

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM

M-10/D8
DESERT SPRINGS
FOUR & FIVE

96138908

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SECOND AMENDED AND RESTATED
DRAINAGE EASEMENT
AND
AGREEMENT

THIS DRAINAGE EASEMENT AND AGREEMENT ("Agreement") is entered into by and among PRESLEY HOMES, a California corporation d/b/a in New Mexico as Presley Homes, Inc. ("Presley"), ALBUQUERQUE SOUTH, a New Mexico general partnership, its purchasers, successors and assigns ("Alb. South"), and GREAT WESTERN LAND COMPANY, a New Mexico general partnership ("Great Western") [Presley, Alb. South and Great Western are sometimes collectively referred to herein as the "Owners"], and the CITY OF ALBUQUERQUE, a municipal corporation (the "City").

RECITALS:

A. Presley is the owner of the following property (the "Presley Property"):

> Tract A-1, Sunrise Estates, Unit One, as the same is shown and designated on the plat thereof, recorded in the Bernalillo County, New Mexico real estate records on August 4, 1995, in Vol. 95-C, Folio 286
>
> and
>
> TRACT C, ALBUQUERQUE SOUTH UNIT 1, as the same is shown and designated on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on August 3, 1987, in Vol. C-34, Folio 74

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED
96 DEC 31 AM 9:43
OFFICIAL RECORD
BERNALILLO COUNTY, NEW MEXICO

B. Alb. South is the owner of the following property (the "Alb. South Property"):

> TRACTS B and D, ALBUQUERQUE SOUTH UNIT 1, as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on August 3, 1987, in Vol. C-34, Folio 74

C. Great Western is the owner of the following property (the "Great Western Property"):

> The westerly 44.5280 acres of Valley West as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on April 17, 1980, in Vol. C-16, Folio 144, which 44.5280 acres is shown on Exhibit "A" attached hereto

D. In conjunction with the development by Presley of another upstream subdivision, Presley, Alb. South and Great Western entered into that certain Drainage Easement dated on or about January 20, 1994, and recorded in the Bernalillo County New Mexico Real Estate Records on January 20, 1994, in Book 94-2, Pages 9787 - 9794 and, further, the parties entered into that certain Amended and Restated Drainage Easement recorded in the Bernalillo County, New Mexico real estate records on April 24, 1995, in Book 95-9, pages 9716-9734 (the "Prior Easement").

E. Presley is in the process of developing the Presley Property into a single family residential subdivision (the "Presley Subdivision") pursuant to a plat thereof (the "Presley Subdivision Plat"), and as a condition of approval of the Presley Subdivision, the City requires Presley to obtain this Agreement, and the easements described herein (the "Easements").

F. These Easements granted herein will entirely replace the Prior Easements, and therefore, upon the recording of this Agreement in the Bernalillo County, New Mexico real estate records, all of the parties terminate and release the Prior Easements and agree that the Prior Easements are of no further force and effect except that the termination of the City's rights in the Prior

Easements shall only be perfected when, and if, the City approves a vacation of the Prior Easements, and all conditions of the vacation decision are satisfied.

NOW, THEREFORE, in consideration of the mutual covenants and conditions, the parties agree as follows:

1. Grants of Easement. Great Western grants to Alb. South, to Presley and to the City a non-exclusive blanket easement over the Great Western Property for purposes of accepting storm drainage waters from the Presley Property and the Alb. South Property. Alb. South grants to Presley and the City a non-exclusive blanket easement over the Alb. South Property for purposes of accepting storm drainage waters from the Presley Property.

The storm drainage waters which the Alb. South Property shall be obligated to accept are the historic storm waters which have flowed from the Presley Property to the Alb. South Property and flows from upstream properties developed as of the date of this Agreement and flows from upstream future development pursuant to the City of Albuquerque Drainage Ordinance (the "Presley Property Historic Flows"), and the increased flows from the Presley Property resulting from the development of the Presley Subdivision (the "Presley Property Developed Flows"). The Presley Property Historic Flows and the Presley Property Developed Flows are jointly referred to herein as the "Presley Flows".

The storm drainage waters which the Great Western Property shall be obligated to accept shall be the Presley Property Historic Flows, the Presley Property Developed Flows, the historic storm

waters which have flowed from the Alb. South Property to the Great Western Property (the "Alb. South Property Historic Flows"), and the increased flows resulting from the future development of the Alb. South Property (the "Alb. South Property Developed Flows"). The Alb. South Property Historic Flows and the Alb. South Property Developed Flows are jointly referred to herein as the Alb. South Flows. The Presley Flows and the Alb. South Flows are jointly referred to as the "Upstream Flows".

The Owner of the beneficial interest in the Easements granted herein shall have the right to construct temporary drainage facilities within the Easements to detain and/or alter the flow characteristics of the storm drainage waters which facilities may include, but are not limited to, pipes, culverts, channels and/or ponds (the "Temporary Facilities"). The Temporary Facilities shall be those approved by the City pursuant to drainage plans submitted to, and approved by, the City for the benefitted properties. The Temporary Facilities to be constructed upon the Alb. South Property are described and shown on Exhibit "A" attached hereto (the "Albuquerque South Facility").

2. Points of Discharge of Flows. Upon development of the Presley Subdivision, Presley, at Presley's sole expense (or public expense if agreed upon by the public agency) shall construct drainage facilities upon the Presley Property which collect the Presley Flows and discharge the Presley Flows onto the Alb. South Property at the location shown on Exhibit "A" (the "Presley Discharge Point"). The Presley Discharge Point shall be shown and

designated on the approved Drainage Plan on file with the City, and Easements and/or rights-of-way required by the City shall be granted on the Presley Subdivision Plat.

Upon development of the Alb. South Property, Alb. South, at Alb. South's sole expense (or public expense if agreed upon by the public agency) shall construct drainage facilities upon the Alb. South Property to collect and discharge the Upstream Flows onto the Great Western Property at the northern four hundred feet of the boundary between the Alb. South Property and the Great Western Property (the "Alb. South Discharge Point").

Upon development of the Great Western Subdivision, Great Western, at Great Western's sole expense (or public expense if agreed upon by the public agency) shall construct drainage facilities upon or adjacent to the Great Western Property to collect and discharge the Upstream Flows into the Amole Del Norte Diversion Channel (the "Channel").

3. Right to Limit Alb. South Easement. Upon execution of this Agreement, the easement across the Alb. South Property shall be a "Blanket Easement", that is the easement shall permit the flow of the Presley Flows across all of the Alb. South Property, in any manner, but upon development of the Presley Subdivision the flow shall be discharged onto the Alb. South Property only at the Presley Discharge Point.

2915

Upon the recording of the Presley Subdivision Plat in the Bernalillo County, New Mexico real estate records, Alb. South's obligation shall be to: (i) accept the Presley Flows at the Presley Discharge Point and to convey the Presley Flows across the Alb. South Property as set forth on Exhibit "A", in any manner acceptable to Alb. South and approved by the City; and (ii) to satisfy the obligation of the Agreement and Covenant regarding maintenance of the Alb. South Property Facilities entered into by and between the City and Alb. South on even date herewith, a copy of which is attached as Exhibit "B" (the "Drainage Covenant"). Upon (i) Alb. South recording a subdivision plat of the Alb. South Property ("Albuquerque South Subdivision") defining Easements for the passage of the Presley Flows across the Alb. South Property, (ii) Alb. South granting Easements to the City acceptable to the City, (iii) Alb. South constructing or causing to be constructed, drainage improvements acceptable to the City, and (iv) the City accepting the drainage improvements, this Blanket Easement to the extent it encumbers the Alb. South Property shall automatically (except as provided below) terminate and be of no further force and effect. To the extent that this Easement benefits Presley or Alb. South, this termination shall occur without any further consent or action by Presley or Alb. South. The termination of the City's rights in this Agreement shall require the approval of the City, if the City approves a vacation of the Prior Easements, and all conditions of the vacation decision are satisfied.

4. Right to Limit Great Western Easement. Upon execution of this Agreement, the easement across the Great Western Property shall be a "Blanket Easement", that is permitting the discharge of the Upstream Flows onto the Great Western Property in any manner and at any location.

Upon the recording of the Alb. South Subdivision or any portion hereof in the Bernalillo County, New Mexico real estate records, Great Western's sole obligation shall be to accept the Upstream Flows at the Alb. South Discharge Point and to convey the Upstream Flows across the Great Western Property, in any manner acceptable to Great Western, so long as the Upstream Flows are confined to the Great Western Property. Upon (i) Great Western recording a subdivision plat or approval of a site development plan of the Great Western Property or any portion thereof defining easements for the passage of the Upstream Flows across the Great Western Property, (ii) Great Western granting easements to the City acceptable to the City, (iii) Great Western constructing drainage improvements acceptable to the City and (iv) the City accepting the drainage improvements, this Easement to the extent it encumbers the Great Western Property shall automatically terminate and be of no further force and effect. To the extent that this Easement benefits Presley or Alb. South, this termination shall occur without any further consent or action by Presley or Albuquerque South. The termination of the City's rights in this Easement shall require approval of the City if the City approves a vacation of the

Prior Easements, and all conditions of the vacation decision are satisfied.

5. Automatic Termination. In the event that Presley does not record the Presley Subdivision Plat in the Bernalillo County, New Mexico real estate records on or before the second anniversary date of the recording of this Easement, this Easement shall automatically terminate and be of no further force or effect. The termination of this Easement shall not enlarge or diminish any common law rights which the parties hereto have with respect to the acceptance or discharge of historic storm drainage waters.

6. Maintenance Responsibilities. Alb. South shall have the obligation of maintaining the Alb. South Property Facilities, pursuant to the terms of the Drainage Covenant. Great Western agrees to confine the Upstream Flows to within the Great Western Property until they discharge into the Channel.

7. City Responsibility. In the event that any of the Owners fail to maintain the Temporary Facilities which they are obligated to maintain, then the City shall have the right, but not the obligation, to enter upon the easement properties to perform any required maintenance and to remove any improvements, and/or landscaping required for the performance of such maintenance, pursuant to the Drainage Covenant. The Drainage Covenant grants the City certain rights, as are more fully set out therein, in the event that the owners default in their maintenance obligations. The City shall not be responsible for any damage to the improvements and/or landscaping of the Owner's properties resulting from the exercise of such rights.

8. Indemnity. The Owners agree to indemnify and hold the City harmless from claims, actions, suits or proceedings of any kind including any claims of third (3rd) parties resulting from the use of the Easement and properties pursuant to this Easement, except those resulting from the negligence of the City. To the extent, if at all, Section 56-7-1 NMSA 1978 is applicable to this Agreement, this obligation will not extend to liability, claims, damages, losses or expenses, including attorney's fees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the City, or the agents or employees of the City; or (2) the giving of or the failure to give direction or instructions by the City, where such giving or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property.

9. Termination/Modification. This Easement may not be terminated, nor may any of the City's rights hereunder be modified without the written joinder of the City.

10. Warranty. The Owners covenant and warrant that they are owners in fee simple of their respective Properties and that they have a good lawful right to convey the Easements or any part thereof, that their respective properties are free from all encumbrances except encumbrances of record and taxes due and owing the Treasurer of Bernalillo County, and that the Owners will forever warrant and defend the title to their respective properties against all claims from all persons or entities.

11. Appurtenant Agreement. The rights and obligations set out herein are appurtenant to the Presley Property, the Alb. South Property and the Great Western Property, as applicable, shall run with, benefit and burden the Presley Property, the Alb. South Property and the Great Western Property and shall be binding upon the parties' successors and assigns.

12. City Drainage Ordinance. The City is a beneficiary of the easements granted by this Agreement because (i) public storm drainage waters which flow off of City Streets are being deposited on the down stream properties, and (ii) this Easement and Agreement is a requirement imposed by the City as a condition of the development of the Presley Property pursuant to the City's Flood Hazard and Drainage Control Ordinance [§14-5-1 et seq., City of Albuquerque, New Mexico] (the "Ordinance"). Presley and Alb. South are beneficiaries of the easements because they are discharging storm drainage waters upon the down stream property owners in a different manner, a greater volume and a greater rate than it would have flowed naturally.

Notwithstanding that Presley and Alb. South are beneficiaries of the easements, nothing herein shall permit Presley and/or Alb. South to use the easements in any manner contrary to approved drainage plans or contrary to the terms of the Ordinance, or to construct any drainage facilities within the easements contrary to any approved drainage plans or contrary to the Ordinance.

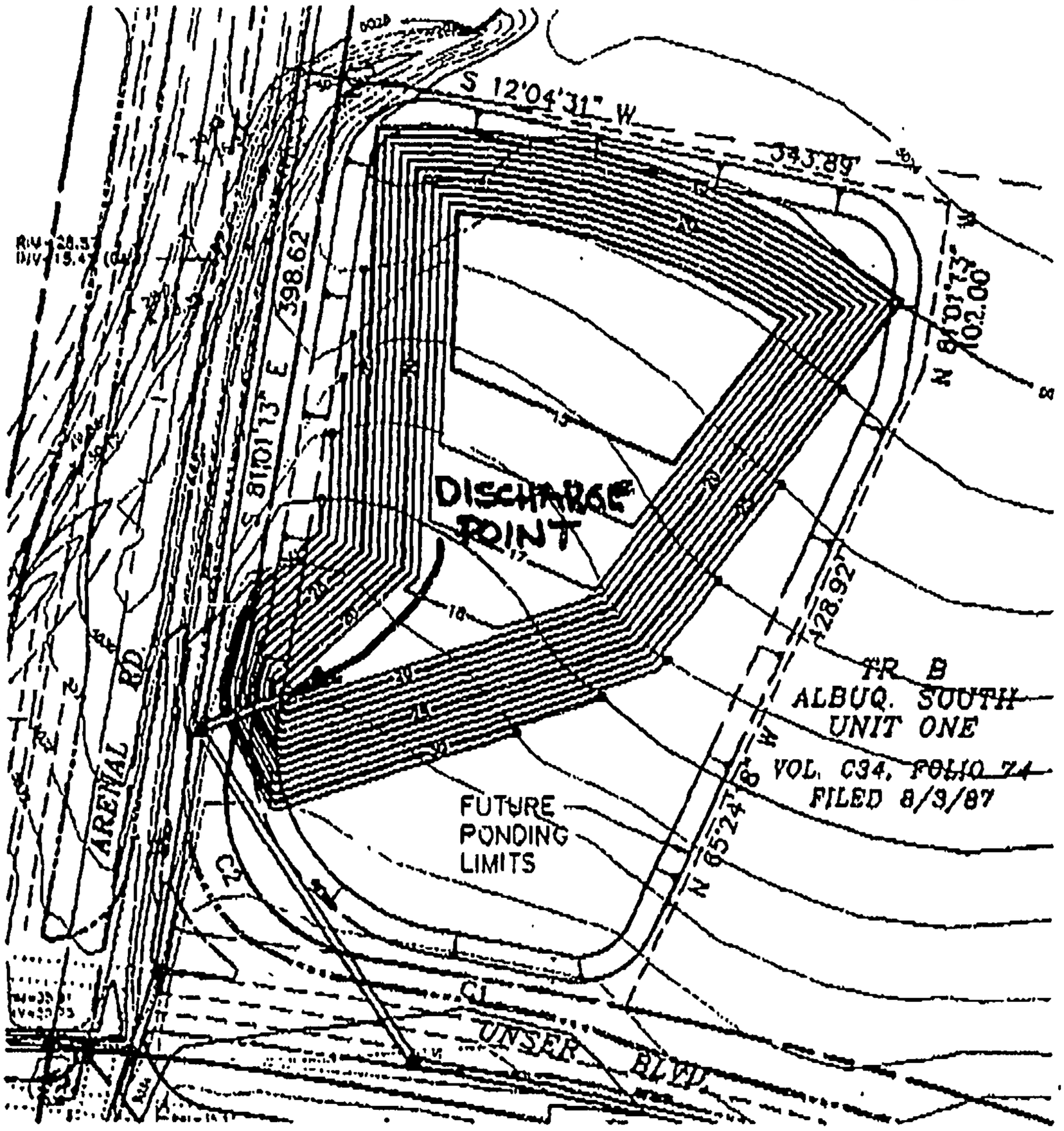
13. Execution. This Easement may be executed in counterparts.

5418

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EASEMENT CURVE TABLE

CURVE	RADIUS	LENGTH	TANGENT	CHORD	BEARING	DELTA
C1	2878.00'	160.05'	80.04'	160.02'	N 10°47'56" E	03°11'10"
C2	100.00'	156.69'	99.61'	141.14'	S 54°05'34" W	89°46'26"
C3	30.00'	48.74'	31.67'	43.56'	N 34°28'21" W	93°05'44"



TEMPORARY POND EASEMENT

1"=100'

903EX018.DWG ane 9/27/96

EXHIBIT "A"

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
96 DEC -9 PM 2:49

96-20 5415-5419

mgf Hooker

9787

94008857

DRAINAGE EASEMENT

THIS DRAINAGE EASEMENT ("Easement") is entered into by and among THE PRESLEY COMPANIES, a California corporation ("Presley"), ALBUQUERQUE SOUTH, a New Mexico general partnership ("Alb. South"), and GREAT WESTERN LAND COMPANY, a New Mexico general partnership ("Great West").

RECITALS:

A. Presley is the owner of the following property (the "Presley Property"):

> TRACT A-1 PLAT OF VISTA NUEVA as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on April 12, 1988, in Vol. C-36, Folio 69

B. Alb. South is the owner of the following property (the "Alb. South Property");

> TRACTS B, C and D, ALBUQUERQUE SOUTH UNIT 1, as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on August 3, 1987, in Vol. C-34, Folio 74

C. Great West is the owner of the following property (the "Great West Property"):

> 44.5280 acres of Valley West as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on April 17, 1980, in Vol. C-16, Folio 144, which 44,5280 acres is shown on Exhibit "A" attached hereto

D. Presley is in the process of developing the Presley Property into a single family residential subdivision (the "Presley Subdivision"), and as a condition of approval of the Presley Subdivision, the City of Albuquerque (the "City") requires Presley

5100 4758

to obtain this Easement.

NOW, THEREFORE, in consideration of the mutual covenants and conditions, the parties agree as follows:

1. Grants of Easement. Great West grants to Alb. South and to Presley a non-exclusive easement over all of the Great West Property for purposes of accepting storm drainage waters from the Presley Property and the Alb. South Property. Alb. South grants to Presley a non-exclusive easement over all of the Alb. South Property for purposes of accepting storm drainage waters from the Presley Property.

The storm drainage waters which the Alb. South Property shall be obligated to accept shall be the historic storm waters which have flowed from the Presley Property to the Alb. South Property (the "Presley Property Historic Flows"), and the increased flows from the Presley Property resulting from the development of the Presley Subdivision (the "Presley Property Developed Flows"). The Presley Property Historic Flows and the Presley Property Developed Flows are jointly referred to herein as the "Presley Flows".

The storm drainage waters which the Great West Property shall be obligated to accept shall be the Presley Property Historic Flows, the Presley Property Developed Flows, the historic storm waters which have flowed from the Alb. South Property to the Great West Property (the "Alb. South Property Historic Flows"), and the increased flows resulting from the development of the Alb. South Property into a single family subdivision (the "Alb. South Property Developed Flows"). The Alb. South Historic Flows and the Alb.

9789

South Developed Flows are jointly referred to herein as the Alb. South Flows. The Presley Flows and the Alb. South Flows are jointly refereed to as the "Upstream Flows".

2. Points of Discharge or Flows. Upon construction of the Presley Subdivision, Presley, at Presley's sole expense or public expense, shall construct drainage facilities upon the Presley Property which collect the Presley Flows and discharge the Presley Flows onto the Alb. South Property in not more than three (3) locations (the "Presley Discharge Points"). The Presley Discharge Points shall be shown and designated on the Presley Subdivision Plat.

Upon construction of the Alb. South Subdivision, Alb. South, at Alb. South's sole expense or public expense, shall construct drainage facilities upon the Alb. South Property to collect and discharge the Upstream Flows onto the Great West Property in not more than three (3) locations (the "Alb. South Discharge Points"). The Alb. South Discharge Points shall be shown and designated on the Alb. South Subdivision Plat.

Upon construction of the Great Western Subdivision, Great Western at Great Western's sole expense or public expense, shall construct drainage facilities upon the Great Western Property to collect and discharge the Upstream Flows into the Amole Del Norte Diversion Channel.

The drainage facilities to be constructed pursuant to this section may be, but are not limited to pipes, culverts, channels or streets. Each of the Discharge Points shall be no greater than

forty feet (40') in width.

3. Right to Limit Alb. South Easement. Upon execution of this Easement, the easement across the Alb. South Property shall be a "Blanket Easement", that is the easement shall permit the discharge of the Presley Flows onto the Alb. South Property, in any manner and at any location.

Upon the recording of the Presley Subdivision Plat in the Bernalillo County, New Mexico real estate records, Alb. South's sole obligation shall be to accept the Presley Flows at the Presley Discharge Points and to convey the Presley Flows across the Alb. South Property, in any manner acceptable to Alb. South. Upon Alb. South recording a subdivision plat of the Alb. South Property defining easements for the passage of the Presley Flows across the Alb. South Property, this Easement to the extent it encumbers the Alb. South Property shall automatically terminate and be of no further force and effect. This termination shall occur without any further consent or action by Presley.

4. Right to Limit Great West Easement. Upon execution of this Easement, the easement across the Great West Property shall be a "Blanket Easement", that is permitting the discharge of the Upstream Flows onto the Great West Property in any manner and at any location.

Upon the recording of the Alb. South Subdivision in the Bernalillo County, New Mexico real estate records, Great West's sole obligation shall be to accept the Upstream Flows at the Alb. South Discharge Points and to convey the Upstream Flows across the

Great West Property, in any manner acceptable to Great West. Upon Great West recording a subdivision plat or approval of a site development plan of the Great West Property defining easements for the passage of the Upstream Flows across the Great West Property, this Easement to the extent it encumbers the Great West Property shall automatically terminate and be of no further force and effect. This termination shall occur without any further consent or action by Presley or Albuquerque South.

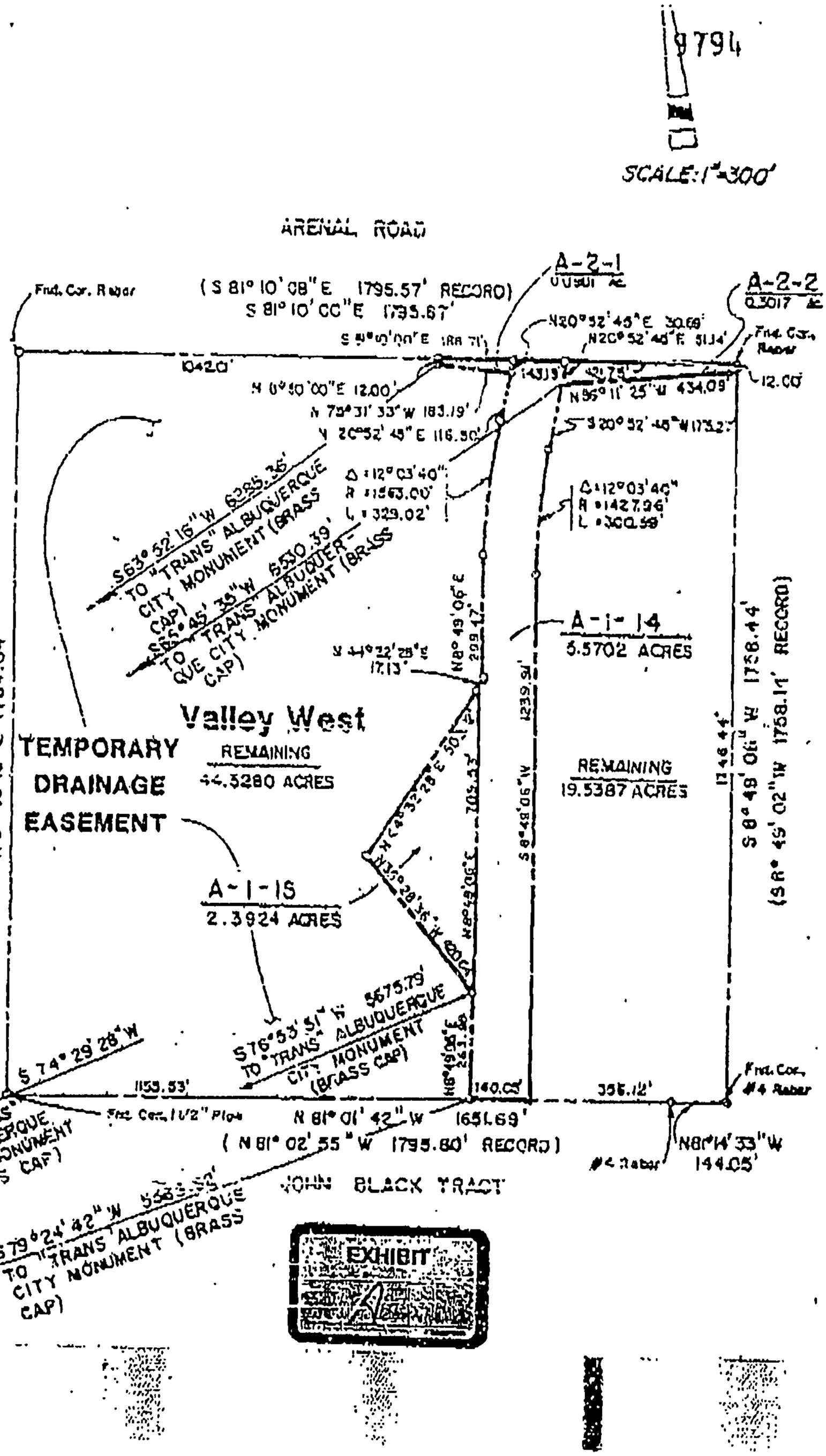
5. Automatic Termination. In the event that Presley does not record the Presley Subdivision Plat in the Bernalillo County, New Mexico real estate records on or before the second anniversary date of the recording of this Easement, this Easement shall automatically terminate and be of no further force or effect. The termination of this Easement shall not enlarge or diminish any common law rights which the parties hereto have with respect to the acceptance or discharge of historic storm drainage waters.

6. Rights to Enter into Agreement. The parties represent that they are the owners of their respective properties described herein, and that they have the right to grant property interests conveyed herein.

7. Appurtenant Agreement. The rights and obligations set out herein are appurtenant to the properties, shall run with, benefit and burden the properties and shall be binding upon the parties' successors and assigns.

8. Execution. This Easement may be executed in counterparts.

EXECUTED December _____, 1993.


9794
SCALE: 1"=300'
ARENAL ROAD
A-2-1
0.0901 AC
A-2-2
0.3017 AC
Fnd. Cor. Rebar
(S 81° 10' 08" E 1795.57' RECORD)
S 81° 10' 00" E 1795.67'
N20° 52' 45" E 30.68'
N20° 52' 45" E 51.14'
Fnd. Cor. Rebar
1042.01'
N 0° 50' 00" E 12.00'
N 75° 31' 33" W 183.19'
N 20° 52' 45" E 116.30'
12.00'
N 55° 11' 25" W 434.09'
S 20° 52' 45" W 173.2
S63° 52' 16" W 6285.36'
TO "TRANS" ALBUQUERQUE CITY MONUMENT (BRASS CAP)
Δ = 12° 03' 40"
R = 1563.00'
L = 329.02'
S85° 45' 35" W 5530.39'
TO TRANS" ALBUQUER-QUE CITY MONUMENT (BRASS CAP)
Δ = 12° 03' 40"
R = 1427.96'
L = 300.59'
N8° 49' 06" E 299.17'
N 44° 32' 28" E 17.13'
A-1-14
5.5702 ACRES
UNPLATTED LAND
N 8° 49' 28" E (754.37' RECORD)
N 8° 49' 13" E 1764.64'
Valley West
TEMPORARY DRAINAGE EASEMENT
REMAINING
44.5280 ACRES
REMAINING
19.5387 ACRES
S 8° 49' 06" W 1239.94'
S 8° 49' 06" W 1758.44'
S 8° 45' 02" W 1758.11' RECORD)
A-1-15
2.3924 ACRES
S 74° 29' 28" W
S 74° 29' 28" W 205.33'
S76° 53' 51" W 5675.79'
TO "TRANS" ALBUQUERQUE CITY MONUMENT (BRASS CAP)
N8° 49' 06" E 1251.58'
5510.40'
TO "TRANS" ALBUQUERQUE CITY MONUMENT (BRASS CAP)
1159.53'
Fnd. Cor. 1/2" Pipe
140.02'
N 81° 01' 42" W 1651.69'
(N 81° 02' 55" W 1795.80' RECORD)
355.12'
Fnd. Cor. #4 Rebar
#4 Rebar
N81°14' 33" W 144.05'
JOHN BLACK TRACT
S79° 24' 42" W 5583.
TO TRANS ALBUQUERQUE CITY MONUMENT (BRASS CAP)
EXHIBIT A

9716

/95040032

AMENDED AND RESTATED DRAINAGE EASEMENT AND AGREEMENT

THIS AMENDED AND RESTATED DRAINAGE EASEMENT AND AGREEMENT supersedes, replaces and restates that certain Drainage Easement recorded in the Bernalillo County, New Mexico real estate records on January 20, 1994, in Book 94-2, Pages 9787-9794 ("Agreement") and is entered into by and among THE PRESLEY COMPANIES, a California corporation ("Presley"), ALBUQUERQUE SOUTH, a New Mexico general partnership ("Alb. South"), and GREAT WESTERN LAND COMPANY, a New Mexico general partnership ("Great Western") [Presley, Alb. South and Great Western are sometimes collectively referred to herein as the "Owners"], and the CITY OF ALBUQUERQUE, a municipal corporation (the "City").

RECITALS:

A. Presley is the owner of the following property (the "Presley Property"):

> TRACT A-1 PLAT OF VISTA NUEVA as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on April 12, 1988, in Vol. C-36, Folio 69

B. Alb. South is the owner of the following property (the "Alb. South Property"):

> TRACTS B, C and D, ALBUQUERQUE SOUTH UNIT 1, as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on August 3, 1987, in Vol. C-34, Folio 74

C. Great Western is the owner of the following property (the "Great Western Property"):

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD
1995 APR 24 PM 3:02
BK 95-9 PG 9716
JUDY D. WOODRUFF
CO. CLERK & RECORDER

9717

44.5280 acres of Valley West as shown on the plat thereof recorded in the Bernalillo County, New Mexico real estate records on April 17, 1980, in Vol. C-16, Folio 144, which 44.5280 acres is shown on Exhibit "A" attached hereto

D. Presley is in the process of developing the Presley Property into a single family residential subdivision (the "Presley Subdivision"), and as a condition of approval of the Presley Subdivision, the City requires Presley to obtain this Agreement, and the easements described herein (the "Easements").

NOW, THEREFORE, in consideration of the mutual covenants and conditions, the parties agree as follows:

1. Grants of Easement. Great Western grants to Alb. South, to Presley and to the City a non-exclusive blanket easement over all of the Great Western Property for purposes of accepting storm drainage waters from the Presley Property and the Alb. South Property. Alb. South grants to Presley and the City a non-exclusive blanket easement over all of the Alb. South Property for purposes of accepting storm drainage waters from the Presley Property.

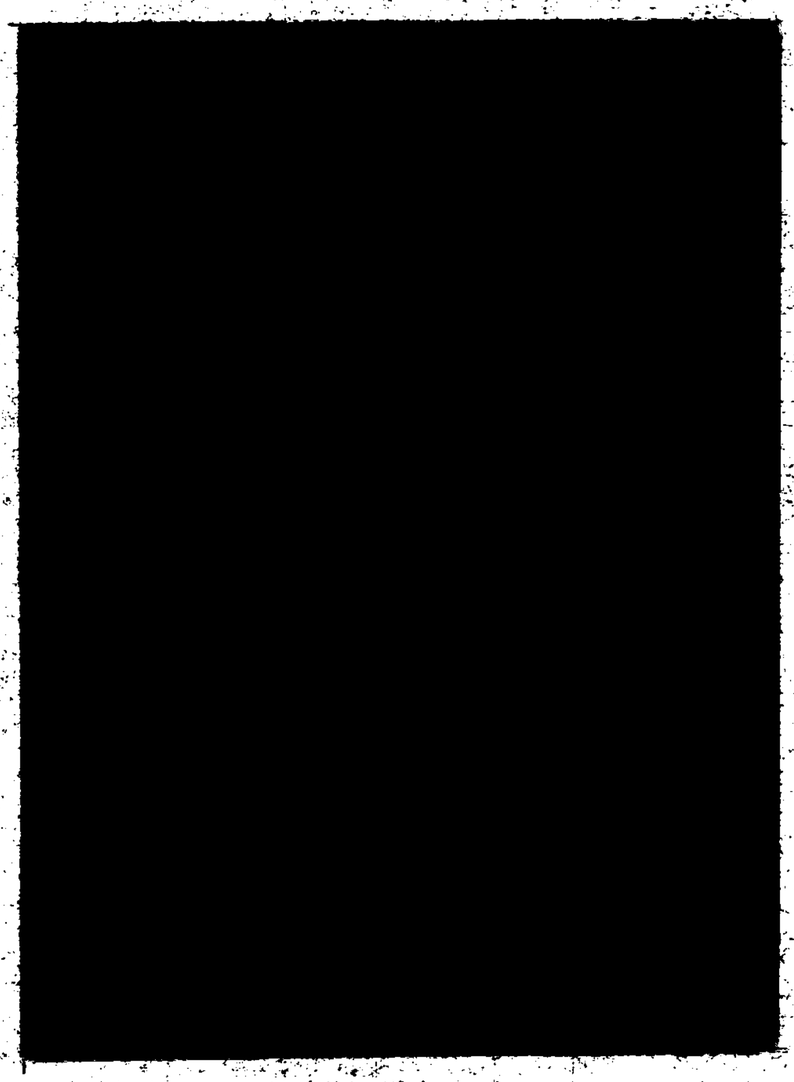
The storm drainage waters which the Alb. South Property shall be obligated to accept shall be the historic storm waters which have flowed from the Presley Property to the Alb. South Property and flows from upstream properties developed as of the date of this Agreement (the "Presley Property Historic Flows"), and the increased flows from the Presley Property resulting from the development of the Presley Subdivision (the "Presley Property Developed Flows"). The Presley Property Historic Flows and the

Presley Property Developed Flows are jointly referred to herein as the "Presley Flows".

The storm drainage waters which the Great Western Property shall be obligated to accept shall be the Presley Property Historic Flows, the Presley Property Developed Flows, the historic storm waters which have flowed from the Alb. South Property to the Great Western Property (the "Alb. South Property Historic Flows"), and the increased flows resulting from the future development of the Alb. South Property (the "Alb. South Property Developed Flows"). The Alb. South Property Historic Flows and the Alb. South Property Developed Flows are jointly referred to herein as the Alb. South Flows. The Presley Flows and the Alb. South Flows are jointly referred to as the "Upstream Flows".

The Owner of the beneficial interest in the Easements granted herein shall have the right to construct temporary drainage facilities within the Easements to detain and/or alter the flow characteristics of the storm drainage waters which facilities may include, but are not limited to, pipes, culverts, channels and/or ponds (the "Temporary Facilities"). The Temporary Facilities shall be those approved by the City pursuant to drainage plans submitted to, and approved by, the City for the benefitted properties. The Temporary Facilities to be constructed upon the Alb. South Property are described and shown on Exhibit "B" attached hereto (the "Albuquerque South Facility").

2. Points of Discharge of Flows. Upon development of the Presley Subdivision, Presley, at Presley's sole expense (or public



CITY OF
Albuquerque

August 26, 1997

Martin J. Chávez, Mayor

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Drainage Report and Grading and Drainage Plan for Desert Springs Subdivision Unit 1 (M10/D8) Submitted for Preliminary Plat Approval, Engineer's Stamp Dated 8/20/97 on Report and Dated 8/25/97 on Plans.

Dear Mr. Arfman:

Based on the information provided in the resubmittal of August 26, 1997, the above referenced drainage report and revised Grading and Drainage plan are approved for Preliminary Plat action.

Prior to Work Order approval, the Agreement and Covenants must be in place for the temporary retention ponds. Prior to Final Plat approval, the Master Drainage Plan for this area must be finalized and approved by my office. As you are aware, the Grading and Drainage Certification of this approved plan is required prior to release of financial guarantees for this Unit.

When Units 2, 3 or 4 are developed, the required storm drains between Unit 1 and the Amole del Norte channel must be designed and constructed. If you should have any questions, please call.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Stan Lane, Builders Investment Co.
Fred Aguirre, DRB 96-435
File

REVISED

DRAINAGE REPORT

FOR

DESERT SPRINGS SUBDIVISION
UNIT ONE

A 99 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO
JULY 1997

Prepared by:

ISAACSON & ARFMAN, P.A.
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FRED C. ARFMAN STATE OF NEW MEXICO 7322 REGISTERED PROFESSIONAL ENGINEER

7-31-97

Fred C. Arfman, P.E. Date

8-20-97

INTRODUCTION

The Desert Springs Subdivision is a masterplan community consisting of multiple phases. The four phases in this community extend from this property, which is situated at the southeast corner of Unser Blvd. and Arenal Road, to the east ending at the Amole del Norte Channel. The first phase of development (Unit One) is located in the northern corner of the community and is connected to the future phases by Rainwater Road and Blue Avena Avenue. Units Two, Three, and Four will be developed from north to south (refer to attached Exhibit A). A 3.8 acre area will be dedicated to the City to be used as a regional detention facility.

This drainage report primarily addresses the flows generated within Unit One. Flows from this community will be conveyed to the Amole del Norte Channel, initially as surface flows and ultimately as both storm drain and street flows. Unit One will utilize two temporary retention ponds as an interim measure to accommodate onsite flows until the phased development of this community is continued, and until the permanent regional detention facility and outfall line are constructed. Flows along Unser and Arenal will be collected by the storm drain system linked to the regional detention facility. Please refer to the Arenal/Unser Drainage Management Plan dated June 1997 for further detailing of this system.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: A parcel of land comprising part of Tract B, Albuquerque South, Unit One (08-03-87, Volume C34, Folio 74).

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SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
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BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: R-LT

NUMBER OF EXISTING TRACTS: 1

NUMBER OF PROPOSED LOTS: 99

TOTAL AREA: 28.80 Ac.
1,254,528 Sq. Ft.

II. SITE CHARACTERISTICS

FLOOD HAZARD: A small part of this development lies within a Zone AO (depth 2) floodplain area as determined by Panel No. 350002-0336 of the September 20, 1996 Edition of the F.E.M.A. Maps (refer to

Exhibit B). Flows within this zone will be captured within the planned regional detention facility located within a proposed right-of-way dedication along the northern property boundary. A Letter of Map Revision from FEMA will therefore not be required until development of Unit Two.

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an overall downward slope toward the east ranging from 1 to 5 percent. Near the center of the site there is a gentle ridge which divides the flow to both the northeast and southeast. Offsite flows from housing developments to the west are caught in an existing storm drain system which deposits the waters into a temporary detention pond. This pond is located where the regional detention facility will be constructed under a city project. (See Appendix A for a map of the temporary retention and planned permanent detention facility layouts).

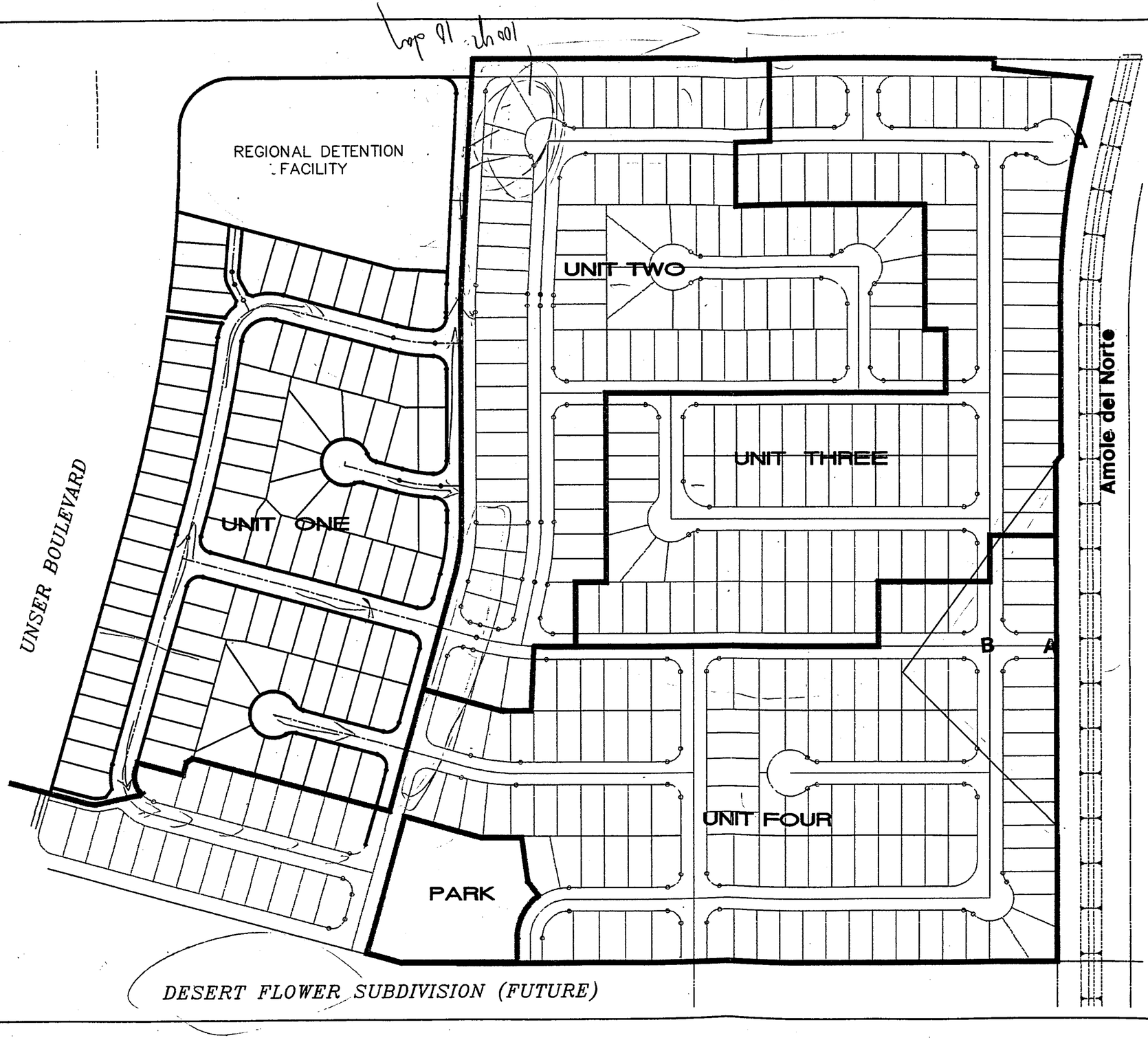


EXHIBIT A

DESERT SPRINGS SUBDIVISION

SCALE: 1"=200'

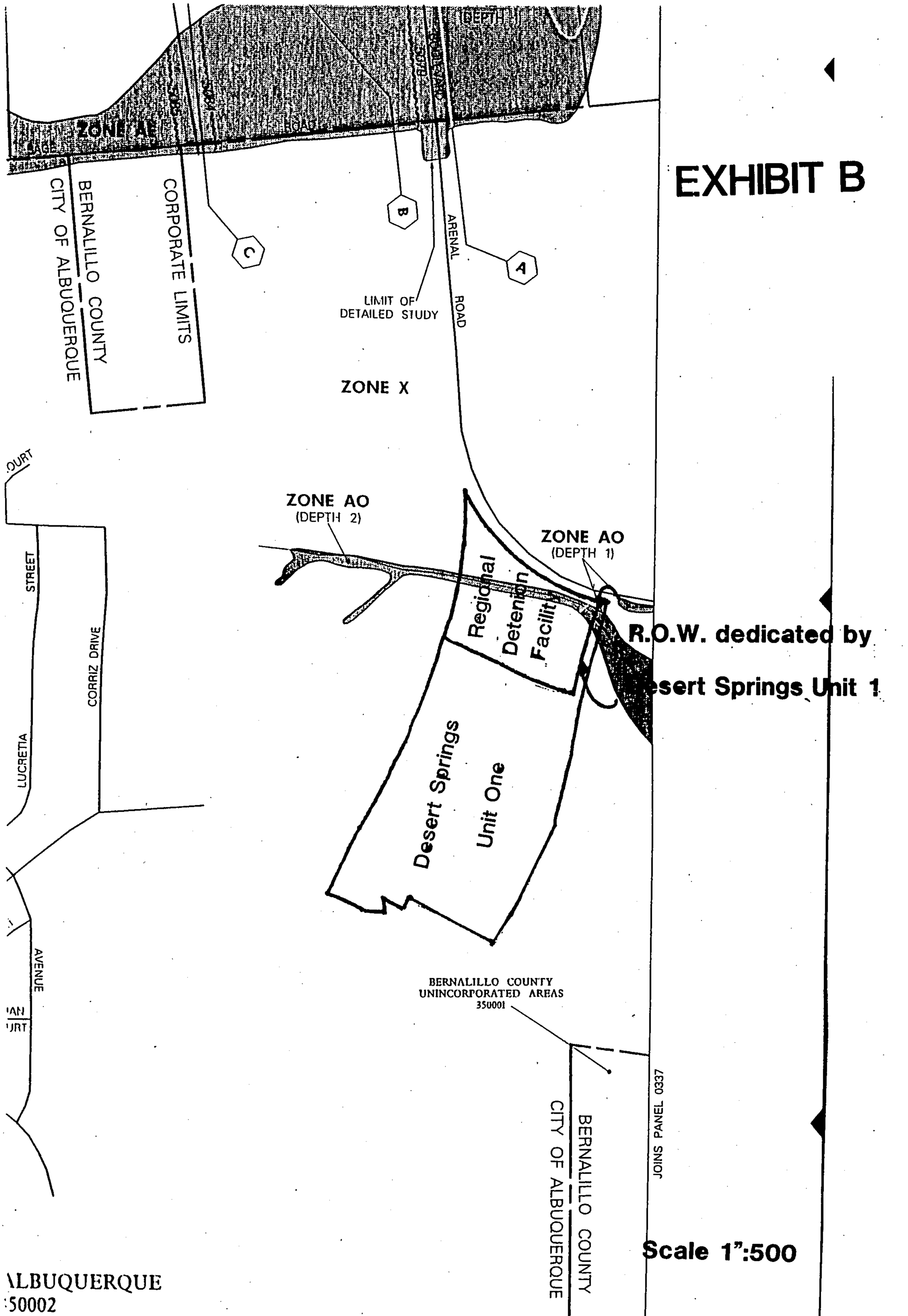
A: Future storm water outfall locations to the Amole del Norte

B: Future surplus drainage R.O.W. Possible vacation & incorporation into future phase development

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EXHIBIT B


ZONE AE
(DEPTH 1)
ROAD
BERNALILLO COUNTY
CITY OF ALBUQUERQUE
CORPORATE LIMITS
B
C
A
ARENAL
ROAD
LIMIT OF
DETAILED STUDY
ZONE X
ZONE AO
(DEPTH 2)
ZONE AO
(DEPTH 1)
Regional
Detention
Facility
Desert Springs
Unit One
R.O.W. dedicated by
esert Springs Unit 1
STREET
CORRIZ DRIVE
LUCRETIA
AVENUE
BERNALILLO COUNTY
UNINCORPORATED AREAS
350001
BERNALILLO COUNTY
CITY OF ALBUQUERQUE
JOINS PANEL 0337
Scale 1":500
ALBUQUERQUE
350002

PROPOSED CONDITIONS: Desert Springs Unit One has multiple drainage outfalls. The first outfall, located at the intersection of Silverbery Road and Desert Springs Drive, will require the construction of a storm drain which will connect to the 48" diameter storm drain planned as a public project at Arenal Road. The remaining outfalls, Rainwater Road, Desert Springs Court, and Shadetree Drive will flow as street flow and be collected in a temporary retention pond until future phases of this development are constructed. All flows will drain from the back of the lots to the front, and will be conveyed via street flow until captured by either a temporary pond or future storm drain.

