428.67	19.029	1.56772	1.600	2.943	
*S ****DIVIDE 235 CFS through 54" pipe and remaining to Surge Pond										
DIVIDE HYD	A218SUMB	1	1	0.18179	235.00	15.200	1.56772	1.433	2.020	
	A218SUMC	and	2	0.04580	193.67	3.830	1.56772	1.600	6.607	
ROUTE RESERVOIR	PondA1	2	30	0.04580	0.30	2.218	0.90789	1.800	0.010	AC-FT= 3.825
ADD HYD	A218SUMD	1&30	1	0.22759	235.29	17.417	1.43493	1.766	1.615	
*S APA11										
ROUTE MCUNGE	A218SUMDRt	1	2	0.22759	234.95	17.122	1.41064	1.766	1.613	CCODE = 0.2
COMPUTE NM HYD	A219	-	1	0.06433	159.68	6.256	1.82356	1.533	3.879	PER IMP= 57.00
ADD HYD	A219SUM	2& 1	1	0.29192	383.01	23.379	1.50163	1.533	2.050	
ROUTE MCUNGE	A219SUMRt	1	2	0.29192	352.54	23.062	1.48130	1.633	1.887	CCODE = 0.2
COMPUTE NM HYD	A220	-	1	0.03619	89.59	3.514	1.82035	1.533	3.868	PER IMP= 57.03
ADD HYD	A220SUM	2& 1	1	0.32811	423.01	26.576	1.51869	1.600	2.014	
*S APA12										
ROUTE MCUNGE	A220SUMRt	1	2	0.32811	396.63	26.125	1.49292	1.667	1.889	CCODE = 0.2
COMPUTE NM HYD	A221	-	1	0.04187	118.26	5.098	2.28291	1.500	4.413	PER IMP= 88.20
ADD HYD	A221SUM	2& 1	1	0.36998	468.86	31.223	1.58232	1.633	1.980	
ROUTE MCUNGE	A221SUMRt	1	2	0.36998	446.04	30.570	1.54926	1.733	1.884	CCODE = 0.2
COMPUTE NM HYD	A222	-	1	0.04520	128.19	5.539	2.29752	1.500	4.431	PER IMP= 89.19
ADD HYD	A222SUM	2& 1	1	0.41518	505.15	36.109	1.63072	1.667	1.901	
ADD HYD	A223SUMA	10& 1	1	22.55556	3301.24	476.569	0.39616	1.667	0.229	
COMPUTE NM HYD	A223	-	2	0.02061	57.77	2.479	2.25499	1.500	4.380	PER IMP= 86.30
ADD HYD	A223SUMB	2& 1	1	22.57617	3333.91	479.048	0.39786	1.667	0.231	
*S APA13										
ROUTE MCUNGE	A223SUMBRT	1	10	22.57617	3319.18	478.885	0.39772	1.733	0.230	CCODE = 0.1
COMPUTE NM HYD	A224	-	1	0.02007	48.08	1.826	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	A224RT	1	2	0.02007	47.67	1.824	1.70410	1.633	3.711	CCODE = 0.1
COMPUTE NM HYD	A225	-	1	0.04681	119.33	4.782	1.91545	1.533	3.983	PER IMP= 63.30
ADD HYD	A225SUMA	2& 1	1	0.06688	153.28	6.606	1.85202	1.567	3.581	
ROUTE MCUNGE	A225SUMBRT	1	2	0.06688	153.16	6.606	1.85193	1.567	3.578	CCODE = 0.2
ADD HYD	A225SUMB	10& 2	10	22.64305	3413.00	485.491	0.40202	1.733	0.236	
*S APA15										
COMPUTE NM HYD	A226	-	1	0.04817	122.90	4.929	1.91841	1.533	3.987	PER IMP= 63.50
ROUTE MCUNGE	A226Rt	1	2	0.04817	119.56	4.909	1.91085	1.600	3.878	CCODE = 0.1
COMPUTE NM HYD	A227	-	1	0.04342	104.57	4.474	1.93209	1.533	3.763	PER IMP= 64.44

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	A227SUM	2& 1	1	0.09159	221.03	9.383	1.92091	1.567	3.771	
COMPUTE NM HYD	A228	-	2	0.06983	167.59	6.379	1.71271	1.533	3.750	PER IMP= 49.50
ADD HYD	A228SUM	1& 2	1	0.16142	376.88	15.762	1.83084	1.567	3.648	
*S APA14										
ROUTE MCUNGE	A228SUMRt	1	2	0.16142	281.42	14.819	1.72129	1.667	2.724	CCODE = 0.2
COMPUTE NM HYD	A229	-	1	0.01395	33.43	1.269	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	A229SUM	1& 2	1	0.17537	300.52	16.088	1.72003	1.667	2.678	
ROUTE MCUNGE	A229SUMRT	1	2	0.17537	300.11	16.089	1.72019	1.667	2.674	CCODE = 0.2
COMPUTE NM HYD	A230	-	1	0.04312	112.97	4.625	2.01129	1.533	4.094	PER IMP= 69.80
ADD HYD	A230SUM	1& 2	1	0.21849	374.61	20.714	1.77764	1.633	2.679	
COMPUTE NM HYD	A231	-	2	0.01188	30.23	1.209	1.90795	1.533	3.976	PER IMP= 62.80
ADD HYD	A231SUMA	1& 2	1	0.23037	396.03	21.923	1.78435	1.600	2.686	
ROUTE MCUNGE	A231SUMCRt	1	2	0.23037	361.65	21.278	1.73187	1.700	2.453	CCODE = 0.2
ADD HYD	A231SUMB	10& 2	1	22.87342	3769.13	506.770	0.41541	1.733	0.257	
ROUTE MCUNGE	A231SUMBRt	1	10	22.87342	3365.62	506.647	0.41531	1.800	0.230	CCODE = 0.2
COMPUTE NM HYD	A232	-	1	0.06536	171.36	7.021	2.01424	1.533	4.096	PER IMP= 70.00
ROUTE MCUNGE	A232RT	1	2	0.06536	166.32	6.985	2.00394	1.766	3.976	CCODE = 0.1
COMPUTE NM HYD	A233	-	1	0.11362	245.20	12.206	2.01424	1.600	3.372	PER IMP= 70.00
ADD HYD	A233SUM	2& 1	1	0.17898	338.06	19.191	2.01047	1.700	2.951	
*S APA16										
ROUTE MCUNGE	A233SUMRT	1	2	0.17898	333.43	19.167	2.00790	1.733	2.911	CCODE = 0.1
ADD HYD	A234SUMA	10& 2	1	23.05240	3683.53	525.814	0.42768	1.800	0.250	
COMPUTE NM HYD	A234	-	2	0.03607	89.40	3.501	1.82001	1.533	3.873	PER IMP= 56.84
ADD HYD	A234SUMB	1& 2	1	23.08847	3708.74	529.315	0.42985	1.800	0.251	
COMPUTE NM HYD	A235	-	2	0.08192	194.03	7.857	1.79834	1.533	3.701	PER IMP= 55.30
ADD HYD	A235SUM	1& 2	1	23.17039	3775.20	537.172	0.43469	1.766	0.255	
*S APA17										
ROUTE MCUNGE	ABASIN	1	49	23.17039	3756.56	537.026	0.43457	1.833	0.253	CCODE = 0.1
*S***										
*S******* END OF AMOLE BASIN										
*S***										
*S***										
*S******* SOUTH AMOLE BASIN										
*S***										
COMPUTE NM HYD	SA202	-	1	0.03705	95.83	3.882	1.96478	1.533	4.041	PER IMP= 66.60
ROUTE MCUNGE	SA202Rt	1	2	0.03705	95.11	3.874	1.96028	1.567	4.011	CCODE = 0.1
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA204	-	1	0.02776	66.16	2.501	1.68909	1.533	3.724	PER IMP= 47.90
ROUTE RESERVOIR	PONDSA1	1	30	0.02776	6.49	2.501	1.68908	2.066	0.365	AC-FT= 1.754
ROUTE MCUNGE	PondSA1Rt	30	1	0.02776	6.49	2.500	1.68876	2.100	0.365	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
ADD HYD	SA203SUMA	2& 1	1	0.06481	97.85	6.374	1.84397	1.567	2.359	
COMPUTE NM HYD	SA203	-	2	0.02384	55.23	2.035	1.60089	1.533	3.620	PER IMP= 42.00
ADD HYD	SA203SUMB	1& 2	1	0.08865	149.30	8.409	1.77859	1.567	2.631	
*S APSA1										
ROUTE MCUNGE	SA203SUMBRt	1	2	0.08865	148.74	8.407	1.77823	1.567	2.622	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA205	-	1	0.07789	154.79	6.232	1.50027	1.567	3.105	PER IMP= 38.20
ADD HYD	SA205SUM	2& 1	1	0.16654	303.53	14.640	1.64822	1.567	2.848	
*S APSA2										
ROUTE MCUNGE	SA205SUMRt	1	2	0.16654	300.99	14.637	1.64789	1.600	2.824	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										

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                            FROM  TO                   PEAK       RUNOFF                TIME TO   CFS      PAGE =  15
               HYDROGRAPH    ID   ID        AREA     DISCHARGE    VOLUME      RUNOFF     PEAK     PER
COMMAND      IDENTIFICATION  NO.  NO.     (SQ MI)      (CFS)      (AC-FT)    (INCHES)  (HOURS)    ACRE      NOTATION

COMPUTE NM HYD        SA206   -    1      0.04163     101.98       3.950     1.77927    1.533     3.828 PER IMP=  54.00
ADD HYD            SA206SUM  2& 1  1      0.20817     393.55      18.587     1.67416    1.567     2.954
ROUTE MCUNGE     SA206SUMRT   1   10      0.20817     390.58      18.587     1.67413    1.567     2.932 CCODE =     0.2
*S  Increased Pipe Size to Allow Extended Storm System
COMPUTE NM HYD        SA207   -    1      0.01910      48.84       1.962     1.92566    1.533     3.996 PER IMP=  64.00
ROUTE MCUNGE        SA207RT   1    2      0.01910      48.62       1.961     1.92477    1.533     3.977 CCODE =     0.1
COMPUTE NM HYD        SA208   -    1      0.03950     106.90       4.608     2.18735    1.533     4.229 PER IMP=  81.72
ADD HYD            SA208SUM  2& 1  1      0.05860     155.52       6.569     2.10175    1.533     4.147
*S APSA3
ROUTE MCUNGE     SA208SUMRT   1    2      0.05860     140.28       6.463     2.06785    1.567     3.741 CCODE =     0.2
ADD HYD          SA213SUMA 10& 2  10      0.26677     530.87      25.050     1.76061    1.567     3.109
COMPUTE NM HYD        SA209   -    1      0.03817      98.39       4.701     2.30949    1.567     4.027 PER IMP=  90.00
ROUTE MCUNGE        SA209RT   1    2      0.03817      97.29       4.698     2.30781    1.600     3.983 CCODE =     0.1
COMPUTE NM HYD        SA210   -    1      0.05112     131.15       5.863     2.15027    1.533     4.009 PER IMP=  81.18
ADD HYD            SA210SUM  2& 1  1      0.08929     223.96      10.561     2.21761    1.567     3.919
*S APSA4
ROUTE MCUNGE     SA210SUMRT   1    2      0.08929     222.93      10.559     2.21722    1.567     3.901 CCODE =     0.2
COMPUTE NM HYD        SA211   -    1      0.02232      49.88       1.867     1.56858    1.533     3.492 PER IMP=  43.00
COMPUTE NM HYD        SA212   -    3      0.06692     145.65       6.184     1.73266    1.567     3.401 PER IMP=  50.85
ADD HYD           SA212SUMA  1& 3  1      0.08924     192.83       8.051     1.69161    1.533     3.376
ADD HYD           SA212SUMB  2& 1  1      0.17853     415.11      18.610     1.95449    1.567     3.633
*S APSA5
ROUTE MCUNGE    SA212SUMBRT   1    2      0.17853     410.49      18.597     1.95319    1.600     3.593 CCODE =     0.2
ADD HYD          SA213SUMB 10& 2   1      0.44530     938.85      43.647     1.83782    1.567     3.294
COMPUTE NM HYD        SA213   -    2      0.06061     136.03       5.280     1.63324    1.533     3.507 PER IMP=  46.75
ADD HYD           SA213SUMC  1& 2  1      0.50591    1068.40      48.926     1.81331    1.567     3.300
ROUTE RESERVOIR     PONDSA2   1   30      0.50591     412.78      48.926     1.81331    1.833     1.275 AC-FT=   19.074
*S  PondSA2 is undersized with the 48" RCP as an outlet.