10-year 6-hour offsite flows along Unser and Arenal will be captured by catch basins to provide the required dry lane. A dry lane analysis for Unser Blvd. was completed for Sunrise Estates Unit Two and Three Drainage Management Plan, and a dry lane study for Arenal Road was designed for this project. Required catch basins will be placed as shown in the plans. (Please refer to Appendix A for copies of the dry lane analysis calculation sheets).

This community was designated as Basin #406 in the Arenal/Unser Drainage Management Plan dated June 1997. (See Appendix B for

basin information). The Amole del Norte Channel is capable of accepting all flows generated within this community. Undisturbed flows will be overland sheet to the Amole del Norte Channel.

Unit One of this subdivision is divided into five subbasins which are summarized in the table below.

SUBBASIN	AREA (Ac)	% LAND TREATMENT A	B	C	D	Q_{100} (cfs)
1A	7.32	0	19.5	19.5	61	26.40
1B	.29	0	19.5	19.5	61	1.41
2A	4.07	0	19.5	19.5	61	14.59
2B	2.23	0	19.5	19.5	61	8.12
2C	1.39	0	19.5	19.5	61	5.11
*2C FUTURE	4.89	0	19.5	19.5	61	17.60

*This area includes 2C and the future Blue Avena Avenue. Flows generated within this area will not be included in pond volume calculations but will be used to check the street flow depths.

A. The new storm drain will begin just north of the intersection of Silverberry Road and Desert Springs Drive (AP1). Two modified Type 'A' drop inlets will capture 100% of the flows generated in Basins 1A and 1B. The storm drain will be 24" diameter pipe for a length of 425 feet and then increase to a 30" diameter pipe to overcome the pressure head (1-foot) generated within

the Arenal Masterplan line. The pipe system will be capable of conveying 27.8 cfs at the projected slope of 1% (see Flowmaster Worksheet in Appendix C).

Interim: Flows conveyed by the storm drain will be discharged into a retention pond located to the east of Desert Springs Drive entrance for Unit One (see Grading Plan for detail).

100-yr
10-day
Vol

Ultimate: The 24" and 30" diameter lines will be connected to the planned public storm line (48" diameter) upon its completion.

B. Interim: The 26.30 cfs generated in Basins 2A, 2B, and 2C will flow to the temporary retention pond located at the east end of Rainwater Road. The flows within Basins 2A and 2B will flow as street flows to the pond (refer to Appendix C for street flow depth calculations). Basin 2C will flow as street flow and earthen channel flow to the basin. The v-ditch earthen channel will slope at 1.3%, have 3:1 side slopes, and convey 5.11 cfs generated within this basin. Please refer to Appendix C for AHYMO

100-yr
10-day

what about undeveloped flows from this basin?

and Flowmaster calculations on the channel. Once a 100-year 6-hour capacity is reached, the pond will drain through an emergency spillway, and will sheet flow to the Amole del Norte Channel (refer to grading plan for further detail).

Ultimate: In the future phases flows will be captured and conveyed to the Amole del Norte Channel by street flow and storm drain.

CONCLUSIONS & RECOMMENDATIONS

The recommendations for Desert Springs Subdivision, Unit One drainage study are presented below:

1. An interim retention pond is required near the intersection of Desert Springs Drive and Arenal Road to capture flows carried by the storm drain until the public storm drain line in Arenal Road is in place. Upon completion of the public line, the storm drain in Desert Springs Drive will be connected and the pond will no longer be needed.

2. A temporary retention pond is required at the easterly terminus of Rainwater Road to capture all street flows generated along Rainwater Road, Shadetree Drive, and Desert Springs Court.

3. All ponds identified above shall be covered by a City of Albuquerque Covenant and Maintenance Agreement. and Blanket drainage easement

4. Runoff from future phases of development is allowed per the previously recorded blanket drainage easement.

5. The reach of the Desert Springs Drive storm drain to the retention pond should be constructed as part of the Unit One construction.

6. No rear yard ponding shall be allowed in this portion of the development (see Typical Lot Grading Detail).

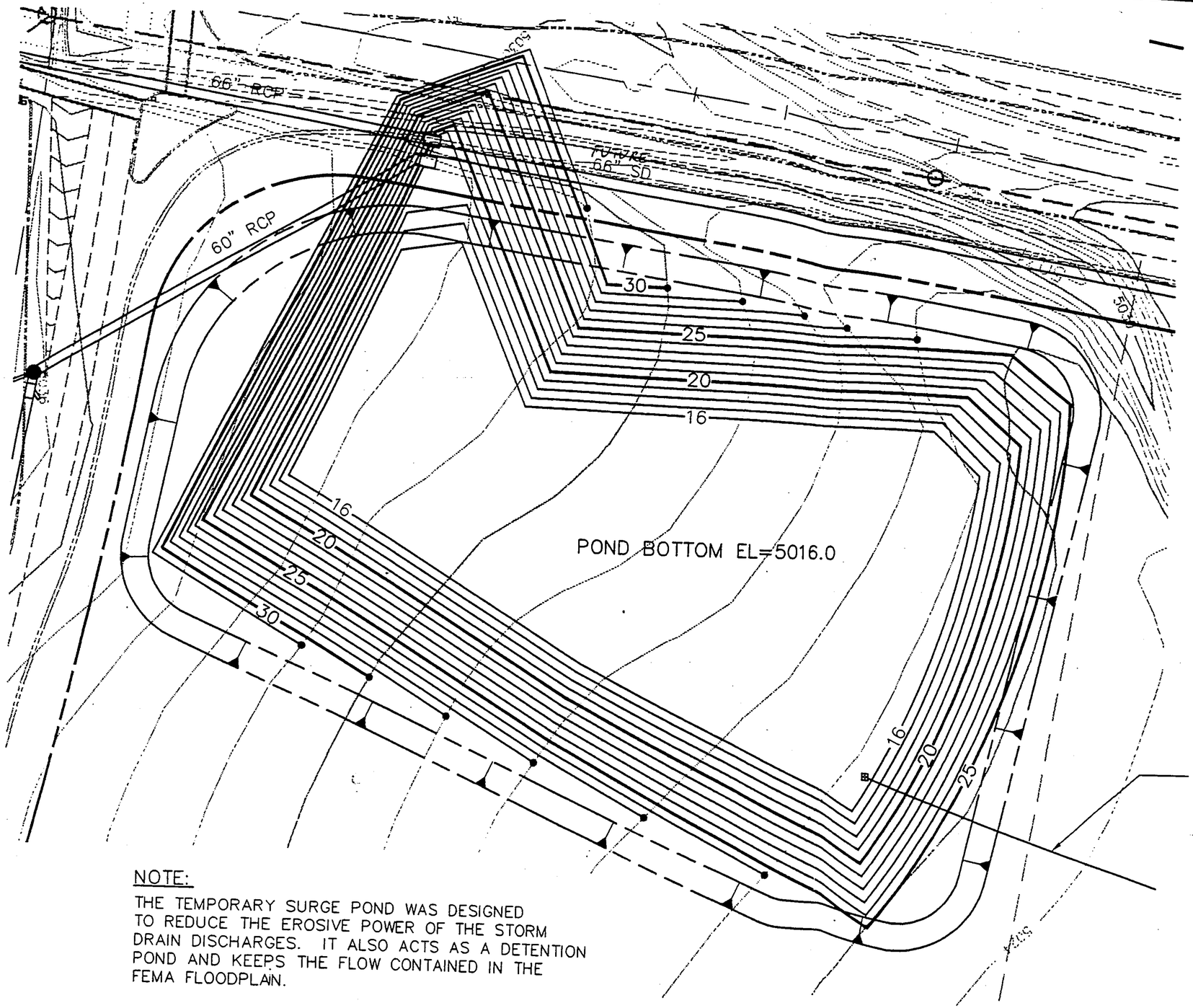
7. Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).

8. Any required catch basins along the portions of Arenal and Unser fronting the property will be installed per design.

APPENDIX A

Temporary Retention Pond Map
Permanent Detention Pond Map
Unser Dry Lane Analysis
- from Sunrise Estates Units Two & Three
  Drainage Management Plans

Arenal Dry Lane Analysis



SCALE: 1"=60'

TEMPORARY SURGE POND

EL (ft)	H (ft)	AREA (Ac)	STORAGE (AF)
16	0	1.30	0
17	1	1.43	1.37
18	2	1.56	2.87
19	3	1.71	4.51
20	4	1.85	6.29
21	5	1.99	8.21
22	6	2.13	10.27
23	7	2.28	12.48
24	8	2.43	14.84
25	9	2.59	17.35

PEAK DISCHARGE TO POND= 880cfs
PEAK DISCHARGE= 352cfs

FLOW OVER SPILLWAY IS WEIR TYPE:
$Q = CLH^{1.5}$, C= 3.0, L= 300, Q= 880cfs
SO, HEIGHT OVER WEIR= 0.98',
Q= VA, V= 880/0.98(300)= 2.97fps. OK

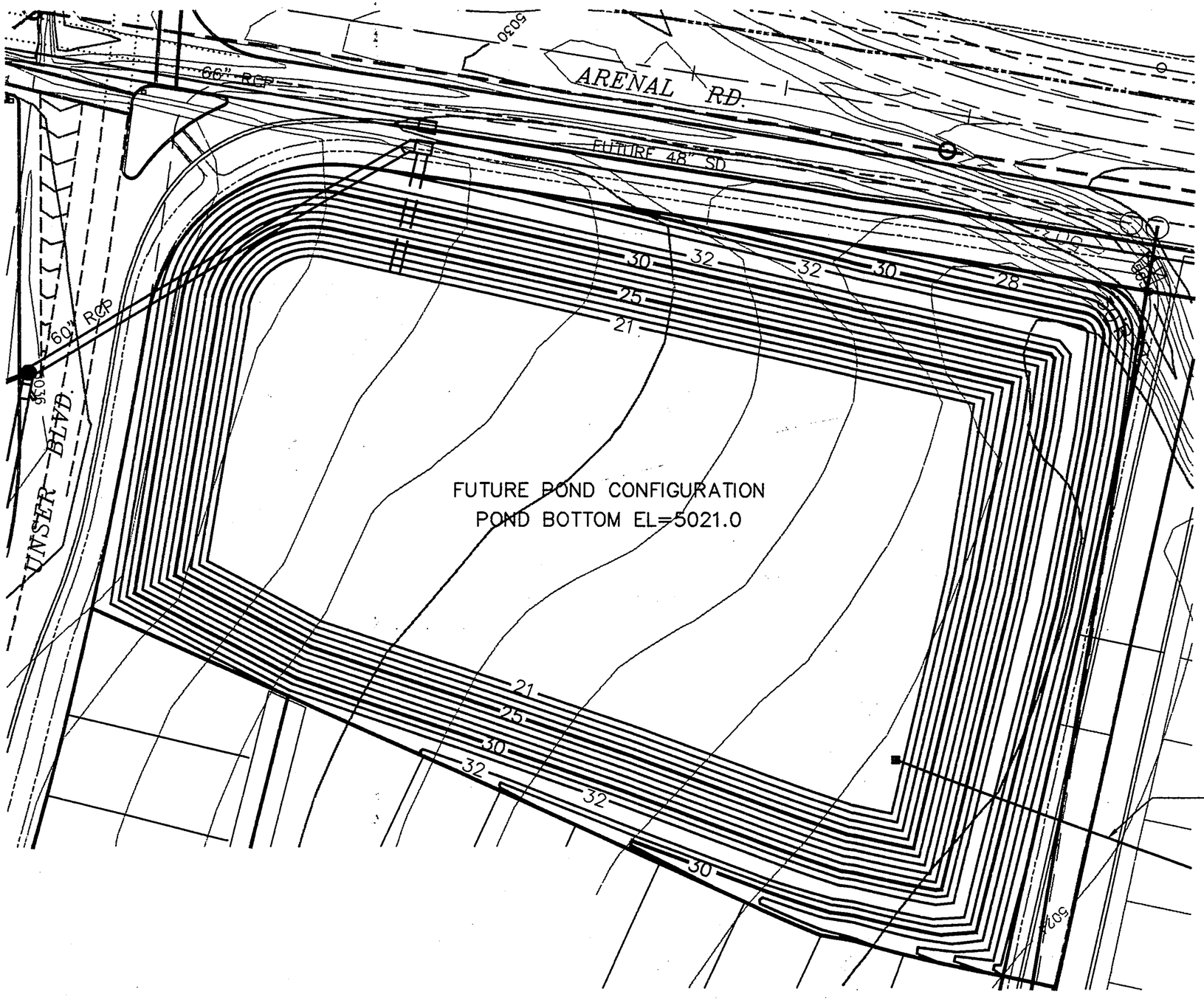
4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

NOTE:

THE TEMPORARY SURGE POND WAS DESIGNED TO REDUCE THE EROSIVE POWER OF THE STORM DRAIN DISCHARGES. IT ALSO ACTS AS A DETENTION POND AND KEEPS THE FLOW CONTAINED IN THE FEMA FLOODPLAIN.

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SCALE: 1"=60'

18 ac.ft. required

RETENTION POND

EL (ft)	H (ft)	AREA (Ac)	STORAGE (AF)
21	0	1.85	0
22	1	1.96	1.91
23	2	2.07	3.93
24	3	2.18	6.06
25	4	2.30	8.30
26	5	2.42	10.66
27	6	2.54	13.14
28	7	2.66	15.74
29	8	2.79	18.47
30	9	2.92	21.33 ✓
31	10	3.05	24.32
32	11	3.18	27.44

PEAK DISCHARGE TO POND= Q_{100}= 880cfs
Q_{10} = 475cfs
PEAK DISCHARGE= 190cfs — peak @ 2 hrs.
MAX. WATER SURFACE ELEV= 26.79'

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

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903EXH16.DWGdlv

6/12/97

SUBJECT: **Unser Blvd. Dry Lane Analysis**

CRITERIA: 10-Year Storm (AHYMO 1994)

SOLUTION: Storm drains shall be situated along the face of curb of Unser Blvd. for that portion of roadway from Arenal Road to approximately 2,200 feet south. The inlet spacing for both the north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 50 feet. The 56-foot wide median shall be designed as having temporary storm water retention incorporated into the design (see attached exhibit). Storm drain inlet spacing shall allow for one "dry" lane in the event of the 10-year storm. The temporary median retention improvements may be abandoned when Unser Blvd. is expanded to six (6) lanes and the median is reconstructed with permanent improvements such as a paved surface and/or median landscaping. The "dry" lane is achieved on the median lane and the increase in storm water flows is carried by the original 25-foot wide driving lanes.

UNSER BLVD. DRY LANE STUDY

CRITERIA : 10 YR STORM
AHYMO (1994)

METHODOLOGY : USING CHART 3 AND 4 (ATTACHED)
"FLOW IN TRIANGULAR SECTIONS"

$Q = Q_s / (1 - E_o)$

WHERE $E_o = 0.44$ (CHART 4)

AND $Q_s = 2.6$ CFS

$\therefore Q = 2.6/(1-0.44) = 4.64$ cfs = CURB LANE STORM WATER CARRYING CAPACITY

DATA : STARTING FROM STA 32+00 AND ENDS AT STA 42+20
TOTAL LENGTH : 1020 FT
WIDTH (WEST R/W TO MED. CURB) = 50'

FROM AHYMO : $Q_{100} = 4.2$ cfs
$Q_{10} = 2.6$ cfs < 4.64 cfs ∴ O.K.
$d_{in} = 0.29'$

Q_{10} CAPTURED FROM INLET #1 (AT STA 33+11.36) = 1.5 cfs

Q_{10} BY-PASS = 2.6 - 1.5 = 1.1 cfs

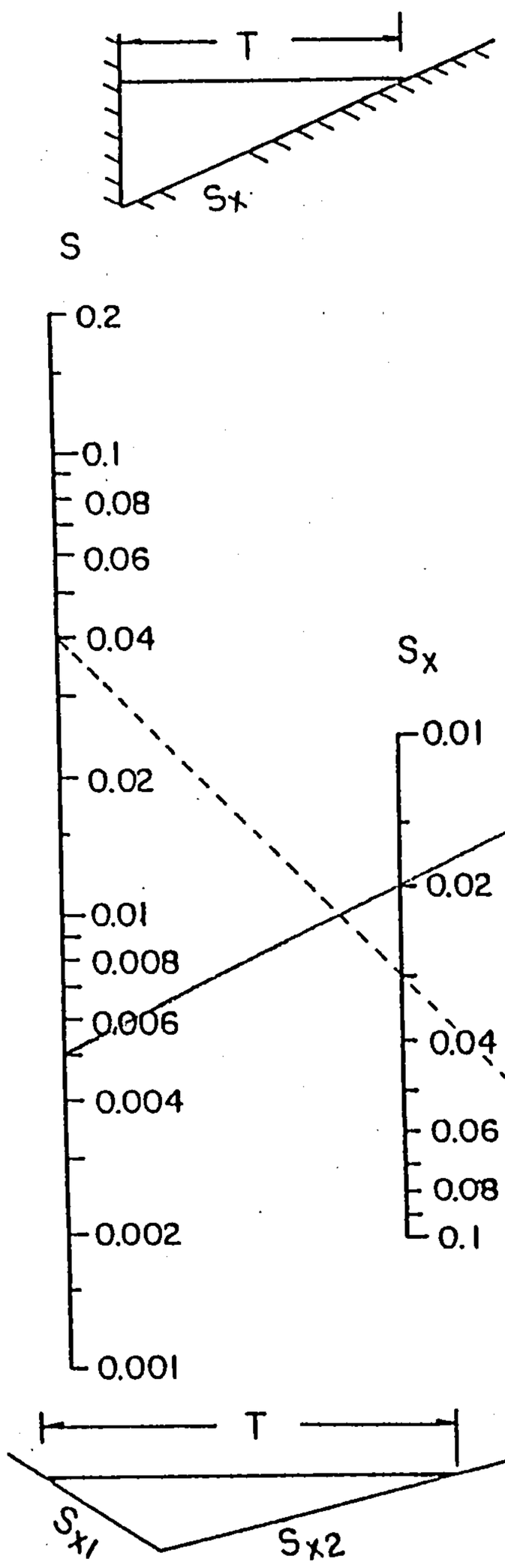
FROM STA 21+80 TO STA 32+00 (SHEET 14+15 OF 23)
TOTAL LENGTH = 1020 FT
WIDTH (WEST R/W TO MED. CURB) = 50'

FROM AHYMO : $Q_{100} = 4.2$ cfs
$Q_{10} = 2.6$ cfs

Q_{10} TO INLET #2 (AT STA 21+81.30) = 2.6 + 1.1 = 3.7 cfs < 4.64 cfs
∴ OK

WITH $Q_{10} = 3.7$ cfs, $D_{in} = 0.33$, Q_{10} CAPTURED = 1.8 cfs

Q_{10} by-pass = 3.7 cfs - 1.8 cfs = 1.9 cfs



$$Q = \frac{0.56}{n} S_x^{1.67} S^{0.5} T^{2.67}$$

EXAMPLE: GIVEN:

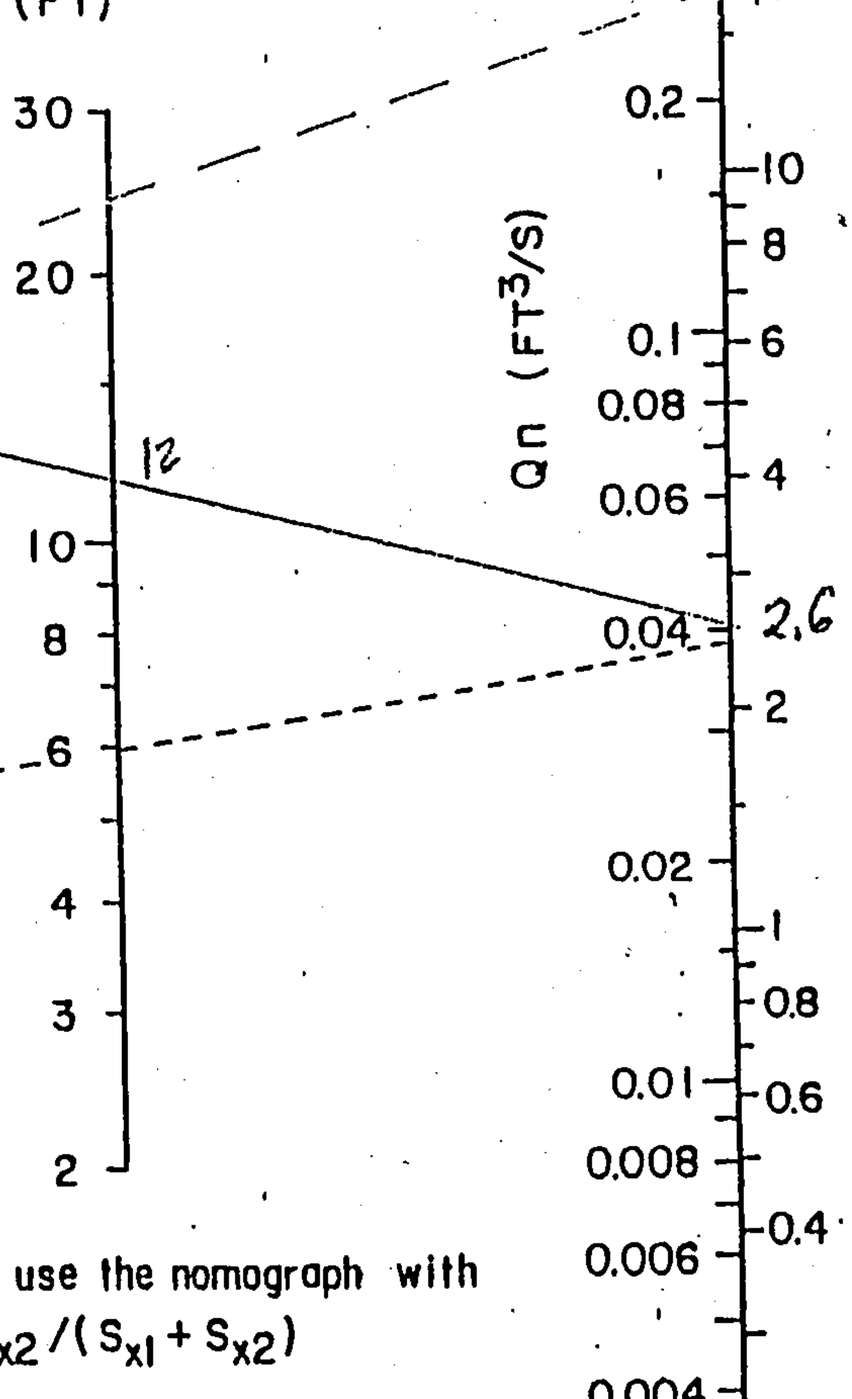
$n = 0.016$; $S_x = 0.03$

$S = 0.04$; $T = 6$ FT

FIND:

$Q = 2.4$ FT^3/S

$Qn = 0.038$ FT^3/S



1) For V-Shape, use the nomograph with
$S_x = S_{x1} S_{x2} / (S_{x1} + S_{x2})$

2) To determine discharge in gutter with composite cross slopes, find Q_s using T_s and S_x. Then, use CHART 4 to find E_o. The total discharge is $Q = Q_s/(1 - E_o)$, and $Q_w = Q - Q_s$.

CHART 3. Flow in triangular gutter sections.

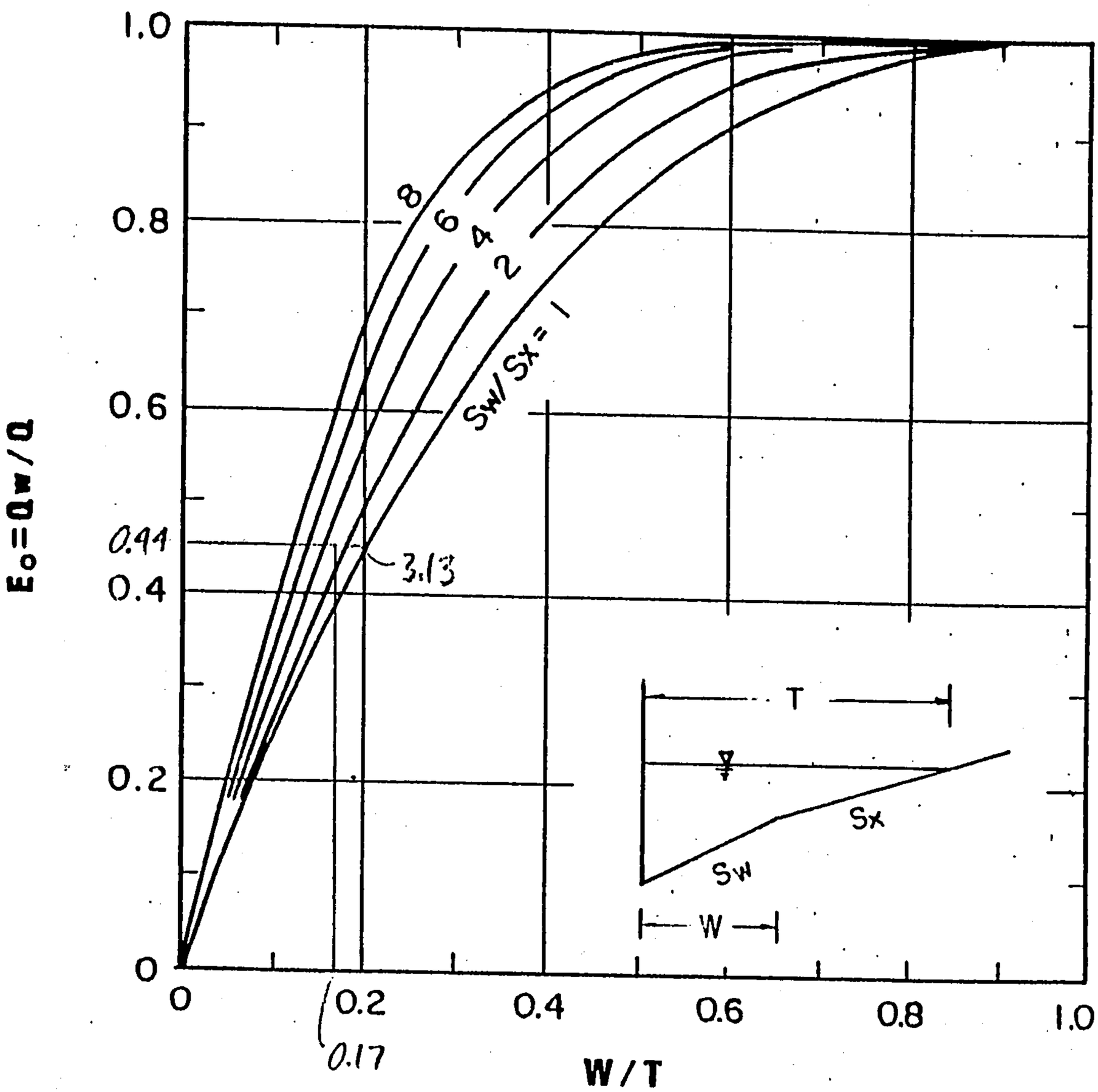
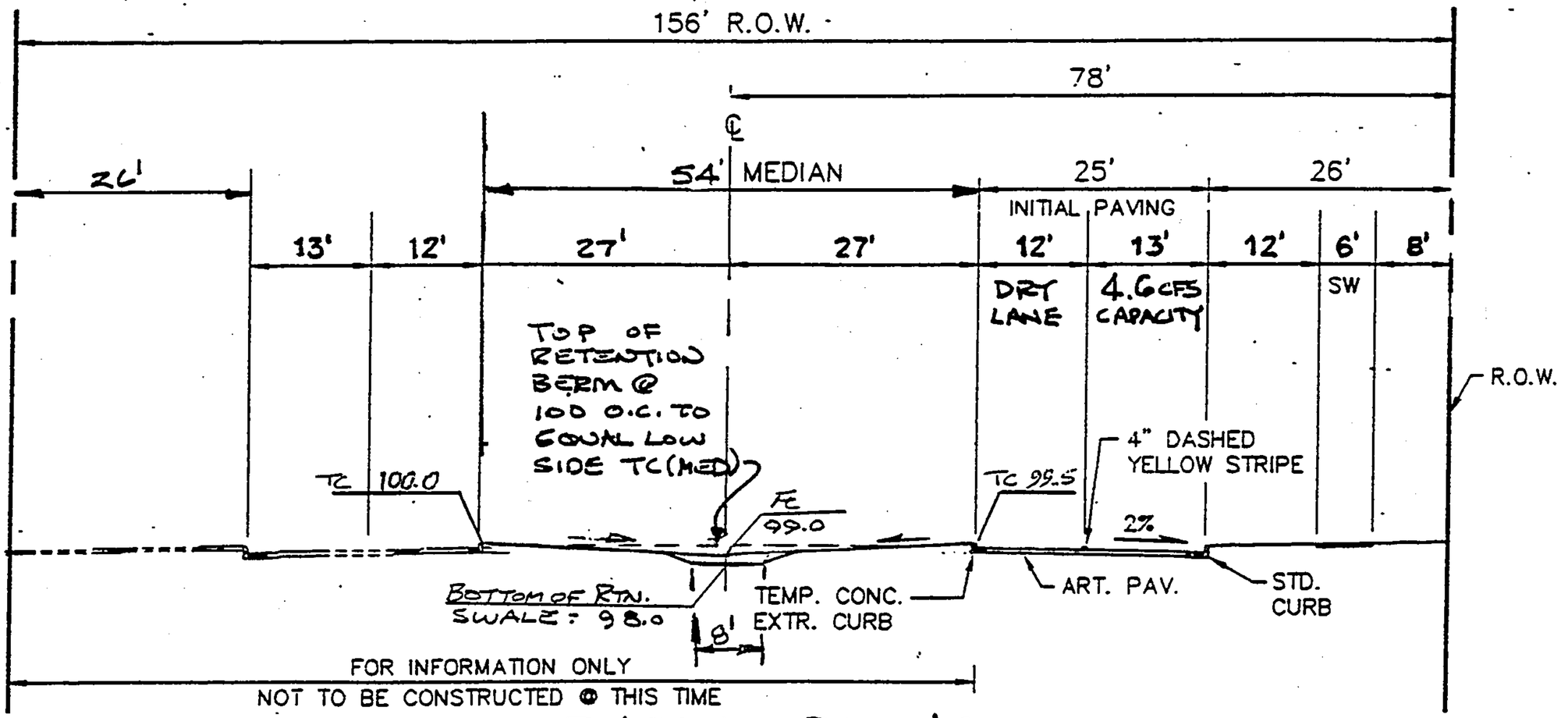


CHART 4. Ratio of frontal flow to total gutter flow.



INITIAL PAVING SECTION

UNSER BLVD

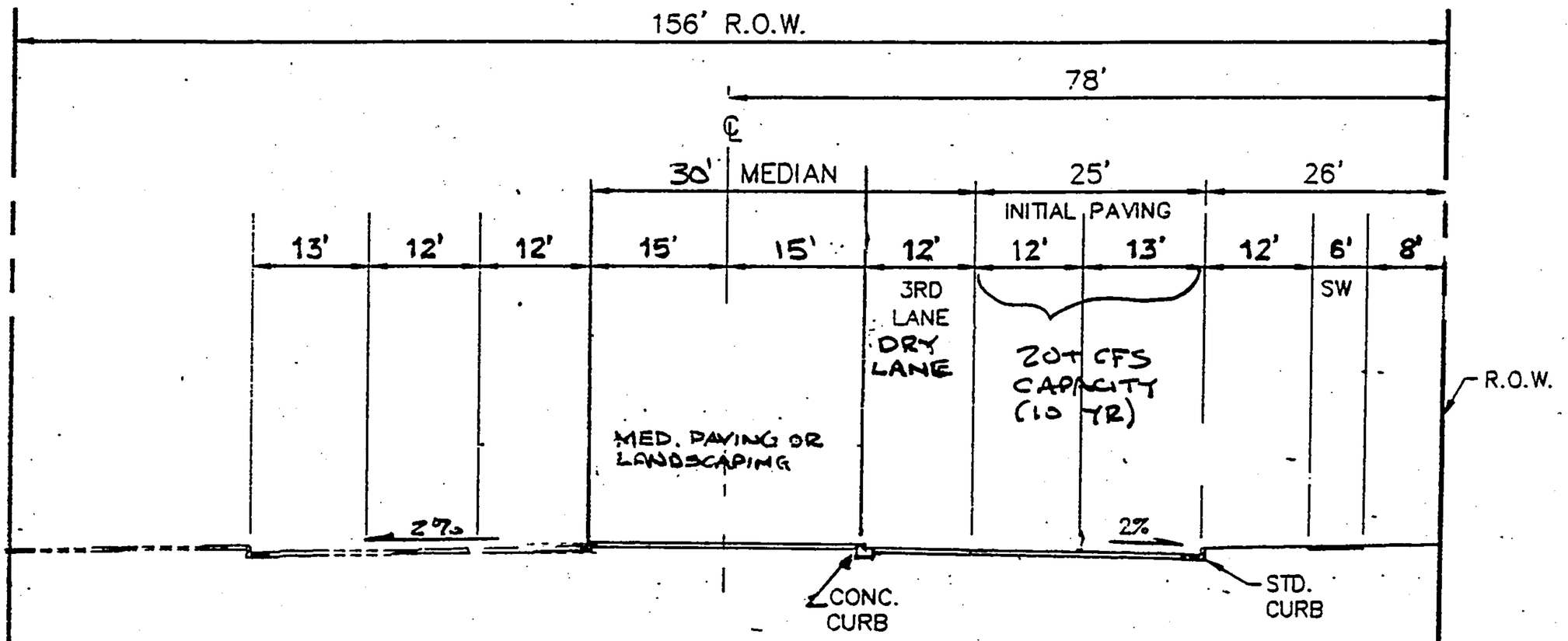
SCALE: 1"=20'

ISAACSON & ARFMAN, P.A.

SUBJECT SUNRISE ESTATES UNIT TWO

BY FCA DATE 6/97 SUBJECT UNSER BLVD. JOB NO.

ISAACSON & ARFMAN, P.A.
SUBJECT_____
BY_____JOB NO._____
DATE_____SHEET NO.____OF____



ULTIMATE PAVING SECTION

UNSER BLVD

SCALE: 1"=20'

UNSER BLVD.

L = 1020'

From R/W to Median Curb = 50' (2 lanes)

B = 70 C = 70 D = 60

Q_{100} = 4.2 cfs (24' F-F, 6' SW, the rest landscaped)

Q_{10} = 2.6 cfs

B = 5 C = 5 D = 60

Q_{100} = 4.9 cfs (24' F-F, no landscape)

Q_{10} = 3.2 cfs

Q_{100} = 5.5 cfs

Median 56' (all paved, no landscape)

Q_{100} = 5.5 cfs

From R/W to Median Curb = 62' (3 lanes)

Q_{100} = 5.2 cfs (36' F-F, 6' SW, & landscape)

Q_{10} = 3.2 cfs

Q_{100} = 6.1 cfs (36' F-F, no landscape)

Q_{10} = 4.0 cfs

SUBJECT: **Arenal Road Dry Lane Analysis**

CRITERIA: 10-Year 6-Hour Storm (DPM Calculations)
Arenal & Unser Intersection Land Treatment: 90% D; 10% C
Arenal Road Land Treatment: 77% D; 23% C

SOLUTION: Storm drains will be placed along the back of curb along Arenal from the intersection of Arenal and Unser to the Amole del Norte Channel under a city public project. The inlet spacing for both north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 25 feet (see attached Exhibit C). Inlet spacing will provide for one dry lane under this original road cross section.

10 year - 6 hour Dry lane Requirements for Arenal

- for one dry lane along Arenal (25' F-F width)

Q_{max} (½ street) = $\frac{1.486}{.017}(.125)^{.67}(.02)^{.5}(1.58) = 4.85$ cfs

* 1 · Pass through flows at the intersection of Arenal & Unser

$Q_{unser} = 1.9$ cfs

$Q_{sapphire} = 0$ cfs

Additional from from Arenal / Unser Intersection

- $A = 1.79$ AC
- 90% : D
  10% : C

$Q_{10-6} = .18(1.49) + 1.61(2.89) = 4.92$ cfs

Q_{10-6} (½ Street) = $4.92/2 = 2.46$ cfs

$Q_{TOTAL} = 1.9 + 2.46 = 4.36$ cfs

Place type A inlet @ each side of road @ Regional Detention Facility : per DPM plate 22.3 D-5 Q = 3.9cfs

∴ Pass through flow = 4.36 - 3.9 = .46 cfs

* 2 · Place catch basins 900 feet east of detention facility

- L = 900
- A = 3.22 Ac
- 77% : D
  23% : C

$Q_{10-6} = 2.48(2.89) + .74(1.49) = 8.27$cfs

Q_{10-6} (½ street) = $8.27/2 = 4.13$ cfs

Q inlet = 4.13 cfs + .46 = 4.59 cfs < 4.85 cfs ✓OK

∴ pass through flow = 4.59 - 3.9 = .69 cfs for type A inlet each side of Road

#3 · Check flow @ existing catch basins (near Arnole del Norte)

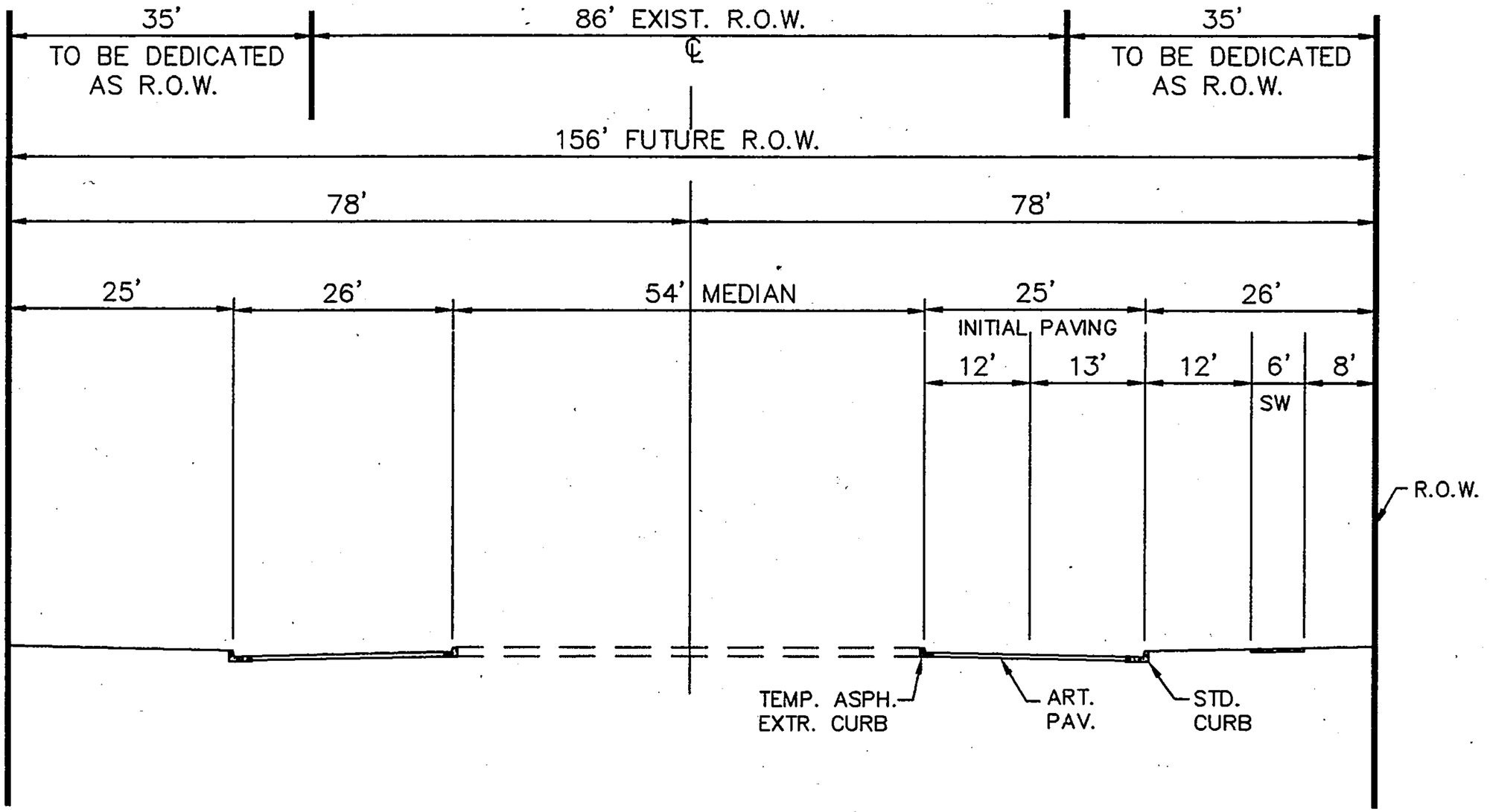
- L = 700 (east of #2)
- A = 2.51 Ac
- 77% : D
  23% : C

$Q_{10-6} = 2.89(1.93) + 1.49(.62) = 6.50$ cfs

Q_{10-6} (½ street) $= 6.50/2 = 3.25$ cfs

$Q_{inlet} = 3.25 + .69 = 3.94 < 4.85$ cfs ✓ok

∴ Replace type D inlet (existing) with type A inlet
Pass through flow = 3.94 - 3.9 = .04 cfs.



ARENAL ROAD

1"=20'

EXHIBIT 'C'

APPENDIX B

Arenal/Unser Drainage Management Plan
- Summary Information
- Basin 406 AHYMO Calculations
- Basin Map

Summary Excerpt from Arenal/Unser Drainage Management Plan

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and referencing datas gathered from BEC report make up the last part of the appendix in this section.

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7	.990	116.33
11	1.0	13.0	1.000	117.49
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

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	404.10	7& 8	9	.15480	272.95	9.204	1.11482	1.533	2.755	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	880.30	32.016	1.08855	1.533	2.494	
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	190.04	32.016	1.08855	1.966	.538	AC-FT= 18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL										
ROUTE	405.30	11	12	.55146	190.02	32.016	1.08855	2.000	.538	
*S**********										
*S**********										
*S **CALC BASIN 406										
COMPUTE NM HYD	406.00	-	13	.05743	117.49	3.920	1.27968	1.500	3.196	PER IMP= 42.00
*S **CALC BASIN 407										
COMPUTE NM HYD	407.00	-	14	.05040	104.81	3.491	1.29860	1.500	3.249	PER IMP= 42.00
*S **CALC BASIN 408										
COMPUTE NM HYD	408.00	-	15	.15736	327.60	10.899	1.29860	1.500	3.253	PER IMP= 42.00
*S**********										
*S**********										
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD										
COMPUTE NM HYD	500.00	-	16	.02491	51.80	1.725	1.29860	1.500	3.250	PER IMP= 42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING										
*S **DIRECTLY TO THE AMOLE CHANNEL										
COMPUTE NM HYD	501.00	-	17	.03663	76.18	2.537	1.29860	1.500	3.249	PER IMP= 42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE										
*S **LONGFORD SD										
ADD HYD	501.10	16&17	18	.06154	127.98	4.262	1.29859	1.500	3.250	
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD										
COMPUTE NM HYD	502.00	-	19	.05788	121.79	4.080	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN										
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.										
COMPUTE NM HYD	503.00	-	20	.03752	78.03	2.599	1.29860	1.500	3.249	PER IMP= 42.00
*S**********										
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @										
*S **A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	504.00	-	1	.03667	77.16	2.585	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.										
COMPUTE NM HYD	505.00	-	2	.02618	43.10	1.407	1.00753	1.500	2.572	PER IMP= 29.00
FINISH										

3.54	11.77	203.89	4.00
3.75	12.24	207.31	4.00
4.00	12.57	207.31	4.00

COMPUTE TRAVEL TIME ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

ROUTE ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0
PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA 405.30

RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

*S**********
*S**********
*S **CALC BASIN 406
COMPUTE NM HYD ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
PER A=4 PER B=27 PER C=27 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
    K =   .121550HR    TP =   .133300HR    K/TP RATIO =   .911856     SHAPE CONSTANT, N =  3.883611
    UNIT PEAK =   86.799    CFS   UNIT VOLUME =    1.000       B =   347.33      P60 = 1.8700
    AREA =      .033312 SQ MI    IA =    .44052 INCHES    INF =   1.08345 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=13   CODE=1

                                    HYDROGRAPH FROM AREA   406.00


    RUNOFF VOLUME =     1.27968 INCHES     =       3.9198 ACRE-FEET
    PEAK DISCHARGE RATE =     117.49 CFS  AT   1.500 HOURS   BASIN AREA =    .0574 SQ. MI.


*S **CALC BASIN 407
COMPUTE NM HYD      ID=14 HYD NO=407.00 AREA=0.0504 SQ MI
                    PER A=0 PER B=29 PER C=29 PER D=42
                    TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   83.572    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =      .021168 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   77.777    CFS   UNIT VOLUME =    1.000       B =   354.67      P60 = 1.8700
    AREA =      .029232 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=14   CODE=1

                                    HYDROGRAPH FROM AREA   407.00


    RUNOFF VOLUME =     1.29860 INCHES     =       3.4906 ACRE-FEET
    PEAK DISCHARGE RATE =     104.81 CFS  AT   1.500 HOURS   BASIN AREA =    .0504 SQ. MI.


*S **CALC BASIN 408
COMPUTE NM HYD      ID=15  HYD NO=408.00  AREA=0.15736 SQ MI
                    PER A=0  PER B=29  PER C=29  PER D=42
                    TP=-0.1333 HR  MASS RAIN=-1

    K =   .074258HR    TP =   .133300HR    K/TP RATIO =   .557073     SHAPE CONSTANT, N =  6.910316
    UNIT PEAK =   256.33    CFS   UNIT VOLUME =    .9995       B =   516.99      P60 = 1.8700
    AREA =      .066091 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .115909HR    TP =   .133300HR    K/TP RATIO =   .869534     SHAPE CONSTANT, N =  4.085829
    UNIT PEAK =   247.07    CFS   UNIT VOLUME =    1.000       B =   360.85      P60 = 1.8700
    AREA =      .091269 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

APPENDIX C

AHYMO Calculations
Retention Pond Calculations
Street Flow Calculations
Flow Master Storm Drain Calculations
Grading & Drainage Plans

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**** DESERT SPRINGS UNIT ONE****
****          JULY 24, 1997              ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR
*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD        ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=1   CODE=5
*S **BASIN 2A (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN)
COMPUTE NM HYD        ID=2 HYD NO=200.00 AREA=0.0005 SQ MI
                      PER A=0 PER B=0 PER C=0 PER D=100
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=2   CODE=5
*S **ADD BASIN 1A & 2A TO GET TOTAL FLOW AT SUMPS
ADD HYD               ID=3 HYD NO=200.1 ID=1 ID=2
PRINT HYD             ID=3 CODE=5
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRINGS)
COMPUTE NM HYD        ID=6 HYD NO=300.00 AREA=0.0063 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=6   CODE=5
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD        ID=7 HYD NO=400.00 AREA=0.0035 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=7   CODE=5
*S **BASIN 2C (10 LOTS, DRAINS TO SHADETREE DR)
COMPUTE NM HYD        ID=8 HYD NO=500.00 AREA=0.0022 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=8   CODE=5
*S **ROUTE BASIN 2C THRU EARTHEN CHANNEL
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                      MIN ELEV=24.96 FT MAX ELEV=33.80 FT
                      CH SLP=.013 FT FP SLP=.0135 FT N=-.025
                      DIST=680 FT
                      DIST ELEV  DIST ELEV   DIST ELEV
                      0    33.8  100  32.5   200  31.2
                      300  29.9  400  28.6   500  27.3
                      600  26.0  680  24.96
*S **COMPUTE TRAVEL TIME THRU CHANNEL
COMPUTE TRAVEL TIME ID=9 REACH NO=1 NO VS=1 L=680
                      SLP=.013
ROUTE                 ID=9 HYD NO=500.1 INFLOW ID=8 DT=0.0
PRINT HYD             ID=9 CODE=5
*S **ADD BASIN 2C AND 2B TOGETHER
ADD HYD               ID=10 HYD NO=500.2 ID=7 ID=9
PRINT HYD             ID=10 CODE=5
*S **ADD BASIN 2A TO THE COMBINED FLOW TO GET THE TOTAL FLOW @ INTERSECTION
ADD HYD               ID=11 HYD NO=600 ID=6 ID=10
PRINT HYD             ID=11 CODE=5
FINISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 07/25/1997
         START TIME (HR:MIN:SEC) = 06:43:05     USER NO.= ISCARFNM.I01
         INPUT FILE = DSTSPG1A.DAT

**** DESERT SPRINGS UNIT ONE****
****          JULY 24, 1997           ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

                  COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =    .033330 HOURS        END TIME =     5.999400 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0085   .0103
                     .0122   .0141   .0160   .0180   .0201   .0222   .0243
                     .0266   .0289   .0312   .0337   .0362   .0388   .0415
                     .0443   .0472   .0502   .0534   .0567   .0601   .0637
                     .0675   .0715   .0758   .0809   .0865   .0924   .1050
                     .1334   .1771   .2398   .3254   .4379   .5814   .7600
                     .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                    1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                    1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                    1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                    1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                    2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                    2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                    2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                    2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                    2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                    2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                    2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                    2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                    2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                    2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                    2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                    2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                    2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                    2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                    2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD        ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   27.455    CFS   UNIT VOLUME =    .9990       B =   526.28      P60 = 1.8700
    AREA =      .006954 SQ MI    IA =     .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   11.829    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
    AREA =      .004446 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

PRINT HYD ID=1 CODE=5

PARTIAL HYDROGRAPH 100.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	26.4	3.000	.3	4.500	.1	5.999	.1
.167	.0	1.667	13.6	3.166	.2	4.666	.1	6.166	.1
.333	.0	1.833	8.0	3.333	.2	4.833	.1	6.333	.0
.500	.0	2.000	5.5	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	2.6	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	1.2	3.833	.1	5.333	.1	6.833	.0
1.000	.0	2.500	.8	4.000	.1	5.499	.1		
1.167	.1	2.666	.5	4.166	.1	5.666	.1		
1.333	6.3	2.833	.4	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.51706 INCHES = .9224 ACRE-FEET
PEAK DISCHARGE RATE = 26.40 CFS AT 1.500 HOURS BASIN AREA = .0114 SQ. MI.

*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN
COMPUTE NM HYD ID=2 HYD NO=200.00 AREA=0.0005 SQ MI
PER A=0 PER B=0 PER C=0 PER D=100
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.9740 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.8700
AREA = .000500 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=2 CODE=5

PARTIAL HYDROGRAPH 200.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.4	2.666	.0	4.000	.0	5.333	.0
.167	.0	1.500	1.4	2.833	.0	4.166	.0	5.499	.0
.333	.0	1.667	.7	3.000	.0	4.333	.0	5.666	.0
.500	.0	1.833	.5	3.166	.0	4.500	.0	5.833	.0
.667	.0	2.000	.3	3.333	.0	4.666	.0	5.999	.0
.833	.0	2.166	.2	3.500	.0	4.833	.0	6.166	.0
1.000	.0	2.333	.1	3.666	.0	4.999	.0	6.333	.0
1.167	.0	2.500	.0	3.833	.0	5.166	.0		

RUNOFF VOLUME = 1.96548 INCHES = .0524 ACRE-FEET
PEAK DISCHARGE RATE = 1.41 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

*S **ADD BASIN 1A & 1B TO GET TOTAL FLOW AT SUMPS
ADD HYD ID=3 HYD NO=200.1 ID=1 ID=2
PRINT HYD ID=3 CODE=5

PARTIAL HYDROGRAPH 200.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	27.8	3.000	.3	4.500	.1	5.999	.2
.167	.0	1.667	14.3	3.166	.2	4.666	.1	6.166	.1
.333	.0	1.833	8.5	3.333	.2	4.833	.1	6.333	.0
.500	.0	2.000	5.9	3.500	.2	4.999	.1	6.499	.0
.667	.0	2.166	2.7	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	1.3	3.833	.1	5.333	.1	6.833	.0
1.000	.0	2.500	.8	4.000	.1	5.499	.1		
1.167	.1	2.666	.5	4.166	.1	5.666	.1		
1.333	6.7	2.833	.4	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.53585 INCHES = .9747 ACRE-FEET
PEAK DISCHARGE RATE = 27.80 CFS AT 1.500 HOURS BASIN AREA = .0119 SQ. MI.

*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING
COMPUTE NM HYD ID=6 HYD NO=300.00 AREA=0.0063 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 15.172 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.8700
AREA = .003843 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 6.5373 CFS UNIT VOLUME = .9984 B = 354.67 P60 = 1.8700
AREA = .002457 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=6 CODE=5

HYDROGRAPH FROM AREA 300.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	14.6	3.000	.1	4.500	.1	5.999	.1
.167	.0	1.667	7.5	3.166	.1	4.666	.1	6.166	.0
.333	.0	1.833	4.4	3.333	.1	4.833	.1	6.333	.0
.500	.0	2.000	3.0	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	1.4	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	.7	3.833	.1	5.333	.1		
1.000	.0	2.500	.4	4.000	.1	5.499	.1		
1.167	.0	2.666	.3	4.166	.1	5.666	.1		
1.333	3.5	2.833	.2	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.51706 INCHES = .5097 ACRE-FEET
PEAK DISCHARGE RATE = 14.59 CFS AT 1.500 HOURS BASIN AREA = .0063 SQ. MI.

*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD ID=7 HYD NO=400.00 AREA=0.0035 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 8.4291 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.8700
AREA = .002135 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 3.6318 CFS UNIT VOLUME = .9969 B = 354.67 P60 = 1.8700
AREA = .001365 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=7 CODE=5

HYDROGRAPH FROM AREA 400.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	8.1	3.000	.1	4.500	.0	5.999	.0
.167	.0	1.667	4.2	3.166	.1	4.666	.0	6.166	.0
.333	.0	1.833	2.5	3.333	.0	4.833	.0	6.333	.0
.500	.0	2.000	1.7	3.500	.0	4.999	.0	6.499	.0
.667	.0	2.166	.8	3.666	.0	5.166	.0	6.666	.0
.833	.0	2.333	.4	3.833	.0	5.333	.0		
1.000	.0	2.500	.2	4.000	.0	5.499	.0		
1.167	.0	2.666	.2	4.166	.0	5.666	.0		
1.333	1.9	2.833	.1	4.333	.0	5.833	.0		

RUNOFF VOLUME = 1.51706 INCHES = .2832 ACRE-FEET
PEAK DISCHARGE RATE = 8.12 CFS AT 1.500 HOURS BASIN AREA = .0035 SQ. MI.

*S **BASIN 2C (10 LOTS, DRAINS TO SHADETREE DR)
COMPUTE NM HYD ID=8 HYD NO=500.00 AREA=0.0022 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 5.2983 CFS UNIT VOLUME = .9973 B = 526.28 P60 = 1.8700
AREA = .001342 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 2.2829 CFS UNIT VOLUME = .9948 B = 354.67 P60 = 1.8700
AREA = .000858 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=8 CODE=5

OUTFLOW HYDROGRAPH RESERVOIR 500.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	1.2	2.666	.1	4.000	.0	5.333	.0
.167	.0	1.500	5.1	2.833	.1	4.166	.0	5.499	.0
.333	.0	1.667	2.6	3.000	.0	4.333	.0	5.666	.0
.500	.0	1.833	1.6	3.166	.0	4.500	.0	5.833	.0
.667	.0	2.000	1.1	3.333	.0	4.666	.0	5.999	.0
.833	.0	2.166	.5	3.500	.0	4.833	.0	6.166	.0
1.000	.0	2.333	.2	3.666	.0	4.999	.0	6.333	.0
1.167	.0	2.500	.1	3.833	.0	5.166	.0	6.499	.0

RUNOFF VOLUME = 1.51706 INCHES = .1780 ACRE-FEET
PEAK DISCHARGE RATE = 5.11 CFS AT 1.500 HOURS BASIN AREA = .0022 SQ. MI.

*S **ROUTE BASIN 2C THRU EARTHEN CHANNEL
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=24.96 FT MAX ELEV=33.80 FT
CH SLP=.013 FT FP SLP=.0135 FT N=-.025
DIST=680 FT

DIST	ELEV	DIST	ELEV	DIST	ELEV
0	33.8	100	32.5	200	31.2
300	29.9	400	28.6	500	27.3
600	26.0	680	24.96		

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
24.96	.00	.00	.00
25.43	8.33	21.34	35.79
25.89	33.30	135.51	71.58
26.36	74.93	399.53	107.37
26.82	133.21	860.44	143.16
27.29	208.14	1560.09	178.95
27.75	299.73	2536.88	214.74
28.22	407.96	3826.70	250.53
28.68	532.85	5463.49	286.32
29.15	674.39	7479.58	322.11
29.61	832.58	9905.98	357.89
30.08	1007.42	12772.56	393.68
30.54	1198.91	16108.22	429.47
31.01	1407.05	19940.99	465.26
31.47	1631.85	24298.12	501.05
31.94	1873.30	29206.17	536.84
32.40	2131.40	34691.09	572.63
32.87	2406.15	40778.25	608.42
33.33	2697.55	47492.48	644.21
33.80	3005.60	54858.18	680.00

*S **COMPUTE TRAVEL TIME THRU CHANNEL
COMPUTE TRAVEL TIME ID=9 REACH NO=1 NO VS=1 L=680
SLP=.013

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.465	8.326	21.34	.0737
.931	33.303	135.51	.0464
1.396	74.932	399.53	.0354
1.861	133.212	860.44	.0292
2.326	208.144	1560.09	.0252
2.792	299.728	2536.88	.0223
3.257	407.963	3826.70	.0201
3.722	532.849	5463.49	.0184
4.187	674.387	7479.58	.0170
4.653	832.577	9905.98	.0159
5.118	1007.418	12772.56	.0149
5.583	1198.910	16108.22	.0141
6.048	1407.055	19940.99	.0133
6.514	1631.850	24298.12	.0127
6.979	1873.298	29206.17	.0121
7.444	2131.396	34691.09	.0116
7.909	2406.147	40778.25	.0111
8.375	2697.549	47492.48	.0107
8.840	3005.602	54858.18	.0103

```
ROUTE              ID=9 HYD NO=500.1 INFLOW ID=8 DT=0.0
PRINT HYD          ID=9 CODE=5
```

OUTFLOW HYDROGRAPH RESERVOIR 500.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	3.6	3.000	.1	4.500	.0	5.999	.0
.167	.0	1.667	3.5	3.166	.0	4.666	.0	6.166	.0
.333	.0	1.833	2.0	3.333	.0	4.833	.0	6.333	.0
.500	.0	2.000	1.3	3.500	.0	4.999	.0	6.499	.0
.667	.0	2.166	.8	3.666	.0	5.166	.0	6.666	.0
.833	.0	2.333	.3	3.833	.0	5.333	.0		
1.000	.0	2.500	.2	4.000	.0	5.499	.0		
1.167	.0	2.666	.1	4.166	.0	5.666	.0		
1.333	.6	2.833	.1	4.333	.0	5.833	.0		

RUNOFF VOLUME = 1.51717 INCHES = .1780 ACRE-FEET
PEAK DISCHARGE RATE = 4.29 CFS AT 1.567 HOURS BASIN AREA = .0022 SQ. MI.

```
*S **ADD BASIN 2C AND 2B TOGETHER
ADD HYD            ID=10 HYD NO=500.2 ID=7 ID=9
PRINT HYD          ID=10 CODE=5
```

OUTFLOW HYDROGRAPH RESERVOIR 500.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	11.7	3.000	.1	4.500	.1	5.999	.1
.167	.0	1.667	7.7	3.166	.1	4.666	.1	6.166	.0
.333	.0	1.833	4.5	3.333	.1	4.833	.1	6.333	.0
.500	.0	2.000	3.0	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	1.6	3.666	.1	5.166	.1	6.666	.0

.833	.0	2.333	.7	3.833	.1	5.333	.1
1.000	.0	2.500	.4	4.000	.1	5.499	.1
1.167	.0	2.666	.3	4.166	.1	5.666	.1
1.333	2.5	2.833	.2	4.333	.1	5.833	.1

RUNOFF VOLUME = 1.51697 INCHES = .4612 ACRE-FEET
PEAK DISCHARGE RATE = 11.91 CFS AT 1.533 HOURS BASIN AREA = .0057 SQ. MI.

```
*S **ADD BASIN 2A TO THE COMBINED FLOW TO GET THE TOTAL FLOW @ INTERSECTION
ADD HYD             ID=11 HYD NO=600 ID=6 ID=10
PRINT HYD           ID=11 CODE=5
```

HYDROGRAPH FROM AREA 600.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	26.3	3.000	.3	4.500	.1	5.999	.1
.167	.0	1.667	15.2	3.166	.2	4.666	.1	6.166	.1
.333	.0	1.833	8.9	3.333	.2	4.833	.1	6.333	.0
.500	.0	2.000	6.0	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	3.0	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	1.4	3.833	.1	5.333	.1		
1.000	.0	2.500	.9	4.000	.1	5.499	.1		
1.167	.0	2.666	.6	4.166	.1	5.666	.1		
1.333	5.9	2.833	.4	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.51699 INCHES = .9709 ACRE-FEET
PEAK DISCHARGE RATE = 26.30 CFS AT 1.500 HOURS BASIN AREA = .0120 SQ. MI.

```
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 06:43:06
```

```
**** DESERT SPRINGS UNIT ONE**** FOR FUTURE FLOWS FROM BLUE AVENA AVENUE
****          JULY 24, 1997                ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD        ID=7 HYD NO=400.00 AREA=0.0035 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=7   CODE=5
*S **BASIN 2C (10 LOTS, DRAINS TO SHADETREE DR & FUTURE BLUE AVENA AVE)
COMPUTE NM HYD        ID=12 HYD NO=600.00 AREA=0.0076 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1
PRINT HYD             ID=12   CODE=5
ADD HYD               ID=13 HYD NO=600.1 ID=12 ID=7
PRINT HYD             ID=13 CODE=5
FINISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 07/27/1997
         START TIME (HR:MIN:SEC) = 07:42:14     USER NO.= ISCARFNM.I01
         INPUT FILE = DSTSPGA2.DAT

**** DESERT SPRINGS UNIT ONE****
****          JULY 24, 1997            ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

                  COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0085   .0103
                     .0122   .0141   .0160   .0180   .0201   .0222   .0243
                     .0266   .0289   .0312   .0337   .0362   .0388   .0415
                     .0443   .0472   .0502   .0534   .0567   .0601   .0637
                     .0675   .0715   .0758   .0809   .0865   .0924   .1050
                     .1334   .1771   .2398   .3254   .4379   .5814   .7600
                     .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                    1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                    1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                    1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                    1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                    2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                    2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                    2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                    2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                    2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                    2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                    2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                    2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                    2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                    2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                    2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                    2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                    2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                    2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                    2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD        ID=7 HYD NO=400.00 AREA=0.0035 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4291    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.6318    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001365 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

PRINT HYD ID=7 CODE=5

HYDROGRAPH FROM AREA 400.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	8.1	3.000	.1	4.500	.0	5.999	.0
.167	.0	1.667	4.2	3.166	.1	4.666	.0	6.166	.0
.333	.0	1.833	2.5	3.333	.0	4.833	.0	6.333	.0
.500	.0	2.000	1.7	3.500	.0	4.999	.0	6.499	.0
.667	.0	2.166	.8	3.666	.0	5.166	.0	6.666	.0
.833	.0	2.333	.4	3.833	.0	5.333	.0		
1.000	.0	2.500	.2	4.000	.0	5.499	.0		
1.167	.0	2.666	.2	4.166	.0	5.666	.0		
1.333	1.9	2.833	.1	4.333	.0	5.833	.0		

RUNOFF VOLUME = 1.51706 INCHES = .2832 ACRE-FEET
PEAK DISCHARGE RATE = 8.12 CFS AT 1.500 HOURS BASIN AREA = .0035 SQ. MI.

*S **BASIN 2C (10 LOTS, DRAINS TO SHADETREE DR & FUTURE BLUE AVENA AVE)
COMPUTE NM HYD ID=12 HYD NO=600.00 AREA=0.0076 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 18.303 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.8700
AREA = .004636 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 7.8862 CFS UNIT VOLUME = .9988 B = 354.67 P60 = 1.8700
AREA = .002964 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=12 CODE=5

HYDROGRAPH FROM AREA 600.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	17.6	3.000	.2	4.500	.1	5.999	.1
.167	.0	1.667	9.1	3.166	.1	4.666	.1	6.166	.0
.333	.0	1.833	5.4	3.333	.1	4.833	.1	6.333	.0
.500	.0	2.000	3.7	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	1.7	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	.8	3.833	.1	5.333	.1	6.833	.0
1.000	.0	2.500	.5	4.000	.1	5.499	.1		
1.167	.0	2.666	.3	4.166	.1	5.666	.1		
1.333	4.2	2.833	.2	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.51706 INCHES = .6149 ACRE-FEET
PEAK DISCHARGE RATE = 17.60 CFS AT 1.500 HOURS BASIN AREA = .0076 SQ. MI.

```
ADD HYD              ID=13 HYD NO=600.1 ID=12 ID=7
PRINT HYD            ID=13 CODE=5
```

HYDROGRAPH FROM AREA 600.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	25.7	3.000	.2	4.500	.1	5.999	.1
.167	.0	1.667	13.3	3.166	.2	4.666	.1	6.166	.1
.333	.0	1.833	7.8	3.333	.2	4.833	.1	6.333	.0
.500	.0	2.000	5.4	3.500	.1	4.999	.1	6.499	.0
.667	.0	2.166	2.5	3.666	.1	5.166	.1	6.666	.0
.833	.0	2.333	1.2	3.833	.1	5.333	.1	6.833	.0
1.000	.0	2.500	.8	4.000	.1	5.499	.1		
1.167	.1	2.666	.5	4.166	.1	5.666	.1		
1.333	6.1	2.833	.3	4.333	.1	5.833	.1		

RUNOFF VOLUME = 1.51701 INCHES = .8981 ACRE-FEET
PEAK DISCHARGE RATE = 25.72 CFS AT 1.500 HOURS BASIN AREA = .0111 SQ. MI.