*S  Runoff will overflow on Arenal.  Added Elev. 5031' to route combined
*S  Overflow and pipe flow to Amole del Norte.
*S  Increasing Outlet in Proposed has allowed entire flow to be carried to chann
*S  Increased to Prevent Overtopping to Double-60" RCP.
ROUTE MCUNGE      PONDSA2RT  30   10      0.50591     412.60      48.900     1.81232    1.866     1.274 CCODE =     0.1
ROUTE MCUNGE      TSBASINRT  45    1      4.97175    1656.83     475.230     1.79224    1.766     0.521 CCODE =     0.2
COMPUTE NM HYD        SA201   -    2      0.16721     309.58      16.338     1.83203    1.633     2.893 PER IMP=  58.76
ADD HYD            SA201SUM  1& 2  1      5.13896    1908.91     491.568     1.79353    1.733     0.580
ADD HYD          SA214SUMA 10& 1   1      5.64487    2305.74     540.468     1.79522    1.733     0.638
*S APSA6
ROUTE MCUNGE    SA214SUMART   1    2      5.64487    2305.74     540.468     1.79522    1.733     0.638 CCODE =     0.0
COMPUTE NM HYD        SA214   -    1      0.06684     123.59       6.676     1.87267    1.633     2.889 PER IMP=  60.86
ADD HYD           SA214SUMB  2& 1  1      5.71171    2412.65     547.143     1.79612    1.733     0.660
ROUTE MCUNGE    SA214SUMBRT   1    2      5.71171    2412.65     547.143     1.79612    1.733     0.660 CCODE =     0.0
COMPUTE NM HYD        SA215   -    1      0.05396     112.89       5.292     1.83876    1.567     3.269 PER IMP=  59.00
ADD HYD            SA215SUM  2& 1  1      5.76567    2490.38     552.435     1.79652    1.700     0.675
ROUTE MCUNGE     SA215SUMRT   1    2      5.76567    2490.78     552.433     1.79652    1.733     0.675 CCODE =     0.2
COMPUTE NM HYD        SA216   -    1      0.13141     263.18      12.990     1.85342    1.600     3.129 PER IMP=  59.54
ADD HYD            SA216SUM  2& 1  1      5.89708    2701.48     565.423     1.79778    1.700     0.716
*S APSA7
ROUTE MCUNGE     SA216SUMRT   1   20      5.89708    2697.01     565.419     1.79777    1.700     0.715 CCODE =     0.2
COMPUTE NM HYD        SA218   -    1      0.03281      78.87       3.008     1.71899    1.533     3.756 PER IMP=  50.00
COMPUTE NM HYD        SA219   -    2      0.01224      29.09       1.098     1.68139    1.533     3.714 PER IMP=  47.45
ADD HYD            SA219SUM  1& 2  1      0.04505     107.97       4.106     1.70876    1.533     3.745
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                            FROM  TO                   PEAK       RUNOFF                TIME TO   CFS      PAGE =  16
               HYDROGRAPH    ID   ID        AREA     DISCHARGE    VOLUME      RUNOFF     PEAK     PER
COMMAND      IDENTIFICATION  NO.  NO.     (SQ MI)      (CFS)      (AC-FT)    (INCHES)  (HOURS)    ACRE      NOTATION

ROUTE MCUNGE     SA219SUMRT   1    2      0.04505     107.41       4.104     1.70806    1.533     3.725 CCODE =     0.2
*S  Extended Storm System to Avoid Excess Street Flow
COMPUTE NM HYD        SA220   -    1      0.06240     159.66       7.686     2.30948    1.567     3.998 PER IMP=  90.00
ADD HYD            SA220SUM  2& 1  1      0.10745     266.80      11.790     2.05732    1.567     3.880
ROUTE MCUNGE     SA220SUMRT   1    2      0.10745     232.43      11.478     2.00284    1.600     3.380 CCODE =     0.2
*S  Extended Storm System to Avoid Excess Street Flow
COMPUTE NM HYD        SA221   -    1      0.00802      21.53       0.919     2.14876    1.533     4.195 PER IMP=  81.10
ADD HYD            SA221SUM  2& 1  1      0.11547     249.80      12.397     2.01297    1.600     3.380
*S APSA8
ROUTE MCUNGE     SA221SUMRT   1    2      0.11547     249.12      12.393     2.01230    1.633     3.371 CCODE =     0.2
*S  Extended Storm System to Avoid Excess Street Flow
COMPUTE NM HYD        SA222   -    1      0.05066     121.15       4.876     1.80470    1.533     3.737 PER IMP=  56.20
ADD HYD            SA222SUM  2& 1 10      0.16613     350.46      17.269     1.94899    1.600     3.296
*S APSA9
COMPUTE NM HYD        SA223   -    1      0.07060     171.74       6.866     1.82356    1.533     3.801 PER IMP=  57.00
ROUTE MCUNGE        SA223RT   1    2      0.07060     170.54       6.863     1.82278    1.533     3.774 CCODE =     0.2
COMPUTE NM HYD        SA224   -    1      0.01720      48.30       2.074     2.26109    1.500     4.388 PER IMP=  86.71
ADD HYD            SA224SUM  2& 1  1      0.08780     218.79       8.937     1.90863    1.533     3.894
COMPUTE NM HYD        SA225   -    2      0.02910      75.31       3.052     1.96638    1.533     4.044 PER IMP=  66.70
ADD HYD            SA225SUM  1& 2  1      0.11690     294.10      11.989     1.92300    1.533     3.931
*S APSA10
ROUTE MCUNGE     SA225SUMRT   1    2      0.11690     294.10      11.989     1.92300    1.533     3.931 CCODE =     0.0
ADD HYD          SA226SUMA 10& 2   1      0.28303     628.13      29.258     1.93825    1.567     3.468
*S APSA11
COMPUTE NM HYD        SA226   -    2      0.06223     154.48       6.052     1.82356    1.533     3.879 PER IMP=  57.00
ADD HYD           SA226SUMB  1& 2  1      0.34526     774.84      35.310     1.91758    1.533     3.507
ROUTE RESERVOIR     PONDSA3   1   30      0.34526     342.02      35.310     1.91758    1.800     1.548 AC-FT=   12.919
*S  Pond is adequate or close to adequate.
*S  Added elevation 5052'
ROUTE MCUNGE      PONDSA3RT  30    1      0.34526     341.99      35.309     1.91754    1.833     1.548 CCODE =     0.2
*S  Increased to Prevent Overtopping to Double-48" RCP.
*S  Also redirected to avoid extending into residents backyards by
*S  running storm drain South down Unser Blvd to Amole Arroyo.
ADD HYD          SA217SUMA 20& 1   1      6.24234    3026.52     600.729     1.80440    1.733     0.758
COMPUTE NM HYD        SA217   -    2      0.12026     230.86      11.964     1.86526    1.633     2.999 PER IMP=  59.90
ADD HYD           SA217SUMB  1& 2  1      6.36260    3229.89     612.692     1.80555    1.700     0.793
*S APSA12
ROUTE MCUNGE    SA217SUMBRT   1    2      6.36260    3223.16     612.689     1.80554    1.733     0.792 CCODE =     0.2
COMPUTE NM HYD      SA227.1   -    1      0.08008     170.52       7.337     1.71788    1.567     3.327 PER IMP=  49.90
ADD HYD         SA227.1SUMA  2& 1  1      6.44268    3336.58     620.026     1.80445    1.700     0.809
ROUTE MCUNGE    SA227.1SUMRT  1    2      6.44268    3330.82     620.023     1.80444    1.733     0.808 CCODE =     0.2
ADD HYD         SA227.1SUMB 49& 2  1     29.61307    6918.42    1157.052     0.73261    1.800     0.365
COMPUTE NM HYD      SA227.2   -    2      0.12451     237.70       8.173     1.23078    1.533     2.983 PER IMP=  24.58
ADD HYD             SABASIN  1& 2 80     29.73758    6980.38    1165.224     0.73469    1.800     0.367
*S APSA13
*S***************************************************************************
*S**********         END OF SOUTH AMOLE BASIN
*S***************************************************************************
*S
*s ***********         AMOLE POND         **************
*S
ROUTE RESERVOIR   AMOLEPOND  80   60     29.73758    1345.62     910.917     0.57435    3.366     0.071 AC-FT=  505.154
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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
DIVIDE HYD	AMOLEPRIME	60	93	11.16737	34.00	342.050	0.57430	3.000	0.005	
	AMOLESPILL	and	94	18.57021	1311.62	568.794	0.57430	3.366	0.110	
*S**										
*S************** SOUTH POWERLINE BASIN										
*S**										
COMPUTE NM HYD	SP201	-	1	0.13557	276.54	10.520	1.45501	1.533	3.187	PER IMP= 36.10
ROUTE RESERVOIR	PondSP1	1	30	0.13557	79.28	10.520	1.45500	1.833	0.914	AC-FT= 4.870
ROUTE MCUNGE	PondSP1Rt	30	1	0.13557	76.98	10.296	1.42405	2.200	0.887	CCODE = 0.2
COMPUTE NM HYD	SP202	-	2	0.22512	426.51	16.350	1.36178	1.533	2.960	PER IMP= 30.40
ADD HYD	SP202SUM	1& 2	1	0.36069	456.59	26.646	1.38518	1.567	1.978	
ROUTE RESERVOIR	PondSP2	1	30	0.36069	220.75	26.646	1.38518	1.766	0.956	AC-FT= 6.378
ROUTE MCUNGE	PondSP2Rt	30	1	0.36069	220.78	26.646	1.38517	1.800	0.956	CCODE = 0.2
COMPUTE NM HYD	SP203	-	2	0.00770	18.46	0.700	1.70546	1.533	3.745	PER IMP= 49.00
ADD HYD	SP203SUM	1& 2	1	0.36839	226.62	27.347	1.39186	1.766	0.961	
ROUTE MCUNGE	SP203SUMRt	1	2	0.36839	226.62	27.347	1.39186	1.766	0.961	CCODE = 0.0
COMPUTE NM HYD	SP204	-	1	0.13615	229.69	8.662	1.19294	1.567	2.636	PER IMP= 22.50
ADD HYD	SP204SUM	2& 1	1	0.50454	418.20	36.009	1.33818	1.600	1.295	
ROUTE RESERVOIR	PondSP4	1	30	0.50454	252.17	36.009	1.33818	1.966	0.781	AC-FT= 6.535
ROUTE MCUNGE	PondSP4Rt	30	1	0.50454	252.19	36.008	1.33817	1.966	0.781	CCODE = 0.2
COMPUTE NM HYD	SP205	-	2	0.03658	85.16	3.293	1.68780	1.533	3.638	PER IMP= 48.20
ADD HYD	SP205SUM	1& 2	1	0.54112	271.30	39.301	1.36180	1.700	0.783	
ROUTE RESERVOIR	PondSP5	1	30	0.54112	232.58	39.301	1.36180	2.400	0.672	AC-FT= 5.504
ROUTE MCUNGE	PondSP5Rt	30	1	0.54112	232.57	39.301	1.36178	2.400	0.672	CCODE = 0.2
COMPUTE NM HYD	SP206	-	2	0.05864	113.68	4.350	1.39105	1.533	3.029	PER IMP= 33.90
ADD HYD	SP206SUM	1& 2	1	0.59976	238.46	43.651	1.36464	2.333	0.621	
ROUTE RESERVOIR	PondSP6	1	30	0.59976	228.13	43.651	1.36464	2.700	0.594	AC-FT= 4.069
ROUTE MCUNGE	SPBASIN	30	1	0.59976	228.13	43.651	1.36463	2.700	0.594	CCODE = 0.2
COMPUTE NM HYD	SP207	-	2	0.18178	249.67	8.627	0.88984	1.567	2.146	PER IMP= 8.20
ADD HYD	SP207SUM	1& 2	1	0.78154	382.89	52.278	1.25420	1.600	0.766	
ROUTE RESERVOIR	PondSP7	1	30	0.78154	316.97	48.767	1.16998	1.733	0.634	AC-FT= 7.825
ROUTE MCUNGE	PONDSP7RT	30	1	0.78154	316.97	48.767	1.16998	1.733	0.634	CCODE = 0.0
COMPUTE NM HYD	SP208	-	2	0.13653	158.63	5.326	0.73143	1.567	1.815	PER IMP= 1.70
ADD HYD	SP208SUM	1& 2	1	0.91807	402.64	54.093	1.10476	1.733	0.685	
ROUTE RESERVOIR	PondSP8	1	30	0.91807	198.61	54.030	1.10347	3.333	0.338	AC-FT= 15.750
ROUTE MCUNGE	PONDSP8RT	30	1	0.91807	198.26	53.978	1.10241	3.400	0.337	CCODE = 0.2
COMPUTE NM HYD	SP209	-	2	0.12305	140.02	4.707	0.71720	1.567	1.778	PER IMP= 0.00
ADD HYD	SP209SUM	2& 1	41	1.04112	199.56	58.685	1.05688	3.366	0.300	
*S APSP1										
*S**										
*S************** END OF SOUTH POWERLINE BASIN										
*S**										
*S**										
*S************** BORREGA BASIN										
*S**										
COMPUTE NM HYD	B201	-	1	0.18234	205.48	7.629	0.78445	1.600	1.761	PER IMP= 0.00
ROUTE MCUNGE	B201RT	1	2	0.18234	203.25	7.620	0.78352	1.667	1.742	CCODE = 0.2
COMPUTE NM HYD	B202	-	1	0.22493	304.29	9.163	0.76386	1.533	2.114	PER IMP= 0.00
ADD HYD	B202SUM	2& 1	1	0.40727	467.76	16.783	0.77266	1.600	1.795	
ROUTE MCUNGE	B202SUMRT	1	2	0.40727	466.59	16.774	0.77226	1.600	1.790	CCODE = 0.2
COMPUTE NM HYD	B203.1	-	1	0.11117	144.97	4.336	0.73133	1.533	2.037	PER IMP= 0.00
ADD HYD	B203.1SUM	2& 1	1	0.51844	595.61	21.110	0.76348	1.600	1.795	
ROUTE MCUNGE	B203.1SUMRT	1	2	0.51844	595.61	21.110	0.76348	1.600	1.795	CCODE = 0.0

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	B203.2	-	1	0.02067	34.05	1.160	1.05217	1.533	2.574	PER IMP= 18.20
ADD HYD	B203.2SUM	2& 1	1	0.53911	624.13	22.270	0.77455	1.600	1.809	
*S APB1										
ROUTE MCUNGE	B203.2SUMRT	1	10	0.53911	616.49	22.234	0.77330	1.633	1.787	CCODE = 0.2
COMPUTE NM HYD	B204	-	1	0.23622	339.36	9.813	0.77894	1.533	2.245	PER IMP= 0.00
ROUTE MCUNGE	NE204RT	1	2	0.23622	329.90	9.789	0.77700	1.667	2.182	CCODE = 0.2
COMPUTE NM HYD	B205	-	1	0.10595	116.11	3.857	0.68261	1.567	1.712	PER IMP= 0.00
ADD HYD	B205SUM	2& 1	1	0.34217	425.51	13.646	0.74777	1.633	1.943	
*S APB2										
ROUTE RESERVOIR	PondB1	1	30	0.34217	185.31	13.646	0.74777	1.866	0.846	AC-FT= 5.985
ROUTE MCUNGE	RB205SUMRT	30	1	0.34217	185.26	13.643	0.74760	1.866	0.846	CCODE = 0.2
ADD HYD	B206SUMA	10& 1	1	0.88128	708.02	35.877	0.76332	1.667	1.255	
COMPUTE NM HYD	B206	-	2	0.02796	70.27	2.783	1.86661	1.533	3.927	PER IMP= 60.00
ADD HYD	B206SUMB	1& 2	1	0.90924	748.05	38.661	0.79725	1.667	1.285	
ROUTE MCUNGE	B206SUMRT	1	2	0.90924	746.12	38.613	0.79627	1.700	1.282	CCODE = 0.1
COMPUTE NM HYD	B207	-	1	0.08667	185.81	7.946	1.71899	1.567	3.350	PER IMP= 50.00
ROUTE MCUNGE	RB207RT	1	3	0.08667	183.95	7.937	1.71718	1.600	3.316	CCODE = 0.2
COMPUTE NM HYD	B208	-	1	0.07574	169.36	6.849	1.69550	1.533	3.494	PER IMP= 48.50
ADD HYD	B208SUM	3& 1	1	0.16241	342.64	14.786	1.70707	1.567	3.296	
ADD HYD	B209SUMA	2& 1	1	1.07165	1009.62	53.400	0.93430	1.667	1.472	
COMPUTE NM HYD	B209	-	2	0.05388	115.31	4.215	1.46683	1.533	3.344	PER IMP= 37.10
ADD HYD	B209SUMB	1& 2	1	1.12553	1077.07	57.615	0.95979	1.633	1.495	
*S APB3										