```
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 07:42:14
```

RUNOFF VOLUME CALCULATIONS

Precip. Zone	Excess Precipitation, E (inches)			
	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

Analysis Point	Land Treatment Areas (ac)					Weighted E (in)	V_{100} (cf)	Remarks
	A_T	A_A	A_B	A_C	A_D			
AP1 Pond 1	7.61	----	1.48	1.48	4.64	1.52	42099	$V_{100\text{-}10d} = .966 + 4.64\ (\frac{3.67-2.20}{12}) = 1.53$ Ac/Ft
AP2 Pond 2	7.69	----	1.50	1.50	4.69	1.53	42577	$V_{100\text{-}10d} = .977 + 4.69\ (\frac{3.67-2.20}{12}) = 1.55$ Ac/Ft

Weighted E = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D) \div A_T$

Volume = $\frac{\text{Weighted E}}{12} \times A_T \times 43{,}560$

Check Street Flow Depths

1) Desert Springs Drive @ Silverberry Rd Intersection

A_{TOTAL} = 7.19 Ac + .29 Ac + .125 Ac (Future) = 7.61 Ac

Q_p (AHYMO) = 27.8 cfs

Q_p (½ street) = 13.9 cfs

for a 36' street (F-F) @ d = .67 feet

$A_{½ \text{ street}} = .125 + .225(16) + .545(2) + .32(16)/2 = 7.38 ft^2$

$WP_{½ \text{ street}} = .67 + 2 + 16 = 18.68$ ft

$S = .5\%$

$Q_{½ \text{street}} = \frac{1.486}{.017}(.345)^{2/3}(.005)^{.5}(7.38) = 24.48$ cfs > 13.9 cfs ½ ok

2) Rainwater Rd @ Desert Springs Dr Intersection

A_{TOTAL} = 4.07 Ac

Q_p (Athymo) = 14.59 cfs

Q_p (½ street) = 7.30 cfs

for a 32' street (F-F) @ d = .67 feet

$A_{½ \text{ street}} = .125 + .28(14)/2 + .265(16) = 6.325$ ft

$WP_{½ \text{ street}} = .67 + 2 + 14 = 16.67$ ft

$S = 1.58\%$

$Q_{½ \text{ street}} = \frac{1.486}{.017}(.379)^{2/3}(.0158)^{.5}(6.325) = 36.28$ cfs > 7.30 cfs ✓ok

3) Desert Springs Court @ Desert Springs Dr Intersection

A_{TOTAL} = 1.73 Ac + 2.23 Ac + 3.7 Ac (Future) = 7.66 Ac

Q_p (Athymo) = 25.72 cfs

Q_p (½ street) = 12.86 cfs

Street Flows Depths (cont)

3) Desert Springs Ct @ Desert Springs Dr

for a 28' street (F-F) @ d = .67 feet

$A_{1/2\ Street} = .125 + 12(.24)/2 + .305(14) = 5.835\ ft^2$

$WP_{1/2\ Street} = .67 + 2 + 12 = 14.67\ ft$

$S = 1\%$

$Q_{1/2\ Street} = \frac{1.486}{.017}(.398)^{2/3}(.01)^{.5}(5.835) = 27.60\ cfs > 12.86\ cfs$ ✓ MC

Pressure Pipe Analysis & Design
Circular Pipe

Worksheet Name: ds1-ds2

Comment: Desert Springs MH1 to Desert Springs MH2

Solve For Pressure @ 1

Given Input Data:

Elevation @ 1.....	22.00 ft
Elevation @ 2.....	17.80 ft
Pressure @ 2.....	0.28 psi
Discharge.....	12477.50 gpm
Diameter.....	24.00 in
Length.....	425.00 ft
Hazen-Williams C..	135.00

Computed Results:

Pressure @ 1.....	0.06 psi
Velocity.....	8.85 fps
Headloss.....	3.68 ft
Energy Grade @ 1..	23.34 ft
Energy Grade @ 2..	19.66 ft
Friction Slope....	8.661 ft/1000 ft

Open Channel Flow Module, Version 3.43 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Pressure Pipe Analysis & Design
Circular Pipe

Worksheet Name: ds2-ar1

Comment: Desert Springs MH2 to Arenal MH 1

Solve For Pressure @ 1

Given Input Data:

Elevation @ 1.....	17.80 ft
Elevation @ 2.....	17.30 ft
Pressure @ 2.....	0.43 psi
Discharge.....	12477.50 gpm
Diameter.....	30.00 in
Length.....	50.00 ft
Hazen-Williams C..	135.00

Computed Results:

Pressure @ 1.....	0.28 psi
Velocity.....	5.66 fps
Headloss.....	0.15 ft
Energy Grade @ 1..	18.94 ft
Energy Grade @ 2..	18.79 ft
Friction Slope....	2.921 ft/1000 ft

Open Channel Flow Module, Version 3.43 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Pressure Pipe Analysis & Design
Circular Pipe

Worksheet Name: ds2-pd

Comment: Desert Springs MH2 to Temp Pond1

Solve For Elevation @ 2

Given Input Data:

Elevation @ 1.....	18.44 ft
Pressure @ 1.....	0.00 psi
Pressure @ 2.....	0.00 psi
Discharge.....	12477.50 gpm
Diameter.....	30.00 in
Length.....	61.00 ft
Hazen-Williams C..	135.00

Computed Results:

Elevation @ 2.....	18.26 ft
Velocity.....	5.66 fps
Headloss.....	0.18 ft
Energy Grade @ 1..	18.94 ft
Energy Grade @ 2..	18.76 ft
Friction Slope....	2.921 ft/1000 ft

Open Channel Flow Module, Version 3.43 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: dsrtspg1

Comment: From Shadetree Drive to Pond #2

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.025
Channel Slope....	0.0130 ft/ft
Discharge.....	5.11 cfs

Computed Results:

Depth.....	0.72 ft
Velocity.....	3.30 fps
Flow Area.....	1.55 sf
Flow Top Width...	4.31 ft
Wetted Perimeter.	4.54 ft
Critical Depth...	0.71 ft
Critical Slope...	0.0138 ft/ft
Froude Number....	0.97 (flow is Subcritical)

Open Channel Flow Module, Version 3.43 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 12, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico 87108

RE: ***Revised Master Drainage Report for Desert Springs Subdivision Units Three Through Five, (M10/D8) Submitted for Preliminary and Final Plat Approval and Rough Grading Approval, Engineer's Stamp Dated 3/22/99 on Report and Plans Dated 4/5/99.***

Dear Mr. Arfman:

Based on the information provided in the submittals of March 22, 1999 and April 6, 1999, the above referenced Plans for Desert Springs Units Three through Five are approved for Preliminary Plat action.

The above referenced plans are also approved for Grading Permit release, however, no grading may occur within the Amole Del Norte Diversion Channel right-of-way until concurrence from City Storm Drain Maintenance is obtained. City Storm Drain Maintenance must also approve the proposed connections to this channel.

The Letter of Map Revision must be received from FEMA prior to release of the SIA or financial guarantees for Units 4 or 5. Approval from the State Engineer's Office for the Arenal/Unser regional detention facility is also required prior to release of the SIA or financial guarantees for Units 4 or 5.

As you are aware, the SIA is required prior to Final Plat sign-off, and the Grading and Drainage Certification is required prior to release of the SIA or financial guarantees for each Unit.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Fred Aguirre, DRB-98-185
Bo K. Johnson, P.E., Curb Inc.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT NAME: Desert Springs Units 3-5 ZONE ATLAS/DRNG. FILE#: M-10008

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: Tracts A & B Desert Springs Subdivision
Tract C-1 Desert Springs Unit 2

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs
ADDRESS: 128 Monroe Street NE PHONE: 268-8828
CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb Inc CONTACT: BO Johnson
ADDRESS: 6301 Indian School Rd Ste 680 PHONE: 881-9190
CITY, STATE: ABQ NM ZIP CODE: 87110

ARCHITECT: NA CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich
ADDRESS: _____ PHONE: 884-1990
CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: NA CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

- ✓ DRAINAGE REPORT
- ___ DRAINAGE PLAN
- ✓ ~~CONCEPTUAL~~ GRADING & DRAINAGE PLAN
- ___ GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION
- ___ OTHER

PRE-DESIGN MEETING:

- ___ YES
- ✓ NO
- ___ COPY PROVIDED

RECEIVED
MAR 22 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SKETCH PLAT APPROVAL
- ✓ PRELIMINARY PLAT APPROVAL
- ___ S.DEV. PLAN FOR SUB'D. APPROVAL
- ___ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- ✓ FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ CERTIFICATE OF OCCUPANCY APPROVAL
- ___ GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ S.A.D. DRAINAGE REPORT
- ___ DRAINAGE REQUIREMENTS
- ✓ OTHER (SPECIFY) Rough Grading Approval

DATE SUBMITTED: 3/22/99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

Regional Pond improvements
on Infrastructure
List? Unit 4?
State Engineer's office
approval for pond?

DRAINAGE INFORMATION SHEET

PROJECT I.E.: Desert Springs Units 3-5 ZONE ATLAS/DRNG. FILE#: M-10 / M10/D8

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: Tracts A & B Desert Springs Subdivision

CITY ADDRESS: Tract C-1 Desert Springs Unit 2

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb Inc CONTACT: BO Johnson

ADDRESS: 6301 Indian School Rd Ste 680 PHONE: 881-9190

CITY, STATE: ABQ NM ZIP CODE: 87110

ARCHITECT: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich

ADDRESS: _____ PHONE: 884-1990

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
X GRADING PLAN
___ EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION
___ OTHER

PRE-DESIGN MEETING:

___ YES
✓ NO
___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
✓ PRELIMINARY PLAT APPROVAL
___ S.DEV. PLAN FOR SUB'D. APPROVAL
___ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
✓ FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
✓ OTHER (SPECIFY) Rough Grading Approval

RECEIVED
APR 6 1999
HYDROLOGY SECTION

DATE SUBMITTED: 4/6/99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

Isaacson &
Arfman, P.A.

Consulting Engineering
Associates

Letter of Transmittal

To Susan Calongne
COA Hydrology

Date 4/6/99

Job No. M10108

Attn:

Reference Desert Springs Subdivision Units 3-5

Gentlemen:

We transmit to you 1 copy(ies) of the following

- ☐ _____ Plats
- ☑ Revised G&D Plans
- ☐ Specifications
- ☐ _____ Report
- ☐ Shop Drawings
- ☐ Submittals
- ☐ Material Specifications
- ☐ Copy of Letter
- ☐ _____
- ☐ _____

This information is transmitted:

- ☐ As per your request
- ☑ For your review & approval
- ☐ For your information
- ☐ For your attention
- ☐ For your signature
- ☑ For your files
- ☑ For your use
- ☐ Please review & return
- ☐ For return to your files
- ☐ Please advise

☑ No changes were made to the grades.
☐ The sheets were re-formatted to show one Unit per page.

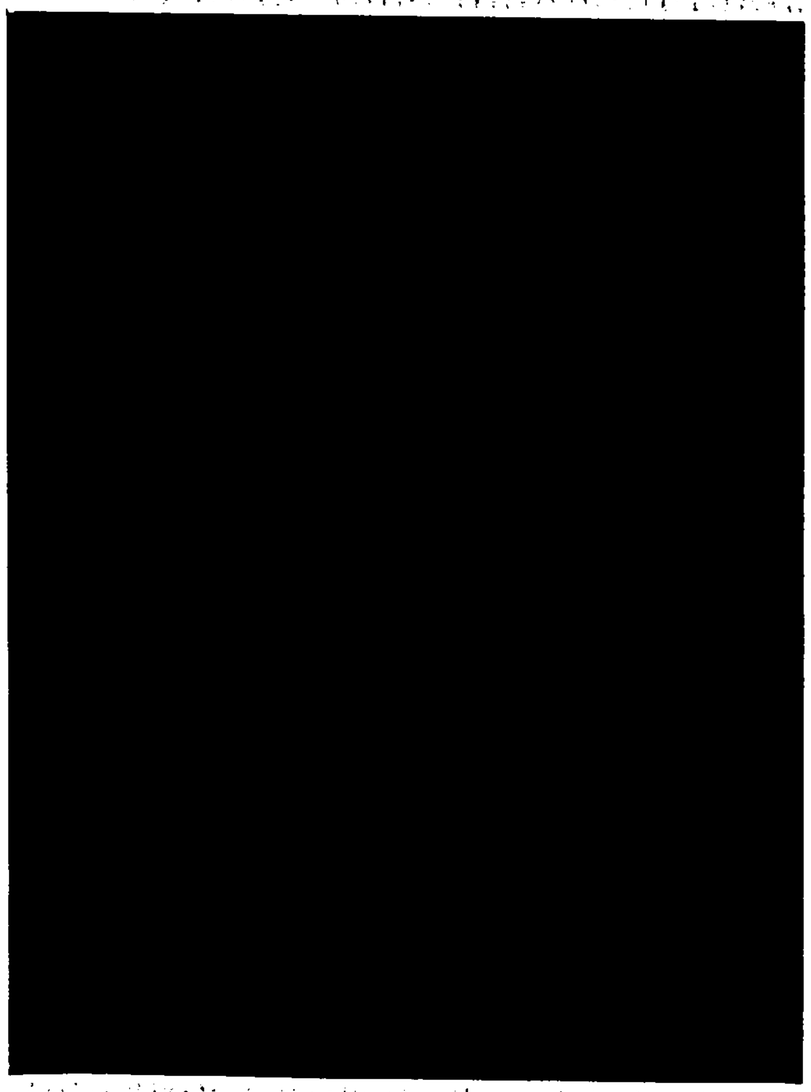
Remarks:

RECEIVED
APR 6 1999
HYDROLOGY SECTION

By: Melissa Combs

Copies To

128 Monroe, NE • Albuquerque, NM 87108 • (505) 268-8828



REVISED MASTER DRAINAGE REPORT

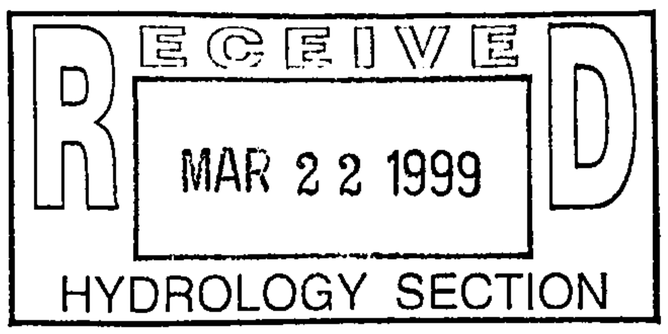
FOR

DESERT SPRINGS SUBDIVISION
UNITS THREE THROUGH FIVE

A 314 LOT (THREE PHASE) SINGLE FAMILY RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO

FEBRUARY 1999



Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
(505) 268-8828



Scott M McGee 3/22/99

Scott M. McGee, PE **Date**

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

March 19, 1999

Ms. Susan Calongne, PE
City/County Floodplain Administrator
Hydrology Division
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Revised Master Drainage Report for
Desert Springs Subdivision Units Three thru Five (M10/D8)

Dear Ms. Calongne:

Attached is our response to your comments provided on 3/18/99.

1. No, grading will occur for each unit at the time of construction. A grading certification will be completed for each unit.

2. Unit labels have been added to the plan. The only proposed retaining walls are to be located along two of the rundowns. They have been added to the plans. The drainage easements have been labeled and called out with a note on each sheet.

3. The proposed storm drain located in Unit Three is shown on the grading plan (refer to the lower right-hand corner of the drawings). Proposed driveway locations have been added to the plan.

4. A cross-section has been added to the plan. This easement has been changed to a 20' public right-of-way since it will also serve as a pedestrian access. The pads are protected from any hydraulic jumps by the CMU privacy walls along each property line.

5. No flows will enter Desert Springs from Desert Flower. The high point in Blue Avena Ave. is at the Desert Springs/Desert Flower property line (see added grades).

6. The pond volume calculations have been added to the grading and drainage plan. An exhibit showing the limits of the contributing basins can be found with the required pond volume calculations in the drainage report. The limits were not added to the grading and drainage plan because they could generate additional confusion.

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

7. Per our phone conversation on 3/18/99 the 10% flow splits were removed from the AHYMO calculations. The previously submitted justification for the 25% flow split was added to the report. In addition, an explanation was included in the 'Proposed Conditions' portion of the report showing that if more flows turn onto Moonlit Rose Dr., Blue Avena Ave. would have the capacity to convey them.

8. Street capacity calculations can be found in Table 2. All calculations are based off of Mannings equation. At each of the intersection with Desert Breeze Energy Grade Line calculations were included. Proposed driveway locations were added to the plans.

9. Presently the storm drain is located within excess Arenal Road right-of-way. When the final plat is filed, the right-of-way will be vacated and an easement will be granted. The easement has been added to the grading plan.

10. We will meet with Glen Jurgensen and obtain a letter stating his concurrence with the grading prior to placing any excess fill material in the Amole del Norte right-of-way.

11. The unit boundaries have been added to the FEMA map in the report. A note has been added to the infrastructure list per your request.

If you have any further questions, please contact me at 268-8828.

Respectfully yours,
ISAACSON & ARFMAN, P.A.

Melissa Combs

Melissa Combs
MC/rtl
Attachments

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 18, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Revised Master Drainage Report for Desert Springs Subdivision Units Three Through Five, (M10/D8) Submitted for Preliminary Plat Approval and Rough Grading Approval, Engineer's Stamp Dated 3/2/99.

Dear Mr. Arfman:

Prior to Preliminary Plat and Rough Grading approval for above referenced subdivision, the following comments must be addressed:

1. The grading plan encompasses all of Units 3, 4 and 5. Is mass grading proposed for the entire site at one time? A grading and drainage certification is required for release of the SIA for each Unit.

2. Please label the Units on the grading plan. Also show all proposed walls on the grading plans. Label and show dimensions for all drainage easements on the plan.

3. Please provide a layout for the proposed storm drain system, labeling the pipe sizes, and catch basins. Show the locations of the driveways on the grading plan where inlets are proposed to demonstrate that there are no conflicts.

4. Provide a cross-section for the emergency overflow at AP5. Are the proposed pad elevations on Lots 2 and 3 higher than the EGL? A minimum 20' wide drainage easement is required for the public storm drain.

5. It appears that off-site flows from Desert Flower Unit 2 enter your site via Blue Avena Avenue. Provide existing, or proposed, street grades to the south of your subdivision to show how this street drains.

6. With respect to the proposed temporary retention facility for Unit 4, show the limits of the contributing basin on the basin map. Provide the volume calculation for the proposed pond.

7. The AHYMO assumes that the street flows split at several locations. The assumption that 25%, or 10%, of the flows turn at an intersection cannot be accepted without justification. Provide all details, sections and calculations for each intersection where this occurs to demonstrate how these flows will split. Revise the AHYMO run of necessary.

8. The street capacity calculations were not provided. Also, please examine the potential for hydraulic jumps at the T intersections on Desert Breeze Drive. Show the locations of the driveways on the east side at these intersections.

9. The plan shows that Lots in the northeast corner of the subdivision are being platted over an existing storm drain. Please clearly show the lot lines and easements in this area. Also show the proposed catch basin in Arenal.

10. It appears that grading is proposed within the Amole Del Norte Channel right-of-way. Permission from City Storm Drain Maintenance must be obtained prior to grading in this area.

11. Show the approximate Unit boundaries on the FEMA map provided in the report. The existing FEMA floodplain is located on both Units 4 and 5. The Letter of Map Revision must be obtained from FEMA prior to release of the SIA for these Units. This requirement must be on the Infrastructure List.

A complete resubmittal is required. If you have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo K. Johnson, P.E., Curb Inc.
File

TABLE OF CONTENTS

Introduction

Vicinity Map
I. Project Information
II. Site Characteristics

Conclusion & Recommendations

Summary Tables

Table 1 - Onsite Basin Summary

Table 2 - Flow Depth at Key Locations

Table 3 - Flow Depth at Sump Inlets and Rundowns

Table 4 - Inlets Capacity at Key Locations

FlowMaster Worksheets for Rundown Capacity

HydraFlow Worksheets for Storm Drain Calculations

Pond Sizing Calculations

Flow Split Justification

Appendices

Appendix A: Onsite AHYMO Summary & Detailed Output 100-Year Storm

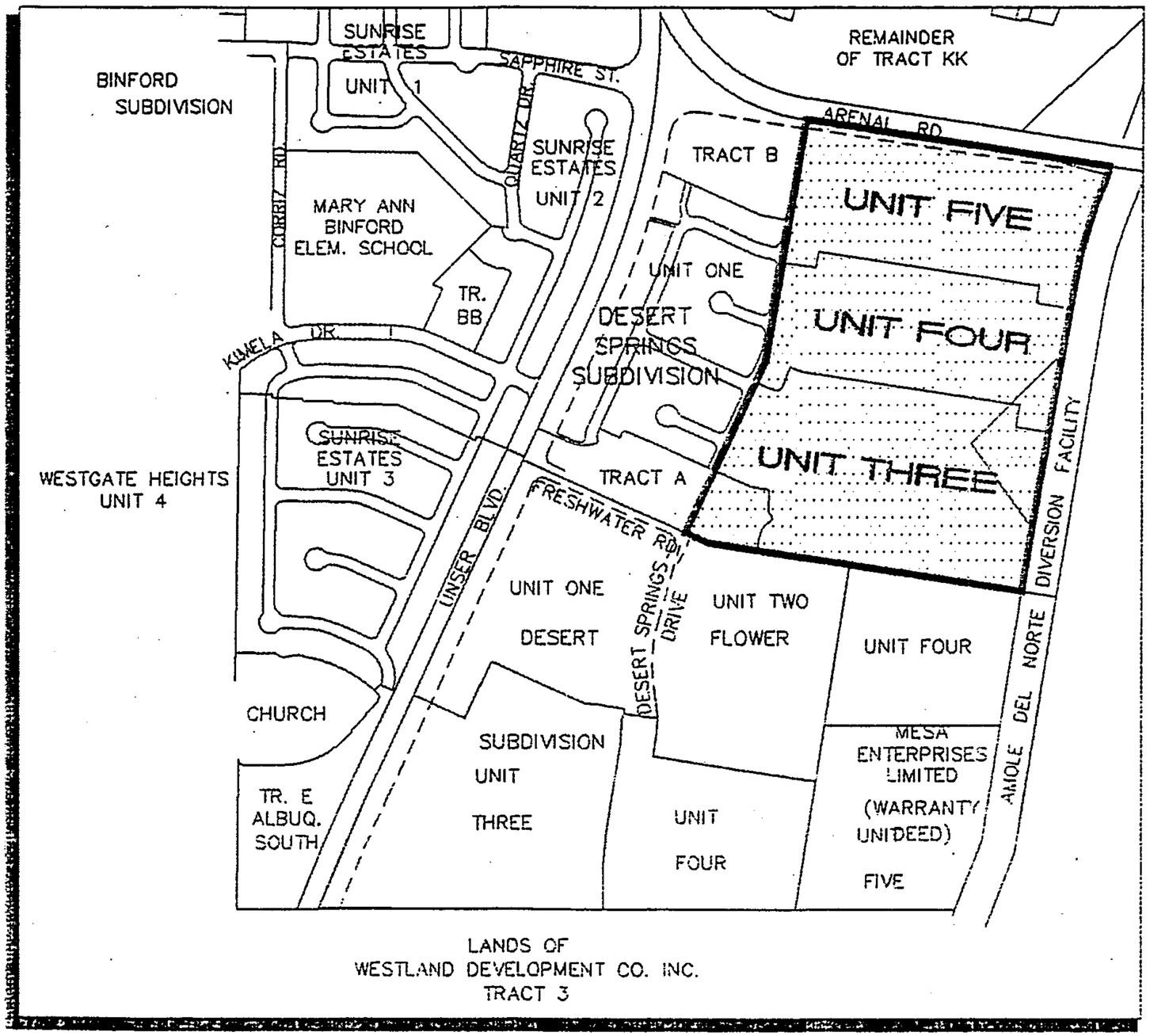
Appendix B: Arenal Road - 10-Year Dry Lane Analysis

Appendix C: Arenal/Unser Drainage Management Plan (M10/D10)
-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Pockets

Units Three-Five Drainage & Grading Plan

Drainage Management Plan Basin Map



1"=750'±

(M-10)

VICINITY MAP

INTRODUCTION

This report shall replace the portion of the Master Drainage Report for Desert Springs Subdivision, Units One-Five (M10/D8) which pertains to Units Three-Five. Units One and Two are presently under construction and follow the approved Master Drainage Report (M10/D8) and the Drainage Report for Unit One (M10/D8). The remaining land underlying the proposed Units Three-Five has been purchased by Curb, Inc. for development and therefore a new layout for the remaining units is being pursued.

The three phases will consist of 133, 90, and 91 single-family lots, respectively. All flows from this area are allowed free discharge to the Amole del Norte Diversion Channel as determined by the Arenal/Unser Drainage Management Plan approved by the City on September 18, 1997 (see Appendix C).

This study shall analyze the area wide drainage characteristics as they impact the site and offer solutions and recommendations to solve the hydrological and hydraulic conditions projected to occur in the event of the 100-year storm.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: Desert Springs Subdivision, Tracts A and B
(February 20, 1997, Book 97C, Page 55)
Desert Springs Subdivision, Unit Two, Tract C-1
(February 24, 1999, Book 99C, Page 34)

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, PE
(505) 268-8828

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: RLT

NUMBER OF PROPOSED LOTS:
Unit Three: 133
Unit Four: 90
Unit Five: 91

TOTAL AREA: 48.9316 Ac.
2,131,461 SF

II. SITE CHARACTERISTICS

FLOOD HAZARD: Portions of Units Four and Five lie within a Zone AO (depth 2) floodplain as determined by Panels No. 350002-0336 and 35001C0337 of the September 20, 1996 Edition of the F.E.M.A. Maps (see attached). Flows within this zone will be captured by the regional detention facility located in the southeast corner of the Unser Blvd. and Arenal Road intersection. The regional detention facility was previously approved in the Arenal/Unser Drainage Management Plan (M10/D10). Final grading of the regional detention facility and a Letter of Map Revision (LOMR) will be required for SIA release of Units Four and Five. A request for the LOMR was submitted to the City of Albuquerque in February 1999.



FEMA PANELS 336 & 337

Scale 1":500'

ISAACSON & ARFMAN, P.A.

SUBJECT _____ JOB NO. ____

BY _____ DATE _____ SHEET NO. ____ OF ____

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an average slope toward the east of 2 percent. It is adjacent to Arenal Road to the north and Desert Springs Subdivision Units One and Two to the west. The Amole del Norte Diversion Channel abuts the east boundary, and Desert Flower Subdivision the south. Storm water generated from the site flows east into the side of the Amole del Norte Diversion Channel. A temporary retention pond located along the eastern boundary of Unit One captures the developed flows from Units One and Two of the Desert Springs Subdivision. Offsite storm waters generated from Unit Two of Sunrise Estates (to the west) are released into Unser Blvd. and are then conveyed by a combination of street flow and storm drain to the regional detention facility. Flows are slowly released from the pond through a storm drain system along Arenal Road, which deposits the discharge into the Amole del Norte Diversion Channel. Runoff south of the proposed development flows southeast into the Amole del Norte Diversion Channel and does not affect the site.

PROPOSED CONDITIONS:

Each phase of the development will be graded at the time of its construction. The site will not be mass graded.

Unit Three: The third phase of Desert Springs will consist of 133 lots. It is located to the east of Unit Two, south of the future Unit Four, west of the Amole del Norte Diversion Channel, and north of the Desert Flower Subdivision (Units Two and Six). A storm drain system and an overland channel will be required to deposit the subdivision runoff into the Amole del Norte Diversion Channel. The temporary pond from Units One and Two will be removed with the developments of this Unit. The flows from the previous units will be allowed to enter Unit Three and continue to the Amole del Norte Diversion Channel via street flow.

The flows from a portion of Units One and Two will enter this unit along Desert Canyon Place. It is assumed that the flows will split at Moonlit Rose Dr. (AP1) since there is no water bar at the intersection of the two streets. A minimum flow split of 25% to Moonlit Rose Dr. was used in AHYMO since Desert Canyon Place has a lower capacity than Blue Avena Ave. (see attached justification of flow splits). If additional flows did happen to enter Moonlit Rose Dr., Blue Avena Ave. would have the capacity to convey up to 65% of the flows at AP1 (see Table 2, AP3**).

All runoff will be carried by street flow to the south boundary of the property. At AP5 a sump inlet (see Table 4) will pick up the runoff and convey it via 36" diameter storm drain to the Amole del Norte Diversion Channel. The emergency overflow for the sump will be via a pedestrian access between Lots 2 and 3, Block F (see the grading plan for cross-sectional detail of the emergency overflow).

The remaining flows from Unit One will enter this phase via Rainwater Road. A concrete rundown will be located at the eastern terminus of Rainwater Road (AP8). This rundown will accept the developed flows from Units One and Four as well as the runoff developed in Basins 105 and 107 of Unit Three.

Unit Four: The fourth unit of Desert Springs Subdivision will consists of 90 lots and will not require the construction of a storm drain. This unit is bordered by Desert Springs Unit One to the west, the Amole del Norte Diversion Channel to the east, the future Desert Springs Unit Five to the north, and Unit Three to the south.

Basins 111 and 112 will contribute to Analysis Point 10. These flows will be conveyed via a concrete rundown to the Amole del Norte Diversion Channel (see FlowMaster sheet for sizing). The runoff generated within Basin 109 will be conveyed via street flow to AP8 (see Table 2 for street flow depths). There the flows will be collected by the existing rundown and conveyed to the Amole del Norte Diversion Channel. A small temporary retention facility will be located at the northeast property boundary to capture the developed flows from Basins 108 and 110 (refer to pond calculations).

Unit Five: The fifth phase of Desert Springs Subdivision is bordered by Unit One to the west, the Amole del Norte Diversion Channel to the east, Arenal Road to the north, and Desert Springs Unit Four to the south. The temporary retention facility constructed with Unit Four will be removed and flows will be allowed to enter the unit via the street continuation. Runoff generated within contributing Basins (106, 110, 113, 114, 116, and 117) (see Basin Map) will be conveyed via street flow to point AP13. Flows will then be conveyed by a concrete rundown to the Amole del Norte Diversion Channel (see attached FlowMaster sheet). The maximum street flow depth will equal 0.58 feet just prior to entering the rundown (refer to Table 3).

Arenal Road: The portion of Arenal Road adjacent to this phase will be constructed prior to construction of this unit. The road has an easterly surface drainage pattern. 10-year street flows shall be collected by new catch basins installed with this unit and be conveyed to the Amole del Norte Diversion Channel by the existing storm drain along Arenal Road. The existing storm drain was designed to accept these flows and was approved with CIP No. 5803.91 (see Appendix B).

CONCLUSIONS & RECOMMENDATIONS

Desert Springs Units Three through Five are proposed to be developed consecutively. Onsite and offsite runoffs have been addressed as to how the subdivision will have a cohesive drainage solution. The Summary Tables provide a more in depth study of the street capacities, drainage basins, and inlet capacities. Attached FlowMaster calculation sheets show rundown sizing calculations. Also, temporary pond sizing calculations have been included. Please refer to the Appendices for further supplemental information.

The recommendations for Units Three through Five construction are presented below:

- A temporary detention pond will be required at the downstream end of Unit Four where the runoffs will be discharged into future units. This pond will be covered by a City of Albuquerque Agreement and Covenant.
- The existing retention pond will be removed and flows will be able to continue east via the street continuations.
- Berms or swale points shall be graded around the developing unit so that offsite runoff will not affect this unit.
- Lots running parallel to Arenal Road shall be graded to be close in elevation to future street grades.
- All required storm drain from Unit Three to the Amole del Norte Diversion Channel shall be included as part of the Unit Three required infrastructure.

- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Three construction.
- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Four construction.
- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Five construction.
- Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).
- A Letter of Map Revision will be required prior to release of the SIA's for Units Four and Five. This requirement will be included on the required infrastructure list.
- Final grading of the Arenal/Unser regional detention facility will be required with Unit Four construction.
- The two required catch basins along the portion of Arenal Road fronting Unit Five shall be included as part of the required infrastructure for Unit Three.

SUMMARY TABLES

TABLE 1
ONSITE BASIN SUMMARY

Basin ID	Area (Sq. Mi.)	Contributing Basins	Cumulative Area (Sq. Mi.)	% A	% B	% C	% D	Basin Q (cfs)	Cumulative Q (cfs)
1A	0.0114	1A	0.0114	0	19.5	19.5	61	26.40	26.40
1B	0.0005	1A	0.0119	0	0	0	100	1.41	27.80
2A	0.0063	2A	0.0063	0	19.5	19.5	61	14.59	14.59
2B	0.00350	2B	0.0035	0	19.5	19.5	61	8.12	8.12
2C	0.0076	2B	0.0111	0	19.5	19.5	61	17.60	25.72
2D	0.0006	2C*	0.0117	0	19.5	19.5	61	1.40	27.12
2E	0.0002	2A	0.0064	0	19.5	19.5	61	.48	15.07
100	0.0042	2D*	0.0159	0	19.5	19.5	61	9.74	36.12
101	0.00036	100*	0.00434	0	19.5	19.5	61	0.85	9.85
102A	0.0026	102A	0.0026	33	19	19	29	4.29	4.29
102	0.0027	102A, 101*	0.00964	0	19.5	19.5	61	6.26	20.06
103	0.0049	102*	0.01454	0	19.5	19.5	61	11.36	29.93
104	0.005	101*	0.0169	0	19.5	19.5	61	11.59	37.07
105	0.0086	2E*	0.01510	0	19.5	19.5	61	19.92	31.26
106	0.0026	104*, 103*	0.03406	0	19.5	19.5	61	6.03	72.79
107	0.0023	105*, 109	0.0247	0	19.5	19.5	61	5.34	52.41
108	0.001	108	0.001	0	19.5	19.5	61	2.33	2.33
109	0.0072	109	0.0072	0	19.5	19.5	61	16.68	16.68
110	0.0012	108	0.0022	0	19.5	19.5	61	2.79	5.12
111	0.0072	110	0.0072	0	19.5	19.5	61	16.68	16.68
112	0.0021	111	0.00930	0	19.5	19.5	61	4.88	21.55
113	0.00319	110*	0.00350	0	19.5	19.5	61	3.02	8.15
114	0.0072	114	0.0072	0	19.5	19.5	61	16.68	16.68
115	0.0016	114, 116*	0.02190	0	19.5	19.5	61	3.72	47.44
116	0.00960	113*	0.01310	0	19.5	19.5	61	22.23	27.43
117	0.0012	115*	0.02310	0	19.5	19.5	61	2.79	50.13

*Cumulative Q of basin

TABLE 2
FLOW DEPTHS @ KEY LOCATIONS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
AP12	32	STD	0.008	27.43	0.51	0.67
AP11	28	STD	0.01	17.5	0.42	0.56
AP9	28	STD	0.0143	16.86	0.40	0.56
AP7	28	STD	0.0151	16.86	0.40	0.57
AP6	32	STD	0.0158	31.26	0.48	0.74
AP4	28	STD	0.012	37.07	0.53	0.81
AP3**	28	STD	0.01	44.5	0.59	0.87
AP3	28	STD	0.01	29.93	0.51	0.72
AP2	28	MTBL	0.01	7.2	0.33	0.41
AP1	28	STD	0.012	36.12	0.55	0.80

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ
**STREET CAPACITY @ AP3 IF ADDITIONAL FLOWS WERE TO TURN DOWN MOONLIT ROSE DR (~65%)

TABLE 3
FLOW DEPTHS @ SUMP INLETS OR RUNDOWNS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)
AP13	24	STD	0.0148	50.13	0.58
AP5	32	STD	NA	60.74	0.65
AP8	32	STD	0.01	52.52	0.61
AP10	32	STD	0.01	21.55	0.46

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ

TABLE 4 INLETS CAPACITY @ KEY LOCATIONS								
INLET NO	**INLET TYPE**	**LOCATION**	**STREET WIDTH & CURB TYPE**	**% SLOPE**	**Q 100 (CFS)**	**Dn (FT)**	**Q intercepted (CFS)**	**Q by-pass (cfs)**
CB1 (2 inlets)	A A, Mod	AP3	28' FF, STD	1.01%	29.93	0.51	6 ea = 12 cfs	17.93
CB2 (1 sumps)	Throat	AP5	32' FF, STD	NA	60.74	0.65	60.74 **	0

*Q per inlet are calculated using DPM Plate 22.3, D-5
** See attached sump calculation sheet

ANALYZE SUMP INLETS

DATA:

Q = 60.74
H = 0.65

GRATE OPEN AREA:

GROSS AREA FOR ONE GRATE = 2' - 1 1/2" * 2' - 11 3/8 " =	6.28 SF
LESS BEARING BARS = (0.5")(1/12) * 2.95 * 13 =	1.60 SF
LESS CROSS BARS = (0.5")(1/12) * 2.13 * 7 =	0.62 SF
PLUS THE INTERSECTION COUNTED 2X = (0.5")(1/12) * (0.5")(1/12) *77 =	0.13 SF
TOTAL =	**4.2**

CALCULATIONS:

FLOW THROUGH THE GRATE = CA(2gH)^.5 =	9.103192
9.10 CFS * 4 GRATES =	36.41277
FLOW THROUGH DOUBLE THROAT = CA(2gH)^.5 =	29.04352

TOTAL CAPACITY= 65.46 EA

RECOMMENDATION:

USE A "MOD" TYPE A INLET WITH FOUR GRATES & A DOUBLE THROAT

EMERGENCY OVERFLOW @ AP5
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Emergency Overflow @ AP5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.017	
Channel Slope	0.021	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	8.00	ft
Discharge	72.74	cfs

Results		
Depth	0.77	ft
Flow Area	7.94	ft^2
Wetted Perimeter	12.87	ft
Top Width	12.62	ft
Critical Depth	1.17	ft
Critical Slope	0.004511	ft/ft
Velocity	9.16	ft/s
Velocity Head	1.30	ft
Specific Energy	2.07	ft
Froude Number	2.04	
Flow is supercritical.		

RUNDOWN @ AP8
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap8
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.036	ft/ft
Bottom Width	12.00	ft
Discharge	52.52	cfs

Results		
Depth	0.39	ft
Flow Area	4.73	ft^2
Wetted Perimeter	12.79	ft
Top Width	12.00	ft
Critical Depth	0.84	ft
Critical Slope	0.003107	ft/ft
Velocity	11.11	ft/s
Velocity Head	1.92	ft
Specific Energy	2.31	ft
Froude Number	3.12	
Flow is supercritical.		

RUNDOWN @ AP10
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap10
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.040	ft/ft
Bottom Width	10.00	ft
Discharge	21.55	cfs

Results		
Depth	0.25	ft
Flow Area	2.47	ft^2
Wetted Perimeter	10.49	ft
Top Width	10.00	ft
Critical Depth	0.52	ft
Critical Slope	0.003488	ft/ft
Velocity	8.72	ft/s
Velocity Head	1.18	ft
Specific Energy	1.43	ft
Froude Number	3.09	
Flow is supercritical.		

RUNDOWN @ AP13
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap13
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.080	ft/ft
Bottom Width	15.00	ft
Discharge	50.13	cfs

Results		
Depth	0.26	ft
Flow Area	3.90	ft^2
Wetted Perimeter	15.52	ft
Top Width	15.00	ft
Critical Depth	0.70	ft
Critical Slope	0.003121	ft/ft
Velocity	12.87	ft/s
Velocity Head	2.57	ft
Specific Energy	2.83	ft
Froude Number	4.45	
Flow is supercritical.		

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	1	72.79	36 c	195.0	4996.00	4998.24	1.149	4999.00	5001.16	0.00	End
2	4	12.00	18 c	75.0	4999.74	5000.75	1.347	5001.24	5002.07	0.00	1
3	5	6.00	18 c	28.0	5000.95	5001.31	1.285	5002.45	5002.46	0.26	2

Project File: dsmdr.stm	I-D-F File: SAMPLE.IDF	Total No. Lines: 3	Run Date: 03-19-1999

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	72.79	4996.00	4999.00	3.00	7.07	10.30	1.65	5000.65	1.192	195	4998.24	5001.16	2.92	7.02	10.37	1.67	5002.84	1.056	1.124	2.191	0.00	0.00
2	18	12.00	4999.74	5001.24	1.50*	1.77	6.79	0.72	5001.96	1.306	75.0	5000.75	5002.07	1.32	1.65	7.28	0.82	5002.89	1.175	1.240	0.930	0.00	0.00
3	18	6.00	5000.95	5002.45	1.50*	1.77	3.40	0.18	5002.63	0.327	28.0	5001.31	5002.46	1.15	1.46	4.11	0.26	5002.73	0.370	0.349	0.098	1.00	0.26

Project File: dsmdr.stm	I-D-F File: SAMPLE.IDF	Total number of lines: 3	Run Date: 03-19-1999

NOTES: Initial tailwater elevation = 4999 (ft) , * Crown depth assumed., ** Critical depth assumed.

20

TEMPORARY RETENTION POND
(BETWEEN UNITS 4 & 5)

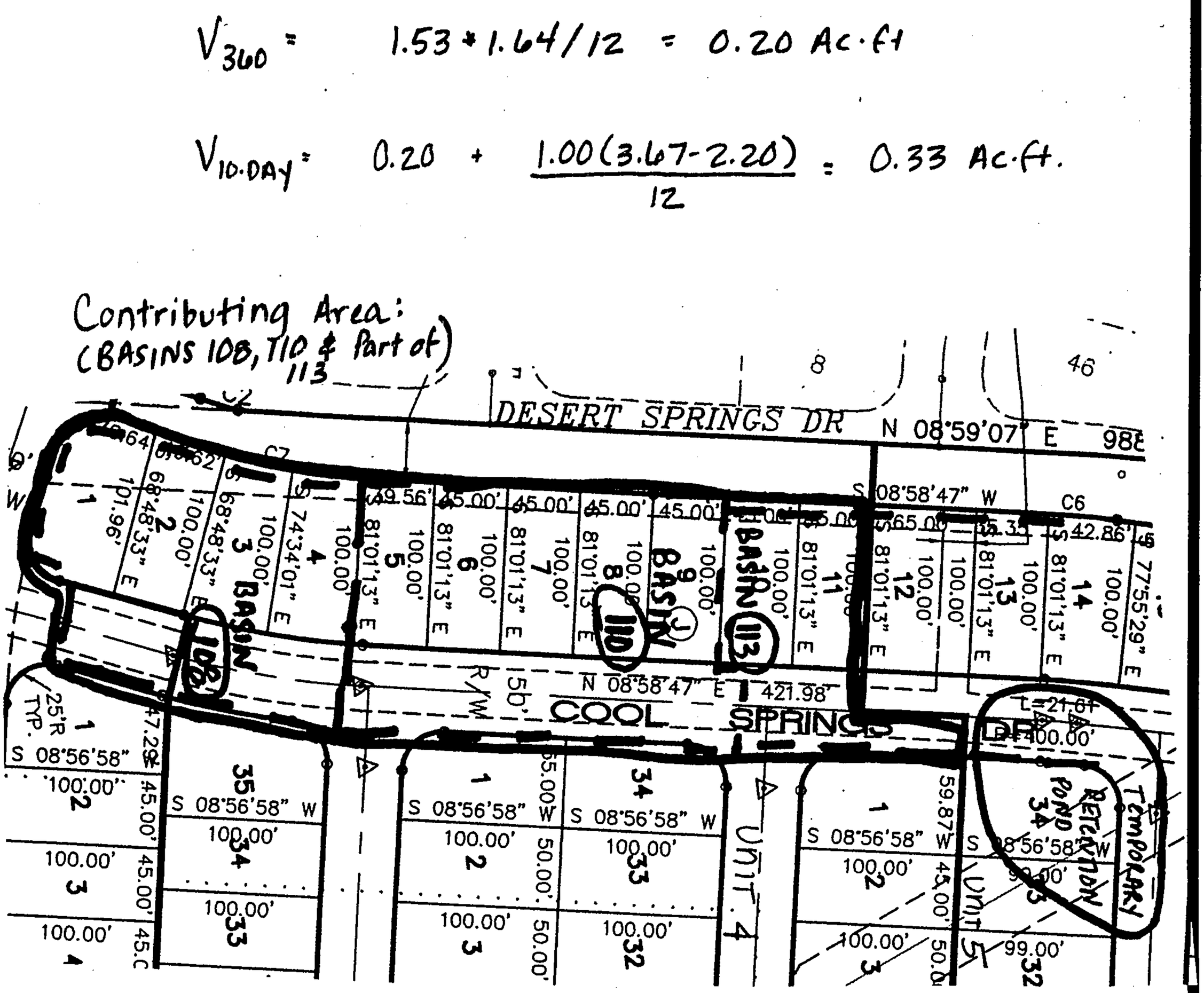
Total Contributing Area: 1.64 Ac

$$Wt\ E = \frac{(0.3198)(0.67) + (0.3198)(0.99) + (1.00)(1.97)}{1.64} = 1.53"$$

$$V_{360} = 1.53 * 1.64/12 = 0.20\ Ac\cdot ft$$

$$V_{10\text{-}DAY} = 0.20 + \frac{1.00(3.67-2.20)}{12} = 0.33\ Ac.ft.$$

Contributing Area:
(BASINS 108, 110 & Part of 113)



ISAACSON & ARFMAN, P.A.

SUBJECT Temp Retention Pond JOB NO.___
BY MSC DATE 3/19/99 SHEET NO.___ OF___

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

March 11, 1999

Ms. Susan Calongne, PE
City/County Floodplain Administrator
Hydrology Division
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Desert Springs Subdivision Units 3 thru 5
DRB No. 98-185

Dear Ms. Calongne:

Please find attached a calculation sheet justifying the flow split we assumed to occur between Moonlit Rose Drive and Desert Canyon Place in our hydrologic calculations for the Desert Springs Subdivision. Although the only way to provide a flow analysis which is 100% accurate would be to build a hydraulic model and test the actual flow conditions, we feel that this analysis provides a conservative estimate which is sufficient for application in this situation.

If you have any further questions, please feel free to contact me at 268-8828.

Respectfully yours,
ISAACSON & ARFMAN, P.A.

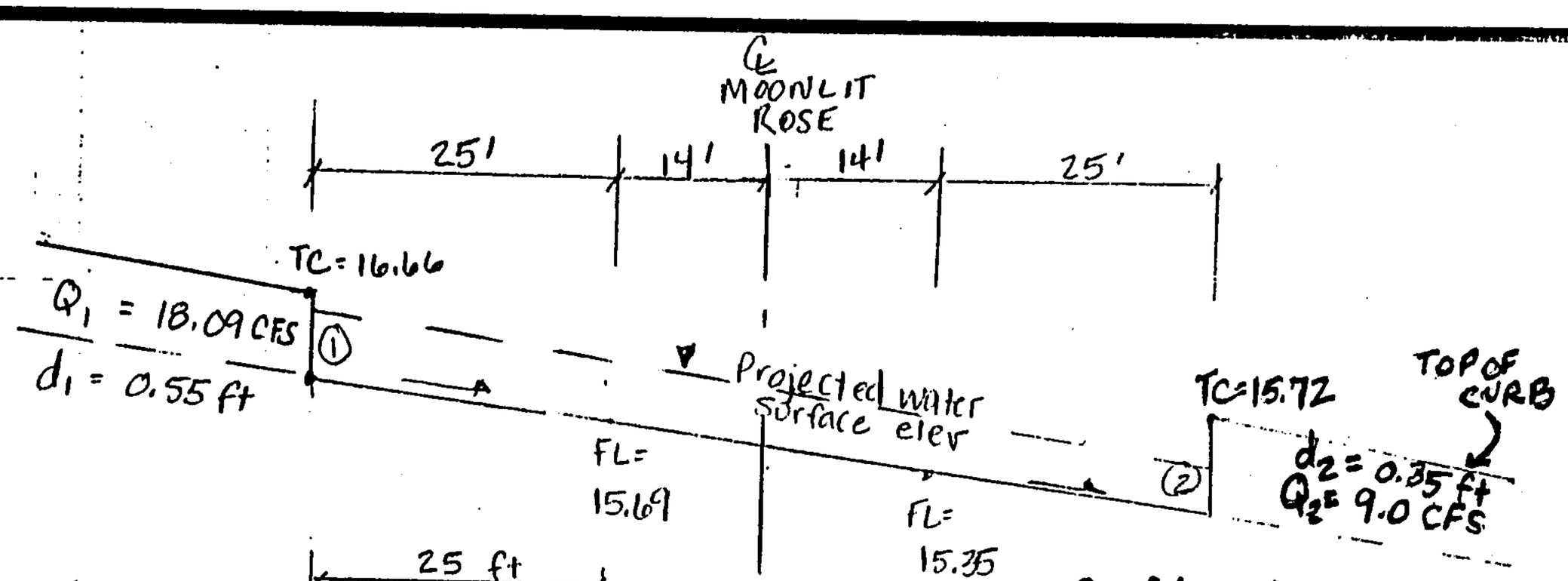
Melissa Combs

Melissa Combs
MC/rtl
Attachment

FRED C. ARFMAN STATE OF NEW MEXICO 7322 REGISTERED PROFESSIONAL ENGINEER

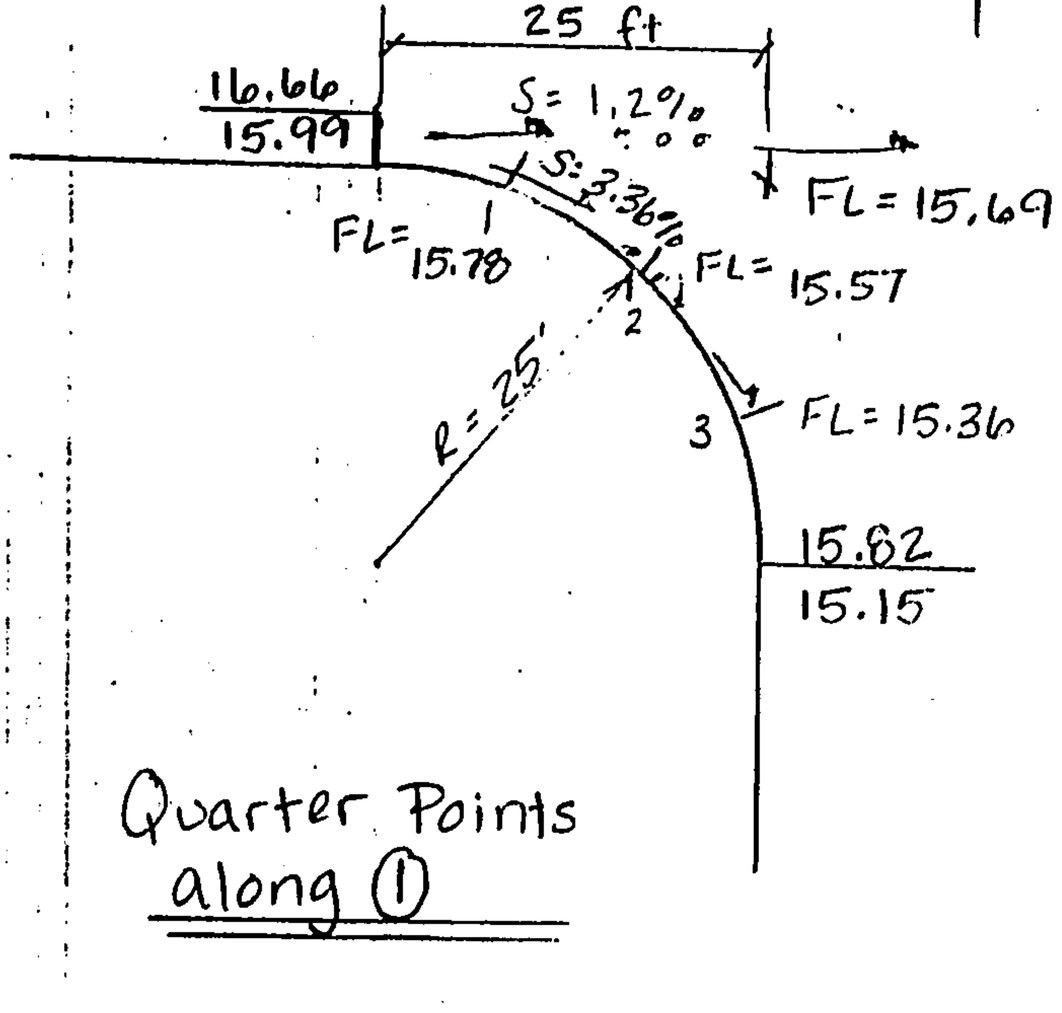
Fred C. Arfman, PE

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632



Profile Along Desert Canyon PL

NOTE: All Q's only account for the south side of Desert Canyon Pl



Quarter Points along ①

Assumptions

- Flow into Moonlit Rose functions as a weir
- Flow depth above the valley gutter depth (0.125 ft) are free to overflow
- 25% of all street flow will enter Moonlit Rose Q's from north Desert Canyon Pl will not cross the ℄ until after the intersection of Moonlit Rose..
- The Length of the weir will be equal to the distance from the curb return to the flow line ≈25ft. Minimal overflow from the remainder of the intersection will be disregarded.
- Assume $d_{weir} = d_2$ = .35 ft (lowest flow depth for conservative analysis)

ISAACSON & ARFMAN, P.A.

SUBJECT Desert Springs Units 3-5 JOB NO.
BY MJC DATE 3/11/99 SHEET NO. 1 OF 2

APPENDIX A

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/19/1999
INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM3.DAT USER NO.= ISCARFNM.I01

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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR										
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)										
COMPUTE NM HYD	100.00	-	1	.01140	26.40	.922	1.51706	1.500	3.618	PER IMP= 61.00
*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN										
COMPUTE NM HYD	101.00	-	2	.00050	1.41	.052	1.96548	1.500	4.396	PER IMP= 100.00
ADD HYD	101.10	1& 2	3	.01190	27.80	.975	1.53585	1.500	3.651	
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING										
COMPUTE NM HYD	102.00	-	4	.00630	14.59	.510	1.51706	1.500	3.620	PER IMP= 61.00
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)										
COMPUTE NM HYD	103.00	-	5	.00350	8.12	.283	1.51706	1.500	3.623	PER IMP= 61.00
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)										
COMPUTE NM HYD	104.00	-	6	.00760	17.60	.615	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASINS 2C & 2B										
ADD HYD	104.10	6& 5	7	.01110	25.72	.898	1.51701	1.500	3.620	
*S **BASIN 2D (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	105.00	-	8	.00060	1.40	.049	1.51706	1.500	3.659	PER IMP= 61.00
*S **ADD BASINS 2C.1 TO 2D										
ADD HYD	105.10	7& 8	9	.01170	27.12	.947	1.51699	1.500	3.622	
*S ** ROUTE BASIN 2C.1 THROUGH 100										
ROUTE	105.20	9	10	.01170	26.76	.947	1.51703	1.533	3.574	
*S **BASIN 100										
COMPUTE NM HYD	106.00	-	11	.00420	9.74	.340	1.51706	1.500	3.622	PER IMP= 61.00
*S **ADD BASIN 100 & 2C.2										
ADD HYD	106.10	10&11	12	.01590	36.12	1.286	1.51700	1.533	3.549	
*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104										
DIVIDE HYD	106.20	12	13	.01192	27.09	.965	1.51699	1.533	3.549	
	106.30	AND	14	.00398	9.03	.322	1.51700	1.533	3.549	
*S **BASIN 101										
COMPUTE NM HYD	107.00	-	15	.00036	.85	.029	1.51706	1.500	3.688	PER IMP= 61.00
*S **ADD BASIN 101 & 100										
ADD HYD	107.10	15&14	16	.00434	9.85	.351	1.51689	1.533	3.549	
*S **COMPUTE BASIN 102A (PARK)										
COMPUTE NM HYD	108.00	-	17	.00260	4.29	.140	1.00753	1.500	2.580	PER IMP= 29.00
*S ** ROUTE BASIN 102A THROUGH 102										
ROUTE	108.10	17	18	.00260	4.20	.140	1.00761	1.533	2.524	
*S **COMPUTE BASIN 102										
COMPUTE NM HYD	109.00	-	19	.00270	6.26	.218	1.51706	1.500	3.625	PER IMP= 61.00
*S **ADD BASIN 102A & 102										
ADD HYD	109.10	19&18	20	.00530	10.22	.358	1.26700	1.533	3.013	
*S **ADD BASIN 101 & 102										
ADD HYD	109.20	20&16	21	.00964	20.06	.709	1.37943	1.533	3.254	
*S ** ROUTE BASIN 102.2 THROUGH 103										
ROUTE	109.30	21	22	.00964	19.24	.709	1.37948	1.567	3.120	
*S **COMPUTE BASIN 103										
COMPUTE NM HYD	110.00	-	23	.00490	11.36	.396	1.51706	1.500	3.621	PER IMP= 61.00
*S **ADD BASIN 102.3 & 103										
ADD HYD	110.10	23&22	24	.01454	29.93 AP3	1.105	1.42582	1.533	3.217	
*S **COMPUTE BASIN 104										

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	111.00	-	25	.00500	11.59	.405	1.51706	1.500	3.621	PER IMP= 61.00
*S ** ROUTE BASIN 100 THRU 104										
ROUTE	111.10	13	26	.01192	26.13	.965	1.51703	1.567	3.424	
*S **ADD BASIN 100 & 104										
ADD HYD	111.20	25&26	27	.01692	37.07 AP4	1.369	1.51700	1.533	3.422	
*S **COMPUTE BASIN 106										
COMPUTE NM HYD	112.00	-	28	.00260	6.03	.210	1.51706	1.500	3.626	PER IMP= 61.00
*S **ADD BASIN 106 & 104										
ADD HYD	112.10	28&27	29	.01952	42.86	1.580	1.51699	1.533	3.430	
*S **ADD BASIN 106 & 103										
ADD HYD	112.20	29&24	30	.03406	72.79 AP5	2.685	1.47808	1.533	3.339	
*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	113.00	-	31	.00020	.48	.016	1.51706	1.500	3.748	PER IMP= 61.00
*S **ADD BASIN 2E & 2A										
ADD HYD	113.10	31& 4	32	.00650	15.07	.526	1.51698	1.500	3.624	
*S ** ROUTE BASIN 2A.1 THROUGH 105										
ROUTE	113.20	32	1	.00650	12.62	.526	1.51707	1.567	3.033	
*S **COMPUTE BASIN 105										
COMPUTE NM HYD	114.00	-	2	.00860	19.92	.696	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 105 & 2A.1										
ADD HYD	114.10	1& 2	3	.01510	31.26 AP6	1.222	1.51700	1.533	3.234	
*S **COMPUTE BASIN 108										
COMPUTE NM HYD	115.00	-	4	.00100	2.33	.081	1.51706	1.500	3.641	PER IMP= 61.00
*S **COMPUTE BASIN 109										
COMPUTE NM HYD	116.00	-	8	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **COMPUTE BASIN 107										
COMPUTE NM HYD	117.00	-	10	.00230	5.34	.186	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 107 & 109										
ADD HYD	117.10	10& 8	11	.00950	22.02	.769	1.51700	1.500	3.621	
*S **ADD BASIN 107 & 105										
ADD HYD	117.20	11& 3	12	.02460	52.41 AP8	1.990	1.51700	1.533	3.329	
*S **COMPUTE BASIN 110										
COMPUTE NM HYD	118.00	-	13	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 110 & 108										
ADD HYD	118.10	13& 4	14	.00220	5.12	.178	1.51680	1.500	3.638	
*S **COMPUTE BASIN 113										
COMPUTE NM HYD	119.00	-	17	.00130	3.02	.105	1.51706	1.500	3.636	PER IMP= 61.00
*S **ADD BASIN 110 & 113										
ADD HYD	119.10	17&14	18	.00350	8.15	.283	1.51682	1.500	3.637	
*S ** ROUTE BASIN 113 THROUGH 116										
ROUTE	119.40	18	21	.00350	6.45	.283	1.51710	1.567	2.878	
*S **COMPUTE BASIN 116										
COMPUTE NM HYD	120.00	-	22	.00960	22.23	.777	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 116 & 113										
ADD HYD	120.10	21&22	23	.01310	27.43 AP12	1.060	1.51701	1.533	3.272	
*S **COMPUTE BASIN 111										
COMPUTE NM HYD	121.00	-	25	.00720	16.68 - AP 9	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **COMPUTE BASIN 112										
COMPUTE NM HYD	122.00	-	27	.00210	4.88	.170	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 111 & 112										
ADD HYD	122.10	25&27	28	.00930	21.55 AP10	.752	1.51700	1.500	3.621	
*S **COMPUTE BASIN 114										

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	123.00	-	30	.00720	16.68 -AP11	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S ** ROUTE BASIN 114 THROUGH 115										
ROUTE	123.30	30	3	.00720	16.44	.583	1.51709	1.533	3.568	
*S **COMPUTE BASIN 115										
COMPUTE NM HYD	124.00	-	4	.00160	3.72	.129	1.51706	1.500	3.631	PER IMP= 61.00
*S **ADD BASIN 114 & 115										
ADD HYD	124.10	3& 4	5	.00880	20.01	.712	1.51699	1.533	3.553	
*S **ADD BASIN 115 & 116										
ADD HYD	124.20	5&23	6	.02190	47.44	1.772	1.51700	1.533	3.385	
*S **COMPUTE BASIN 117										
COMPUTE NM HYD	125.00	-	7	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 116 & 117										
ADD HYD	125.10	7& 6	8	.02310	50.13 AP13	1.869	1.51699	1.500	3.391	
FINISH										

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 03/19/1999
         START TIME (HR:MIN:SEC) = 11:07:30     USER NO.= ISCARFNM.I01
         INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM3.DAT

**** DESERT SPRINGS MASTER DRAINAGE REPORT****
****          MARCH 19, 1999            ****
****          DSTSPGM3.DAT             ****
START                RAINFALL BEGINS AT 0.0 HRS
RAINFALL             TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                     RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

                  COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0085   .0103
                     .0122   .0141   .0160   .0180   .0201   .0222   .0243
                     .0266   .0289   .0312   .0337   .0362   .0388   .0415
                     .0443   .0472   .0502   .0534   .0567   .0601   .0637
                     .0675   .0715   .0758   .0809   .0865   .0924   .1050
                     .1334   .1771   .2398   .3254   .4379   .5814   .7600
                     .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                    1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                    1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                    1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                    1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                    2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                    2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                    2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                    2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                    2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                    2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                    2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                    2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                    2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                    2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                    2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                    2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                    2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                    2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                    2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD       ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   27.455    CFS   UNIT VOLUME =    .9990       B =   526.28      P60 = 1.8700
    AREA =      .006954 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
    K =   .118429HR     TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   11.829    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
    AREA =      .004446 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1   CODE=1

                                PARTIAL HYDROGRAPH   100.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .9224 ACRE-FEET
    PEAK DISCHARGE RATE =      26.40 CFS  AT   1.500 HOURS   BASIN AREA =   .0114 SQ. MI.


*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN
COMPUTE NM HYD      ID=2 HYD NO=101.00 AREA=0.0005 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR     TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.9740    CFS   UNIT VOLUME =    .9933       B =   526.28      P60 = 1.8700
    AREA =      .000500 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2   CODE=5

                                PARTIAL HYDROGRAPH   101.00
```

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.4	2.666	.0	4.000	.0	5.333	.0
.167	.0	1.500	1.4	2.833	.0	4.166	.0	5.499	.0
.333	.0	1.667	.7	3.000	.0	4.333	.0	5.666	.0
.500	.0	1.833	.5	3.166	.0	4.500	.0	5.833	.0
.667	.0	2.000	.3	3.333	.0	4.666	.0	5.999	.0
.833	.0	2.166	.2	3.500	.0	4.833	.0	6.166	.0
1.000	.0	2.333	.1	3.666	.0	4.999	.0	6.333	.0
1.167	.0	2.500	.0	3.833	.0	5.166	.0		

```
    RUNOFF VOLUME =     1.96548 INCHES     =        .0524 ACRE-FEET
    PEAK DISCHARGE RATE =       1.41 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


ADD HYD             ID=3 HYD NO=101.1 ID=1 ID=2
PRINT HYD           ID=3 CODE=1

                                PARTIAL HYDROGRAPH   101.10


    RUNOFF VOLUME =     1.53585 INCHES     =        .9747 ACRE-FEET
    PEAK DISCHARGE RATE =      27.80 CFS  AT   1.500 HOURS   BASIN AREA =   .0119 SQ. MI.
```

```
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING
COMPUTE NM HYD       ID=4 HYD NO=102.00 AREA=0.0063 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   15.172    CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =      .003843 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   6.5373    CFS   UNIT VOLUME =    .9984       B =   354.67      P60 = 1.8700
    AREA =      .002457 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   102.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5097 ACRE-FEET
    PEAK DISCHARGE RATE =      14.59 CFS  AT   1.500 HOURS   BASIN AREA =   .0063 SQ. MI.


*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD       ID=5 HYD NO=103.00 AREA=0.0035 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4291    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.6318    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001365 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=5   CODE=1

                                PARTIAL HYDROGRAPH   103.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .2832 ACRE-FEET
    PEAK DISCHARGE RATE =      8.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0035 SQ. MI.
```

```
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)
COMPUTE NM HYD       ID=6 HYD NO=104.00 AREA=0.0076 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.303    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004636 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.8862    CFS   UNIT VOLUME =    .9988       B =   354.67      P60 = 1.8700
    AREA =      .002964 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=6   CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .6149 ACRE-FEET
    PEAK DISCHARGE RATE =      17.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0076 SQ. MI.


*S **ADD BASINS 2C & 2B
ADD HYD              ID=7 HYD NO=104.1 ID=6 ID=5
PRINT HYD            ID=7 CODE=1

                                PARTIAL HYDROGRAPH   104.10


    RUNOFF VOLUME =     1.51701 INCHES      =        .8981 ACRE-FEET
    PEAK DISCHARGE RATE =      25.72 CFS  AT   1.500 HOURS   BASIN AREA =   .0111 SQ. MI.


*S **BASIN 2D (DESERT SPRINGS DRIVE)
COMPUTE NM HYD       ID=8 HYD NO=105.00 AREA=0.0006 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.4450    CFS   UNIT VOLUME =    .9911       B =   526.28      P60 = 1.8700
    AREA =      .000366 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .62260    CFS   UNIT VOLUME =    .9795       B =   354.67      P60 = 1.8700
    AREA =      .000234 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=8   CODE=1
```

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = 1.51706 INCHES = .0485 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

```
*S **ADD BASINS 2C.1 TO 2D
ADD HYD              ID=9 HYD NO=105.1 ID=7 ID=8
PRINT HYD            ID=9 CODE=1
```

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 1.51699 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.12 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

```
*S ** ROUTE BASIN 2C.1 THROUGH 100
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

```
COMPUTE TRAVEL TIME  ID=10 REACH NO=1 NO VS=1 L=510 FT
                     SLP=0.012
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1711
.071	.248	.33	.1078
.106	.557	.96	.0823
.141	.991	2.07	.0679
.176	1.548	3.75	.0585
.212	2.229	6.09	.0518
.247	3.034	9.19	.0468
.282	3.962	13.18	.0426
.317	4.946	19.05	.0368
.353	5.930	25.73	.0327
.388	6.914	33.18	.0295
.423	7.898	41.35	.0271
.458	8.883	50.21	.0251
.494	9.869	59.73	.0234
.529	10.854	69.89	.0220
.564	11.841	80.66	.0208
.599	12.827	92.01	.0197
.635	13.814	103.94	.0188
.670	14.801	116.42	.0180

ROUTE ID=10 HYD NO=105.2 INFLOW ID=9 DT=0.0 HR
PRINT HYD ID=10 CODE=1

PARTIAL HYDROGRAPH 105.20

RUNOFF VOLUME = 1.51703 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 26.76 CFS AT 1.533 HOURS BASIN AREA = .0117 SQ. MI.