ROUTE MCUNGE	B209SUMBRT	1	2	1.12553	1065.65	57.559	0.95886	1.766	1.479	CCODE = 0.1
COMPUTE NM HYD	B211.1	-	1	0.06114	146.43	5.561	1.70546	1.533	3.742	PER IMP= 49.00
ADD HYD	B211.1SUM	1& 2	1	1.18667	1117.05	63.120	0.99732	1.733	1.471	
ROUTE MCUNGE	B211.1SUMRT	1	2	1.18667	1116.05	63.108	0.99714	1.766	1.470	CCODE = 0.1
COMPUTE NM HYD	B210	-	1	0.09574	206.58	8.708	1.70546	1.567	3.371	PER IMP= 49.00
ADD HYD	B211.2SUMA	2& 1	1	1.28241	1210.22	71.816	1.05002	1.766	1.475	
ROUTE MCUNGE	B211.2SUMART	1	2	1.28241	1208.72	71.813	1.04998	1.800	1.473	CCODE = 0.2
COMPUTE NM HYD	B211.2	-	1	0.03788	85.41	3.445	1.70546	1.533	3.523	PER IMP= 49.00
ADD HYD	B211.2SUMB	2& 1	10	1.32029	1237.50	75.259	1.06878	1.800	1.465	
COMPUTE NM HYD	B213.1	-	1	0.06111	143.54	5.567	1.70816	1.533	3.670	PER IMP= 49.20
ROUTE MCUNGE	B213.1RT	1	2	0.06111	142.33	5.567	1.70797	1.533	3.639	CCODE = 0.2
COMPUTE NM HYD	B213.2	-	1	0.01461	35.00	1.329	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	B213.2SUM	2& 1	1	0.07572	177.34	6.895	1.70747	1.533	3.659	
ROUTE MCUNGE	B213.2SUMRT	1	2	0.07572	170.47	6.857	1.69799	1.700	3.518	CCODE = 0.1
COMPUTE NM HYD	B213.3	-	1	0.06698	155.41	6.092	1.70546	1.533	3.625	PER IMP= 49.00
ADD HYD	B215SUM	2& 1	1	0.14270	258.99	12.949	1.70149	1.667	2.836	
ROUTE MCUNGE	B213.3SUMRT	1	2	0.14270	256.89	12.947	1.70121	1.700	2.813	CCODE = 0.2
COMPUTE NM HYD	B213.1	-	1	0.02317	55.50	2.107	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	B213.4RT	1	3	0.02317	52.87	2.091	1.69212	1.733	3.565	CCODE = 0.1
ADD HYD	B213.5SUMA	2& 3	1	0.16587	308.43	15.038	1.69993	1.733	2.905	
COMPUTE NM HYD	B213.5	-	2	0.07883	172.15	7.170	1.70546	1.567	3.412	PER IMP= 49.00
ADD HYD	B213.5SUMB	1& 2	1	0.24470	412.13	22.208	1.70171	1.700	2.632	
ROUTE MCUNGE	B213.5SUMBRT	1	2	0.24470	409.63	22.206	1.70154	1.733	2.616	CCODE = 0.2
COMPUTE NM HYD	B213.6	-	1	0.05793	138.74	5.269	1.70546	1.533	3.742	PER IMP= 49.00
ADD HYD	B213.6SUMB	2& 1	1	0.30263	492.54	27.475	1.70229	1.600	2.543	
ADD HYD	B213.6SUMC	10& 1	1	1.62292	1646.44	102.734	1.18691	1.766	1.585	
*S APB4										
ROUTE MCUNGE	B213.6SUMCRT	1	10	1.62292	1633.18	102.709	1.18662	1.833	1.572	CCODE = 0.1
COMPUTE NM HYD	B211.3	-	1	0.04871	92.71	3.498	1.34663	1.533	2.974	PER IMP= 31.40

18

```
                             FROM  TO                   PEAK       RUNOFF                TIME TO   CFS      PAGE =  19
                 HYDROGRAPH   ID   ID         AREA    DISCHARGE    VOLUME     RUNOFF      PEAK     PER
COMMAND        IDENTIFICATION NO.  NO.      (SQ MI)     (CFS)      (AC-FT)   (INCHES)   (HOURS)    ACRE     NOTATION

ROUTE MCUNGE        B211.3RT   1    2       0.04871      92.30      3.498    1.34646     1.633     2.961 CCODE =      0.2
COMPUTE NM HYD       B211.4    -    1       0.17820     322.23     13.693    1.44074     1.567     2.825 PER IMP=   37.00
ADD HYD          BB211.4SUM  2& 1   1       0.22691     396.77     17.191    1.42050     1.600     2.732
ROUTE MCUNGE    B211.4SUMRT    1    2       0.22691     390.80     17.181    1.41970     1.667     2.691 CCODE =      0.2
COMPUTE NM HYD       B211.5    -    1       0.04923     117.91      4.478    1.70546     1.533     3.742 PER IMP=   49.00
ADD HYD          B211.5SUM   2& 1   1       0.27614     458.16     21.659    1.47064     1.667     2.592
ADD HYD          B212SUMA   10& 1   1       1.89906    1941.86    124.367    1.22792     1.800     1.598
COMPUTE NM HYD         B212    -    2       0.08048     151.47      5.366    1.25021     1.533     2.941 PER IMP=   27.37
ADD HYD          B212SUMB    1& 2   1       1.97954    1983.07    129.734    1.22882     1.800     1.565
*S
*S ***********        BORREGA DETENTION DAM       **************
*S
ROUTE RESERVOIR     PONDBOR    1   30       1.97954     189.34    128.776    1.21975     2.766     0.149 AC-FT=    96.177
ROUTE MCUNGE         BBASIN   30   61       1.97954     189.34    128.774    1.21974     2.800     0.149 CCODE =      0.2
*S*****************************************************************************
*S**************   END OF BORREGA BASIN
*S*****************************************************************************
*S*****************************************************************************
*S**************   RIO BRAVO BASIN
*S*****************************************************************************
COMPUTE NM HYD        RB201    -    1       0.13686     208.11      8.679    1.18900     1.633     2.376 PER IMP=    5.60
ROUTE MCUNGE        RB201RT    1    2       0.13686     207.00      8.677    1.18875     1.667     2.363 CCODE =      0.2
COMPUTE NM HYD        RB202    -    1       0.13037     281.52     12.159    1.74869     1.567     3.374 PER IMP=   53.05
ADD HYD           RB202SUM   2& 1   1       0.26723     464.27     20.836    1.46192     1.600     2.715
ROUTE RESERVOIR     PondRB1    1   30       0.26723      73.98     20.836    1.46191     2.100     0.433 AC-FT=    13.680
ROUTE MCUNGE      PondRB1RT   30   10       0.26723      71.89     20.689    1.45166     2.666     0.420 CCODE =      0.2
ROUTE MCUNGE      SPBASINRT   41    1       1.04112     199.57     58.689    1.05696     3.400     0.300 CCODE =      0.2
COMPUTE NM HYD        RB203    -    2       0.04593     130.48      5.643    2.30358     1.500     4.439 PER IMP=   89.60
ADD HYD           RB203SUM   1& 2   1       1.08705     261.66     64.332    1.10963     1.567     0.376
ROUTE MCUNGE     RB203SUMRT    1    2       1.08705     260.15     64.325    1.10950     1.600     0.374 CCODE =      0.1
COMPUTE NM HYD        RB204    -    1       0.11728     235.03      9.263    1.48095     1.567     3.131 PER IMP=   31.37
ADD HYD           RB204SUM   2& 1   1       1.20433     487.97     73.588    1.14568     1.567     0.633
*S APRB1
ROUTE MCUNGE     RB204SUMRT    1    2       1.20433     485.84     73.552    1.14512     1.667     0.630 CCODE =      0.1
ADD HYD           RB204SUM  10& 2   1       1.47156     516.89     94.241    1.20078     1.667     0.549
COMPUTE NM HYD      RB205.1    -    2       0.10519     209.87      9.031    1.60975     1.567     3.117 PER IMP=   42.60
ADD HYD        RB205.1SUMA   1& 2   1       1.57675     688.00    103.272    1.22807     1.667     0.682
*S APRB2
ROUTE MCUNGE   RB205.1SUMBR    1    2       1.57675     681.90    103.220    1.22744     1.766     0.676 CCODE =      0.1
COMPUTE NM HYD        RB106    -    1       0.06997     173.51      6.797    1.82146     1.533     3.875 PER IMP=   56.90
ROUTE MCUNGE   RB206.1SUMRT    1    3       0.06997     165.10      6.748    1.80839     1.600     3.687 CCODE =      0.2
ADD HYD        RB205.1SUMA   2& 3   1       1.64672     750.94    109.968    1.25213     1.766     0.713
COMPUTE NM HYD      RB206.2    -    2       0.12568     282.64     11.995    1.78948     1.533     3.514 PER IMP=   54.70
ADD HYD        RB206.2SUMA   1& 2   1       1.77240     873.11    121.963    1.29023     1.766     0.770
*S APRB3
COMPUTE NM HYD      RB207.1    -    2       0.06566     150.52      6.743    1.92566     1.567     3.582 PER IMP=   64.00
ADD HYD         RB207.1SUM   1& 2   1       1.83806     957.23    128.706    1.31293     1.733     0.814
*S APRB4
ROUTE MCUNGE   RB207.1SUMRt    1   10       1.83806     953.63    128.675    1.31261     1.800     0.811 CCODE =      0.1
ROUTE MCUNGE     AMOLEDAMRt   94    1      18.57021    1311.74    568.799    0.57431     3.400     0.110 CCODE =      0.2
COMPUTE NM HYD        RB208    -    2       0.16716     220.47     12.253    1.37442     1.667     2.061 PER IMP=   35.90
ADD HYD           RB208SUM   1& 2   1      18.73737    1316.76    581.053    0.58144     3.400     0.110
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                             FROM  TO                   PEAK       RUNOFF                TIME TO   CFS      PAGE =  20
                 HYDROGRAPH   ID   ID         AREA    DISCHARGE    VOLUME     RUNOFF      PEAK     PER
COMMAND        IDENTIFICATION NO.  NO.      (SQ MI)     (CFS)      (AC-FT)   (INCHES)   (HOURS)    ACRE     NOTATION

ROUTE MCUNGE      RB208SUMRt   1    2      18.73737    1316.33    581.126    0.58152     3.400     0.110 CCODE =      0.2
ADD HYD         RB209.1SUMB 10& 2   1      20.57543    1587.70    709.801    0.64683     3.400     0.121
COMPUTE NM HYD      RB209.1    -    2       0.06158      90.63      3.845    1.17070     1.600     2.300 PER IMP=   18.72
ADD HYD           RB109SUMA  1& 2   1      20.63701    1588.75    713.646    0.64839     3.400     0.120
ROUTE MCUNGE    RB209.1SUMRT   1   10      20.63701    1588.75    713.646    0.64839     3.400     0.120 CCODE =      0.0
COMPUTE NM HYD      RB205.2    -    1       0.01722      35.13      1.574    1.71358     1.567     3.187 PER IMP=   49.60
ROUTE MCUNGE      RB205.2RT    1    2       0.01722      32.36      1.553    1.69138     1.833     2.937 CCODE =      0.1
COMPUTE NM HYD      RB206.3    -    1       0.01237      28.70      1.125    1.70546     1.533     3.625 PER IMP=   49.00
ADD HYD         RB206.3SUM   2& 1   1       0.02959      40.17      2.678    1.69724     1.800     2.121
ROUTE MCUNGE    RB206.3SUMRT   1    2       0.02959      40.14      2.678    1.69705     1.833     2.120 CCODE =      0.2
COMPUTE NM HYD      RB207.2    -    1       0.00378       9.07      0.344    1.70546     1.533     3.749 PER IMP=   49.00
ADD HYD         RB207.2SUM   2& 1   1       0.03337      42.28      3.022    1.69798     1.833     1.980
COMPUTE NM HYD        RB211    -    2       0.04777     112.01      4.345    1.70546     1.533     3.664 PER IMP=   49.00
ADD HYD           RB211SUMA  1& 2   1       0.08114     150.04      7.367    1.70238     1.533     2.889
ROUTE MCUNGE     RB211SUMART   1    2       0.08114     149.04      7.364    1.70165     1.600     2.870 CCODE =      0.2
ADD HYD           RB209SUMA 10& 2   1      20.71815    1590.33    721.010    0.65252     3.400     0.120
COMPUTE NM HYD      RB209.2    -    2       0.01087      21.94      0.768    1.32391     1.533     3.154 PER IMP=   28.30
ADD HYD         RB209.2SUM   1& 2   1      20.72902    1590.41    721.777    0.65287     3.400     0.120
COMPUTE NM HYD        RB212    -    2       0.29207     414.32     21.068    1.35252     1.633     2.216 PER IMP=   31.10
ADD HYD           RB212SUMA 61& 2   2       2.27161     417.63    149.842    1.23681     1.633     0.287
ADD HYD           RB212SUMB  1& 2   1      23.00063    1785.24    871.620    0.71054     3.400     0.121
*S*****************************************************************************
*S**************   END OF RIO BRAVO BASIN
*S*****************************************************************************
*S
*s ***********        HUBBELL LAKE DETENTION BASIN       **************
*S
ROUTE RESERVOIR  HUBBELLDAM    1   99      23.00063     385.77    745.039    0.60735     8.799     0.026 AC-FT=   480.156
DIVIDE HYD      HUBBELLPRIME  99    1      14.70713      55.00    476.360    0.60731     8.599     0.006
                HUBBELLSPILL  and  94       8.29350     330.77    268.624    0.60731     8.799     0.062
FINISH
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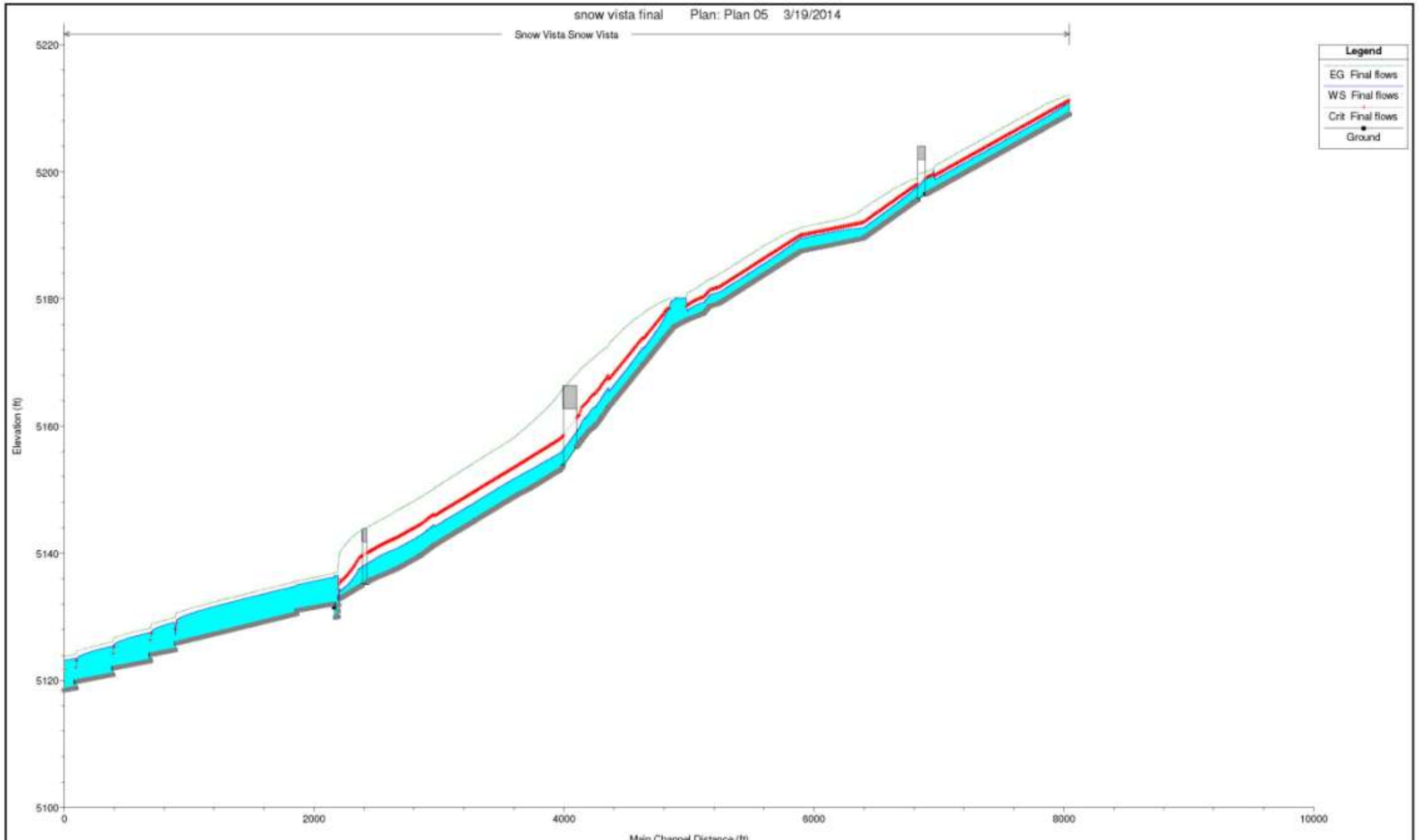
Appendix C


snow vista final Plan: Plan 05 3/19/2014
Snow Vista Snow Vista
Legend
EG Final flows
WS Final flows
Crit Final flows
Ground
Elevation (ft)
Main Channel Distance (ft)
5220
5200
5180
5160
5140
5120
5100
0
2000
4000
6000
8000
10000

HEC-RAS Plan: Plan 05 River: Snow Vista Reach: Snow Vista

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Snow Vista	9750	Existing flowrat	205.00	5209.05	5211.32	5211.32	5212.12	0.002320	7.20	28.48	18.08	1.01
Snow Vista	9750	Design flowrates	484.00	5209.05	5212.62	5212.62	5213.81	0.002012	8.74	55.35	23.29	1.00
Snow Vista	9750	Final flows	195.00	5209.05	5211.26	5211.27	5212.05	0.002344	7.12	27.39	17.84	1.01
Snow Vista	8655	Existing flowrat	544.00	5197.04	5200.82	5200.82	5202.08	0.002009	9.02	60.29	24.11	1.01
Snow Vista	8655	Design flowrates	484.00	5197.04	5200.41	5200.61	5201.82	0.002562	9.54	50.73	22.47	1.12
Snow Vista	8655	Final flows	250.00	5197.04	5199.57	5199.57	5200.44	0.002228	7.52	33.23	19.10	1.01
Snow Vista	8605	Existing flowrat	544.00	5196.50	5200.50	5200.28	5201.73	0.001677	8.88	61.25	20.00	0.89
Snow Vista	8605	Design flowrates	484.00	5196.50	5200.26	5200.05	5201.40	0.001691	8.57	56.49	20.00	0.90
Snow Vista	8605	Final flows	250.00	5196.50	5199.23	5199.06	5199.98	0.001719	6.94	36.01	19.02	0.89
Snow Vista	8565.86		Bridge									
Snow Vista	8533.67	Existing flowrat	544.00	5195.60	5199.38	5199.38	5200.64	0.002016	9.03	60.21	24.10	1.01
Snow Vista	8533.67	Design flowrates	484.00	5195.60	5199.15	5199.15	5200.36	0.002053	8.81	54.96	23.21	1.01
Snow Vista	8533.67	Final flows	250.00	5195.60	5198.12	5198.12	5199.00	0.002257	7.56	33.08	19.07	1.01
Snow Vista	8500	Existing flowrat	544.00	5195.11	5198.26	5199.88	5200.44	0.004256	11.84	45.96	21.60	1.43
Snow Vista	8500	Design flowrates	484.00	5195.11	5198.05	5198.66	5200.16	0.004470	11.66	41.53	20.77	1.45
Snow Vista	8500	Final flows	250.00	5195.11	5197.14	5197.64	5198.79	0.005461	10.31	24.24	17.12	1.53
Snow Vista	8100	Existing flowrat	544.00	5189.51	5191.97	5193.28	5196.45	0.011681	16.97	32.06	18.85	2.29
Snow Vista	8100	Design flowrates	484.00	5189.51	5191.83	5193.06	5196.02	0.011740	16.43	29.46	18.29	2.28
Snow Vista	8100	Final flows	250.00	5189.51	5191.14	5192.04	5194.22	0.013453	14.09	17.74	15.52	2.32
Snow Vista	8050	Existing flowrat	544.00	5189.31	5191.89	5193.08	5195.80	0.009658	15.86	34.29	19.32	2.10
Snow Vista	8050	Design flowrates	484.00	5189.31	5191.76	5192.86	5195.36	0.009490	15.24	31.76	18.79	2.07