*S **BASIN 100
COMPUTE NM HYD ID=11 HYD NO=106.00 AREA=0.0042 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.115 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002562 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 4.3582 CFS UNIT VOLUME = .9972 B = 354.67 P60 = 1.8700
AREA = .001638 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=11 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = 1.51706 INCHES = .3398 ACRE-FEET
PEAK DISCHARGE RATE = 9.74 CFS AT 1.500 HOURS BASIN AREA = .0042 SQ. MI.

```
*S **ADD BASIN 100 & 2C.2
ADD HYD             ID=12 HYD NO=106.1 ID=10 ID=11
PRINT HYD           ID=12 CODE=1
```

PARTIAL HYDROGRAPH 106.10

RUNOFF VOLUME = 1.51700 INCHES = 1.2864 ACRE-FEET
PEAK DISCHARGE RATE = 36.12 CFS AT 1.533 HOURS BASIN AREA = .0159 SQ. MI.

```
*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104
DIVIDE HYD          ID=12  PER=-75    ID=13 HYD=106.2
                                      ID=14 HYD=106.3
PRINT HYD           ID=13  CODE=1
```

PARTIAL HYDROGRAPH 106.20

RUNOFF VOLUME = 1.51699 INCHES = .9648 ACRE-FEET
PEAK DISCHARGE RATE = 27.09 CFS AT 1.533 HOURS BASIN AREA = .0119 SQ. MI.

```
PRINT HYD           ID=14  CODE=1
```

PARTIAL HYDROGRAPH 106.30

RUNOFF VOLUME = 1.51700 INCHES = .3216 ACRE-FEET
PEAK DISCHARGE RATE = 9.03 CFS AT 1.533 HOURS BASIN AREA = .0040 SQ. MI.

```
*S **BASIN 101
COMPUTE NM HYD      ID=15 HYD NO=107.00 AREA=0.00036 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .86699 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.8700
AREA = .000220 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = .37356 CFS UNIT VOLUME = .9637 B = 354.67 P60 = 1.8700
AREA = .000140 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=15   CODE=1

                                PARTIAL HYDROGRAPH   107.00

    RUNOFF VOLUME =     1.51706 INCHES      =         .0291 ACRE-FEET
    PEAK DISCHARGE RATE =         .85 CFS  AT   1.500 HOURS   BASIN AREA =    .0004 SQ. MI.


*S **ADD BASIN 101 & 100
ADD HYD             ID=16 HYD NO=107.1 ID=15 ID=14
PRINT HYD           ID=16 CODE=1

                                PARTIAL HYDROGRAPH   107.10

    RUNOFF VOLUME =     1.51689 INCHES      =         .3507 ACRE-FEET
    PEAK DISCHARGE RATE =        9.85 CFS  AT   1.533 HOURS   BASIN AREA =    .0043 SQ. MI.


*S **COMPUTE BASIN 102A (PARK)
COMPUTE NM HYD      ID=17 HYD NO=108.00 AREA=0.0026 SQ MI
                    PER A=33  PER B=19  PER C=19  PER D=29
                    TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.9768    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =       .000754 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =    .139463HR    TP =    .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   4.3075    CFS   UNIT VOLUME =    .9968       B =   311.05      P60 = 1.8700
    AREA =       .001846 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=17   CODE=1

                                PARTIAL HYDROGRAPH   108.00

    RUNOFF VOLUME =     1.00753 INCHES      =         .1397 ACRE-FEET
    PEAK DISCHARGE RATE =        4.29 CFS  AT   1.500 HOURS   BASIN AREA =    .0026 SQ. MI.


*S ** ROUTE BASIN 102A THROUGH 102
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.33 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.33 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.33
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.02	.02	.01	1.74
100.03	.06	.05	3.47
100.05	.14	.15	5.21
100.07	.24	.31	6.94
100.09	.38	.57	8.68
100.10	.54	.93	10.41
100.12	.74	1.40	12.15
100.14	.96	2.00	13.88
100.16	1.22	2.73	15.62
100.17	1.51	3.62	17.35
100.19	1.82	4.67	19.09
100.21	2.17	5.88	20.82
100.23	2.55	7.28	22.56
100.24	2.95	8.88	24.29
100.26	3.39	10.67	26.03
100.28	3.86	12.67	27.77
100.30	4.34	15.35	27.98
100.31	4.83	18.31	27.99
100.33	5.32	21.46	28.00

COMPUTE TRAVEL TIME ID=18 REACH NO=1 NO VS=1 L=280 FT
SLP=0.01

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.017	.015	.01	.1504
.035	.060	.05	.0947
.052	.136	.15	.0723
.069	.241	.31	.0597
.087	.377	.57	.0514
.104	.543	.93	.0455
.122	.739	1.40	.0411
.139	.965	2.00	.0376
.156	1.221	2.73	.0348
.174	1.507	3.62	.0324
.191	1.824	4.67	.0304
.208	2.171	5.88	.0287
.226	2.547	7.28	.0272
.243	2.954	8.88	.0259
.261	3.391	10.67	.0247
.278	3.859	12.67	.0237
.295	4.345	15.35	.0220
.313	4.831	18.31	.0205
.330	5.317	21.46	.0193

ROUTE ID=18 HYD NO=108.1 INFLOW ID=17 DT=0.0 HR
PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 108.10

RUNOFF VOLUME = 1.00761 INCHES = .1397 ACRE-FEET
PEAK DISCHARGE RATE = 4.20 CFS AT 1.533 HOURS BASIN AREA = .0026 SQ. MI.

*S **COMPUTE BASIN 102
COMPUTE NM HYD ID=19 HYD NO=109.00 AREA=0.0027 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.5024 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.8700
AREA = .001647 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 2.8017 CFS UNIT VOLUME = .9958 B = 354.67 P60 = 1.8700
AREA = .001053 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=19 CODE=1

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.51706 INCHES = .2185 ACRE-FEET
PEAK DISCHARGE RATE = 6.26 CFS AT 1.500 HOURS BASIN AREA = .0027 SQ. MI.

*S **ADD BASIN 102A & 102
ADD HYD ID=20 HYD NO=109.1 ID=19 ID=18
PRINT HYD ID=20 CODE=1

PARTIAL HYDROGRAPH 109.10

RUNOFF VOLUME = 1.26700 INCHES = .3581 ACRE-FEET
PEAK DISCHARGE RATE = 10.22 CFS AT 1.533 HOURS BASIN AREA = .0053 SQ. MI.

*S **ADD BASIN 101 & 102
ADD HYD ID=21 HYD NO=109.2 ID=20 ID=16
PRINT HYD ID=21 CODE=1

PARTIAL HYDROGRAPH 109.20

RUNOFF VOLUME = 1.37943 INCHES = .7088 ACRE-FEET
PEAK DISCHARGE RATE = 20.06 CFS AT 1.533 HOURS BASIN AREA = .0096 SQ. MI.

```
*S ** ROUTE BASIN 102.2 THROUGH 103
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

```
COMPUTE TRAVEL TIME  ID=22 REACH NO=1 NO VS=1 L=600 FT
                     SLP=0.0101
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2013
.071	.248	.33	.1268
.106	.557	.96	.0968
.141	.991	2.07	.0799
.176	1.548	3.75	.0689
.212	2.229	6.09	.0610
.247	3.034	9.19	.0550
.282	3.962	13.18	.0501
.317	4.946	19.05	.0433
.353	5.930	25.73	.0384
.388	6.914	33.18	.0347
.423	7.898	41.35	.0318
.458	8.883	50.21	.0295
.494	9.869	59.73	.0275

```
                                .529       10.854        69.89        .0259
                                .564       11.841        80.66        .0245
                                .599       12.827        92.01        .0232
                                .635       13.814       103.94        .0222
                                .670       14.801       116.42        .0212
ROUTE                  ID=22 HYD NO=109.3 INFLOW ID=21 DT=0.0 HR
PRINT HYD              ID=22 CODE=1

                                   PARTIAL HYDROGRAPH   109.30


    RUNOFF VOLUME =     1.37948 INCHES     =         .7089 ACRE-FEET
    PEAK DISCHARGE RATE =      19.24 CFS  AT    1.567 HOURS   BASIN AREA =    .0096 SQ. MI.


*S **COMPUTE BASIN 103
COMPUTE NM HYD         ID=23 HYD NO=110.00 AREA=0.0049 SQ MI
                       PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                       TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.801    CFS   UNIT VOLUME =     .9984       B =   526.28      P60 = 1.8700
    AREA =       .002989 SQ MI    IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.0846    CFS   UNIT VOLUME =     .9978       B =   354.67      P60 = 1.8700
    AREA =       .001911 SQ MI    IA =     .42500 INCHES    INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD              ID=23   CODE=1

                                   PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =     1.51706 INCHES     =         .3965 ACRE-FEET
    PEAK DISCHARGE RATE =      11.36 CFS  AT    1.500 HOURS   BASIN AREA =    .0049 SQ. MI.


*S **ADD BASIN 102.3 & 103
ADD HYD                ID=24 HYD NO=110.1 ID=23 ID=22
PRINT HYD              ID=24 CODE=1

                                   PARTIAL HYDROGRAPH   110.10


    RUNOFF VOLUME =     1.42582 INCHES     =        1.1053 ACRE-FEET
    PEAK DISCHARGE RATE =      29.93 CFS  AT    1.533 HOURS   BASIN AREA =    .0145 SQ. MI.
```

```
*S **COMPUTE BASIN 104
COMPUTE NM HYD       ID=25 HYD NO=111.00 AREA=0.0050 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   12.042    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .003050 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.1883    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001950 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=25   CODE=1

                                PARTIAL HYDROGRAPH   111.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .4045 ACRE-FEET
    PEAK DISCHARGE RATE =      11.59 CFS  AT   1.500 HOURS   BASIN AREA =    .0050 SQ. MI.


*S ** ROUTE BASIN 100 THRU 104
COMPUTE TRAVEL TIME  ID=26 REACH NO=1 NO VS=1 L=620 FT
SLP=0.012

          TRAVEL TIME TABLE
                          REACH=  1.0

          WATER          AVERAGE        FLOW          TRAVEL
          DEPTH          AREA           RATE          TIME
          FEET           SQ.FT.         CFS           HRS
             .035            .062            .05         .2081
             .071            .248            .33         .1311
             .106            .557            .96         .1000
             .141            .991           2.07         .0826
             .176           1.548           3.75         .0712
             .212           2.229           6.09         .0630
             .247           3.034           9.19         .0569
             .282           3.962          13.18         .0518
             .317           4.946          19.05         .0447
             .353           5.930          25.73         .0397
             .388           6.914          33.18         .0359
             .423           7.898          41.35         .0329
             .458           8.883          50.21         .0305
             .494           9.869          59.73         .0285
             .529          10.854          69.89         .0267
             .564          11.841          80.66         .0253
             .599          12.827          92.01         .0240
             .635          13.814         103.94         .0229
             .670          14.801         116.42         .0219
```

```
ROUTE                ID=26 HYD NO=111.1 INFLOW ID=13 DT=0.0 HR
PRINT HYD            ID=26 CODE=1

                                PARTIAL HYDROGRAPH   111.10

    RUNOFF VOLUME =     1.51703 INCHES      =         .9648 ACRE-FEET
    PEAK DISCHARGE RATE =      26.13 CFS  AT   1.567 HOURS   BASIN AREA =    .0119 SQ. MI.


*S **ADD BASIN 100 & 104
ADD HYD              ID=27 HYD NO=111.2 ID=25 ID=26
PRINT HYD            ID=27 CODE=1

                                PARTIAL HYDROGRAPH   111.20

    RUNOFF VOLUME =     1.51700 INCHES      =        1.3693 ACRE-FEET
    PEAK DISCHARGE RATE =      37.07 CFS  AT   1.533 HOURS   BASIN AREA =   .0169 SQ. MI.


*S **COMPUTE BASIN 106
COMPUTE NM HYD       ID=28 HYD NO=112.00 AREA=0.0026 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   6.2616    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
    AREA =      .001586 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.6979    CFS   UNIT VOLUME =    .9953       B =   354.67      P60 = 1.8700
    AREA =      .001014 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=28   CODE=1

                                PARTIAL HYDROGRAPH   112.00

    RUNOFF VOLUME =     1.51706 INCHES      =         .2104 ACRE-FEET
    PEAK DISCHARGE RATE =       6.03 CFS  AT   1.500 HOURS   BASIN AREA =    .0026 SQ. MI.


*S **ADD BASIN 106 & 104
ADD HYD              ID=29 HYD NO=112.1 ID=28 ID=27
PRINT HYD            ID=29 CODE=1

                                PARTIAL HYDROGRAPH   112.10
```

```
    RUNOFF VOLUME =      1.51699 INCHES      =        1.5797 ACRE-FEET
    PEAK DISCHARGE RATE =       42.86 CFS  AT    1.533 HOURS    BASIN AREA =    .0195 SQ. MI.


*S **ADD BASIN 106 & 103
ADD HYD              ID=30 HYD NO=112.2 ID=29 ID=24
PRINT HYD            ID=30 CODE=1

                                PARTIAL HYDROGRAPH    112.20


    RUNOFF VOLUME =      1.47808 INCHES      =        2.6850 ACRE-FEET
    PEAK DISCHARGE RATE =       72.79 CFS  AT    1.533 HOURS    BASIN AREA =    .0341 SQ. MI.


*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)
COMPUTE NM HYD       ID=31 HYD NO=113.00 AREA=0.0002 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    .48166    CFS   UNIT VOLUME =     .9751       B =   526.28      P60 = 1.8700
    AREA =       .000122 SQ MI    IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    .20753    CFS   UNIT VOLUME =     .9360       B =   354.67      P60 = 1.8700
    AREA =       .000078 SQ MI    IA =     .42500 INCHES    INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=31   CODE=1

                                PARTIAL HYDROGRAPH    113.00


    RUNOFF VOLUME =      1.51706 INCHES      =         .0162 ACRE-FEET
    PEAK DISCHARGE RATE =         .48 CFS  AT    1.500 HOURS    BASIN AREA =    .0002 SQ. MI.


*S **ADD BASIN 2E & 2A
ADD HYD              ID=32 HYD NO=113.1 ID=31 ID=4
PRINT HYD            ID=32 CODE=1

                                PARTIAL HYDROGRAPH    113.10


    RUNOFF VOLUME =      1.51698 INCHES      =         .5259 ACRE-FEET
    PEAK DISCHARGE RATE =       15.07 CFS  AT    1.500 HOURS    BASIN AREA =    .0065 SQ. MI.
```

*S ** ROUTE BASIN 2A.1 THROUGH 105
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1010 FT
SLP=0.0158

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3389
.071	.248	.33	.2135
.106	.558	.96	.1629
.141	.992	2.07	.1345
.176	1.549	3.75	.1159
.212	2.231	6.10	.1026
.247	3.037	9.20	.0926
.282	3.966	13.13	.0847
.317	5.020	17.98	.0783
.353	6.144	25.01	.0689
.388	7.269	33.05	.0617
.423	8.395	41.95	.0561
.458	9.521	51.67	.0517
.494	10.647	62.16	.0481

```
                                .529        11.774         73.40         .0450
                                .564        12.901         85.36         .0424
                                .599        14.029         98.01         .0402
                                .635        15.157        111.33         .0382
                                .670        16.285        125.31         .0365
ROUTE                 ID=1 HYD NO=113.2 INFLOW ID=32 DT=0.0 HR
PRINT HYD             ID=1 CODE=1

                                  PARTIAL HYDROGRAPH   113.20

    RUNOFF VOLUME =      1.51707 INCHES      =          .5259 ACRE-FEET
    PEAK DISCHARGE RATE =       12.62 CFS  AT    1.567 HOURS    BASIN AREA =    .0065 SQ. MI.


*S **COMPUTE BASIN 105
COMPUTE NM HYD        ID=2 HYD NO=114.00 AREA=0.0086 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    20.711     CFS    UNIT VOLUME =     .9988         B =    526.28       P60 = 1.8700
    AREA =       .005246 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    8.9239     CFS    UNIT VOLUME =     .9989         B =    354.67       P60 = 1.8700
    AREA =       .003354 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD             ID=2    CODE=1

                                  PARTIAL HYDROGRAPH   114.00

    RUNOFF VOLUME =      1.51706 INCHES      =          .6958 ACRE-FEET
    PEAK DISCHARGE RATE =       19.92 CFS  AT    1.500 HOURS    BASIN AREA =    .0086 SQ. MI.


*S **ADD BASIN 105 & 2A.1
ADD HYD               ID=3 HYD NO=114.1 ID=1 ID=2
PRINT HYD             ID=3 CODE=1

                                  PARTIAL HYDROGRAPH   114.10

    RUNOFF VOLUME =      1.51700 INCHES      =         1.2217 ACRE-FEET
    PEAK DISCHARGE RATE =       31.26 CFS  AT    1.533 HOURS    BASIN AREA =    .0151 SQ. MI.
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```
*S **COMPUTE BASIN 108
COMPUTE NM HYD       ID=4 HYD NO=115.00 AREA=0.0010 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.4083    CFS   UNIT VOLUME =    .9949       B =   526.28      P60 = 1.8700
    AREA =      .000610 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.0377    CFS   UNIT VOLUME =    .9874       B =   354.67      P60 = 1.8700
    AREA =      .000390 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   115.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0809 ACRE-FEET
    PEAK DISCHARGE RATE =       2.33 CFS  AT   1.500 HOURS   BASIN AREA =   .0010 SQ. MI.


*S **COMPUTE BASIN 109
COMPUTE NM HYD       ID=8 HYD NO=116.00 AREA=0.0072 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=8   CODE=1

                                PARTIAL HYDROGRAPH   116.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5825 ACRE-FEET
    PEAK DISCHARGE RATE =      16.68 CFS  AT   1.500 HOURS   BASIN AREA =   .0072 SQ. MI.
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```
*S **COMPUTE BASIN 107
COMPUTE NM HYD       ID=10 HYD NO=117.00 AREA=0.0023 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.5391    CFS   UNIT VOLUME =    .9973       B =   526.28      P60 = 1.8700
    AREA =      .001403 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.3866    CFS   UNIT VOLUME =    .9948       B =   354.67      P60 = 1.8700
    AREA =      .000897 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=10   CODE=1

                                PARTIAL HYDROGRAPH   117.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .1861 ACRE-FEET
    PEAK DISCHARGE RATE =       5.34 CFS  AT   1.500 HOURS   BASIN AREA =   .0023 SQ. MI.


*S **ADD BASIN 107 & 109
ADD HYD              ID=11 HYD NO=117.1 ID=10 ID=8
PRINT HYD            ID=11 CODE=1

                                PARTIAL HYDROGRAPH   117.10

    RUNOFF VOLUME =     1.51700 INCHES      =        .7686 ACRE-FEET
    PEAK DISCHARGE RATE =      22.02 CFS  AT   1.500 HOURS   BASIN AREA =   .0095 SQ. MI.


*S **ADD BASIN 107 & 105
ADD HYD              ID=12 HYD NO=117.2 ID=11 ID=3
PRINT HYD            ID=12 CODE=1

                                PARTIAL HYDROGRAPH   117.20

    RUNOFF VOLUME =     1.51700 INCHES      =       1.9903 ACRE-FEET
    PEAK DISCHARGE RATE =      52.41 CFS  AT   1.533 HOURS   BASIN AREA =   .0246 SQ. MI.


*S **COMPUTE BASIN 110
COMPUTE NM HYD       ID=13 HYD NO=118.00 AREA=0.0012 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.8900    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.2452    CFS   UNIT VOLUME =    .9896       B =   354.67      P60 = 1.8700
    AREA =      .000468 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=13   CODE=1

                                PARTIAL HYDROGRAPH   118.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0971 ACRE-FEET
    PEAK DISCHARGE RATE =       2.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.


*S **ADD BASIN 110 & 108
ADD HYD             ID=14 HYD NO=118.1 ID=13 ID=4
PRINT HYD           ID=14 CODE=1

                                PARTIAL HYDROGRAPH   118.10


    RUNOFF VOLUME =     1.51680 INCHES      =        .1780 ACRE-FEET
    PEAK DISCHARGE RATE =       5.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0022 SQ. MI.


*S **COMPUTE BASIN 113
COMPUTE NM HYD      ID=17 HYD NO=119.00 AREA=0.0013 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.1308    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000793 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.3490    CFS   UNIT VOLUME =    .9906       B =   354.67      P60 = 1.8700
    AREA =      .000507 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=17   CODE=1

                                PARTIAL HYDROGRAPH   119.00
```

RUNOFF VOLUME = 1.51706 INCHES = .1052 ACRE-FEET
PEAK DISCHARGE RATE = 3.02 CFS AT 1.500 HOURS BASIN AREA = .0013 SQ. MI.

*S **ADD BASIN 110 & 113
ADD HYD ID=18 HYD NO=119.1 ID=17 ID=14
PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 119.10

RUNOFF VOLUME = 1.51682 INCHES = .2831 ACRE-FEET
PEAK DISCHARGE RATE = 8.15 CFS AT 1.500 HOURS BASIN AREA = .0035 SQ. MI.

*S ** ROUTE BASIN 113 THROUGH 116
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=21 REACH NO=1 NO VS=1 L=1040 FT
SLP=0.008

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3490
.071	.248	.33	.2198
.106	.558	.96	.1678
.141	.992	2.07	.1385
.176	1.549	3.75	.1194
.212	2.231	6.10	.1057
.247	3.037	9.20	.0954
.282	3.966	13.13	.0872
.317	5.020	17.98	.0807
.353	6.144	25.01	.0710
.388	7.269	33.05	.0635
.423	8.395	41.95	.0578
.458	9.521	51.67	.0532
.494	10.647	62.16	.0495
.529	11.774	73.40	.0463
.564	12.901	85.36	.0437
.599	14.029	98.01	.0413
.635	15.157	111.33	.0393
.670	16.285	125.31	.0375

```
ROUTE                ID=21 HYD NO=119.4 INFLOW ID=18 DT=0.0 HR
PRINT HYD            ID=21 CODE=1

                          PARTIAL HYDROGRAPH   119.40

    RUNOFF VOLUME =     1.51710 INCHES     =        .2832 ACRE-FEET
    PEAK DISCHARGE RATE =       6.45 CFS  AT   1.567 HOURS   BASIN AREA =    .0035 SQ. MI.


*S **COMPUTE BASIN 116
COMPUTE NM HYD       ID=22 HYD NO=120.00 AREA=0.0096 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   23.120    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .005856 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   9.9616    CFS   UNIT VOLUME =    .9991       B =   354.67      P60 = 1.8700
    AREA =      .003744 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=22   CODE=1

                          PARTIAL HYDROGRAPH   120.00
```

RUNOFF VOLUME = 1.51706 INCHES = .7767 ACRE-FEET
PEAK DISCHARGE RATE = 22.23 CFS AT 1.500 HOURS BASIN AREA = .0096 SQ. MI.

*S **ADD BASIN 116 & 113
ADD HYD ID=23 HYD NO=120.1 ID=21 ID=22
PRINT HYD ID=23 CODE=1

PARTIAL HYDROGRAPH 120.10

RUNOFF VOLUME = 1.51701 INCHES = 1.0599 ACRE-FEET
PEAK DISCHARGE RATE = 27.43 CFS AT 1.533 HOURS BASIN AREA = .0131 SQ. MI.

*S **COMPUTE BASIN 111
COMPUTE NM HYD ID=25 HYD NO=121.00 AREA=0.0072 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 17.340 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.8700
AREA = .004392 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 7.4712 CFS UNIT VOLUME = .9986 B = 354.67 P60 = 1.8700
AREA = .002808 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=25 CODE=1

PARTIAL HYDROGRAPH 121.00

RUNOFF VOLUME = 1.51706 INCHES = .5825 ACRE-FEET
PEAK DISCHARGE RATE = 16.68 CFS AT 1.500 HOURS BASIN AREA = .0072 SQ. MI.

*S **COMPUTE BASIN 112
COMPUTE NM HYD ID=27 HYD NO=122.00 AREA=0.0021 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 5.0575 CFS UNIT VOLUME = .9973 B = 526.28 P60 = 1.8700
AREA = .001281 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
    K =   .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    2.1791     CFS    UNIT VOLUME =     .9943         B =    354.67       P60 = 1.8700
    AREA =       .000819 SQ MI     IA =     .42500 INCHES     INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD           ID=27   CODE=1

                                  PARTIAL HYDROGRAPH   122.00

    RUNOFF VOLUME =      1.51706 INCHES      =         .1699 ACRE-FEET
    PEAK DISCHARGE RATE =        4.88 CFS  AT    1.500 HOURS    BASIN AREA =    .0021 SQ. MI.


*S **ADD BASIN 111 & 112
ADD HYD             ID=28 HYD NO=122.1 ID=25 ID=27
PRINT HYD           ID=28 CODE=1

                                  PARTIAL HYDROGRAPH   122.10

    RUNOFF VOLUME =      1.51700 INCHES      =         .7524 ACRE-FEET
    PEAK DISCHARGE RATE =       21.55 CFS  AT    1.500 HOURS    BASIN AREA =    .0093 SQ. MI.


*S **COMPUTE BASIN 114
COMPUTE NM HYD      ID=30 HYD NO=123.00 AREA=0.0072 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    17.340     CFS    UNIT VOLUME =     .9988         B =    526.28       P60 = 1.8700
    AREA =       .004392 SQ MI     IA =     .10000 INCHES     INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =   .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    7.4712     CFS    UNIT VOLUME =     .9986         B =    354.67       P60 = 1.8700
    AREA =       .002808 SQ MI     IA =     .42500 INCHES     INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD           ID=30   CODE=1

                                  PARTIAL HYDROGRAPH   123.00

    RUNOFF VOLUME =      1.51706 INCHES      =         .5825 ACRE-FEET
    PEAK DISCHARGE RATE =       16.68 CFS  AT    1.500 HOURS    BASIN AREA =    .0072 SQ. MI.
```

*S ** ROUTE BASIN 114 THROUGH 115
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=200 FT
SLP=0.005

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.0671
.071	.248	.33	.0423
.106	.558	.96	.0323
.141	.992	2.07	.0266
.176	1.549	3.75	.0230
.212	2.231	6.10	.0203
.247	3.037	9.20	.0183
.282	3.966	13.13	.0168
.317	5.020	17.98	.0155
.353	6.144	25.01	.0136
.388	7.269	33.05	.0122
.423	8.395	41.95	.0111
.458	9.521	51.67	.0102
.494	10.647	62.16	.0095

```
                                .529      11.774       73.40       .0089
                                .564      12.901       85.36       .0084
                                .599      14.029       98.01       .0080
                                .635      15.157      111.33       .0076
                                .670      16.285      125.31       .0072
ROUTE                 ID=3 HYD NO=123.3 INFLOW ID=30 DT=0.0 HR
PRINT HYD             ID=3 CODE=1

                                    PARTIAL HYDROGRAPH   123.30


    RUNOFF VOLUME =     1.51709 INCHES     =        .5826 ACRE-FEET
    PEAK DISCHARGE RATE =      16.44 CFS  AT   1.533 HOURS   BASIN AREA =    .0072 SQ. MI.


*S **COMPUTE BASIN 115
COMPUTE NM HYD        ID=4 HYD NO=124.00 AREA=0.0016 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.8533    CFS   UNIT VOLUME =    .9965       B =   526.28      P60 = 1.8700
    AREA =      .000976 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.6603    CFS   UNIT VOLUME =    .9923       B =   354.67      P60 = 1.8700
    AREA =      .000624 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD             ID=4   CODE=1

                                    PARTIAL HYDROGRAPH   124.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .1295 ACRE-FEET
    PEAK DISCHARGE RATE =       3.72 CFS  AT   1.500 HOURS   BASIN AREA =    .0016 SQ. MI.


*S **ADD BASIN 114 & 115
ADD HYD               ID=5 HYD NO=124.1 ID=3 ID=4
PRINT HYD             ID=5 CODE=1

                                    PARTIAL HYDROGRAPH   124.10


    RUNOFF VOLUME =     1.51699 INCHES     =        .7120 ACRE-FEET
    PEAK DISCHARGE RATE =      20.01 CFS  AT   1.533 HOURS   BASIN AREA =    .0088 SQ. MI.
```

```
*S **ADD BASIN 115 & 116
ADD HYD             ID=6 HYD NO=124.2 ID=5 ID=23
PRINT HYD           ID=6 CODE=1

                                PARTIAL HYDROGRAPH   124.20


    RUNOFF VOLUME =     1.51700 INCHES      =       1.7718 ACRE-FEET
    PEAK DISCHARGE RATE =      47.44 CFS  AT   1.533 HOURS   BASIN AREA =   .0219 SQ. MI.


*S **COMPUTE BASIN 117
COMPUTE NM HYD      ID=7 HYD NO=125.00 AREA=0.0012 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.8900    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.2452    CFS   UNIT VOLUME =    .9896       B =   354.67      P60 = 1.8700
    AREA =      .000468 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD           ID=7   CODE=1

                                PARTIAL HYDROGRAPH   125.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0971 ACRE-FEET
    PEAK DISCHARGE RATE =       2.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.


*S **ADD BASIN 116 & 117
ADD HYD             ID=8 HYD NO=125.1 ID=7 ID=6
PRINT HYD           ID=8 CODE=1

                                PARTIAL HYDROGRAPH   125.10


    RUNOFF VOLUME =     1.51699 INCHES      =       1.8689 ACRE-FEET
    PEAK DISCHARGE RATE =      50.13 CFS  AT   1.500 HOURS   BASIN AREA =   .0231 SQ. MI.


FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 11:07:33
```

APPENDIX B

ARENAL ROAD – 10-YEAR DRY LANE ANALYSIS
(PREVIOUSLY APPROVED CID NO. 5803.91)

SUBJECT: **Arenal Road Dry Lane Analysis**

CRITERIA: 10-Year 6-Hour Storm (DPM Calculations)
Arenal & Unser Intersection Land Treatment: 90% D; 10% C
Arenal Road Land Treatment: 77% D; 23% C

SOLUTION: Storm drains will be placed along the back of curb along Arenal from the intersection of Arenal and Unser to the Amole del Norte Channel under a city public project. The inlet spacing for both north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 25 feet (see attached Exhibit C). Inlet spacing will provide for one dry lane under this original road cross section.

Calculate dry lane catch basin requirements for Arenal

pt (1) Unser PASS Thru = 1.9 cfs
Sapphire Pass Thru = 0 cfs
Intersection of Arenal / Unser A = .74 AC
Land Treatment: 10% C; 90% D
$Q_{10-6} = 1.49(.07) + 2.89(.66) = 2.04$ cfs

Unser ST 21+80 to ST 20+00 A = .58 AC
Land Treatment: 20% B; 20% C; 60% D
$Q_{10-6} = 1.49(.116) + 2.89(.348) + .76(.116)$
$Q = 1.27$ cfs

Arenal ST 17 to ST 18+67 A = .46 AC
Land Treatment: 77% D; 23% C
$Q_{10-6} = 1.49(\quad) + 2.89(\quad) = 1.19$

$Q_{\text{total}} = 1.19 + 1.27 + 2.04 = 4.48$
$Q_{\frac{1}{2}\text{ street}} = 4.48/2 = 2.24$

$Q_{\frac{1}{2}\text{ street}} = 2.24 + 1.9 = 4.1$ cfs

For one dry lane

$S_{avg} = 1.43\%$ $Q_{max\ \frac{1}{2}} = \frac{1.486}{.017}(.125)^{.67}(.0143)^{.5}(1.58) = 4.1$ cfs

per DPM plate D-5 one inlet $Q_{in} = 3.0$ cfs
at pt 1 place 2 grates; Type A inlet
PASS Through = 0 cfs

pt (2) From 18+67 to ST 27+00
A = 2.98
$Q_{10-6} = 2.89(2.3) + 1.49(.69) = 7.67/2 = 3.84 < 4.10$ ✓ ok
Use a Single Grate Type A inlet
PASS Through Flow = 3.84 - 3.00 = .84 cfs

@ pt 3 ST 27+00 to existing inlets
(L = 700')

A = 2.51 Ac

Q_{10-6} = 2.89(1.93) + 1.49(.62) = 6.50/2 = 3.25 cfs

Qinlet = 3.25 + .84 = 4.09 cfs < 4.10 ✓OK

Pass Through Flow = 4.09 - 3.00 = 1.09 cfs

Check Flow Depth for 100 year - 6 yr Storm

pt(1)

Sapphire pass through = 10 cfs
Unser pass through = 3.5 cfs
Intersection of Arenal/Unser (per Sheet 1) = 3.09 cfs/2 = 1.55 cfs
Unser ST 21+80 to ST 20+00 (per Sheet 1) = 2.09 cfs/2 = 1.05 cfs
Arenal ST 17 to ST 18+67 (per Sheet 1) = 1.85 cfs/2 = .93 cfs
Assume no flows pass through from North Unser

Q_{TOTAL} = 10 + 3.5 + 1.55 + 1.05 + .93 = 17.03 cfs

S_{avg} = 1.43%

@ d = .67 $Q = 1.486/.017\,(.0193)^{.5}(.33)^{.67}(8.48) = 42.17$ cfs

@ d = .33 $Q = 1.486/.017\,(.0143)^{.5}(.126)^{.67}(1.59) = 4.15$ cfs

∴ @ Q = 17.03 d = .45 feet

From Plate 22.3 D-5 (DPM) a single grate type A inlet $Q_{in} \approx 5.5$ cfs

Pass Through 17.03 − 2(5.5) = 6.03 cfs

pt(2) From ST 18+67 to ST 27+00

$Q_{100} = 1.37(2.3) + 2.87(.69) = 12.03/2 = 6.02$ cfs

$Q_{inlet} = 6.02 + 6.03 = 12.05$ cfs

∴ @ Q = 12.05 cfs d = .40 feet

per dPM plate 22.3 D-5 $Q_{in} = 4.6$ cfs

Pass Through 12.05 − 4.6 = 7.45 cfs

pt(3) From ST 27+00 to existing inlets

$Q_{100} = 2.87(.62) + 1.93(4.37) = 10.24/2 = 5.1$ cfs

$Q_{inlet} = 5.1 + 7.45 = 12.55$ cfs

@ Q = 12.55 d = .41 ft Q

per dpm plate 22.3 D-5 $Q_{in} = 4.7$ cfs (change existing to Type A inlets)

Q pass through = 12.55 − 4.7 = 7.85 cfs.

APPENDIX C

ARENAL/UNSER DRAINAGE MANAGEMENT PLAN (M10/D10)

-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Summary Excerpt from Arenal/Unser Drainage Management Plan

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and referencing datas gathered from BEC report make up the last part of the appendix in this section.