Snow Vista	8050	Final flows	250.00	5189.31	5191.08	5191.83	5193.51	0.009486	12.49	20.01	16.10	1.97
Snow Vista	7600	Existing flowrat	553.00	5187.51	5190.49	5191.32	5193.14	0.005524	13.06	42.35	20.92	1.62
Snow Vista	7600	Design flowrates	484.00	5187.51	5190.25	5191.07	5192.84	0.005939	12.90	37.52	19.98	1.66
Snow Vista	7600	Final flows	261.00	5187.51	5189.67	5190.09	5191.17	0.004549	9.81	26.59	17.66	1.41
Snow Vista	7000	Existing flowrat	553.00	5179.95	5182.44	5183.75	5186.90	0.011492	16.95	32.63	18.97	2.28
Snow Vista	7000	Design flowrates	484.00	5179.95	5182.29	5183.51	5186.40	0.011432	16.27	29.74	18.36	2.25
Snow Vista	7000	Final flows	261.00	5179.95	5181.68	5182.53	5184.50	0.011361	13.48	19.37	15.94	2.15
Snow Vista	6950	Existing flowrat	553.00	5179.32	5181.80	5183.12	5186.32	0.011678	17.05	32.44	18.93	2.30
Snow Vista	6950	Design flowrates	484.00	5179.32	5181.65	5182.87	5185.80	0.011560	16.34	29.62	18.33	2.26
Snow Vista	6950	Final flows	261.00	5179.32	5181.04	5181.90	5183.91	0.011616	13.59	19.22	15.90	2.18
Snow Vista	6872.38	Existing flowrat	553.00	5178.84	5181.43	5182.64	5185.43	0.009873	16.06	34.43	19.35	2.12
Snow Vista	6872.38	Design flowrates	484.00	5178.84	5181.27	5182.39	5184.95	0.009774	15.40	31.43	18.72	2.09
Snow Vista	6872.38	Final flows	261.00	5178.84	5180.66	5181.42	5183.11	0.009264	12.56	20.78	16.29	1.96
Snow Vista	6822.38	Existing flowrat	553.00	5177.73	5180.18	5181.53	5184.87	0.012329	17.38	31.82	18.80	2.35
Snow Vista	6822.38	Design flowrates	484.00	5177.73	5180.02	5181.28	5184.40	0.012485	16.79	28.83	18.16	2.35
Snow Vista	6822.38	Final flows	261.00	5177.73	5179.41	5180.31	5182.48	0.012848	14.06	18.56	15.73	2.28
Snow Vista	6700	Existing flowrat	553.00	5176.77	5179.04	5180.34	5183.38	0.011049	16.71	33.09	19.10	2.24
Snow Vista	6700	Design flowrates	484.00	5176.77	5178.89	5180.09	5182.90	0.011072	16.08	30.09	18.46	2.22
Snow Vista	6700	Final flows	261.00	5176.77	5178.29	5179.11	5181.00	0.010766	13.22	19.74	16.06	2.10
Snow Vista	6693.5	Existing flowrat	553.00	5176.70	5178.97	5180.26	5183.32	0.011076	16.73	33.06	19.09	2.24
Snow Vista	6693.5	Design flowrates	484.00	5176.70	5178.81	5180.01	5182.94	0.011100	16.10	30.06	18.45	2.22
Snow Vista	6693.5	Final flows	261.00	5176.70	5178.21	5179.03	5180.94	0.010829	13.25	19.70	16.05	2.11
Snow Vista	6591.26	Existing flowrat	795.00	5175.68	5181.20		5181.56	0.000284	4.77	166.51	39.22	0.41
Snow Vista	6591.26	Design flowrates	774.00	5175.68	5181.11		5181.46	0.000288	4.75	162.80	39.22	0.41
Snow Vista	6591.26	Final flows	527.00	5175.68	5179.86		5180.19	0.000362	4.57	115.38	35.95	0.45
Snow Vista	6550	Existing flowrat	795.00	5174.75	5179.57	5179.57	5181.38	0.002043	10.82	73.50	20.51	1.01
Snow Vista	6550	Design flowrates	774.00	5174.75	5179.50	5179.50	5181.29	0.002043	10.74	72.08	20.36	1.01
Snow Vista	6550	Final flows	527.00	5174.75	5178.55	5178.55	5180.04	0.002128	9.79	53.81	18.30	1.01
Snow Vista	6500	Existing flowrat	795.00	5173.57	5177.58	5178.61	5180.98	0.004911	14.81	53.70	18.51	1.53
Snow Vista	6500	Design flowrates	774.00	5173.57	5177.53	5178.54	5180.88	0.004903	14.69	52.71	18.39	1.53
Snow Vista	6500	Final flows	527.00	5173.57	5176.71	5177.60	5179.63	0.005521	13.71	38.44	16.54	1.58
Snow Vista	6393.94	Existing flowrat	795.00	5170.99	5174.31	5176.03	5180.03	0.010186	19.20	41.40	16.94	2.16
Snow Vista	6393.94	Design flowrates	774.00	5170.99	5174.25	5175.96	5179.93	0.010279	19.12	40.49	16.82	2.17
Snow Vista	6393.94	Final flows	627.00	5170.99	5173.57	5175.02	5178.52	0.011724	17.85	29.53	15.29	2.26
Snow Vista	6336.8	Existing flowrat	838.00	5169.60	5172.90	5174.77	5179.32	0.011483	20.33	41.12	16.90	2.30
Snow Vista	6336.8	Design flowrates	850.00	5169.60	5173.00	5174.82	5179.13	0.010633	19.88	42.75	17.12	2.22
Snow Vista	6336.8	Final flows	598.00	5169.60	5172.37	5173.92	5177.84	0.011510	18.42	32.46	15.70	2.26
Snow Vista	6060.45	Existing flowrat	935.00	5162.89	5166.13	5168.39	5174.56	0.015357	23.28	40.16	16.77	2.65

HEC-RAS Plan: Plan 05 River: Snow Vista Reach: Snow Vista (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Snow Vista	6060.45	Design flowrates	950.00	5162.89	5166.18	5168.43	5174.52	0.014946	23.17	41.00	16.89	2.62
Snow Vista	6060.45	Final flows	809.00	5162.89	5166.10	5167.97	5172.56	0.011897	20.39	39.67	16.71	2.33
Snow Vista	5992.68	Existing flowrat	935.00	5161.24	5164.38	5166.73	5173.58	0.017410	24.34	38.41	16.54	2.81
Snow Vista	5992.68	Design flowrates	950.00	5161.24	5164.42	5166.78	5173.56	0.017011	24.25	39.17	16.64	2.79
Snow Vista	5992.68	Final flows	809.00	5161.24	5164.29	5166.33	5171.73	0.014541	21.89	36.96	16.34	2.56
Snow Vista	5954.6	Existing flowrat	935.00	5159.99	5163.08	5165.48	5172.64	0.018387	24.81	37.69	16.44	2.89
Snow Vista	5954.6	Design flowrates	950.00	5159.99	5163.13	5165.53	5172.64	0.018027	24.76	38.37	16.53	2.86
Snow Vista	5954.6	Final flows	809.00	5159.99	5162.96	5165.08	5170.95	0.016090	22.68	35.67	16.16	2.69
Snow Vista	5904.6	Existing flowrat	935.00	5159.21	5162.08	5164.50	5171.64	0.018247	24.91	37.68	16.26	2.87
Snow Vista	5904.6	Design flowrates	950.00	5159.21	5162.12	5164.55	5171.65	0.017930	24.78	38.34	16.35	2.85
Snow Vista	5904.6	Final flows	809.00	5159.21	5161.93	5164.08	5170.08	0.016417	22.90	35.32	15.94	2.71
Snow Vista	5849.6	Existing flowrat	935.00	5157.80	5160.89	5163.46	5170.67	0.017494	25.09	37.26	14.12	2.72
Snow Vista	5849.6	Design flowrates	950.00	5157.80	5160.94	5163.51	5170.67	0.017148	25.03	37.96	14.18	2.70
Snow Vista	5849.6	Final flows	809.00	5157.80	5160.71	5162.99	5169.15	0.016080	23.32	34.69	13.88	2.60
Snow Vista	5829.6	Existing flowrat	935.00	5157.29	5159.90	5162.21	5170.21	0.022067	25.77	36.28	17.82	3.18
Snow Vista	5829.6	Design flowrates	950.00	5157.29	5159.93	5162.25	5170.23	0.021730	25.76	36.89	17.93	3.16
Snow Vista	5829.6	Final flows	809.00	5157.29	5159.75	5161.82	5168.73	0.020477	24.06	33.63	17.37	3.06
Snow Vista	5807.01	Existing flowrat	935.00	5156.71	5159.31	5161.64	5169.73	0.022385	25.90	36.10	17.79	3.20
Snow Vista	5807.01	Design flowrates	950.00	5156.71	5159.34	5161.67	5169.75	0.022069	25.89	36.69	17.89	3.19
Snow Vista	5807.01	Final flows	809.00	5156.71	5159.15	5161.23	5169.26	0.020878	24.22	33.41	17.30	3.07
Snow Vista	5752.94		Bridge									
Snow Vista	5698.87	Existing flowrat	935.00	5153.61	5156.40	5158.85	5167.19	0.023711	26.35	35.46	17.86	3.29
Snow Vista	5698.87	Design flowrates	950.00	5153.61	5156.43	5158.89	5167.24	0.023467	26.38	36.01	17.94	3.28
Snow Vista	5698.87	Final flows	809.00	5153.61	5156.23	5158.47	5165.85	0.022745	24.89	32.51	17.32	3.20
Snow Vista	5674	Existing flowrat	935.00	5153.10	5155.90	5158.34	5166.59	0.023416	26.24	35.64	17.87	3.27
Snow Vista	5674	Design flowrates	950.00	5153.10	5155.93	5158.38	5166.65	0.023196	26.27	36.16	17.96	3.26
Snow Vista	5674	Final flows	809.00	5153.10	5155.73	5157.96	5165.27	0.022496	24.79	32.63	17.36	3.18