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7	.990	116.33
11	1.0	13.0	1.000	117.49
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 407
(SIDE FLOW 1650' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2103
DIFFERENCE IN ELEVATION ACROSS BASIN	=	32
SLOPE OF BASIN, (FT/FT)	=	0.0152
AREA OF BASIN, (ACRES)	=	32.26
AREA OF BASIN, (SQ MI)	=	0.05040
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	19.2
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.5
PEAK RUNOFF (CFS) (from AHYMO run)	=	104.81
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.14
3	.2	2.3	.100	10.48
4	.3	3.9	.190	19.91
5	.4	5.2	.310	32.49
6	.5	6.5	.470	49.26
7	.6	7.8	.660	69.17
8	.7	9.1	.820	85.94
9	.8	10.4	.930	97.46
10	.9	11.7	.990	103.75
11	1.0	13.0	1.000	104.81
12	1.1	14.3	.990	103.75
13	1.2	15.6	.930	97.46
14	1.3	16.9	.860	90.13
15	1.4	18.2	.780	81.74
16	1.5	19.5	.680	71.26
17	1.6	20.8	.560	58.69
18	1.7	22.1	.460	48.21
19	1.8	23.4	.390	40.87
20	1.9	24.7	.330	34.58
21	2.0	26.0	.280	29.34
22	2.2	28.6	.207	21.69
23	2.4	31.2	.147	15.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	11.21
25	2.8	36.4	.077	8.07
26	3.0	39.0	.055	5.76
27	3.2	41.6	.040	4.19
28	3.4	44.2	.029	3.04
29	3.6	46.8	.021	2.20
30	3.8	49.4	.015	1.57
31	4.0	52.0	.011	1.15
32	4.5	58.5	.005	0.52
33	5.0	65.0	.000	.00

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	404.10	7& 8	9	.15480	272.95	9.204	1.11482	1.533	2.755	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	880.30	32.016	1.08855	1.533	2.494	
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	190.04	32.016	1.08855	1.966	.538	AC-FT= 18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL										
ROUTE	405.30	11	12	.55146	190.02	32.016	1.08855	2.000	.538	
*S**********										
*S **CALC BASIN 406										
COMPUTE NM HYD	406.00	-	13	.05743	117.49	3.920	1.27968	1.500	3.196	PER IMP= 42.00
*S **CALC BASIN 407										
COMPUTE NM HYD	407.00	-	14	.05040	104.81	3.491	1.29860	1.500	3.249	PER IMP= 42.00
*S **CALC BASIN 408										
COMPUTE NM HYD	408.00	-	15	.15736	327.60	10.899	1.29860	1.500	3.253	PER IMP= 42.00
*S**********										
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD										
COMPUTE NM HYD	500.00	-	16	.02491	51.80	1.725	1.29860	1.500	3.250	PER IMP= 42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING										
*S **DIRECTLY TO THE AMOLE CHANNEL										
COMPUTE NM HYD	501.00	-	17	.03663	76.18	2.537	1.29860	1.500	3.249	PER IMP= 42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE										
*S **LONGFORD SD										
ADD HYD	501.10	16&17	18	.06154	127.98	4.262	1.29859	1.500	3.250	
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD										
COMPUTE NM HYD	502.00	-	19	.05788	121.79	4.080	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN										
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.										
COMPUTE NM HYD	503.00	-	20	.03752	78.03	2.599	1.29860	1.500	3.249	PER IMP= 42.00
*S**********										
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @										
*S **A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	504.00	-	1	.03667	77.16	2.585	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.										
COMPUTE NM HYD	505.00	-	2	.02618	43.10	1.407	1.00753	1.500	2.572	PER IMP= 29.00
FINISH										

[redacted] 3.54 [redacted] 11.77 [redacted] 203.89 [redacted] 4.00
3.75 12.24 207.31 4.00
4.00 12.57 207.31 4.00

COMPUTE TRAVEL TIME ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

ROUTE ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0
PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA 405.30

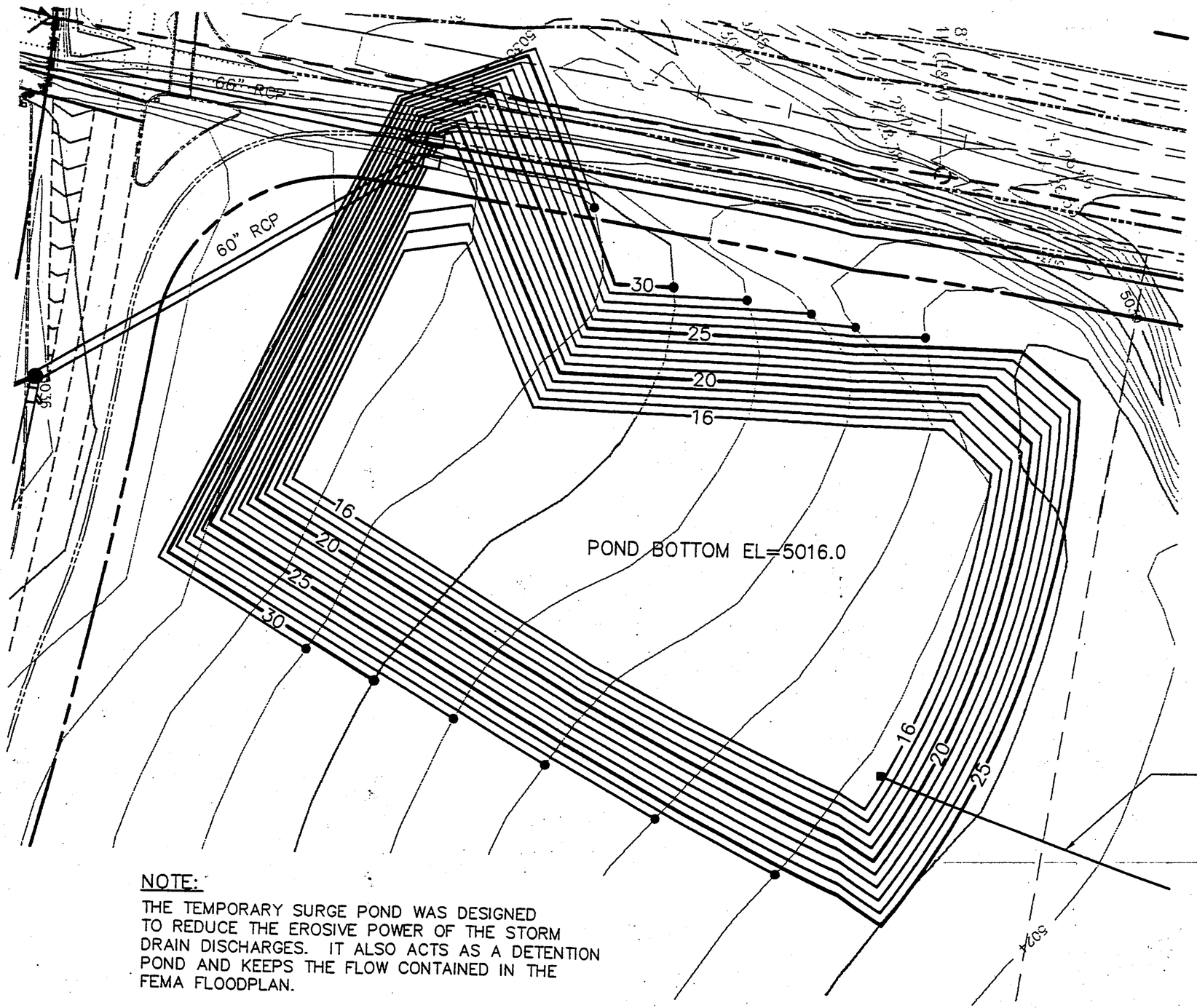
RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

*S**********
*S**********
*S **CALC BASIN 406
COMPUTE NM HYD ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
PER A=4 PER B=27 PER C=27 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

[redacted]

[redacted] [redacted] [redacted] [



SCALE: 1"=60'

TEMPORARY SURGE POND

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

NOTE:

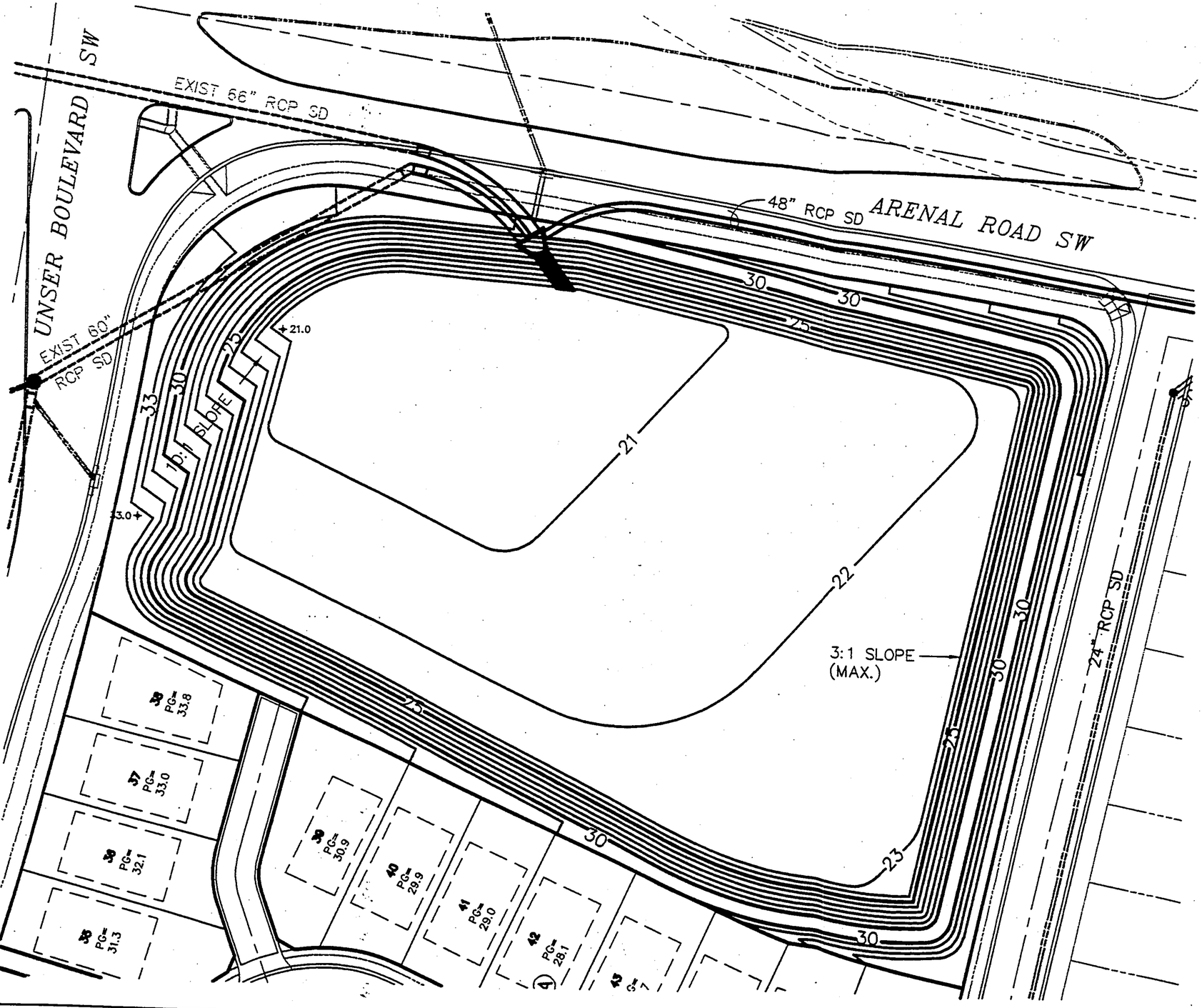
THE TEMPORARY SURGE POND WAS DESIGNED TO REDUCE THE EROSIVE POWER OF THE STORM DRAIN DISCHARGES. IT ALSO ACTS AS A DETENTION POND AND KEEPS THE FLOW CONTAINED IN THE FEMA FLOODPLAN.

FIGURE 1

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

903EXH13.DWGdlv

5/1/97



PERMANENT RETENTION POND

SCALE: 1"=60'

ELEV	H (ft)	AREA (ac)	STORAGE (af)
21	0	0.54	0
22	1	1.57	1.06
23	2	2.48	3.08
24	3	2.58	5.61
25	4	2.68	8.24
26	5	2.79	10.98
27	6	2.89	13.82
28	7	3.00	16.76
29	8	3.11	19.81
30	9	3.21	22.98

PEAK DISCHARGE TO POND = Q_{100} = 798cfs
= Q_{10} = 435 cfs

PEAK DISCHARGE = 183.8 cfs
MAX WATER SURFACE ELEV = 28.21 ft
POND STORAGE = 17.4 ac ft
MAX POND STORAGE = 22.98 ac ft

FIGURE 2

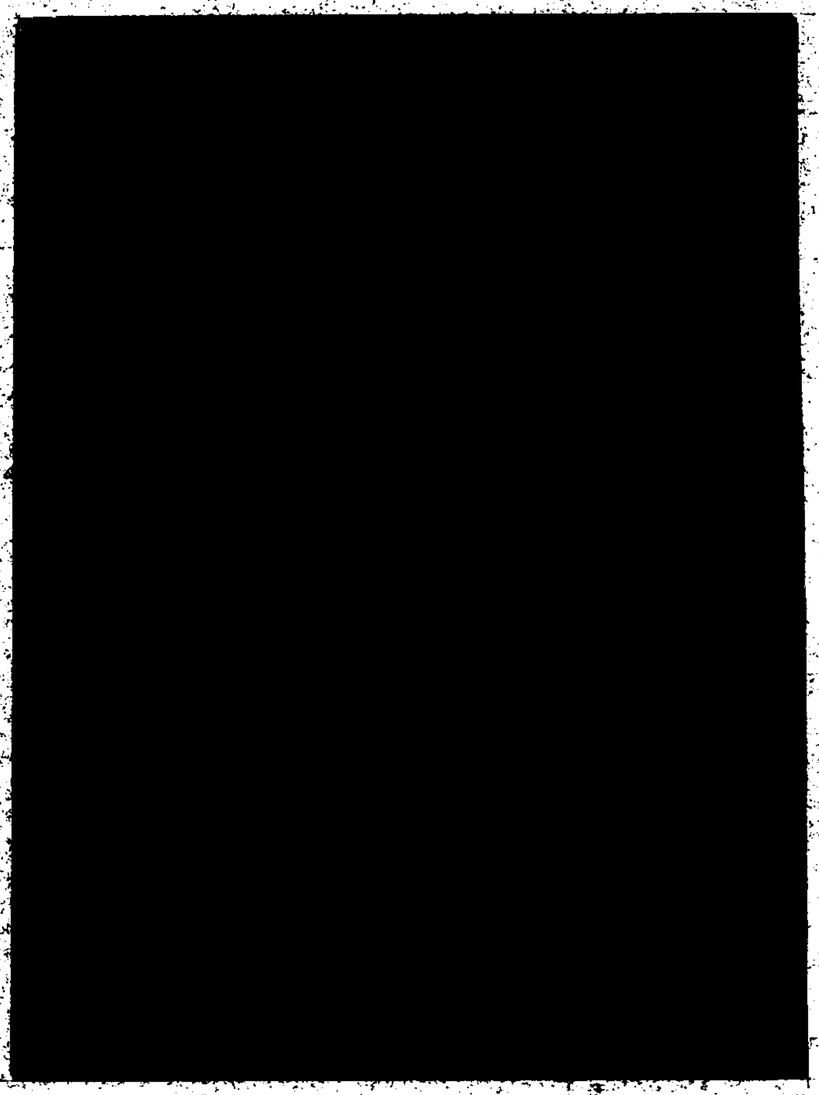
ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque New Mexico

921EXH10.DWGems 09/16/97

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM



MASTER DRAINAGE REPORT

FOR

DESERT SPRINGS SUBDIVISION
UNITS ONE THROUGH FIVE

A 472 LOT (FIVE PHASE) SINGLE FAMILY RESIDENTIAL SUBDIVISION

AND

DRAINAGE REPORT
FOR
DESERT SPRINGS SUBDIVISION
UNIT TWO (22 LOTS)

ALBUQUERQUE NEW MEXICO
MAY 1998

RECEIVED
MAY 29 1998
HYDROLOGY SECTION

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
(505) 268-8828

05.29.98

Fred C. Arfman, P.E. 4922 **Date**

FRED C. ARFMAN STATE OF NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

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Pond Sizing Calculations

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100-Year Storm

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Arenal Road - 10-Year Dry Lane Analysis

Appendix C: Arenal/Unser Drainage Management Plan (M10/D10)
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-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Pockets

Master Drainage Plan of May 1998

Unit Two Drainage & Grading Plan

Drainage Management Plan Basin Map

INTRODUCTION

This report shall serve as a Master Drainage Report for Desert Springs Subdivision, Units One-Five and the Drainage Report for Desert Springs Subdivision Unit Two. The five phases will consist of 99, 22, 100, 103, and 148 single family lots, respectively. All flow from this area is allowed free discharge to the Amole del Norte Diversion Channel as determined by the Arenal/Unser Drainage Management Plan approved by the City on September 18, 1997 (see Appendix C). The Desert Springs Unit One Drainage Report (M10/D8) which was previously approved on August 22, 1997 and is on file at the City will be incorporated into this report. This unit is currently under construction.

This study shall analyze the area wide drainage characteristics as they impact the site and offer solutions and recommendations to solve the hydrological and hydraulic conditions projected to occur in the event of the 100-year storm.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: Desert Springs Subdivision, Unit One,
Tract A & Tract B (March 30, 1998, Book 98C, Page 86)
Desert Springs Subdivision, Tracts A, B, and C
(February 20, 1997, Book 97C, Page 55)

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, P.E.
(505) 268-8828

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

DESERT SPRINGS SUBDIVISION

MASTER DRAINAGE REPORT



SCALE: 1"=200'

EXHIBIT 'A'

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque New Mexico

921EXH20.DWGems 5/26/98

BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: RLT

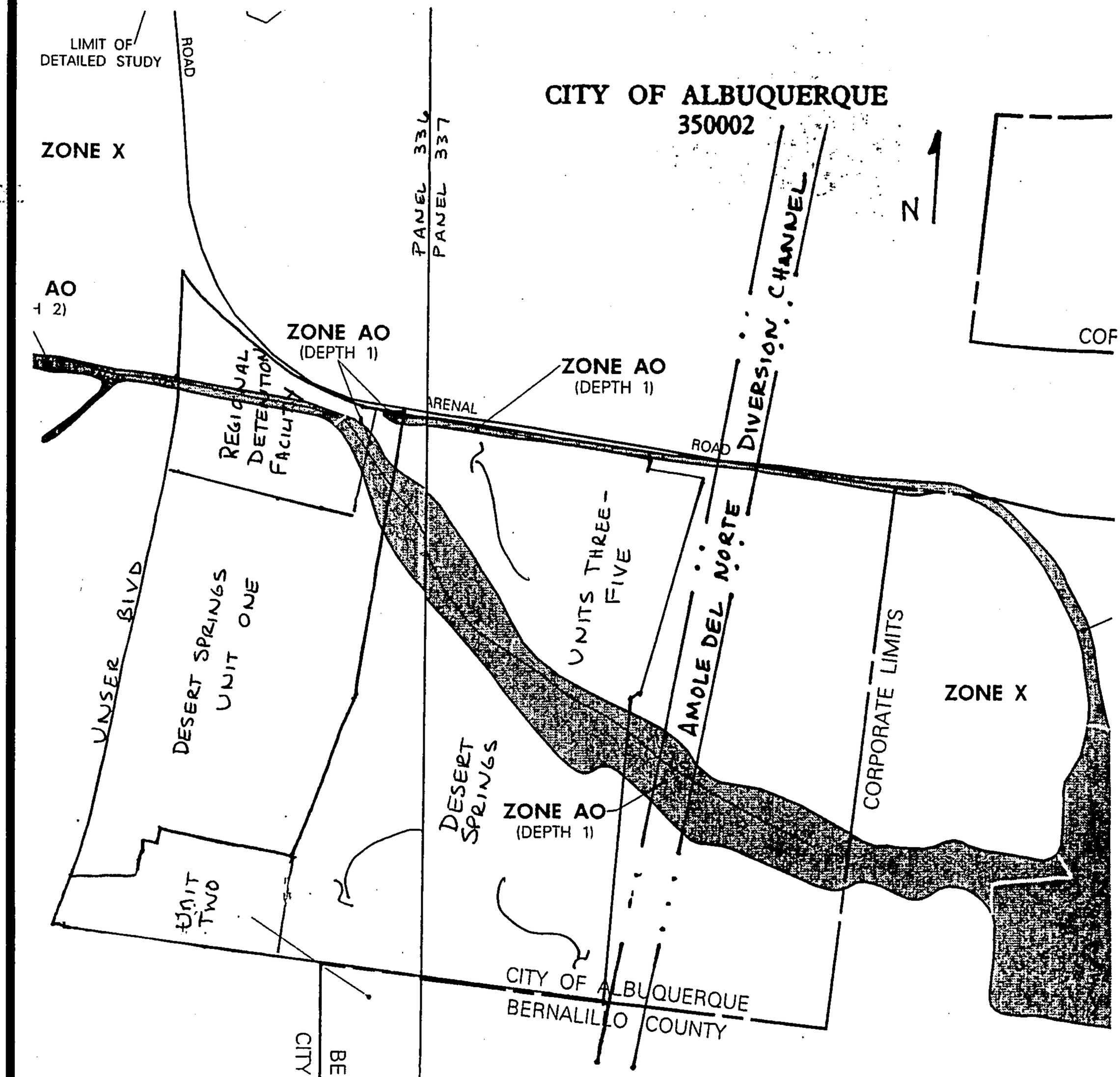
NUMBER OF PROPOSED LOTS:
Unit One: 99
Unit Two: 22
Unit Three: 100
Unit Four: 103
Unit Five: 148

TOTAL AREA: 73.38 Ac.
3,196,433 Sq. Ft.

II. SITE CHARACTERISTICS

FLOOD HAZARD: Portions of Units One, Three, and Four lie within a Zone AO (depth 2) floodplain as determined by Panels No. 350002-0336 and 35001C0337 of the September 20, 1996 Edition of the F.E.M.A. Maps (see attached). Flows within this zone will be captured by the regional detention facility located in the southeast corner of the Unser Blvd. and Arenal Road intersection. The regional detention facility was previously approved in the Arenal/Unser Drainage Management Plan (M10/D10). Final grading of the regional detention facility and a Letter of Map Revision (LOMR) will be required with the development of Unit Three.

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an average slope toward the east



FEMA PANELS 336 & 337

Scale 1":500'

ISAACSON & ARFMAN, P.A.

SUBJECT_____ JOB NO.___

BY_____ DATE_____ SHEET NO.____ OF___

of 2 percent. It is adjacent to Arenal Road to the north and Unser Blvd. to the west. The Amole del Norte Diversion Channel abuts the east boundary, and Desert Flower Subdivision the south. Storm water generated from the site flows east into the side of the Amole del Norte Diversion Channel. Offsite storm waters generated from Unit Two of Sunrise Estates (to the north) are released into Unser Blvd. and are then conveyed by a combination of street flow and storm drain to the regional detention facility. Flows are slowly released from the pond through a storm drain system along Arenal Road, which deposits the discharge into the Amole del Norte Diversion Channel. Runoff south of the proposed development flows southeast into the Amole del Norte Diversion Channel and does not affect the site.

PROPOSED CONDITIONS:

Unit One: This unit is currently under construction and is being developed per the approved Drainage Report for Unit One. Storm water flows from Rainwater Road, Silverberry Drive, and Desert Canyon Place will enter a temporary retention pond capable of accepting the 100-year 10-day volume. A storm drain system, which collects the flows from Silverberry Road and Desert Springs Court, will be installed along Desert Springs Drive. The storm drain will connect to the existing storm drain along Arenal Road.

Arenal Road/Unser Blvd.: Being adjacent to this phase, Unser Blvd. and Arenal Road are included as part of the development and have been analyzed for storm water flow carrying capacity for both the 10-year and 100-year events (see Appendix B).

Required catch basins will be constructed with this phase.

Unit Two: The second phase of this subdivision will be Tract A, Desert Springs Subdivision Unit One (located south of Unit One), and will consist of 22 lots. Discharge generated along Blue Avenida Avenue and Freshwater Road will be conveyed via street flow to Desert Springs Drive. There the flows will combine with Unit One flows and enter the temporary retention pond located at the east ends of Desert Canyon Place and Rainwater Road. The temporary retention pond used to capture Unit One runoff will be enlarged to account for the additional developed flows (see pond calculations). Storm drain construction will not be required with this phase of the project.

Unser Blvd.: Abutting the west property line of this phase has been analyzed for storm water capacity for both the 10-year and 100-year events (see Appendix B). The storm drain line was previously extended with Desert Flower Subdivision Unit One and no additional catch basins will be required with this phase.

Unit Three: The third phase of Desert Springs will be Tract A of Desert Springs Subdivision. This unit is bordered by Unit One to the west, the Amole del Norte Diversion Channel to the east, Arenal Road to the north and future Desert Springs Unit Four to the south.

The development of the 100 lots of this phase will not require storm drain construction. Runoff generated within Basins 113, 114, and 115 (see Basin Map) will be conveyed via street flow to a rundown which will be connected to the Amole del Norte Diversion Channel. The maximum street flow depth will equal 0.64' feet just prior to entering the rundown (refer to Table 2). Basins 109 and 110 will have a southerly drainage pattern. This portion of the unit will accept undeveloped flows from the future Desert Springs Unit Four located to the west. These flows will be captured by a temporary detention pond which will discharge to the Amole del Norte Diversion Channel at the pre-developed flow rate. The regional detention facility will be regraded to its final configuration with the development of this phase. A LOMR will be required prior to subdivision acceptance for this unit.

Arenal Road: The portion of Arenal Road adjacent to this phase, has an easterly surface drainage pattern. 10-year street flows shall be collected by new catch basins installed with this unit and be conveyed to the Amole del Norte Diversion Channel by the existing storm drain along Arenal Road. The existing storm drain was

designed to accept these flows and was approved with CIP No. 5803.91 (see Appendix B).

Unit Four: The fourth unit will be Tract B of Desert Springs Subdivision. It will have 103 lots and will not require the construction of a storm drain. This unit is bordered by Desert Springs Unit One to the west, the Amole del Norte Diversion Channel to the east, Desert Springs Unit Three to the north, and future Unit Five to the south. The temporary detention pond and a portion of the temporary retention pond used to capture runoffs from Units One and Three will be removed. The runoff from the previous units will enter this unit and be conveyed east via the continuation of the existing streets (see Table 2). A temporary detention pond situated to the south of Unit Four will collect the runoff from this phase until Unit Five is developed.

Unit Five: The final phase of Desert Springs will consist of 148 lots. It is located to the east of Unit Two, south of Unit Four, west of the Amole del Norte Diversion Channel, and north of the Desert Flower Subdivision. A storm drain system and two overland channels will be required to deposit the subdivision runoff into the Amole del Norte Diversion Channel. The temporary ponds from Units One, Two, and Four will be removed with the developments of this Unit, the flows from the previous units will be allowed to enter Unit Five.

Runoff from Desert Canyon Place and Desert Springs Drive will flow down a concrete channel into Basin 100. The storm waters will then be carried by street flow to the south boundary of Basin 101. There are two Type A inlets will pick up 16 cfs of the runoff and convey it via an 18" and 24" diameter storm drain to the Amole del Norte Diversion Channel.

The remaining flow will be conveyed via street flow to the southeast property line where an overland channel will deposit the flows into the Amole del Norte Diversion Channel. The second rundown will be required at the eastern terminus of Rainwater Road. This rundown will accept the previously developed flows from Units One, Three, and Four as well as the runoff developed in Basins 104, 105, 112 of Unit Five. All of this discharge will be conveyed to the rundown via street flow (see Table 2).

CONCLUSIONS & RECOMMENDATIONS

Desert Springs Units One through Five are proposed to be developed consecutively. Onsite and offsite runoffs have been addressed as to how the subdivision will have a cohesive drainage solution. The Summary Tables provide a more in depth study of the street capacities, drainage basins, and inlet capacities. Attached Flowmaster calculation sheets show rundown and storm sizing calculations. Also, pond sizing calculations have been included. Please refer to the Appendices for further supplemental information.

The recommendations for Units One through Five construction are presented below:

- The existing retention pond at the downstream end of Unit One will need to be enlarged to accommodate the runoff from Unit Two. This pond will be covered by a City of Albuquerque Agreement and Covenant.
- Temporary detention ponds will be required at the downstream end of Units Three and Four where the runoffs will be discharged into future units. These ponds will be covered by a City of Albuquerque Agreement and Covenant.
- Retention ponds will be removed and replaced with either a storm drain system or appropriate rundown when the abutting unit is in place.
- Berms or swale points shall be graded around the developing unit so that offsite runoff will not affect this unit.
- Lots running parallel to Unser Blvd. and Arenal Road shall be graded to be close in elevation to future street grades.
- All required storm drain from Unit Five to the Amole del Norte Diversion Channel shall be included as part of the Unit Five required infrastructure.
- Developer shall construct the storm drain outfalls to the Amole del Norte Diversion Channel as determined necessary in Unit Five Drainage Report.
- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Three construction.

- Two permanent overland outfalls to the Amole del Norte Diversion Channel will be required with Unit Five construction.

- Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).

- A Letter of Map Revision will be required of Unit Three prior to subdivision acceptance.

- Final grading of the regional detention facility will be required with Unit Three construction.

- Unit Two will not be allowed to have any rear yard ponding (see Typical Lot Grading Detail).

- Any required catch basins along the portion of Arenal Road fronting Unit Three shall be included as part of the required infrastructure for the unit.

SUMMARY TABLES

TABLE 1
ONSITE BASIN SUMMARY

Basin ID	Area (Sq. Mi.)	Contributing Basins	Cumulative Area (Sq. Mi.)	% A	% B	% C	% D	Basin Q (cfs)	Cumulative Q (cfs)
1A	0.0114	1A	0.0114	0	19.5	19.5	61	26.40	26.40
1B	0.0005	1A	0.0119	0	0	0	100	1.41	27.80
2A	0.0063	2A	0.0063	0	19.5	19.5	64	14.59	14.59
2B	0.00350	2B	0.0035	0	19.5	19.5	64	8.12	8.12
2C	0.0076	2B	0.0111	0	19.5	19.5	64	17.60	25.72
2D	0.0006	2C*	0.0117	0	19.5	19.5	64	1.40	27.12
2E	0.0002	2A	0.0064	0	19.5	19.5	64	.48	15.07
100	0.0049	2D*	0.0166	0	19.5	19.5	64	11.36	38.0
101	0.0015	100*	0.0181	0	19.5	19.5	64	3.49	41.90
102A	0.00268	102A	0.00268	33	19	19	29	4.43	4.43
102	0.0033	102A, 101*	0.02408	0	19.5	19.5	61	7.65	53.40
103	0.0055	102*	0.02958	0	19.5	19.5	61	12.74	65.20
104	0.00368	104	0.00368	0	19.5	19.5	61	8.53	8.53
105	0.0081	2E*	0.0146	0	19.5	19.5	61	18.76	30.06
106	0.0068	106	0.0068	0	19.5	19.5	61	15.75	15.75
107	0.0032	107	0.0032	0	19.5	19.5	61	7.42	7.42
108	0.0036	108	0.0036	0	19.5	19.5	61	8.35	8.35
109	0.0042	107, 108	0.0110	0	19.5	19.5	61	9.74	24.83
110	0.002	109*	0.0130	0	19.5	19.5	61	4.64	29.32
111	0.0018	106, 110*	0.0216	0	19.5	19.5	61	4.18	49.21
112	0.00275	104, 105*, 111*	0.0426	0	19.5	19.5	61	6.38	93.81
113	0.00308	113	0.00308	0	19.5	19.5	61	7.14	7.14
114	0.011	113	0.01408	0	19.5	19.5	61	25.47	29.52
115	0.0049	114*	0.019	0	19.5	19.5	61	11.36	40.63

*Cumulative Q of basin

Jun 26'98 9:40 No.001 P.03
TEL:505-268-2632

TABLE 2
Flow Depth at Key Locations

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
UNIT TWO						
Desert Springs Dr @ Desert Canyon	36	STD	0.008	27.12	0.51	0.64
Shadetree Dr @ Desert Springs	28	STD	0.013	17.6	0.41	0.56
UNIT THREE						
AP14	32	STD	0.005	40.63	0.64	0.79
AP13	32	STD	0.0068	29.52	0.54	0.68
UNIT FOUR						
AP11	32	STD	0.008	49.21	0.63	0.85
AP10	32	STD	0.008	29.32	0.52	0.67
AP9	26	STD	0.009	8.35	0.34	0.42
AP8	28	MTBL	0.0139	7.42	0.31	0.41
AP7	28	STD	0.0143	15.75	0.39	0.54
UNIT FIVE						
AP6	32	STD	0.0158	30.06	0.47	0.70
AP5	26	MTBL	0.02	8.53	0.30	0.45
AP4 **	28	STD	0.006	41.2	0.64	0.82
AP3 **	28	STD	0.005	37.4	0.64	0.79
AP2	28	MTBL	0.015	8.7	0.32	0.44
AP1	26	STD	0.0135	38	0.53	0.83

NOTES:
* DESERT SPRINGS UNIT ONE WAS PREVIOUSLY APPROVED UNDER WO # 5785.81 AND IS CURRENTLY UNDER CONSTRUCTION
* FLOWRATES LISTED ARE FOR FULL STREET WIDTH
** DOES NOT INCLUDE STORM DRAIN FLOWS

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Kevin M. McGaw, PE

FAX NO. (505) 268-2632

*** FAX COVER SHEET ***

TO: Susan Calongne
COA Hydrology
FAX #: 924-3864

DATE: 6/26/98

REFERENCE: Desert Springs Masterplan

TOTAL NUMBER OF PAGES. INCLUDING THIS PAGE: 3

☐ Hard copy to follow via mail.

If you do not receive any of these pages, please call (505) 268-8828.

MESSAGE:

Please find attached the revised Table 2 (with energy grade line depths) and rundown calculation sheet for incorporation into the Masterplan. Please call me if you have any further questions.

FROM: Melissa Cordes

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

TABLE 2
Flow Depth at Key Locations

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)
UNIT TWO					
Desert Springs Dr @ Desert Canyon	36	STD	0.008	27.12	0.51
Shadetree Dr @ Desert Springs	28	STD	0.013	17.6	0.41
UNIT THREE					
AP14	32	STD	0.005	40.63	0.64
AP13	32	STD	0.0068	29.52	0.54
UNIT FOUR					
AP11	32	STD	0.008	49.21	0.63
AP10	32	STD	0.008	29.32	0.52
AP9	26	STD	0.009	8.35	0.34
AP8	28	MTBL	0.0139	7.42	0.31
AP7	28	STD	0.0143	15.75	0.39
UNIT FIVE					
AP6	32	STD	0.0158	30.06	0.47
AP5	26	MTBL	0.02	8.53	0.30
AP4 **	28	STD	0.006	41.2	0.64
AP3 **	28	STD	0.005	37.4	0.64
AP2	28	MTBL	0.015	8.7	0.32
AP1	26	STD	0.0135	38	0.53

does EG stay in ROW?

NOTES:
* DESERT SPRINGS UNIT ONE WAS PREVIOUSLY APPROVED UNDER WO # 5785.81 AND IS CURRENTLY UNDER CONSTRUCTION
* FLOWRATES LISTED ARE FOR FULL STREET WIDTH
** DOES NOT INCLUDE STORM DRAIN FLOWS

TABLE 3
INLETS CAPACITY AT KEY LOCATIONS

INLET NO.	INLET TYPE	LOCATION (STA)	STREET WIDTH & CURB TYPE	% SLOPE	Q100	Dn (ft)	Qintercepted (cfs)	Qby-pass (cfs)
1 & 2	A	40' North of AP3	28' FF	.82	41.90	.61	16	29.5
3	A	300' West of AP4	28' FF	.5	42.54	.67	8	34.54

*Q inlets are calculated using DPM Plate 22.3, D-5

Concrete Rundown to Basin 100
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	CONCRETE RUNDOWN @ DESERT CANYON DR
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	2.00	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	10.00	ft
Discharge	27.12	cfs

Results		
Depth	0.94	ft
Flow Area	9.63	ft²
Wetted Perimeter	11.52	ft
Top Width	11.36	ft
Critical Depth	0.59	ft
Critical Slope	0.003132	ft/ft
Velocity	7.48	ft/s
Velocity Head	0.87	ft
Specific Energy	1.21	ft
Froude Number	2.33	
Flow is supercritical.		

Concrete Rundown to Basin 100
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	CONCRETE RUNDOWN @ DESERT CANYON DR
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	2.00	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	6.00	ft
Discharge	27.12	cfs

Results		
Depth	0.45	ft
Flow Area	3.14	ft²
Wetted Perimeter	8.03	ft
Top Width	7.82	ft
Critical Depth	0.78	ft
Critical Slope	0.002998	ft/ft
Velocity	8.64	ft/s
Velocity Head	1.16	ft
Specific Energy	1.61	ft
Froude Number	2.40	
Flow is supercritical.		

Change to
10'
Bottom
City
Standards

Amole Connection @ AP4
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	AMOLE CONNECTION @ AP4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	4.80	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	12.00	ft
Discharge	41.20	cfs

Results		
Depth	0.30	ft
Flow Area	3.80	ft²
Wetted Perimeter	13.35	ft
Top Width	13.21	ft
Critical Depth	0.69	ft
Critical Slope	0.002967	ft/ft
Velocity	10.84	ft/s
Velocity Head	1.83	ft
Specific Energy	2.13	ft
Froude Number	3.56	
Flow is supercritical.		

Amole Connection @ AP12
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	AMOLE CONNECTION @ AP12
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	3.40	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	17.00	ft
Discharge	93.81	cfs

Results		
Depth	0.44	ft
Flow Area	7.95	ft²
Wetted Perimeter	18.99	ft
Top Width	18.78	ft
Critical Depth	0.94	ft
Critical Slope	0.002665	ft/ft
Velocity	11.80	ft/s
Velocity Head	2.16	ft
Specific Energy	2.61	ft
Froude Number	3.20	
Flow is supercritical.		

Amole Connection @ AP14
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	AMOLE CONNECTION @ AP14
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	10.00	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	12.00	ft
Discharge	40.63	cfs

Results		
Depth	0.24	ft
Flow Area	3.00	ft^2
Wetted Perimeter	13.07	ft
Top Width	12.96	ft
Critical Depth	0.68	ft
Critical Slope	0.002975	ft/ft
Velocity	13.55	ft/s
Velocity Head	2.85	ft
Specific Energy	3.09	ft
Froude Number	4.96	
Flow is supercritical.		

Amole to MH1
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	AMOLE TO MH1
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	2.00	%
Diameter	24.00	in
Discharge	24.00	cfs

Results		
Depth	1.29	ft
Flow Area	2.15	ft²
Wetted Perimeter	3.74	ft
Top Width	1.91	ft
Critical Depth	1.74	ft
Percent Full	64.63	
Critical Slope	0.010303	ft/ft
Velocity	11.18	ft/s
Velocity Head	1.94	ft
Specific Energy	3.23	ft
Froude Number	1.86	
Maximum Discharge	34.41	cfs
Full Flow Capacity	31.99	cfs
Full Flow Slope	0.011256	ft/ft
Flow is supercritical.		

MH1 to MH2
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	MH1 TO MH2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	2.00	%
Diameter	24.00	in
Discharge	24.00	cfs

Results		
Depth	1.29	ft
Flow Area	2.15	ft^2
Wetted Perimeter	3.74	ft
Top Width	1.91	ft
Critical Depth	1.74	ft
Percent Full	64.63	
Critical Slope	0.010303	ft/ft
Velocity	11.18	ft/s
Velocity Head	1.94	ft
Specific Energy	3.23	ft
Froude Number	1.86	
Maximum Discharge	34.41	cfs
Full Flow Capacity	31.99	cfs
Full Flow Slope	0.011256	ft/ft
Flow is supercritical.		

MH2 TO MH3
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	MH2 TO MH3; 24" DIAMETER
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.90	%
Diameter	24.00	in
Discharge	16.00	cfs

Results		
Depth	1.29	ft
Flow Area	2.14	ft^2
Wetted Perimeter	3.72	ft
Top Width	1.92	ft
Critical Depth	1.44	ft
Percent Full	64.35	
Critical Slope	0.006614	ft/ft
Velocity	7.49	ft/s
Velocity Head	0.87	ft
Specific Energy	2.16	ft
Froude Number	1.25	
Maximum Discharge	23.08	cfs
Full Flow Capacity	21.46	cfs
Full Flow Slope	0.005003	ft/ft
Flow is supercritical.		

MH3 TO CATCH BASINS
Worksheet for Pressure Pipe

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	MH3 TO INLETS 2 & 1
Flow Element	Pressure Pipe
Method	Hazen-Williams Formula
Solve For	Pressure at 1

Input Data	
Pressure at 2	1.50 feet H20
Elevation at 1	109.23 ft
Elevation at 2	108.60 ft
Length	60.00 ft
C Coefficient	105.0
Diameter	18.00 in
Discharge	16.00 cfs

Results		
Pressure at 1	2.08	feet H20
Headloss	1.21	ft
Energy Grade at 1	112.58	ft
Energy Grade at 2	111.37	ft
Hydraulic Grade at 1	111.31	ft
Hydraulic Grade at 2	110.10	ft
Flow Area	1.77	ft^2
Wetted Perimeter	4.71	ft
Velocity	9.05	ft/s
Velocity Head	1.27	ft
Friction Slope	0.020132	ft/ft

Temporary Pond Calculations

Unit Two

Existing Pond Vol = 1.55 Ac.Ft

Additional Area = 3.5 Ac

$$\text{Wt } E = \frac{1.97(2.135) + .67(.68) + .99(.68)}{3.5} = 1.53 \text{ IN} \quad \begin{pmatrix} 6190 \text{ D,} \\ 19.570 \text{ B \& C} \end{pmatrix}$$

$$V_{360} = \frac{1.53 + 3.5}{12} = .45 \text{ Ac.Ft}$$

$$V_{10 \text{ DAY}} = .45 + \frac{2.135\,(3.67 - 2.2)}{12} = .71 \text{ Ac.Ft}$$

'Enlarge existing pond capacity to equal 1.55+.71 = 2.26 Ac.Ft'

Unit Three

Contributing Basins: 109, 110, 108*, 107*

* NOT developed

Area = 8.32 Ac

$$\text{Wt } E = \frac{.44(4.35) + .67(.79) + .99(.79) + 1.97(2.39)}{8.32} = .95 \text{ IN}$$

(5290 A, 2990 D, 9.590 B & C)

$$V_{360} = .95 + 8.32/12 = .66 \text{ Ac.Ft}$$

$$V_{10 \text{ DAY}} = .66 + \frac{2.39(3.67 - 2.2)}{12} = .95 \text{ Ac.Ft}$$

Unit FOUR

CONTRIBUTING BASINS : 104-111

AREA = 13.82 AC

Wt E = 1.53 IN (See Unit Two)

$V_{360} = \frac{1.53 \times 13.82}{12} = 1.76$ Ac·Ft

$V_{10\,DAY} = 1.76 + \frac{8.43(3.67-2.2)}{12} = 2.79$ Ac·Ft

APPENDIX A

ONSITE AHYMO SUMMARY & DETAILED OUTPUT
100-YEAR STORM

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/28/1998
INPUT FILE = DSRTSPGM.DAT USER NO.= ISCARFNM.I01

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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR										
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)										
COMPUTE NM HYD	100.00	-	1	.01140	26.40	.922	1.51706	1.500	3.618	PER IMP= 61.00
*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN										
COMPUTE NM HYD	101.00	-	2	.00050	1.41	.052	1.96548	1.500	4.396	PER IMP= 100.00
ADD HYD	101.10	1& 2	3	.01190	27.80	.975	1.53585	1.500	3.651	
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING										
COMPUTE NM HYD	102.00	-	4	.00630	14.59	.510	1.51706	1.500	3.620	PER IMP= 61.00
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)										
COMPUTE NM HYD	103.00	-	5	.00350	8.12	.283	1.51706	1.500	3.623	PER IMP= 61.00
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)										
COMPUTE NM HYD	104.00	-	6	.00760	17.60	.615	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASINS 2C & 2B										
ADD HYD	104.10	6& 5	7	.01110	25.72	.898	1.51701	1.500	3.620	
*S **BASIN 2D (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	105.00	-	8	.00060	1.40	.049	1.51706	1.500	3.659	PER IMP= 61.00
*S **ADD BASINS 2C.1 TO 2D										
ADD HYD	105.10	7& 8	9	.01170	27.12	.947	1.51699	1.500	3.622	
*S **ROUTE BASIN 2C.2 THRU CONCRETE RUNDOWN										
ROUTE	105.20	9	10	.01170	27.13	.947	1.51703	1.500	3.623	
*S ** ROUTE BASIN 2C.2 THROUGH 100										
ROUTE	105.30	10	11	.01170	27.09	.947	1.51703	1.533	3.617	
*S **BASIN 100										
COMPUTE NM HYD	106.00	-	12	.00490	11.36	.396	1.51706	1.500	3.621	PER IMP= 61.00
*S **ADD BASIN 100 & 2C.2										
ADD HYD	106.10	12&11	13	.01660	38.00	1.343	1.51700	1.533	3.577	
*S **ROUTE BASINS 100 & 2C.2 THROUGH 101										
ROUTE	106.20	13	14	.01660	38.55	1.343	1.51703	1.533	3.628	
*S **COMPUTE BASIN 101										
COMPUTE NM HYD	107.00	-	15	.00150	3.49	.121	1.51706	1.500	3.633	PER IMP= 61.00
*S **ADD BASIN 101 & 100										
ADD HYD	107.10	14&15	16	.01810	41.90	1.464	1.51699	1.533	3.617	
*S **COMPUTE BASIN 102A (PARK)										
COMPUTE NM HYD	108.00	-	17	.00268	4.43	.144	1.00753	1.500	2.580	PER IMP= 29.00
*S ** ROUTE BASIN 102A THROUGH 102										
ROUTE	108.10	17	18	.00268	4.15	.144	1.00761	1.533	2.418	
*S **COMPUTE BASIN 102										
COMPUTE NM HYD	109.00	-	19	.00330	7.65	.267	1.51706	1.500	3.624	PER IMP= 61.00
*S **ADD BASIN 102A & 102										
ADD HYD	109.10	19&18	20	.00598	11.50	.411	1.28862	1.533	3.005	
*S **ADD BASIN 101.1 & 102.1										
ADD HYD	109.20	20&16	21	.02408	53.40	1.875	1.46028	1.533	3.465	
*S ** ROUTE BASIN 102.2 THROUGH 103										
ROUTE	109.30	21	22	.02408	52.95	1.875	1.46030	1.533	3.436	
*S **COMPUTE BASIN 103										
COMPUTE NM HYD	110.00	-	23	.00550	12.74	.445	1.51706	1.500	3.620	PER IMP= 61.00
*S **ADD BASIN 102.3 & 103										

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	110.10	23&22	24	.02958	65.20	2.320	1.47083	1.533	3.444	
*S **COMPUTE BASIN 104										
COMPUTE NM HYD	111.00	-	24	.00368	8.53	.298	1.51706	1.500	3.623	PER IMP= 61.00
*S ** ROUTE BASIN 104 THROUGH 112										
ROUTE	111.10	24	25	.00368	8.41	.298	1.51712	1.533	3.570	
*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	112.00	-	26	.00020	.48	.016	1.51706	1.500	3.748	PER IMP= 61.00
*S **ADD BASIN 2E & 2A										
ADD HYD	112.10	26& 4	27	.00650	15.07	.526	1.51698	1.500	3.624	
*S ** ROUTE BASIN 2A.1 THROUGH 105										
ROUTE	112.20	27	28	.00650	12.55	.526	1.51707	1.567	3.017	
*S **COMPUTE BASIN 105										
COMPUTE NM HYD	113.00	-	29	.00810	18.76	.655	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 105 & 2A.1										
ADD HYD	113.10	28&29	30	.01460	30.06	1.181	1.51701	1.533	3.217	
*S **ADD BASIN 105.1 & 104.1										
ADD HYD	113.20	30&25	1	.01828	38.46	1.479	1.51700	1.533	3.288	
*S **COMPUTE BASIN 106										
COMPUTE NM HYD	114.00	-	2	.00680	15.75	.550	1.51706	1.500	3.620	PER IMP= 61.00
*S ** ROUTE BASIN 106 THROUGH 111										
ROUTE	114.10	2	3	.00680	15.58	.550	1.51709	1.500	3.579	
*S **COMPUTE BASIN 107										
COMPUTE NM HYD	115.00	-	4	.00320	7.42	.259	1.51706	1.500	3.624	PER IMP= 61.00
*S ** ROUTE BASIN 107 THROUGH 109										
ROUTE	115.10	4	5	.00320	7.24	.259	1.51713	1.533	3.535	
*S **COMPUTE BASIN 108										
COMPUTE NM HYD	116.00	-	6	.00360	8.35	.291	1.51706	1.500	3.623	PER IMP= 61.00
*S ** ROUTE BASIN 108 THROUGH 109										
ROUTE	116.10	6	7	.00360	8.23	.291	1.51712	1.533	3.574	
*S **ADD BASIN 108.1 & 107.1										
ADD HYD	116.20	7& 5	8	.00680	15.47	.550	1.51699	1.533	3.555	
*S **COMPUTE BASIN 109										
COMPUTE NM HYD	117.00	-	9	.00420	9.74	.340	1.51706	1.500	3.622	PER IMP= 61.00
*S **ADD BASIN 108.2 & 109										
ADD HYD	117.10	8& 9	10	.01100	24.83	.890	1.51699	1.533	3.527	
*S **COMPUTE BASIN 110										
COMPUTE NM HYD	118.00	-	11	.00200	4.64	.162	1.51706	1.500	3.628	PER IMP= 61.00
*S **ADD BASIN 109.1 & 110										
ADD HYD	118.10	10&11	12	.01300	29.32	1.052	1.51698	1.500	3.524	
*S ** ROUTE BASIN 110.1 THROUGH 111										
ROUTE	118.20	12	13	.01300	29.73	1.052	1.51702	1.533	3.573	
*S **ADD BASIN 106 & 110										
ADD HYD	118.30	13& 3	14	.01980	45.20	1.602	1.51700	1.533	3.567	
*S **COMPUTE BASIN 111										
COMPUTE NM HYD	119.00	-	15	.00180	4.18	.146	1.51706	1.500	3.630	PER IMP= 61.00
*S **ADD BASIN 111 & 110.2										
ADD HYD	119.10	15&14	16	.02160	49.21	1.748	1.51699	1.533	3.560	
*S **ADD BASIN 111.1 & 105.2										
ADD HYD	119.20	16& 1	17	.03988	87.68	3.227	1.51700	1.533	3.435	
*S **COMPUTE BASIN 112										
COMPUTE NM HYD	120.00	-	18	.00275	6.38	.223	1.51706	1.500	3.625	PER IMP= 61.00
*S **ADD BASIN 111.2 & 112										

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	120.10	18&17	19	.04263	93.81	3.449	1.51699	1.533	3.438	
*S **COMPUTE BASIN 113										
COMPUTE NM HYD	121.00	-	20	.00308	7.14	.249	1.51706	1.500	3.624	PER IMP= 61.00
*S ** ROUTE BASIN 113 THROUGH 114										
ROUTE	121.10	20	1	.00308	5.27	.249	1.51713	1.567	2.672	
*S **COMPUTE BASIN 114										
COMPUTE NM HYD	122.00	-	2	.01100	25.47	.890	1.51706	1.500	3.618	PER IMP= 61.00
*S **ADD BASIN 114 & 113.1										
ADD HYD	122.10	2& 1	3	.01408	29.52	1.139	1.51701	1.500	3.276	
*S ** ROUTE BASIN 114.1 THROUGH 115										
ROUTE	122.20	3	4	.01408	29.72	1.139	1.51704	1.533	3.298	
*S **COMPUTE BASIN 115										
COMPUTE NM HYD	123.00	-	5	.00490	11.36	.396	1.51706	1.500	3.621	PER IMP= 61.00
*S **ADD BASIN 114.2 & 115										
ADD HYD	123.10	5& 4	6	.01898	40.63	1.536	1.51700	1.533	3.345	
FINISH										

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 05/28/1998
         START TIME (HR:MIN:SEC) = 10:19:44     USER NO.= ISCARFNM.I01
         INPUT FILE = DSRTSPGM.DAT

**** DESERT SPRINGS MASTER DRAINAGE REPORT****
****          MAY 28, 1998            ****
****          DSRTSPGM.DAT            ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

                  COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0085   .0103
                     .0122   .0141   .0160   .0180   .0201   .0222   .0243
                     .0266   .0289   .0312   .0337   .0362   .0388   .0415
                     .0443   .0472   .0502   .0534   .0567   .0601   .0637
                     .0675   .0715   .0758   .0809   .0865   .0924   .1050
                     .1334   .1771   .2398   .3254   .4379   .5814   .7600
                     .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                    1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                    1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                    1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                    1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                    2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                    2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                    2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                    2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                    2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                    2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                    2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                    2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                    2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                    2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                    2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                    2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                    2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                    2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                    2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD        ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   27.455    CFS   UNIT VOLUME =    .9990       B =   526.28      P60 = 1.8700
    AREA =      .006954 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   11.829    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
    AREA =      .004446 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1   CODE=1

                                PARTIAL HYDROGRAPH   100.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .9224 ACRE-FEET
    PEAK DISCHARGE RATE =      26.40 CFS  AT   1.500 HOURS   BASIN AREA =   .0114 SQ. MI.


*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN
COMPUTE NM HYD      ID=2 HYD NO=101.00 AREA=0.0005 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.9740    CFS   UNIT VOLUME =    .9933       B =   526.28      P60 = 1.8700
    AREA =      .000500 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2   CODE=5

                                PARTIAL HYDROGRAPH   101.00

 TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
  HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
 .000        .0          1.333        .4         2.666        .0         4.000        .0         5.333        .0
 .167        .0          1.500       1.4         2.833        .0         4.166        .0         5.499        .0
 .333        .0          1.667        .7         3.000        .0         4.333        .0         5.666        .0
 .500        .0          1.833        .5         3.166        .0         4.500        .0         5.833        .0
 .667        .0          2.000        .3         3.333        .0         4.666        .0         5.999        .0
 .833        .0          2.166        .2         3.500        .0         4.833        .0         6.166        .0
1.000        .0          2.333        .1         3.666        .0         4.999        .0         6.333        .0
1.167        .0          2.500        .0         3.833        .0         5.166        .0

    RUNOFF VOLUME =     1.96548 INCHES     =        .0524 ACRE-FEET
    PEAK DISCHARGE RATE =       1.41 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


ADD HYD             ID=3 HYD NO=101.1 ID=1 ID=2
PRINT HYD           ID=3 CODE=1

                                PARTIAL HYDROGRAPH   101.10


    RUNOFF VOLUME =     1.53585 INCHES     =        .9747 ACRE-FEET
    PEAK DISCHARGE RATE =      27.80 CFS  AT   1.500 HOURS   BASIN AREA =   .0119 SQ. MI.
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```
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING
COMPUTE NM HYD       ID=4 HYD NO=102.00 AREA=0.0063 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   15.172    CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =      .003843 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   6.5373    CFS   UNIT VOLUME =    .9984       B =   354.67      P60 = 1.8700
    AREA =      .002457 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   102.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5097 ACRE-FEET
    PEAK DISCHARGE RATE =      14.59 CFS  AT   1.500 HOURS   BASIN AREA =   .0063 SQ. MI.


*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD       ID=5 HYD NO=103.00 AREA=0.0035 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4291    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.6318    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001365 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=5   CODE=1

                                PARTIAL HYDROGRAPH   103.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .2832 ACRE-FEET
    PEAK DISCHARGE RATE =       8.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0035 SQ. MI.


*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)
COMPUTE NM HYD       ID=6 HYD NO=104.00 AREA=0.0076 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.303    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004636 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.8862    CFS   UNIT VOLUME =    .9988       B =   354.67      P60 = 1.8700
    AREA =      .002964 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=6   CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .6149 ACRE-FEET
    PEAK DISCHARGE RATE =      17.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0076 SQ. MI.


*S **ADD BASINS 2C & 2B
ADD HYD             ID=7 HYD NO=104.1 ID=6 ID=5
PRINT HYD           ID=7 CODE=1

                                PARTIAL HYDROGRAPH   104.10

    RUNOFF VOLUME =     1.51701 INCHES      =        .8981 ACRE-FEET
    PEAK DISCHARGE RATE =      25.72 CFS  AT   1.500 HOURS   BASIN AREA =   .0111 SQ. MI.


*S **BASIN 2D (DESERT SPRINGS DRIVE)
COMPUTE NM HYD      ID=8 HYD NO=105.00 AREA=0.0006 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.4450    CFS   UNIT VOLUME =    .9911       B =   526.28      P60 = 1.8700
    AREA =      .000366 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .62260    CFS   UNIT VOLUME =    .9795       B =   354.67      P60 = 1.8700
    AREA =      .000234 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=8   CODE=1

                                PARTIAL HYDROGRAPH   105.00
```

RUNOFF VOLUME = 1.51706 INCHES = .0485 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

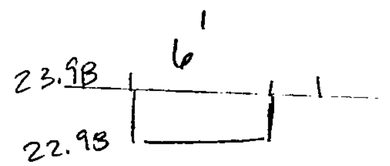
*S **ADD BASINS 2C.1 TO 2D
ADD HYD ID=9 HYD NO=105.1 ID=7 ID=8
PRINT HYD ID=9 CODE=1

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 1.51699 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.12 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

*S **ROUTE BASIN 2C.2 THRU CONCRETE RUNDOWN
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=22.98 FT MAX ELEV=23.98 FT
CH SLP=.02 FT FP SLP=.02 FT N=-.013
DIST=10 FT

DIST	ELEV	DIST	ELEV	DIST	ELEV
0	23.98	2	22.98	8	22.98
10	23.98				



RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
22.98	.00	.00	.00
23.03	.32	.72	6.21
23.09	.65	2.29	6.42
23.14	1.00	4.52	6.63
23.19	1.35	7.34	6.84
23.24	1.72	10.70	7.05
23.30	2.09	14.58	7.26
23.35	2.48	18.95	7.47
23.40	2.88	23.81	7.68
23.45	3.29	29.14	7.89
23.51	3.71	34.94	8.11
23.56	4.14	41.21	8.32
23.61	4.59	47.94	8.53
23.66	5.04	55.14	8.74
23.72	5.51	62.80	8.95
23.77	5.98	70.92	9.16
23.82	6.47	79.50	9.37
23.87	6.97	88.56	9.58
23.93	7.48	98.08	9.79
23.98	8.00	108.07	10.00

need
10' bottom
- public
waters
City maint.

COMPUTE TRAVEL TIME ID=10 REACH NO=1 NO VS=1 L=115
SLP=.02

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.321	.72	.0143
.105	.654	2.29	.0091
.158	.997	4.52	.0070
.211	1.352	7.34	.0059
.263	1.717	10.70	.0051
.316	2.094	14.58	.0046
.368	2.482	18.95	.0042
.421	2.881	23.81	.0039
.474	3.291	29.14	.0036
.526	3.712	34.94	.0034
.579	4.144	41.21	.0032
.632	4.587	47.94	.0031
.684	5.042	55.14	.0029
.737	5.507	62.80	.0028
.789	5.983	70.92	.0027
.842	6.471	79.50	.0026
.895	6.969	88.56	.0025
.947	7.479	98.08	.0024
1.000	8.000	108.07	.0024

```
ROUTE                ID=10 HYD NO=105.2 INFLOW ID=9 DT=0.0
PRINT HYD            ID=10 CODE=1
```

PARTIAL HYDROGRAPH 105.20

RUNOFF VOLUME = 1.51703 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.13 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

```
*S ** ROUTE BASIN 2C.2 THROUGH 100
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=26 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   13   100.26
                     25.9 100.00 26.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.04
100.18	1.55	3.74	17.55
100.21	2.23	6.09	21.06

100.25	3.03	9.18	24.57
100.28	3.94	13.69	25.88
100.32	4.85	19.35	25.89
100.35	5.76	25.75	25.91
100.39	6.68	32.85	25.92
100.42	7.59	40.61	25.93
100.46	8.50	48.99	25.94
100.49	9.42	57.99	25.95
100.53	10.33	67.56	25.96
100.56	11.25	77.69	25.97
100.60	12.17	88.36	25.98
100.63	13.08	99.55	25.99
100.67	14.00	111.25	26.00

COMPUTE TRAVEL TIME ID=11 REACH NO=1 NO VS=1 L=400 FT
SLP=.0135

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1342
.071	.248	.33	.0846
.106	.557	.96	.0645
.141	.990	2.07	.0533
.176	1.547	3.74	.0459
.212	2.228	6.09	.0407
.247	3.032	9.18	.0367
.282	3.936	13.69	.0319
.317	4.849	19.35	.0278
.353	5.762	25.75	.0249
.388	6.676	32.85	.0226
.423	7.590	40.61	.0208
.458	8.505	48.99	.0193
.494	9.419	57.99	.0180
.529	10.335	67.56	.0170
.564	11.250	77.69	.0161
.599	12.166	88.36	.0153
.635	13.082	99.55	.0146
.670	13.999	111.25	.0140

ROUTE ID=11 HYD NO=105.3 INFLOW ID=10 DT=0.0 HR
PRINT HYD ID=11 CODE=1

PARTIAL HYDROGRAPH 105.30

RUNOFF VOLUME = 1.51703 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.09 CFS AT 1.533 HOURS BASIN AREA = .0117 SQ. MI.

*S **BASIN 100
COMPUTE NM HYD ID=12 HYD NO=106.00 AREA=0.0049 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.801    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .002989 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.0846    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001911 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=12   CODE=1

                                PARTIAL HYDROGRAPH   106.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .3965 ACRE-FEET
    PEAK DISCHARGE RATE =      11.36 CFS  AT   1.500 HOURS   BASIN AREA =   .0049 SQ. MI.


*S **ADD BASIN 100 & 2C.2
ADD HYD            . ID=13 HYD NO=106.1 ID=12 ID=11
PRINT HYD           ID=13 CODE=1

                                PARTIAL HYDROGRAPH   106.10


    RUNOFF VOLUME =     1.51700 INCHES     =       1.3430 ACRE-FEET
    PEAK DISCHARGE RATE =      38.00 CFS  AT   1.533 HOURS   BASIN AREA =   .0166 SQ. MI.


*S **ROUTE BASINS 100 & 2C.2 THROUGH 101
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67

                              RATING CURVE VALLEY SECTION  1.0
                                WATER       FLOW        FLOW        TOP
                               SURFACE      AREA        RATE       WIDTH
                                ELEV        SQ FT       CFS        FT
                               100.00         .00         .00         .00
                               100.04         .06         .05        3.51
                               100.07         .25         .33        7.02
                               100.11         .56         .96       10.53
                               100.14         .99        2.07       14.05
                               100.18        1.55        3.75       17.56
                               100.21        2.23        6.09       21.07
                               100.25        3.03        9.19       24.58
                               100.28        3.96       13.18       27.88
                               100.32        4.95       19.05       27.89
```

100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

38

```
COMPUTE TRAVEL TIME  ID=14 REACH NO=1 NO VS=1 L=250 FT
                     SLP=.0082
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.0839
.071	.248	.33	.0528
.106	.557	.96	.0403
.141	.991	2.07	.0333
.176	1.548	3.75	.0287
.212	2.229	6.09	.0254
.247	3.034	9.19	.0229
.282	3.962	13.18	.0209
.317	4.946	19.05	.0180
.353	5.930	25.73	.0160
.388	6.914	33.18	.0145
.423	7.898	41.35	.0133
.458	8.883	50.21	.0123
.494	9.869	59.73	.0115
.529	10.854	69.89	.0108
.564	11.841	80.66	.0102
.599	12.827	92.01	.0097
.635	13.814	103.94	.0092
.670	14.801	116.42	.0088

over crown @ 33 cfs

```
ROUTE                ID=14 HYD NO=106.2 INFLOW ID=13 DT=0.0 HR
PRINT HYD            ID=14 CODE=1
```

PARTIAL HYDROGRAPH 106.20

RUNOFF VOLUME = 1.51703 INCHES = 1.3431 ACRE-FEET
PEAK DISCHARGE RATE = 38.55 CFS AT 1.533 HOURS BASIN AREA = .0166 SQ. MI.

```
*S **COMPUTE BASIN 101
COMPUTE NM HYD       ID=15 HYD NO=107.00 AREA=0.0015 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.6125    CFS   UNIT VOLUME =    .9961       B =   526.28      P60 = 1.8700
    AREA =      .000915 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.5565    CFS   UNIT VOLUME =    .9923       B =   354.67      P60 = 1.8700
    AREA =      .000585 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=15   CODE=1

                                PARTIAL HYDROGRAPH   107.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .1214 ACRE-FEET
    PEAK DISCHARGE RATE =       3.49 CFS  AT   1.500 HOURS   BASIN AREA =   .0015 SQ. MI.


*S **ADD BASIN 101 & 100
ADD HYD             ID=16 HYD NO=107.1 ID=14 ID=15
PRINT HYD           ID=16 CODE=1

                                PARTIAL HYDROGRAPH   107.10


    RUNOFF VOLUME =     1.51699 INCHES     =       1.4644 ACRE-FEET
    PEAK DISCHARGE RATE =      41.90 CFS  AT   1.533 HOURS   BASIN AREA =   .0181 SQ. MI.


*S **COMPUTE BASIN 102A (PARK)
COMPUTE NM HYD      ID=17 HYD NO=108.00 AREA=0.00268 SQ MI
                    PER A=33  PER B=19  PER C=19  PER D=29
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.0684    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000777 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   4.4401    CFS   UNIT VOLUME =    .9968       B =   311.05      P60 = 1.8700
    AREA =      .001903 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=17   CODE=1

                                PARTIAL HYDROGRAPH   108.00
```

RUNOFF VOLUME = 1.00753 INCHES = .1440 ACRE-FEET
PEAK DISCHARGE RATE = 4.43 CFS AT 1.500 HOURS BASIN AREA = .0027 SQ. MI.

*S ** ROUTE BASIN 102A THROUGH 102
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.33 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.33 0.1 100.00 14 100.28
27.9 100.00 28.0 100.33

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.02	.02	.01	1.74
100.03	.06	.05	3.47
100.05	.14	.15	5.21
100.07	.24	.31	6.94
100.09	.38	.57	8.68
100.10	.54	.93	10.41
100.12	.74	1.40	12.15
100.14	.96	2.00	13.88
100.16	1.22	2.73	15.62
100.17	1.51	3.62	17.35
100.19	1.82	4.67	19.09
100.21	2.17	5.88	20.82
100.23	2.55	7.28	22.56
100.24	2.95	8.88	24.29
100.26	3.39	10.67	26.03
100.28	3.86	12.67	27.77
100.30	4.34	15.35	27.98
100.31	4.83	18.31	27.99
100.33	5.32	21.46	28.00

COMPUTE TRAVEL TIME ID=18 REACH NO=1 NO VS=1 L=400 FT
SLP=.015

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.017	.015	.01	.2148
.035	.060	.05	.1353
.052	.136	.15	.1033
.069	.241	.31	.0853
.087	.377	.57	.0735
.104	.543	.93	.0651
.122	.739	1.40	.0587
.139	.965	2.00	.0537
.156	1.221	2.73	.0497

.174	1.507	3.62	.0463
.191	1.824	4.67	.0434
.208	2.171	5.88	.0410
.226	2.547	7.28	.0389
.243	2.954	8.88	.0370
.261	3.391	10.67	.0353
.278	3.859	12.67	.0338
.295	4.345	15.35	.0314
.313	4.831	18.31	.0293
.330	5.317	21.46	.0275

```
ROUTE                ID=18 HYD NO=108.1 INFLOW ID=17 DT=0.0 HR
PRINT HYD            ID=18 CODE=1

                                PARTIAL HYDROGRAPH   108.10

    RUNOFF VOLUME =     1.00761 INCHES      =        .1440 ACRE-FEET
    PEAK DISCHARGE RATE =       4.15 CFS  AT   1.533 HOURS   BASIN AREA =   .0027 SQ. MI.


*S **COMPUTE BASIN 102
COMPUTE NM HYD      .ID=19 HYD NO=109.00 AREA=0.0033 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   7.9474    CFS   UNIT VOLUME =    .9978       B =   526.28      P60 = 1.8700
    AREA =      .002013 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.4243    CFS   UNIT VOLUME =    .9966       B =   354.67      P60 = 1.8700
    AREA =      .001287 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=19   CODE=1

                                PARTIAL HYDROGRAPH   109.00

    RUNOFF VOLUME =     1.51706 INCHES      =        .2670 ACRE-FEET
    PEAK DISCHARGE RATE =       7.65 CFS  AT   1.500 HOURS   BASIN AREA =   .0033 SQ. MI.


*S **ADD BASIN 102A & 102
ADD HYD              ID=20 HYD NO=109.1 ID=19 ID=18
PRINT HYD            ID=20 CODE=1

                                PARTIAL HYDROGRAPH   109.10
```

RUNOFF VOLUME = 1.28862 INCHES = .4110 ACRE-FEET
PEAK DISCHARGE RATE = 11.50 CFS AT 1.533 HOURS BASIN AREA = .0060 SQ. MI.

*S **ADD BASIN 101.1 & 102.1
ADD HYD ID=21 HYD NO=109.2 ID=20 ID=16
PRINT HYD ID=21 CODE=1

PARTIAL HYDROGRAPH 109.20

RUNOFF VOLUME = 1.46028 INCHES = 1.8754 ACRE-FEET
PEAK DISCHARGE RATE = 53.40 CFS AT 1.533 HOURS BASIN AREA = .0241 SQ. MI.

*S ** ROUTE BASIN 102.2 THROUGH 103
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 14 100.28
27.9 100.00 28.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=22 REACH NO=1 NO VS=1 L=530 FT
SLP=.005

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1779
.071	.248	.33	.1120
.106	.557	.96	.0855
.141	.991	2.07	.0706
.176	1.548	3.75	.0608
.212	2.229	6.09	.0539
.247	3.034	9.19	.0486
.282	3.962	13.18	.0442
.317	4.946	19.05	.0382
.353	5.930	25.73	.0339
.388	6.914	33.18	.0307
.423	7.898	41.35	.0281
.458	8.883	50.21	.0260
.494	9.869	59.73	.0243
.529	10.854	69.89	.0229
.564	11.841	80.66	.0216
.599	12.827	92.01	.0205
.635	13.814	103.94	.0196
.670	14.801	116.42	.0187

```
ROUTE                ID=22 HYD NO=109.3 INFLOW ID=21 DT=0.0 HR
PRINT HYD            ID=22 CODE=1

                          PARTIAL HYDROGRAPH   109.30

    RUNOFF VOLUME =     1.46030 INCHES      =       1.8754 ACRE-FEET
    PEAK DISCHARGE RATE =      52.95 CFS  AT   1.533 HOURS   BASIN AREA =    .0241 SQ. MI.


*S **COMPUTE BASIN 103
COMPUTE NM HYD       ID=23 HYD NO=110.00 AREA=0.0055 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   13.246    CFS   UNIT VOLUME =    .9985       B =   526.28      P60 = 1.8700
    AREA =      .003355 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.7072    CFS   UNIT VOLUME =    .9980       B =   354.67      P60 = 1.8700
    AREA =      .002145 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=23   CODE=1

                          PARTIAL HYDROGRAPH   110.00
```

```
    RUNOFF VOLUME =     1.51706 INCHES      =         .4450 ACRE-FEET
    PEAK DISCHARGE RATE =      12.74 CFS  AT    1.500 HOURS    BASIN AREA =    .0055 SQ. MI.


*S **ADD BASIN 102.3 & 103
ADD HYD             ID=24 HYD NO=110.1 ID=23 ID=22
PRINT HYD           ID=24 CODE=1

                                PARTIAL HYDROGRAPH   110.10


    RUNOFF VOLUME =     1.47083 INCHES      =        2.3204 ACRE-FEET
    PEAK DISCHARGE RATE =      65.20 CFS  AT    1.533 HOURS    BASIN AREA =    .0296 SQ. MI.


*S **COMPUTE BASIN 104
COMPUTE NM HYD      ID=24 HYD NO=111.00 AREA=0.00368 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.8626    CFS   UNIT VOLUME =     .9981       B =   526.28      P60 = 1.8700
    AREA =       .002245 SQ MI    IA =     .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.8186    CFS   UNIT VOLUME =     .9969       B =   354.67      P60 = 1.8700
    AREA =       .001435 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD           ID=24   CODE=1

                                PARTIAL HYDROGRAPH   111.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .2977 ACRE-FEET
    PEAK DISCHARGE RATE =       8.53 CFS  AT    1.500 HOURS    BASIN AREA =    .0037 SQ. MI.


*S ** ROUTE BASIN 104 THROUGH 112
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   16   100.32
                     31.9 100.00 32.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=25 REACH NO=1 NO VS=1 L=220 FT
SLP=.005

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.0738
.071	.248	.33	.0465
.106	.558	.96	.0355
.141	.992	2.07	.0293
.176	1.549	3.75	.0252
.212	2.231	6.10	.0224
.247	3.037	9.20	.0202
.282	3.966	13.13	.0185
.317	5.020	17.98	.0171
.353	6.144	25.01	.0150
.388	7.269	33.05	.0134
.423	8.395	41.95	.0122
.458	9.521	51.67	.0113
.494	10.647	62.16	.0105
.529	11.774	73.40	.0098
.564	12.901	85.36	.0092
.599	14.029	98.01	.0087
.635	15.157	111.33	.0083
.670	16.285	125.31	.0079

ROUTE ID=25 HYD NO=111.1 INFLOW ID=24 DT=0.0 HR
PRINT HYD ID=25 CODE=1

PARTIAL HYDROGRAPH 111.10

RUNOFF VOLUME = 1.51712 INCHES = .2978 ACRE-FEET
PEAK DISCHARGE RATE = 8.41 CFS AT 1.533 HOURS BASIN AREA = .0037 SQ. MI.

```
*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)
COMPUTE NM HYD      ID=26 HYD NO=112.00 AREA=0.0002 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .48166    CFS   UNIT VOLUME =    .9751       B =  526.28      P60 = 1.8700
    AREA =      .000122 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .20753    CFS   UNIT VOLUME =    .9360       B =   354.67      P60 = 1.8700
    AREA =      .000078 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=26   CODE=1
```

PARTIAL HYDROGRAPH 112.00

RUNOFF VOLUME = 1.51706 INCHES = .0162 ACRE-FEET
PEAK DISCHARGE RATE = .48 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

```
*S **ADD BASIN 2E & 2A
ADD HYD             ID=27 HYD NO=112.1 ID=26 ID=4
PRINT HYD           ID=27 CODE=1
```

PARTIAL HYDROGRAPH 112.10

RUNOFF VOLUME = 1.51698 INCHES = .5259 ACRE-FEET
PEAK DISCHARGE RATE = 15.07 CFS AT 1.500 HOURS BASIN AREA = .0065 SQ. MI.

```
*S ** ROUTE BASIN 2A.1 THROUGH 105
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   16   100.32
                     31.9 100.00 32.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=28 REACH NO=1 NO VS=1 L=1030 FT
SLP=.0158

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3456
.071	.248	.33	.2177
.106	.558	.96	.1662
.141	.992	2.07	.1372
.176	1.549	3.75	.1182
.212	2.231	6.10	.1047
.247	3.037	9.20	.0945
.282	3.966	13.13	.0864
.317	5.020	17.98	.0799
.353	6.144	25.01	.0703
.388	7.269	33.05	.0629
.423	8.395	41.95	.0573
.458	9.521	51.67	.0527
.494	10.647	62.16	.0490
.529	11.774	73.40	.0459
.564	12.901	85.36	.0432
.599	14.029	98.01	.0410
.635	15.157	111.33	.0390
.670	16.285	125.31	.0372

ROUTE ID=28 HYD NO=112.2 INFLOW ID=27 DT=0.0 HR
PRINT HYD ID=28 CODE=1

PARTIAL HYDROGRAPH 112.20

RUNOFF VOLUME = 1.51707 INCHES = .5259 ACRE-FEET
PEAK DISCHARGE RATE = 12.55 CFS AT 1.567 HOURS BASIN AREA = .0065 SQ. MI.

*S **COMPUTE BASIN 105
COMPUTE NM HYD ID=29 HYD NO=113.00 AREA=0.0081 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 19.507 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.8700
AREA = .004941 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 8.4051 CFS UNIT VOLUME = .9988 B = 354.67 P60 = 1.8700
AREA = .003159 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=29 CODE=1

PARTIAL HYDROGRAPH 113.00

RUNOFF VOLUME = 1.51706 INCHES = .6554 ACRE-FEET
PEAK DISCHARGE RATE = 18.76 CFS AT 1.500 HOURS BASIN AREA = .0081 SQ. MI.

*S **ADD BASIN 105 & 2A.1
ADD HYD ID=30 HYD NO=113.1 ID=28 ID=29
PRINT HYD ID=30 CODE=1

PARTIAL HYDROGRAPH 113.10

RUNOFF VOLUME = 1.51701 INCHES = 1.1812 ACRE-FEET
PEAK DISCHARGE RATE = 30.06 CFS AT 1.533 HOURS BASIN AREA = .0146 SQ. MI.

*S **ADD BASIN 105.1 & 104.1
ADD HYD ID=1 HYD NO=113.2 ID=30 ID=25
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 113.20

RUNOFF VOLUME = 1.51700 INCHES = 1.4790 ACRE-FEET
PEAK DISCHARGE RATE = 38.46 CFS AT 1.533 HOURS BASIN AREA = .0183 SQ. MI.

```
*S **COMPUTE BASIN 106
COMPUTE NM HYD       ID=2 HYD NO=114.00 AREA=0.0068 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   16.377    CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =      .004148 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.0561    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002652 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=2   CODE=1

                                PARTIAL HYDROGRAPH   114.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5502 ACRE-FEET
    PEAK DISCHARGE RATE =      15.75 CFS  AT   1.500 HOURS   BASIN AREA =   .0068 SQ. MI.


*S ** ROUTE BASIN 106 THROUGH 111
COMPUTE TRAVEL TIME  ID=3 REACH NO=1 NO VS=1 L=130 FT
                     SLP=.008

                TRAVEL TIME TABLE
                                REACH=  1.0

                WATER       AVERAGE      FLOW         TRAVEL
                DEPTH       AREA         RATE         TIME
                FEET        SQ.FT.       CFS          HRS
                   .035         .062          .05        .0436
                   .071         .248          .33        .0275
                   .106         .558          .96        .0210
                   .141         .992         2.07        .0173
                   .176        1.549         3.75        .0149
                   .212        2.231         6.10        .0132
                   .247        3.037         9.20        .0119
                   .282        3.966        13.13        .0109
                   .317        5.020        17.98        .0101
                   .353        6.144        25.01        .0089
                   .388        7.269        33.05        .0079
                   .423        8.395        41.95        .0072
                   .458        9.521        51.67        .0067
                   .494       10.647        62.16        .0062
                   .529       11.774        73.40        .0058
                   .564       12.901        85.36        .0055
                   .599       14.029        98.01        .0052
                   .635       15.157       111.33        .0049
                   .670       16.285       125.31        .0047
```

```
ROUTE                ID=3 HYD NO=114.1 INFLOW ID=2 DT=0.0 HR
PRINT HYD            ID=3 CODE=1

                              PARTIAL HYDROGRAPH   114.10

    RUNOFF VOLUME =     1.51709 INCHES     =        .5502 ACRE-FEET
    PEAK DISCHARGE RATE =      15.58 CFS  AT   1.500 HOURS   BASIN AREA =   .0068 SQ. MI.


*S **COMPUTE BASIN 107
COMPUTE NM HYD       ID=4 HYD NO=115.00 AREA=0.0032 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   7.7066    CFS   UNIT VOLUME =    .9978       B =   526.28      P60 = 1.8700
    AREA =      .001952 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.3205    CFS   UNIT VOLUME =    .9966       B =   354.67      P60 = 1.8700
    AREA =      .001248 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD            ID=4   CODE=1

                              PARTIAL HYDROGRAPH   115.00

    RUNOFF VOLUME =     1.51706 INCHES     =        .2589 ACRE-FEET
    PEAK DISCHARGE RATE =       7.42 CFS  AT   1.500 HOURS   BASIN AREA =   .0032 SQ. MI.


*S ** ROUTE BASIN 107 THROUGH 109
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67

                              RATING CURVE VALLEY SECTION  1.0
                                WATER       FLOW        FLOW        TOP
                               SURFACE      AREA        RATE       WIDTH
                                ELEV       SQ FT       CFS         FT
                               100.00        .00         .00         .00
                               100.04        .06         .05        3.51
                               100.07        .25         .33        7.02
                               100.11        .56         .96       10.53
                               100.14        .99        2.07       14.05
                               100.18       1.55        3.75       17.56
```

100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=5 REACH NO=1 NO VS=1 L=300 FT
SLP=.008

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1007
.071	.248	.33	.0634
.106	.557	.96	.0484
.141	.991	2.07	.0400
.176	1.548	3.75	.0344
.212	2.229	6.09	.0305
.247	3.034	9.19	.0275
.282	3.962	13.18	.0250
.317	4.946	19.05	.0216
.353	5.930	25.73	.0192
.388	6.914	33.18	.0174
.423	7.898	41.35	.0159
.458	8.883	50.21	.0147
.494	9.869	59.73	.0138
.529	10.854	69.89	.0129
.564	11.841	80.66	.0122
.599	12.827	92.01	.0116
.635	13.814	103.94	.0111
.670	14.801	116.42	.0106

ROUTE ID=5 HYD NO=115.1 INFLOW ID=4 DT=0.0 HR
PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 115.10

RUNOFF VOLUME = 1.51713 INCHES = .2589 ACRE-FEET
PEAK DISCHARGE RATE = 7.24 CFS AT 1.533 HOURS BASIN AREA = .0032 SQ. MI.

```
*S **COMPUTE BASIN 108
COMPUTE NM HYD       ID=6 HYD NO=116.00 AREA=0.0036 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.6699    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002196 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.7356    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001404 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=6   CODE=1

                                PARTIAL HYDROGRAPH   116.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .2913 ACRE-FEET
    PEAK DISCHARGE RATE =       8.35 CFS  AT   1.500 HOURS   BASIN AREA =    .0036 SQ. MI.


*S ** ROUTE BASIN 108 THROUGH 109
COMPUTE TRAVEL TIME  ID=7 REACH NO=1 NO VS=1 L=200 FT
                     SLP=.008

                TRAVEL TIME TABLE
                                REACH=  1.0

                WATER        AVERAGE      FLOW         TRAVEL
                DEPTH        AREA         RATE         TIME
                FEET         SQ.FT.       CFS          HRS
                   .035          .062          .05        .0671
                   .071          .248          .33        .0423
                   .106          .557          .96        .0323
                   .141          .991         2.07        .0266
                   .176         1.548         3.75        .0230
                   .212         2.229         6.09        .0203
                   .247         3.034         9.19        .0183
                   .282         3.962        13.18        .0167
                   .317         4.946        19.05        .0144
                   .353         5.930        25.73        .0128
                   .388         6.914        33.18        .0116
                   .423         7.898        41.35        .0106
                   .458         8.883        50.21        .0098
                   .494         9.869        59.73        .0092
                   .529        10.854        69.89        .0086
                   .564        11.841        80.66        .0082
                   .599        12.827        92.01        .0077
                   .635        13.814       103.94        .0074
                   .670        14.801       116.42        .0071
```

```
ROUTE                ID=7 HYD NO=116.1 INFLOW ID=6 DT=0.0 HR
PRINT HYD            ID=7 CODE=1

                                PARTIAL HYDROGRAPH   116.10

    RUNOFF VOLUME =     1.51712 INCHES      =        .2913 ACRE-FEET
    PEAK DISCHARGE RATE =       8.23 CFS  AT   1.533 HOURS   BASIN AREA =   .0036 SQ. MI.


*S **ADD BASIN 108.1 & 107.1
ADD HYD              ID=8 HYD NO=116.2 ID=7 ID=5
PRINT HYD            ID=8 CODE=1

                                PARTIAL HYDROGRAPH   116.20

    RUNOFF VOLUME =     1.51699 INCHES      =        .5502 ACRE-FEET
    PEAK DISCHARGE RATE =      15.47 CFS  AT   1.533 HOURS   BASIN AREA =   .0068 SQ. MI.


*S **COMPUTE BASIN 109
COMPUTE NM HYD       ID=9 HYD NO=117.00 AREA=0.0042 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   10.115    CFS   UNIT VOLUME =    .9982       B =   526.28      P60 = 1.8700
    AREA =      .002562 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   4.3582    CFS   UNIT VOLUME =    .9972       B =   354.67      P60 = 1.8700
    AREA =      .001638 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=9   CODE=1

                                PARTIAL HYDROGRAPH   117.00

    RUNOFF VOLUME =     1.51706 INCHES      =        .3398 ACRE-FEET
    PEAK DISCHARGE RATE =       9.74 CFS  AT   1.500 HOURS   BASIN AREA =   .0042 SQ. MI.


*S **ADD BASIN 108.2 & 109
ADD HYD              ID=10 HYD NO=117.1 ID=8 ID=9
PRINT HYD            ID=10 CODE=1

                                PARTIAL HYDROGRAPH   117.10
```

```
    RUNOFF VOLUME =     1.51699 INCHES      =         .8900 ACRE-FEET
    PEAK DISCHARGE RATE =      24.83 CFS  AT   1.533 HOURS   BASIN AREA =    .0110 SQ. MI.


*S **COMPUTE BASIN 110
COMPUTE NM HYD      ID=11 HYD NO=118.00 AREA=0.002 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   4.8166    CFS   UNIT VOLUME =    .9969       B =   526.28      P60 = 1.8700
    AREA =      .001220 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.0753    CFS   UNIT VOLUME =    .9943       B =   354.67      P60 = 1.8700
    AREA =      .000780 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=11   CODE=1

                              PARTIAL HYDROGRAPH   118.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .1618 ACRE-FEET
    PEAK DISCHARGE RATE =       4.64 CFS  AT   1.500 HOURS   BASIN AREA =    .0020 SQ. MI.


*S **ADD BASIN 109.1 & 110
ADD HYD             ID=12 HYD NO=118.1 ID=10 ID=11
PRINT HYD           ID=12 CODE=1

                                   PARTIAL HYDROGRAPH   118.10


    RUNOFF VOLUME =     1.51698 INCHES      =        1.0518 ACRE-FEET
    PEAK DISCHARGE RATE =      29.32 CFS  AT   1.500 HOURS   BASIN AREA =    .0130 SQ. MI.


*S ** ROUTE BASIN 110.1 THROUGH 111
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   16   100.32
                     31.9 100.00 32.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=13 REACH NO=1 NO VS=1 L=350 FT
SLP=.008

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1174
.071	.248	.33	.0740
.106	.558	.96	.0565
.141	.992	2.07	.0466
.176	1.549	3.75	.0402
.212	2.231	6.10	.0356
.247	3.037	9.20	.0321
.282	3.966	13.13	.0294
.317	5.020	17.98	.0271
.353	6.144	25.01	.0239
.388	7.269	33.05	.0214
.423	8.395	41.95	.0195
.458	9.521	51.67	.0179
.494	10.647	62.16	.0167
.529	11.774	73.40	.0156
.564	12.901	85.36	.0147
.599	14.029	98.01	.0139
.635	15.157	111.33	.0132
.670	16.285	125.31	.0126

ROUTE ID=13 HYD NO=118.2 INFLOW ID=12 DT=0.0 HR
PRINT HYD ID=13 CODE=1

PARTIAL HYDROGRAPH 118.20

RUNOFF VOLUME = 1.51702 INCHES = 1.0518 ACRE-FEET
PEAK DISCHARGE RATE = 29.73 CFS AT 1.533 HOURS BASIN AREA = .0130 SQ. MI.

```
*S **ADD BASIN 106 & 110
ADD HYD             ID=14 HYD NO=118.3 ID=13 ID=3
PRINT HYD           ID=14 CODE=1
```

PARTIAL HYDROGRAPH 118.30

RUNOFF VOLUME = 1.51700 INCHES = 1.6019 ACRE-FEET
PEAK DISCHARGE RATE = 45.20 CFS AT 1.533 HOURS BASIN AREA = .0198 SQ. MI.

```
*S **COMPUTE BASIN 111
COMPUTE NM HYD      ID=15 HYD NO=119.00 AREA=0.0018 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 4.3350 CFS UNIT VOLUME = .9969 B = 526.28 P60 = 1.8700
AREA = .001098 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 1.8678 CFS UNIT VOLUME = .9930 B = 354.67 P60 = 1.8700
AREA = .000702 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=15   CODE=1
```

PARTIAL HYDROGRAPH 119.00

RUNOFF VOLUME = 1.51706 INCHES = .1456 ACRE-FEET
PEAK DISCHARGE RATE = 4.18 CFS AT 1.500 HOURS BASIN AREA = .0018 SQ. MI.

```
*S **ADD BASIN 111 & 110.2
ADD HYD             ID=16 HYD NO=119.1 ID=15 ID=14
PRINT HYD           ID=16 CODE=1
```

PARTIAL HYDROGRAPH 119.10

RUNOFF VOLUME = 1.51699 INCHES = 1.7476 ACRE-FEET
PEAK DISCHARGE RATE = 49.21 CFS AT 1.533 HOURS BASIN AREA = .0216 SQ. MI.

```
*S **ADD BASIN 111.1 & 105.2
ADD HYD             ID=17 HYD NO=119.2 ID=16 ID=1
PRINT HYD           ID=17 CODE=1

                                PARTIAL HYDROGRAPH   119.20


    RUNOFF VOLUME =     1.51700 INCHES      =       3.2265 ACRE-FEET
    PEAK DISCHARGE RATE =      87.68 CFS  AT   1.533 HOURS   BASIN AREA =    .0399 SQ. MI.


*S **COMPUTE BASIN 112
COMPUTE NM HYD      ID=18 HYD NO=120.00 AREA=0.00275 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   6.6229    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
    AREA =      .001678 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.8536    CFS   UNIT VOLUME =    .9958       B =   354.67      P60 = 1.8700
    AREA =      .001073 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD           ID=18   CODE=1

                                PARTIAL HYDROGRAPH   120.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .2225 ACRE-FEET
    PEAK DISCHARGE RATE =       6.38 CFS  AT   1.500 HOURS   BASIN AREA =    .0028 SQ. MI.


*S **ADD BASIN 111.2 & 112
ADD HYD             ID=19 HYD NO=120.1 ID=18 ID=17
PRINT HYD           ID=19 CODE=1

                                PARTIAL HYDROGRAPH   120.10


    RUNOFF VOLUME =     1.51699 INCHES      =       3.4490 ACRE-FEET
    PEAK DISCHARGE RATE =      93.81 CFS  AT   1.533 HOURS   BASIN AREA =    .0426 SQ. MI.


*S **COMPUTE BASIN 113
COMPUTE NM HYD      ID=20 HYD NO=121.00 AREA=0.00308 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   7.4176    CFS   UNIT VOLUME =    .9978       B =   526.28      P60 = 1.8700
    AREA =      .001879 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.1960    CFS   UNIT VOLUME =    .9962       B =   354.67      P60 = 1.8700
    AREA =      .001201 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=20   CODE=1

                                PARTIAL HYDROGRAPH   121.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .2492 ACRE-FEET
    PEAK DISCHARGE RATE =       7.14 CFS  AT   1.500 HOURS   BASIN AREA =    .0031 SQ. MI.


*S ** ROUTE BASIN 113 THROUGH 114
COMPUTE TRAVEL TIME  ID=1 REACH NO=1 NO VS=1 L=1200 FT
                     SLP=.0068

                              TRAVEL TIME TABLE
                                                REACH=  1.0
                              WATER       AVERAGE      FLOW        TRAVEL
                              DEPTH       AREA         RATE        TIME
                              FEET        SQ.FT.       CFS         HRS
                                 .035         .062          .05       .4027
                                 .071         .248          .33       .2537
                                 .106         .558          .96       .1936
                                 .141         .992         2.07       .1598
                                 .176        1.549         3.75       .1377
                                 .212        2.231         6.10       .1220
                                 .247        3.037         9.20       .1100
                                 .282        3.966        13.13       .1007
                                 .317        5.020        17.98       .0931
                                 .353        6.144        25.01       .0819
                                 .388        7.269        33.05       .0733
                                 .423        8.395        41.95       .0667
                                 .458        9.521        51.67       .0614
                                 .494       10.647        62.16       .0571
                                 .529       11.774        73.40       .0535
                                 .564       12.901        85.36       .0504
                                 .599       14.029        98.01       .0477
                                 .635       15.157       111.33       .0454
                                 .670       16.285       125.31       .0433
ROUTE               ID=1 HYD NO=121.1 INFLOW ID=20 DT=0.0 HR
PRINT HYD           ID=1 CODE=1

                                PARTIAL HYDROGRAPH   121.10
```

```
    RUNOFF VOLUME =     1.51713 INCHES      =         .2492 ACRE-FEET
    PEAK DISCHARGE RATE =       5.27 CFS  AT   1.567 HOURS   BASIN AREA =    .0031 SQ. MI.


*S **COMPUTE BASIN 114
COMPUTE NM HYD      ID=2 HYD NO=122.00 AREA=0.011 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   26.491    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.8700
    AREA =      .006710 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   11.414    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
    AREA =      .004290 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2   CODE=1

                                PARTIAL HYDROGRAPH   122.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .8900 ACRE-FEET
    PEAK DISCHARGE RATE =      25.47 CFS  AT   1.500 HOURS   BASIN AREA =    .0110 SQ. MI.


*S **ADD BASIN 114 & 113.1
ADD HYD             ID=3 HYD NO=122.1 ID=2 ID=1
PRINT HYD           ID=3 CODE=1

                                PARTIAL HYDROGRAPH   122.10


    RUNOFF VOLUME =     1.51701 INCHES      =        1.1392 ACRE-FEET
    PEAK DISCHARGE RATE =      29.52 CFS  AT   1.500 HOURS   BASIN AREA =    .0141 SQ. MI.