Snow Vista	5450	Existing flowrat	935.00	5150.35	5153.42	5155.59	5161.71	0.016385	23.12	40.45	18.69	2.77
Snow Vista	5450	Design flowrates	950.00	5150.35	5153.44	5155.61	5161.79	0.016317	23.19	40.97	18.77	2.77
Snow Vista	5450	Final flows	809.00	5150.35	5153.23	5155.21	5160.63	0.015706	21.94	37.05	18.12	2.69
Snow Vista	5350	Existing flowrat	935.00	5149.35	5152.34	5154.34	5159.89	0.015718	22.04	42.43	20.93	2.73
Snow Vista	5350	Design flowrates	950.00	5149.35	5152.37	5154.37	5159.97	0.015693	22.13	42.94	21.02	2.73
Snow Vista	5350	Final flows	809.00	5149.35	5152.17	5153.98	5158.89	0.015017	20.81	38.88	20.23	2.65
Snow Vista	5200	Existing flowrat	935.00	5147.57	5150.65	5152.56	5157.59	0.013988	21.14	44.24	21.27	2.58
Snow Vista	5200	Design flowrates	950.00	5147.57	5150.67	5152.59	5157.67	0.013996	21.23	44.74	21.36	2.59
Snow Vista	5200	Final flows	809.00	5147.57	5150.45	5152.20	5156.79	0.013849	20.21	40.02	20.46	2.55
Snow Vista	5000	Existing flowrat	935.00	5145.18	5148.27	5150.17	5155.14	0.013798	21.09	44.46	21.31	2.57
Snow Vista	5000	Design flowrates	950.00	5145.18	5148.29	5150.20	5155.23	0.013825	21.14	44.94	21.40	2.57
Snow Vista	5000	Final flows	809.00	5145.18	5148.06	5149.81	5154.38	0.013762	20.17	40.11	20.48	2.54
Snow Vista	4683.65	Existing flowrat	1091.00	5141.18	5144.77	5146.56	5150.76	0.010139	19.65	56.53	23.30	2.24
Snow Vista	4683.65	Design flowrates	990.00	5141.18	5144.44	5146.31	5150.98	0.012326	20.52	48.24	22.01	2.44
Snow Vista	4683.65	Final flows	917.00	5141.18	5144.45	5146.11	5150.04	0.010536	18.98	48.31	22.02	2.26
Snow Vista	4558.65	Existing flowrat	1091.00	5139.60	5143.09	5144.99	5149.58	0.011299	20.43	53.40	22.93	2.38
Snow Vista	4558.65	Design flowrates	990.00	5139.60	5142.81	5144.72	5149.67	0.013150	21.01	47.13	21.81	2.52
Snow Vista	4558.65	Final flows	917.00	5139.60	5142.79	5144.52	5148.79	0.011614	19.66	46.64	21.72	2.36
Snow Vista	4400	Existing flowrat	1091.00	5137.85	5141.33	5143.24	5147.89	0.011497	20.56	53.07	22.88	2.38
Snow Vista	4400	Design flowrates	990.00	5137.85	5141.13	5142.97	5147.59	0.012137	20.41	48.51	22.06	2.43
Snow Vista	4400	Final flows	917.00	5137.85	5141.04	5142.78	5147.03	0.011563	19.63	46.72	21.73	2.36
Snow Vista	4365.13	Existing flowrat	1091.00	5137.47	5140.96	5142.84	5147.47	0.011383	20.49	53.25	22.91	2.37
Snow Vista	4365.13	Design flowrates	990.00	5137.47	5140.76	5142.59	5147.16	0.011958	20.30	48.77	22.11	2.41
Snow Vista	4365.13	Final flows	917.00	5137.47	5140.67	5142.41	5146.61	0.011453	19.56	46.87	21.76	2.36
Snow Vista	4183.21	Existing flowrat	1091.00	5135.96	5144.55		5144.90	0.000191	4.75	229.91	37.00	0.34
Snow Vista	4183.21	Design flowrates	990.00	5135.96	5139.04	5140.81	5145.02	0.011076	19.63	50.43	22.78	2.33
Snow Vista	4183.21	Final flows	917.00	5135.96	5138.93	5140.60	5144.61	0.010928	19.12	47.95	22.32	2.30
Snow Vista	4171.73	Existing flowrat	1091.00	5135.84	5144.55		5144.89	0.000180	4.65	234.66	37.00	0.33
Snow Vista	4171.73	Design flowrates	990.00	5135.84	5138.92	5140.98	5144.90	0.011076	19.63	50.43	22.78	2.33
Snow Vista	4171.73	Final flows	917.00	5135.84	5138.81	5140.47	5144.49	0.010928	19.12	47.95	22.32	2.30
Snow Vista	4130.37	Existing flowrat	1091.00	5135.37	5144.58	5140.44	5144.87	0.000144	4.31	253.00	37.00	0.29
Snow Vista	4130.37	Design flowrates	990.00	5135.37	5142.65	5140.19	5143.11	0.000319	5.45	181.51	37.00	0.43

HEC-RAS Plan: Plan 05 River: Snow Vista Reach: Snow Vista (Continued)

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)	
Snow Vista	4130.37	Finalflows	917.00	5135.37	5138.33	5140.00	5144.05	0.011032	19.19	47.79	22.29	2.31
Snow Vista	4112.55		Bridge									
Snow Vista	4094.73	Existing flowrat	1091.00	5134.96	5144.37		5144.65	0.000132	4.19	260.67	37.00	0.28
Snow Vista	4094.73	Design flowrates	990.00	5134.96	5142.57		5142.98	0.000261	5.11	193.89	37.00	0.39
Snow Vista	4094.73	Finalflows	917.00	5134.96	5137.92	5139.60	5143.65	0.011081	19.22	47.71	22.28	2.31
Snow Vista	4061.73	Existing flowrat	1572.00	5134.58	5141.07	5141.07	5144.34	0.002969	14.51	108.31	16.70	1.00
Snow Vista	4061.73	Design flowrates	1200.00	5134.58	5140.00	5140.00	5142.73	0.002756	13.29	90.48	16.70	1.00
Snow Vista	4061.73	Finalflows	917.00	5134.58	5137.40	5139.11	5143.29	0.010727	19.47	47.11	16.70	2.04
Snow Vista	3911.73	Existing flowrat	1572.00	5132.78	5134.56	5136.40	5142.13	0.019386	22.08	71.19	40.00	2.92
Snow Vista	3911.73	Design flowrates	1200.00	5132.79	5134.28	5135.81	5140.51	0.019740	20.03	59.90	40.00	2.88
Snow Vista	3911.73	Finalflows	1296.00	5132.78	5134.54	5135.97	5139.82	0.013752	18.45	70.25	40.00	2.45
Snow Vista	3901	Existing flowrat	1572.00	5130.00	5131.54	5133.63	5141.61	0.030688	25.45	61.76	40.00	3.61
Snow Vista	3901	Design flowrates	1200.00	5130.00	5136.29	5133.03	5136.64	0.000216	4.77	251.62	40.00	0.34
Snow Vista	3901	Finalflows	1296.00	5130.00	5136.54	5133.19	5136.92	0.000224	4.96	261.54	40.00	0.34
Snow Vista	3873	Existing flowrat	1572.00	5129.86	5137.00		5137.47	0.000254	5.51	285.41	40.00	0.36
Snow Vista	3873	Design flowrates	1200.00	5129.86	5136.30		5136.63	0.000201	4.66	257.46	40.00	0.32
Snow Vista	3873	Finalflows	1296.00	5129.86	5136.54		5136.91	0.000210	4.85	267.38	40.00	0.33
Snow Vista	3869	Existing flowrat	1572.00	5131.53	5136.40		5137.41	0.000809	8.07	194.71	40.00	0.64
Snow Vista	3869	Design flowrates	1200.00	5131.53	5135.84		5136.59	0.000687	6.96	172.30	40.00	0.59
Snow Vista	3869	Finalflows	1296.00	5131.53	5136.08		5136.87	0.000678	7.13	181.88	40.00	0.59
Snow Vista	3867	Existing flowrat	1572.00	5132.03	5136.66		5137.29	0.004056	6.38	246.47	66.46	0.58
Snow Vista	3867	Design flowrates	1200.00	5132.03	5135.98		5136.53	0.004181	5.92	202.59	62.57	0.58
Snow Vista	3867	Finalflows	1296.00	5132.03	5136.25		5136.79	0.003857	5.90	219.54	64.10	0.56
Snow Vista	3672	Existing flowrat	1572.00	5130.96	5135.22		5135.99	0.005463	7.04	223.28	64.93	0.67
Snow Vista	3672	Design flowrates	1200.00	5130.96	5134.00	5133.77	5135.01	0.010552	8.09	148.41	57.78	0.89
Snow Vista	3672	Finalflows	1296.00	5130.96	5134.99		5135.59	0.004508	6.21	208.75	63.60	0.60
Snow Vista	3570	Existing flowrat	1786.00	5130.46	5136.22		5136.97	0.004691	6.96	256.77	67.88	0.63
Snow Vista	3570	Design flowrates	1200.00	5130.46	5134.28		5134.86	0.004681	6.14	195.49	62.37	0.61
Snow Vista	3570	Finalflows	1558.00	5130.46	5134.88		5135.57	0.004685	6.66	233.82	65.87	0.62
Snow Vista	2604	Existing flowrat	1785.00	5125.79	5129.38	5129.38	5130.88	0.012914	9.84	181.33	61.03	1.01
Snow Vista	2604	Design flowrates	1200.00	5125.79	5128.60	5128.60	5129.82	0.013841	8.86	135.50	56.46	1.01
Snow Vista	2604	Finalflows	1558.00	5125.79	5129.10	5129.10	5130.49	0.013182	9.49	164.20	59.36	1.01
Snow Vista	2600	Existing flowrat	1785.00	5124.79	5127.39	5128.38	5130.63	0.040400	14.45	123.53	55.20	1.70
Snow Vista	2600	Design flowrates	1200.00	5124.79	5126.74	5127.60	5129.56	0.049256	13.48	89.05	51.41	1.80
Snow Vista	2600	Finalflows	1558.00	5124.79	5127.14	5128.10	5130.24	0.043199	14.11	110.39	53.79	1.74
Snow Vista	2404	Existing flowrat	1785.00	5124.03	5127.62	5127.62	5129.12	0.012883	9.84	181.48	61.04	1.01
Snow Vista	2404	Design flowrates	1200.00	5124.03	5126.84	5126.84	5128.06	0.013790	8.85	135.67	56.47	1.01
Snow Vista	2404	Finalflows	1558.00	5124.03	5127.33	5127.33	5128.73	0.013195	9.49	164.14	59.35	1.01
Snow Vista	2400	Existing flowrat	1785.00	5123.03	5127.86	5126.62	5128.59	0.004436	6.82	261.79	68.31	0.61
Snow Vista	2400	Design flowrates	1200.00	5123.03	5126.95	5125.84	5127.50	0.004295	5.96	201.49	62.93	0.59
Snow Vista	2400	Finalflows	1558.00	5123.03	5127.53	5126.33	5128.19	0.004379	6.51	239.34	66.36	0.60
Snow Vista	2104	Existing flowrat	1785.00	5121.90	5125.49	5125.49	5126.99	0.012876	9.83	181.51	61.04	1.01
Snow Vista	2104	Design flowrates	1200.00	5121.90	5124.71	5124.71	5125.93	0.013841	8.86	135.50	56.46	1.01
Snow Vista	2104	Finalflows	1558.00	5121.90	5125.21	5125.21	5126.60	0.013182	9.49	164.20	59.36	1.01
Snow Vista	2100	Existing flowrat	1785.00	5120.90	5125.74	5124.49	5126.46	0.004431	6.82	261.89	68.32	0.61
Snow Vista	2100	Design flowrates	1200.00	5120.90	5124.82	5123.71	5125.37	0.004285	5.96	201.49	62.93	0.59
Snow Vista	2100	Finalflows	1558.00	5120.90	5125.40	5124.21	5126.06	0.004384	6.51	239.24	66.35	0.60
Snow Vista	1804	Existing flowrat	1785.00	5119.77	5123.36	5123.36	5124.87	0.012964	9.86	181.10	61.00	1.01
Snow Vista	1804	Design flowrates	1200.00	5119.77	5122.58	5122.58	5123.80	0.013857	8.88	135.44	56.45	1.01
Snow Vista	1804	Finalflows	1558.00	5119.77	5123.07	5123.07	5124.47	0.013195	9.49	164.14	59.35	1.01
Snow Vista	1800	Existing flowrat	1785.00	5118.77	5123.83	5122.36	5124.47	0.003771	6.44	277.01	69.61	0.57
Snow Vista	1800	Design flowrates	1200.00	5118.77	5122.83	5121.58	5123.33	0.003769	5.70	210.55	63.77	0.55
Snow Vista	1800	Finalflows	1558.00	5118.77	5123.46	5122.07	5124.05	0.003769	6.18	252.08	67.48	0.56
Snow Vista	1708.38	Existing flowrat	1785.00	5118.42	5123.47	5122.01	5124.12	0.003783	6.45	276.71	69.58	0.57
Snow Vista	1708.38	Design flowrates	1200.00	5118.42	5122.47	5121.24	5122.98	0.003792	5.71	210.30	63.75	0.55
Snow Vista	1708.38	Finalflows	1558.00	5118.42	5123.11	5121.72	5123.70	0.003781	6.19	251.82	67.45	0.56

Appendix D

Pond PL1 Expansion - Preliminary Construction Cost Estimate

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$5,000.00	$5,000.00
2	Mobilization and Demobilization	1	LS	$10,000.00	$10,000.00
3	Removal of Existing Outlet Structure	1	EA	$5,000.00	$5,000.00
4	Pond Excavation	16500	CY	$10.00	$165,000.00
5	Outlet Structure - Similar to Other Ponds Outlet Structures in PL	1	EA	$25,000.00	$25,000.00

SUBTOTAL CONSTRUCTION COSTS	$210,000.00
CONSTRUCTION CONTINGENCIES @ 25%	$52,500.00
ENGINEERING, TESTING, TAXES @ 25%	$65,700.00
TOTAL ESTIMATED PROJECT COSTS	$328,200.00

Preliminary Construction Cost Estimate - Benavides Storm Drain

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$20,000.00	$20,000.00
3	Storm Drain, 66"	2250	LF	$335.00	$753,750.00
4	Storm Drain, 60"	500	LF	$280.00	$140,000.00
5	Storm Drain, 42"	400	LF	$135.00	$54,000.00
6	Storm Drain, 30"	700	LF	$75.00	$52,500.00
7	Inlets, 9 CFS capacity	30	EA	$4,500.00	$135,000.00
8	Inlet Piping	1	LS	$75,000.00	$75,000.00
9	Manholes	7	EA	$4,200.00	$29,400.00
10	AC Pavement, Remove and Replace	8,300	SY	$35.00	$290,500.00

SUBTOTAL CONSTRUCTION COSTS	$1,557,700.00
CONSTRUCTION CONTINGENCIES @ 25%	$389,500.00
ENGINEERING, TESTING, TAXES @ 25%	$486,800.00
TOTAL ESTIMATED PROJECT COSTS	$2,434,000.00

Preliminary Construction Cost Estimate - Pond SV8

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
3	Earthwork	7950	CY	$10.00	$79,500.00
4	Outfall Structure	1	EA	$30,000.00	$30,000.00
5	Storm Drain, 24"	40	LF	$100.00	$4,000.00

SUBTOTAL CONSTRUCTION COSTS	$136,000.00
CONSTRUCTION CONTINGENCIES @ 25%	$34,000.00
ENGINEERING, TESTING, TAXES @ 25%	$42,500.00
TOTAL ESTIMATED PROJECT COSTS	$212,500.00

Preliminary Construction Cost Estimate - Pond SV205

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
4	Earthwork	45175	CY	$10.00	$451,750.00
5	Outfall Structure	1	EA	$30,000.00	$30,000.00
6	Storm Drain, 24"	910	LF	$100.00	$91,000.00

SUBTOTAL CONSTRUCTION COSTS	$595,300.00
CONSTRUCTION CONTINGENCIES @ 25%	$148,900.00
ENGINEERING, TESTING, TAXES @ 25%	$186,100.00
TOTAL ESTIMATED CONSTRUCTION COSTS	$930,300.00

	Right of Way Acquistion	5.00	AC	$30,000.00	$150,000.00

TOTAL ESTIMATED PROJECT COSTS	$1,080,300.00

Guac Dam Construction - Preliminary Construction Cost Estimate

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$50,000.00	$50,000.00
3	Dam Excavation -550ac-ft	887500	CY	$5.00	$4,437,500.00
4	Amole Arroyo Entrance Concrete Channel/Flume	1	EA	$60,000.00	$60,000.00

SUBTOTAL CONSTRUCTION COSTS	$4,555,000.00
CONSTRUCTION CONTINGENCIES @ 25%	$1,138,800.00
ENGINEERING, TESTING, TAXES @ 25%	$1,423,500.00
TOTAL ESTIMATED PROJECT COSTS	$7,117,300.00

98th & Central Basin NE2 Spillway relocation

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
3	Concrete Spillway	600	SY	$200.00	$120,000.00

SUBTOTAL CONSTRUCTION COSTS	$142,500.00
CONSTRUCTION CONTINGENCIES @ 25%	$35,700.00
ENGINEERING, TESTING, TAXES @ 25%	$44,600.00
TOTAL ESTIMATED PROJECT COSTS	$222,800.00

Infrastructure Adjustment from B205 to North Branch Borrega Channel - Preliminar

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$5,000.00	$5,000.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
3	Dam Excavation - Increase Storage from 113 to 127 ac-ft	22600	CY	$10.00	$226,000.00
4	5'x4' RCB Outlet w/ Headwall and Wingwalls	1	EA	$100,000.00	$100,000.00

SUBTOTAL CONSTRUCTION COSTS	$346,000.00
CONSTRUCTION CONTINGENCIES @ 25%	$86,500.00
ENGINEERING, TESTING, TAXES @ 25%	$108,200.00
TOTAL ESTIMATED PROJECT COSTS	$540,700.00

Preliminary Construction Cost Estimate - Pond SA2

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
4	Earthwork	9000	CY	$10.00	$90,000.00

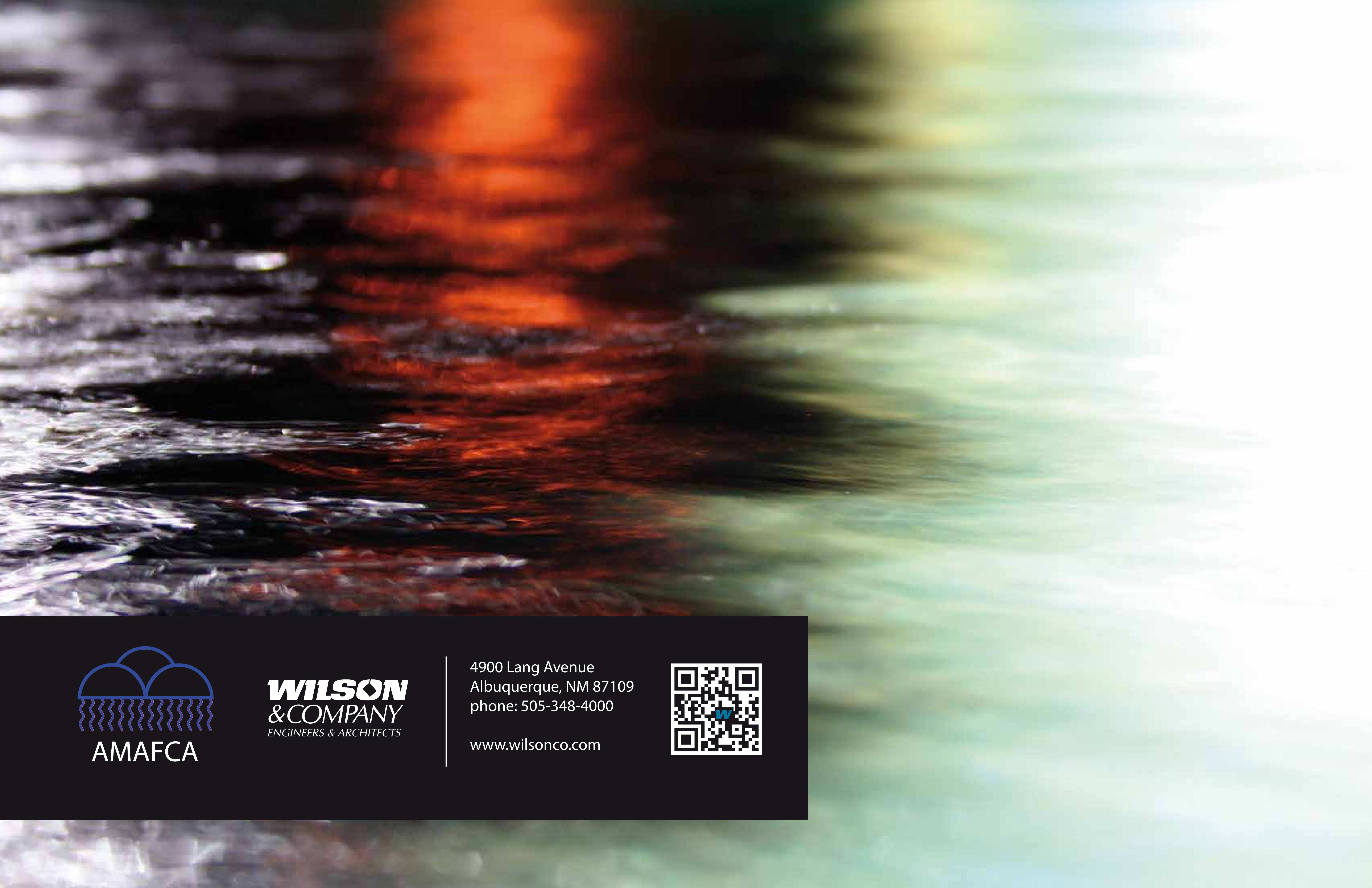
SUBTOTAL CONSTRUCTION COSTS	**$112,500.00**
CONSTRUCTION CONTINGENCIES @ 25%	**$28,200.00**
ENGINEERING, TESTING, TAXES @ 25%	**$35,200.00**
TOTAL ESTIMATED CONSTRUCTION COSTS	**$175,900.00**

Preliminary Construction Cost Estimate - Pond SA3

ITEM No.	ITEM DESCRIPTION	Estimated Quantity	UNIT	UNIT PRICE	AMOUNT
1	Surveying	1	LS	$7,500.00	$7,500.00
2	Mobilization and Demobilization	1	LS	$15,000.00	$15,000.00
4	Earthwork	1700	CY	$10.00	$17,000.00

SUBTOTAL CONSTRUCTION COSTS	**$39,500.00**
CONSTRUCTION CONTINGENCIES @ 25%	**$9,900.00**
ENGINEERING, TESTING, TAXES @ 25%	**$12,400.00**
TOTAL ESTIMATED CONSTRUCTION COSTS	**$61,800.00**

Appendix E



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