*S ** ROUTE BASIN 114.1 THROUGH 115
COMPUTE TRAVEL TIME  ID=4 REACH NO=1 NO VS=1 L=400 FT
                     SLP=.005
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1342
.071	.248	.33	.0846
.106	.558	.96	.0645
.141	.992	2.07	.0533
.176	1.549	3.75	.0459
.212	2.231	6.10	.0407
.247	3.037	9.20	.0367
.282	3.966	13.13	.0336
.317	5.020	17.98	.0310
.353	6.144	25.01	.0273
.388	7.269	33.05	.0244
.423	8.395	41.95	.0222
.458	9.521	51.67	.0205
.494	10.647	62.16	.0190
.529	11.774	73.40	.0178
.564	12.901	85.36	.0168
.599	14.029	98.01	.0159
.635	15.157	111.33	.0151
.670	16.285	125.31	.0144

```
ROUTE                ID=4 HYD NO=122.2 INFLOW ID=3 DT=0.0 HR
PRINT HYD            ID=4 CODE=1
```

PARTIAL HYDROGRAPH 122.20

RUNOFF VOLUME = 1.51704 INCHES = 1.1392 ACRE-FEET
PEAK DISCHARGE RATE = 29.72 CFS AT 1.533 HOURS BASIN AREA = .0141 SQ. MI.

```
*S **COMPUTE BASIN 115
COMPUTE NM HYD       ID=5 HYD NO=123.00 AREA=0.0049 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 11.801 CFS UNIT VOLUME = .9984 B = 526.28 P60 = 1.8700
AREA = .002989 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 5.0846 CFS UNIT VOLUME = .9978 B = 354.67 P60 = 1.8700
AREA = .001911 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD            ID=5   CODE=1
```

PARTIAL HYDROGRAPH 123.00

RUNOFF VOLUME = 1.51706 INCHES = .3965 ACRE-FEET
PEAK DISCHARGE RATE = 11.36 CFS AT 1.500 HOURS BASIN AREA = .0049 SQ. MI.

*S **ADD BASIN 114.2 & 115
ADD HYD ID=6 HYD NO=123.1 ID=5 ID=4
PRINT HYD ID=6 CODE=1

PARTIAL HYDROGRAPH 123.10

RUNOFF VOLUME = 1.51700 INCHES = 1.5356 ACRE-FEET
PEAK DISCHARGE RATE = 40.63 CFS AT 1.533 HOURS BASIN AREA = .0190 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 10:19:46

APPENDIX B

- UNSER BLVD.- 10-YEAR DRY LANE ANALYSIS
(PREVIOUSLY APPROVED UNDER PROJECT NO. 5057.91)

- ARENAL ROAD - 10-YEAR DRY LANE ANALYSIS
(PREVIOUSLY APPROVED CID NO. 5803.91)

SUBJECT: **Unser Blvd. Dry Lane Analysis**

CRITERIA: 10-Year Storm (AHYMO 1994)

SOLUTION: Storm drains shall be situated along the face of curb of Unser Blvd. for that portion of roadway from Arenal Road to approximately 2,200 feet south. The inlet spacing for both the north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 50 feet. The 56-foot wide median shall be designed as having temporary storm water retention incorporated into the design (see attached exhibit). Storm drain inlet spacing shall allow for one "dry" lane in the event of the 10-year storm. The temporary median retention improvements may be abandoned when Unser Blvd. is expanded to six (6) lanes and the median is reconstructed with permanent improvements such as a paved surface and/or median landscaping. The "dry" lane is achieved on the median lane and the increase in storm water flows is carried by the original 25-foot wide driving lanes.

UNSER BLVD. DRY LANE STUDY

CRITERIA : 10 YR STORM
AHYMO (1994)

METHODOLOGY : USING CHART 3 AND 4 (ATTACHED)
"FLOW IN TRIANGULAR SECTIONS"

$Q = Q_s / (1 - E_o)$

WHERE $E_o = 0.44$ (CHART 4)

AND $Q_s = 2.6$ CFS

$\therefore Q = 2.6 / (1 - 0.44) = 4.64$ cfs = CURB LANE STORM WATER CARRYING CAPACITY

DATA : STARTING FROM STA 32+00 AND ENDS AT STA 42+20
TOTAL LENGTH : 1020 FT
WIDTH (WEST R/W TO MED. CURB) = 50'

FROM AHYMO : $Q_{100} = 4.2$ cfs
$Q_{10} = 2.6$ cfs < 4.64 cfs ∴ O.K.
$d_{IL} = 0.29'$

Q_{10} CAPTURED FROM INLET #1 (AT STA 33+11.36) = 1.5 cfs

Q_{10} BYPASS = 2.6 − 1.5 = 1.1 cfs

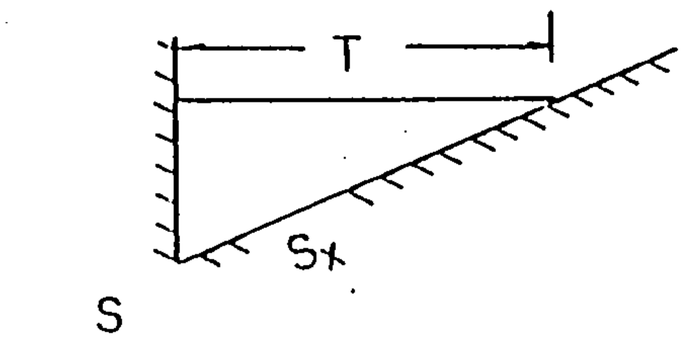
FROM STA 21+80 TO STA 32+00 (SHEET 14+15 OF 23)
TOTAL LENGTH = 1020 FT
WIDTH (WEST R/W TO MED. CURB) = 50'

FROM AHYMO : $Q_{100} = 4.2$ cfs
$Q_{10} = 2.6$ cfs

Q_{10} TO INLET #2 (AT STA 21+81.30) = 2.6 + 1.1 = 3.7 cfs < 4.64 cfs
∴ OK

WITH $Q_{10} = 3.7$ cfs, $D_{IL} = 0.33$, Q_{10} CAPTURED = 1.8 cfs

Q_{10} BY-PASS = 3.7 cfs − 1.8 cfs = 1.9 cfs



$$Q = \frac{0.56}{n} S_x^{1.67} S^{0.5} T^{2.67}$$

EXAMPLE: GIVEN:

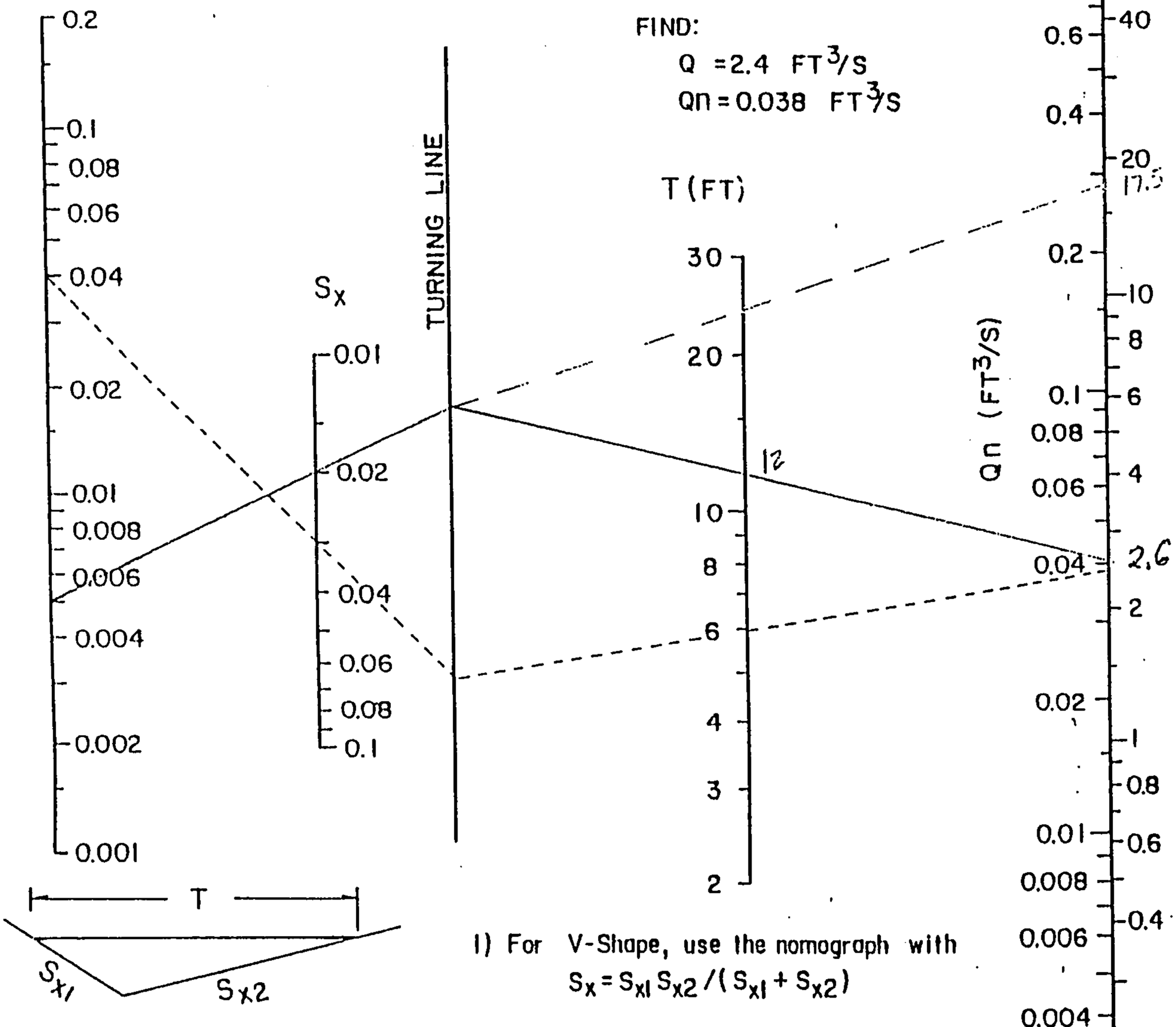
n=0.016 ; S_x=0.03

S=0.04 ; T = 6 FT

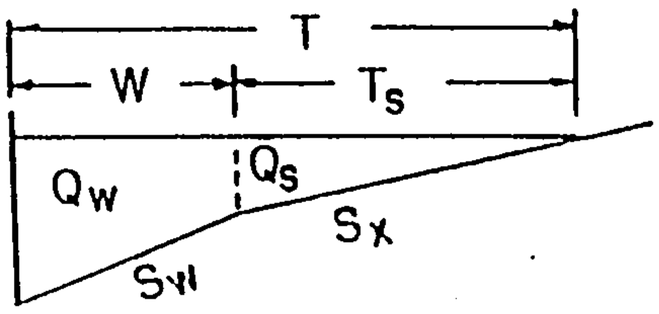
FIND:

Q =2.4 FT^3/S

Qn = 0.038 FT^3/S



1) For V-Shape, use the nomograph with $S_x = S_{x1} S_{x2} / (S_{x1} + S_{x2})$



2) To determine discharge in gutter with composite cross slopes, find Q_s using T_s and S_x. Then, use CHART 4 to find E_o. The total discharge is $Q = Q_s/(1 - E_o)$, and $Q_w = Q - Q_s$.

CHART 3. Flow in triangular gutter sections.

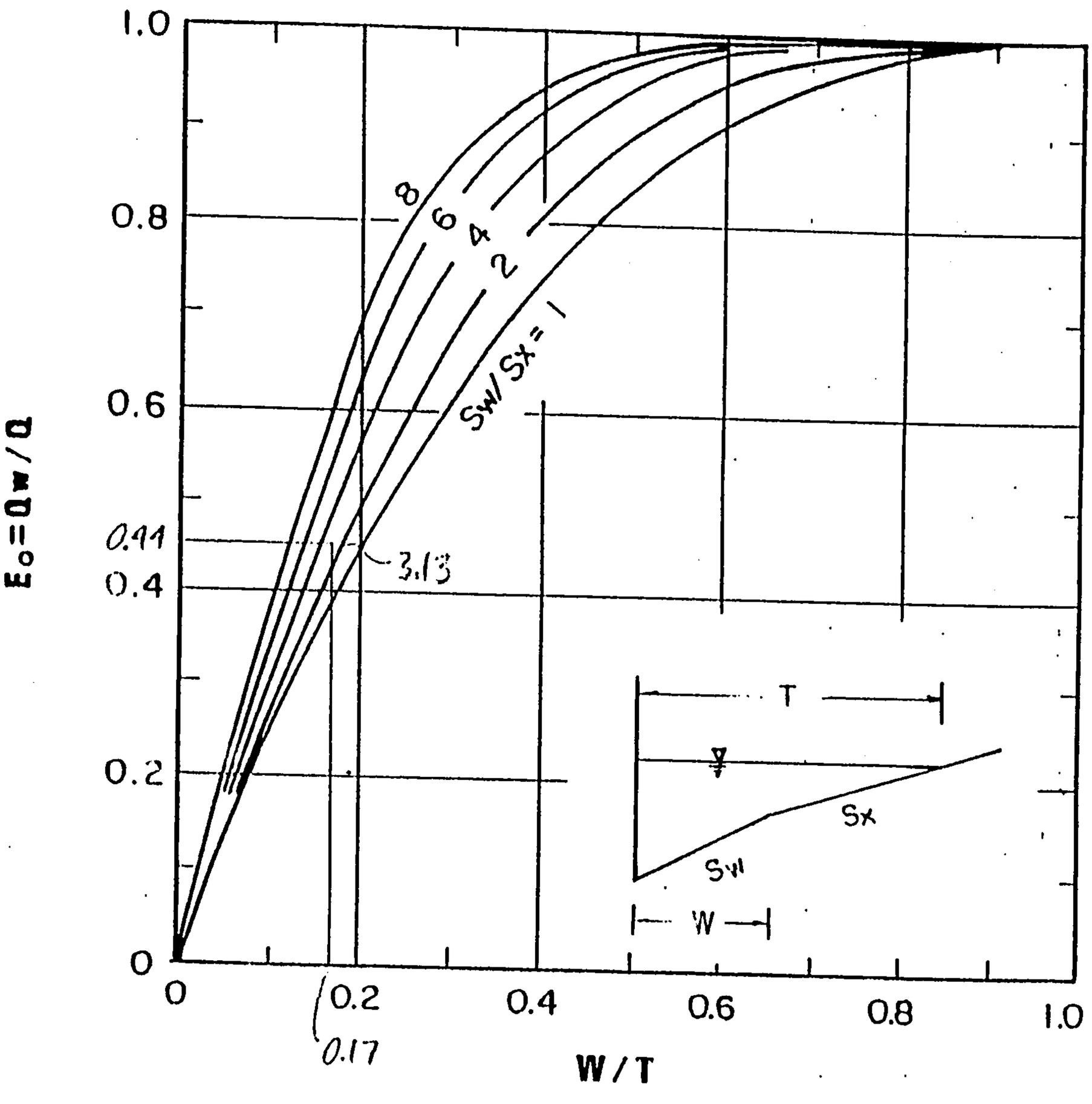
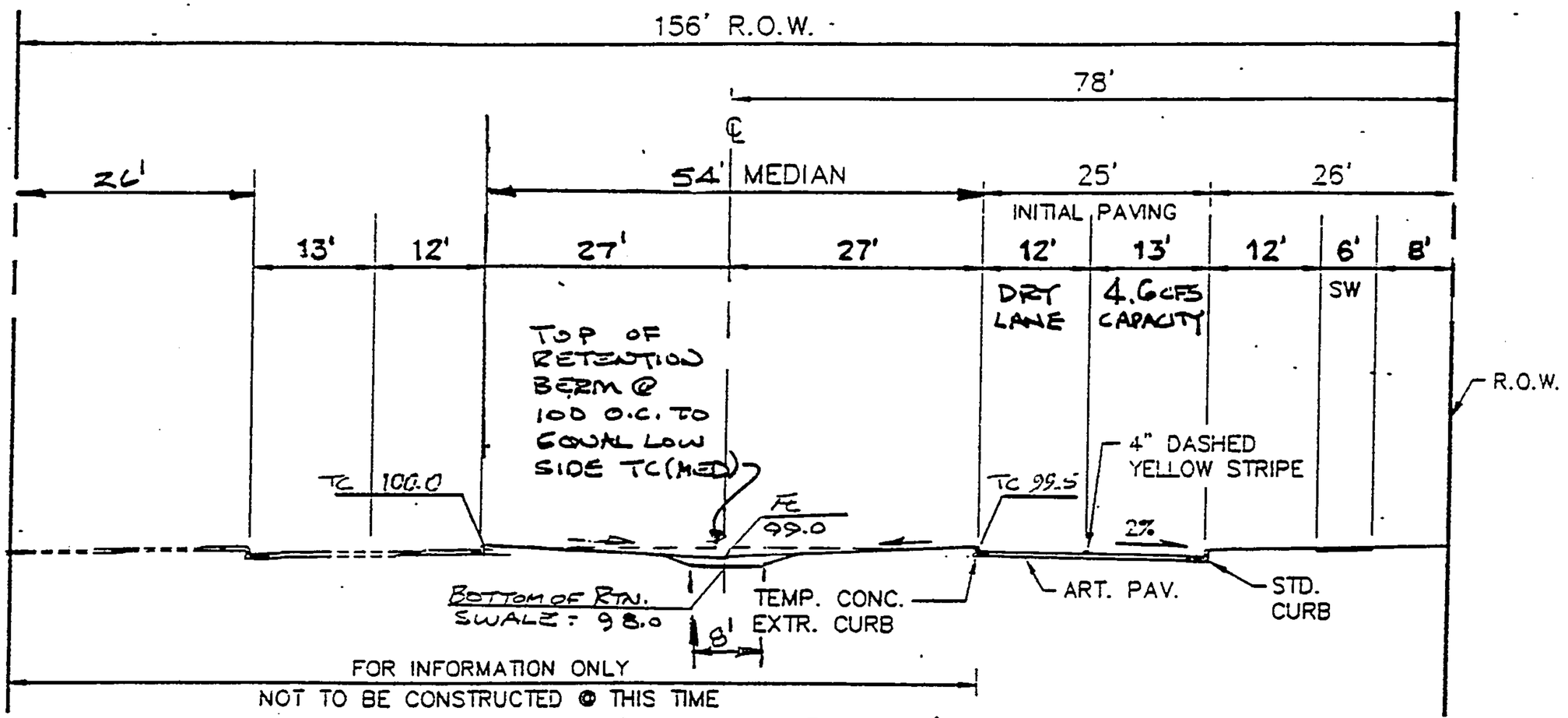


CHART 4. Ratio of frontal flow to total gutter flow.



INITIAL PAVING SECTION

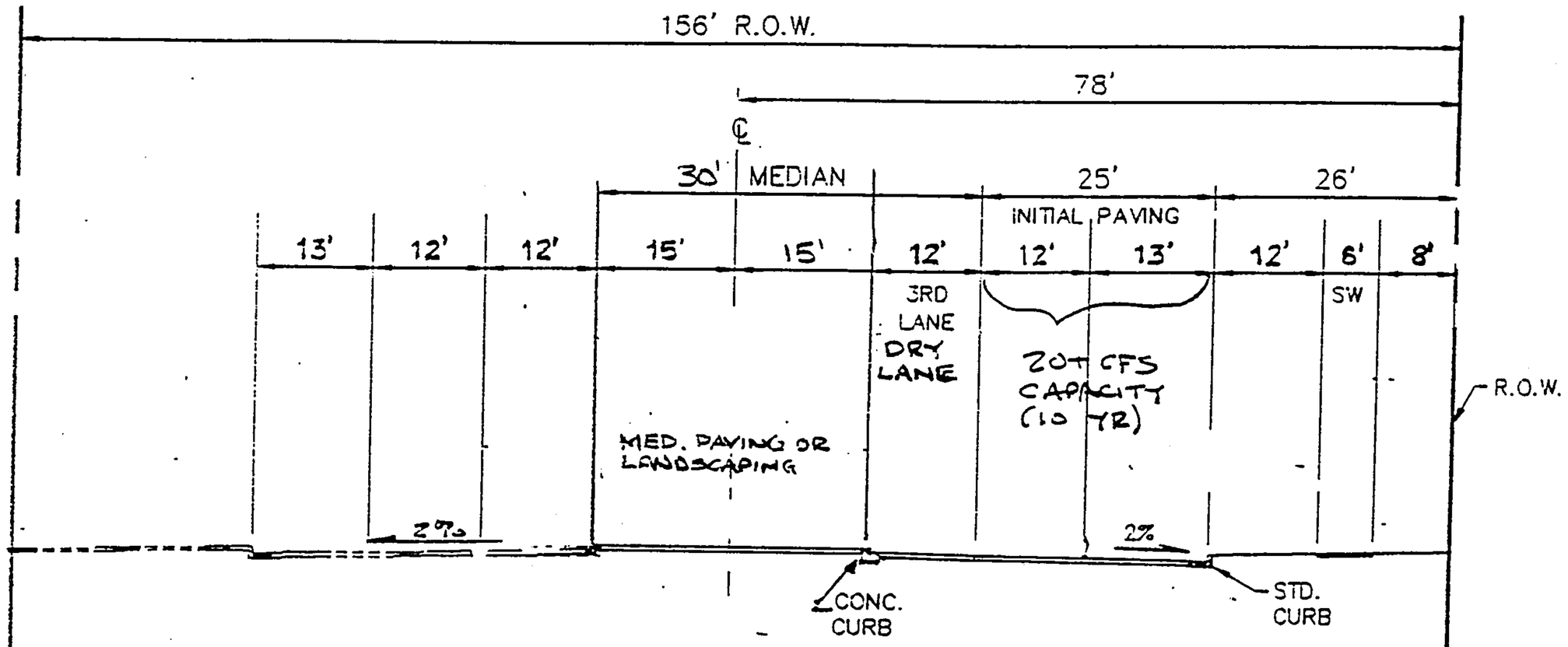
UNSER BLVD

SCALE: 1"=20'

ISAACSON & ARFMAN, P.A.

SUBJECT: SUNRISE ESTATES UNIT TWO
BY FCA UNSER BLVD. JOB NO.
DATE 6/97 SHEET NO.

ISAACSON & ARFMAN, P.A.
SUBJECT
BY DATE SHEET NO. OF JOB NO.



ULTIMATE PAVING SECTION

UNSER BLVD

SCALE: 1"=20'

UNSER BLVD.

L = 1020'

From R/W to Median Curb = 50' (2 lanes)

B = 70 C = 70 D = 60

Q_{100} = 4.2 cfs (24' F-F, 6' SW, the rest landscaped)

Q_{10} = 2.6 cfs

B = 5 C = 5 D = 60

Q_{100} = 4.9 cfs (24' F-F, no landscape)

Q_{10} = 3.2 cfs

Q_{100} = 5.5 cfs

Median 56' (all paved, no landscape)

Q_{100} = 5.5 cfs

From R/W to Median Curb = 62' (3 lanes)

Q_{100} = 5.2 cfs (36' F-F, 6' SW, & landscape)

Q_{10} = 3.2 cfs

Q_{100} = 6.1 cfs (36' F-F, no landscape)

Q_{10} = 4.0 cfs

SUBJECT: **Arenal Road Dry Lane Analysis**

CRITERIA: 10-Year 6-Hour Storm (DPM Calculations)
Arenal & Unser Intersection Land Treatment: 90% D; 10% C
Arenal Road Land Treatment: 77% D; 23% C

SOLUTION: Storm drains will be placed along the back of curb along Arenal from the intersection of Arenal and Unser to the Amole del Norte Channel under a city public project. The inlet spacing for both north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 25 feet (see attached Exhibit C). Inlet spacing will provide for one dry lane under this original road cross section.

Calculate dry lane catch basin requirements for Arenal

pt (1) Unser PASS Thru = 1.9 cfs

Dappuru Pass Thru = 0 cfs

Intersection of Arenal / Unser A = .74 AC

Land Treatment: 10% C; 90% D

$Q_{10\text{-}6} = 1.99(.07) + 2.89(.66) = 2.04$ cfs

Unser ST 21+80 to ST 20+00 A = .58 AC

Land Treatment: 20% B; 20% C; 60% D

$Q_{10\text{-}6} = 1.99(.116) + 2.89(.348) + .76(.116)$

$Q = 1.27$ cfs

Arenal ST 17 to ST 18+67 A = .46 Ac

Land Treatment: 77% D; 23% C

$Q_{10\text{-}6} = 1.99(\quad) + 2.89(\quad) = 1.19$

$Q_{\text{total}} = 1.19 + 1.27 + 2.04 = 4.48$

$Q_{\frac{1}{2}\text{ street}} = 4.48/2 = 2.24$

$Q_{\frac{1}{2}\text{ street}} = 2.24 + 1.9 = 4.1$ cfs

For one dry lane

$S_{avg} = 1.43\%$ $Q_{max\ \frac{1}{2}} = \frac{1.486}{.017}(.125)^{.67}(.0143)^{.5}(1.58) = 4.1$ cfs

Per DPM plate D-5 one inlet $Q_{in} = 3.0$ cfs

at pt 1 place 2 grates; Type A inlet

PASS Through = 0 cfs

pt (2) From 18+67 to ST 27+00

A = 2.98

$Q_{10\text{-}6} = 2.89(2.3) + 1.49(.69) = 7.67/2 = 3.84 < 4.10$ ✓ ok

Use a Single Grate Type A inlet

PASS Through Flow = 3.84 - 3.00 = .84 cfs

@ pt. 3 ST 27+00 to existing inlets
(L=700')

A = 2.51 Ac

Q_{10-6} = 2.89(1.93) + 1.49(.62) = 6.50/2 = 3.25 cfs

Qinlet = 3.25 + .84 = 4.09 cfs < 4.10 ✓OK

Pass Through Flow = 4.09 - 3.00 = 1.09 cfs

Check Flow Depth for 100 year - 10 yr Storm

pt ① Sapphire pass through = 10 cfs
Unser pass through = 3.5 cfs
Intersection of Arenal/Unser (per Sheet 1) = 3.09 cfs / 2 = 1.55 cfs
Unser ST 21+80 to ST 20+00 (per Sheet 1) = 2.09 cfs / 2 = 1.05 cfs
Arenal ST 17 to ST 18+67 (per Sheet 1) = 1.85 cfs / 2 = .93 cfs
Assume no flows pass through from North Unser

Q_{TOTAL} = 10 + 3.5 + 1.55 + 1.05 + .93 = 17.03 cfs

S_{avg} = 1.43%

@ d = .67 $Q = 1.486/.017 (.0143)^{.5} (.33)^{.67} (8.48) = 42.17$ cfs

@ d = .33 $Q = 1.486/.017 (.0143)^{.5} (.126)^{.67} (1.59) = 4.15$ cfs

∴ @ Q = 17.03 d = .45 feet

From Plate 22.3 D-5 (DPM) a single grate type A inlet $Q_{in} \approx 5.5$ cfs

Pass Through 17.03 - 2(5.5) = 6.03 cfs

pt ② From ST 18+67 to ST 27+00

$Q_{100} = 1.37(2.3) + 2.87(.69) = 12.03/2 = 6.02$ cfs

$Q_{inlet} = 6.02 + 6.03 = 12.05$ cfs

∴ @ Q = 12.05 cfs d = .40 feet

per dpm plate 22.3 D-5 $Q_{in} = 4.6$ cfs

Pass Through 12.05 - 4.6 = 7.45 cfs

pt ③ From ST 27+00 to existing inlets

$Q_{100} = 2.87(.62) + 1.93(4.37) = 10.24/2 = 5.1$ cfs

$Q_{inlet} = 5.1 + 7.45 = 12.55$ cfs

@ Q = 12.55 d = .41 ft

per dpm plate 22.3 D-5 $Q_{in} = 4.7$ cfs (change existing to Type A inlets)

Q pass through = 12.55 - 4.7 = 7.85 cfs.

APPENDIX C

ARENAL/UNSER DRAINAGE MANAGEMENT PLAN (M10/D10)

- Summary Information
- Basins 406 and 407 AHYMO Calculations
- Regional Detention Facility Map
- Basin Map

Summary Excerpt from Arenal/Unser Drainage Management Plan

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and refcrencing datas gathered from BEC report make up the last part of the appendix in this section.

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150′ S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7	.990	116.33
11	1.0	13.0	1.000	117.49
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 407
(SIDE FLOW 1650′ S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2103
DIFFERENCE IN ELEVATION ACROSS BASIN	=	32
SLOPE OF BASIN, (FT/FT)	=	0.0152
AREA OF BASIN, (ACRES)	=	32.26
AREA OF BASIN, (SQ MI)	=	0.05040
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	19.2
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.5
PEAK RUNOFF (CFS) (from AHYMO run)	=	104.81
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.14
3	.2	2.3	.100	10.48
4	.3	3.9	.190	19.91
5	.4	5.2	.310	32.49
6	.5	6.5	.470	49.26
7	.6	7.8	.660	69.17
8	.7	9.1	.820	85.94
9	.8	10.4	.930	97.46
10	.9	11.7	.990	103.75
11	1.0	13.0	1.000	104.81
12	1.1	14.3	.990	103.75
13	1.2	15.6	.930	97.46
14	1.3	16.9	.860	90.13
15	1.4	18.2	.780	81.74
16	1.5	19.5	.680	71.26
17	1.6	20.8	.560	58.69
18	1.7	22.1	.460	48.21
19	1.8	23.4	.390	40.87
20	1.9	24.7	.330	34.58
21	2.0	26.0	.280	29.34
22	2.2	28.6	.207	21.69
23	2.4	31.2	.147	15.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	11.21
25	2.8	36.4	.077	8.07
26	3.0	39.0	.055	5.76
27	3.2	41.6	.040	4.19
28	3.4	44.2	.029	3.04
29	3.6	46.8	.021	2.20
30	3.8	49.4	.015	1.57
31	4.0	52.0	.011	1.15
32	4.5	58.5	.005	0.52
33	5.0	65.0	.000	.00

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	404.10	7& 8	9	.15480	272.95	9.204	1.11482	1.533	2.755	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	880.30	32.016	1.08855	1.533	2.494	
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	190.04	32.016	1.08855	1.966	.538	AC-FT= 18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL										
ROUTE	405.30	11	12	.55146	190.02	32.016	1.08855	2.000	.538	
*S**********										
*S**********										
*S **CALC BASIN 406										
COMPUTE NM HYD	406.00	-	13	.05743	117.49	3.920	1.27968	1.500	3.196	PER IMP= 42.00
*S **CALC BASIN 407										
COMPUTE NM HYD	407.00	-	14	.05040	104.81	3.491	1.29860	1.500	3.249	PER IMP= 42.00
*S **CALC BASIN 408										
COMPUTE NM HYD	408.00	-	15	.15736	327.60	10.899	1.29860	1.500	3.253	PER IMP= 42.00
*S**********										
*S**********										
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD										
COMPUTE NM HYD	500.00	-	16	.02491	51.80	1.725	1.29860	1.500	3.250	PER IMP= 42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING										
*S **DIRECTLY TO THE AMOLE CHANNEL										
COMPUTE NM HYD	501.00	-	17	.03663	76.18	2.537	1.29860	1.500	3.249	PER IMP= 42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE										
*S **LONGFORD SD										
ADD HYD	501.10	16&17	18	.06154	127.98	4.262	1.29859	1.500	3.250	
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD										
COMPUTE NM HYD	502.00	-	19	.05788	121.79	4.080	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN										
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.										
COMPUTE NM HYD	503.00	-	20	.03752	78.03	2.599	1.29860	1.500	3.249	PER IMP= 42.00
*S**********										
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @										
*S **A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	504.00	-	1	.03667	77.16	2.585	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.										
COMPUTE NM HYD	505.00	-	2	.02618	43.10	1.407	1.00753	1.500	2.572	PER IMP= 29.00
FINISH										

[redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] 3.5[redacted] [redacted] 77 [redacted] 20[redacted] [redacted] 4.[redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]

	3.75	12.24	207.31	4.00
	4.00	12.57	207.31	4.00

COMPUTE TRAVEL TIME ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

ROUTE ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0

PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA 405.30

RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

*S**********
*S**********
*S **CALC BASIN 406
COMPUTE NM HYD ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
PER A=4 PER B=27 PER C=27 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

[redacted]

K = .121550HR TP = .133300HR K/TP RATIO = .911856 SHAPE CONSTANT, N = 3.883611
UNIT PEAK = 86.799 CFS UNIT VOLUME = 1.000 B = 347.33 P60 = 1.8700
AREA = .033312 SQ MI IA = .44052 INCHES INF = 1.08345 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=13 CODE=1

HYDROGRAPH FROM AREA 406.00

RUNOFF VOLUME = 1.27968 INCHES = 3.9198 ACRE-FEET
PEAK DISCHARGE RATE = 117.49 CFS AT 1.500 HOURS BASIN AREA = .0574 SQ. MI.

[redacted]**CALC BASIN 407
COMPUTE NM HYD ID=14 HYD NO=407.00 AREA=0.0504 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 83.572 CFS UNIT VOLUME = .9992 B = 526.28 P60 = 1.8700
AREA = .021168 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 77.777 CFS UNIT VOLUME = 1.000 B = 354.67 P60 = 1.8700
AREA = .029232 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=14 CODE=1

HYDROGRAPH FROM AREA 407.00

RUNOFF VOLUME = 1.29860 INCHES = 3.4906 ACRE-FEET
PEAK DISCHARGE RATE = 104.81 CFS AT 1.500 HOURS BASIN AREA = .0504 SQ. MI.

*S **CALC BASIN 408
COMPUTE NM HYD ID=15 HYD NO=408.00 AREA=0.15736 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .074258HR TP = .133300HR K/TP RATIO = .557073 SHAPE CONSTANT, N = 6.910316
UNIT PEAK = 256.33 CFS UNIT VOLUME = .9995 B = 516.99 P60 = 1.8700
AREA = .066091 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .115909HR TP = .133300HR K/TP RATIO = .869534 SHAPE CONSTANT, N = 4.085829
UNIT PEAK = 247.07 CFS UNIT VOLUME = 1.000 B = 360.85 P60 = 1.8700
AREA = .091269 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

[redacted]



TEMPORARY SURGE POND

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

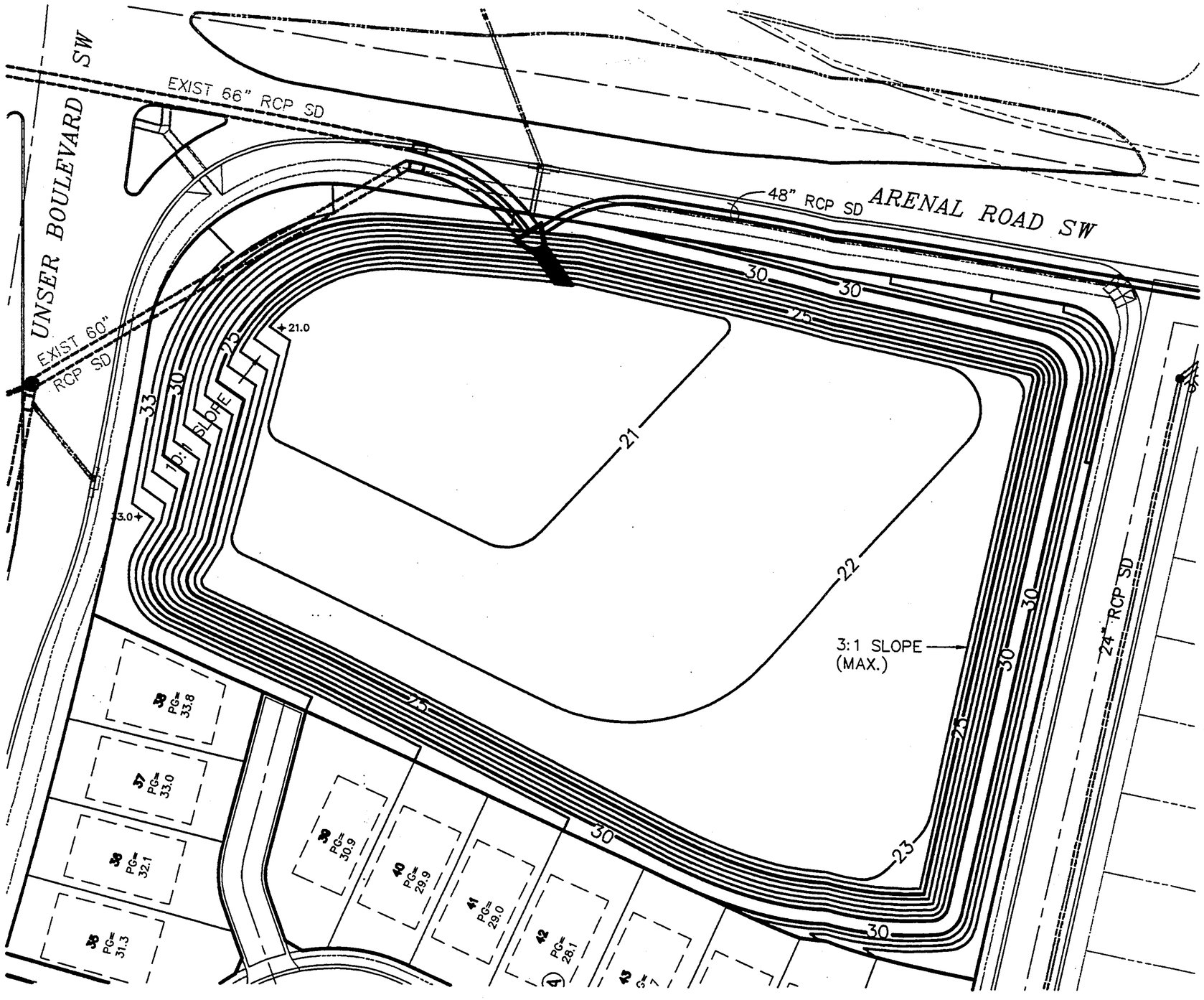
FIGURE 1

NOTE:

THE TEMPORARY SURGE POND WAS DESIGNED TO REDUCE THE EROSIVE POWER OF THE STORM DRAIN DISCHARGES. IT ALSO ACTS AS A DETENTION POND AND KEEPS THE FLOW CONTAINED IN THE FEMA FLOODPLAN.

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

903EXH13.DWGdlv 5/1/97



PERMANENT RETENTION POND

SCALE: 1"=60'

ELEV	H (ft)	AREA (ac)	STORAGE (af)
21	0	0.54	0
22	1	1.57	1.06
23	2	2.48	3.08
24	3	2.58	5.61
25	4	2.68	8.24
26	5	2.79	10.98
27	6	2.89	13.82
28	7	3.00	16.76
29	8	3.11	19.81
30	9	3.21	22.98

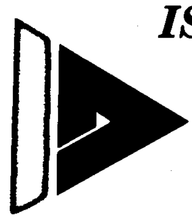
PEAK DISCHARGE TO POND = Q_{100} = 798cfs
= Q_{10} = 435 cfs

PEAK DISCHARGE = 183.8 cfs
MAX WATER SURFACE ELEV = 28.21 ft
POND STORAGE = 17.4 ac ft
MAX POND STORAGE = 22.98 ac ft

FIGURE 2

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque New Mexico

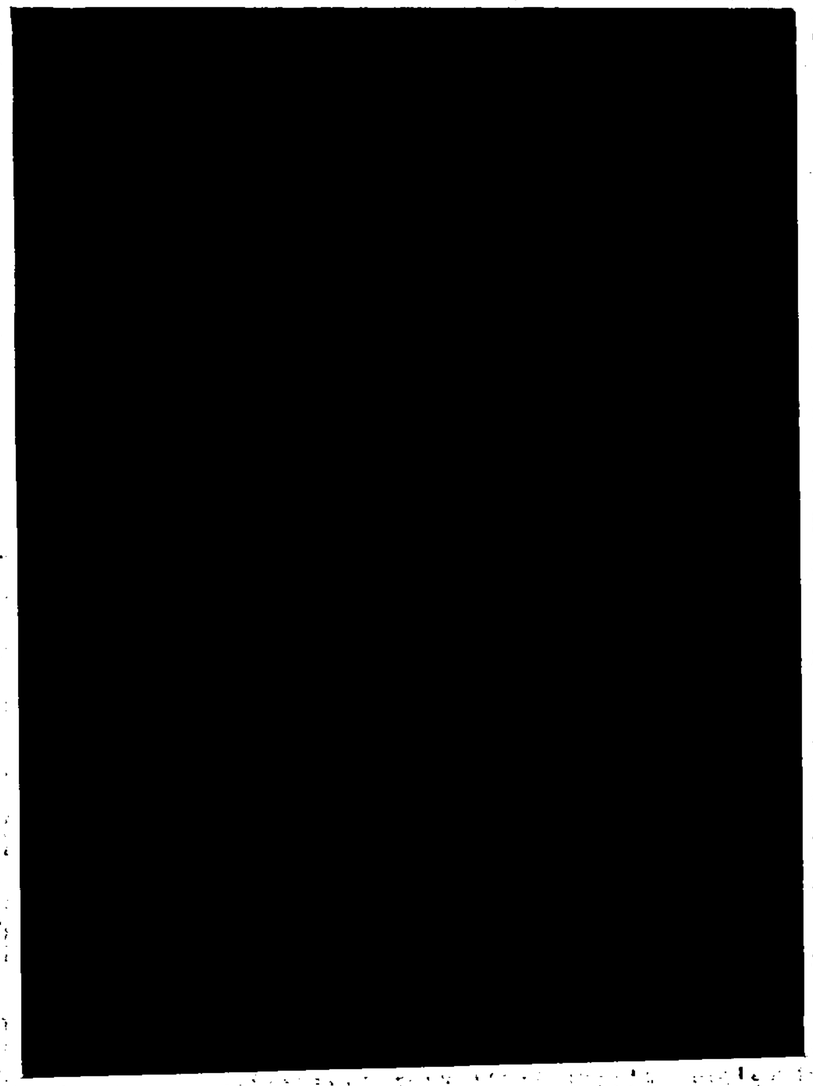
921EXH10.DWGems 09/16/97



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM



City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 1, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Drainage Report and Grading and Drainage Plan for Desert Springs Subdivision Unit Three, (M10/D8) Submitted for Final Plat and Work Order Approval, Engineer's Stamp Dated 6/17/99 on Plans, Report Dated 6/18/99.

Dear Mr. Arfman:

It appears that the above referenced Drainage report is in compliance with the approved Revised Master Drainage Report for Desert Springs Subdivision, Units Three Through Five, dated March 22, 1999. Unless the drainage concepts change from this approved Master plan, separate drainage reports are not necessary for each Unit. Supplemental calculations may be submitted as designs change, but entire reports are not required.

However, based on the information provided, the above referenced report dated June 18, 1999 and plan dated June 17, 1999 for Desert Springs Unit Three are approved for Final Plat action and Work Order release.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo K. Johnson, P.E., Curb Inc.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT #: Desert Springs Subdivision Unit 3 ZONE ATLAS/DRNG. FILE#: M-10/008A

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: Tract C-1, Desert Springs Unit 2 & A portion of Tract B. Desert Springs Subdivision

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A.	CONTACT: Melissa Combs
ADDRESS: 128 Monroe Street NE	PHONE: 268-8828
CITY, STATE: Albuquerque, NM	ZIP CODE: 87108
OWNER: Curb Inc	CONTACT: Bo Johnson
ADDRESS: 6301 Indian School Rd Ste 680	PHONE: 881-9190
CITY, STATE: ABQ NM	ZIP CODE: 87110
ARCHITECT: NA	CONTACT:
ADDRESS:	PHONE:
CITY, STATE:	ZIP CODE:
SURVEYOR: Aldrich Land Surveying	CONTACT: Tim Aldrich
ADDRESS:	PHONE: 884-1990
CITY, STATE:	ZIP CODE:
CONTRACTOR: NA	CONTACT:
ADDRESS:	PHONE:
CITY, STATE:	ZIP CODE:

TYPE OF SUBMITTAL:

- ✓ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- ✓ NO
- ____ COPY PROVIDED

RECEIVED
JUN 19 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S.DEV. PLAN FOR SUB'D. APPROVAL
- ____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ✓ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ✓ OTHER (SPECIFY) WO Approval

Unit 3 - for Final plat & work order

DATE SUBMITTED: 6/18/99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

DRAINAGE REPORT

FOR

DESERT SPRINGS SUBDIVISION
UNIT THREE

A 137-LOT SINGLE-FAMILY
RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO

JUNE 1999

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
(505) 268-8828

FRED C. ARFMAN
STATE OF NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

06-18-99

Fred C. Arfman, PE **Date**

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I. Project Information
II. Site Characteristics

Conclusion & Recommendations

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Table 4 - Inlet Capacity at Key Locations

FlowMaster Worksheets for Rundown Capacity

HydraFlow Worksheets for Storm Drain Calculations

Flow Split Justification

Appendices

Appendix A: Onsite AHYMO Summary & Detailed Output
100-Year Storm

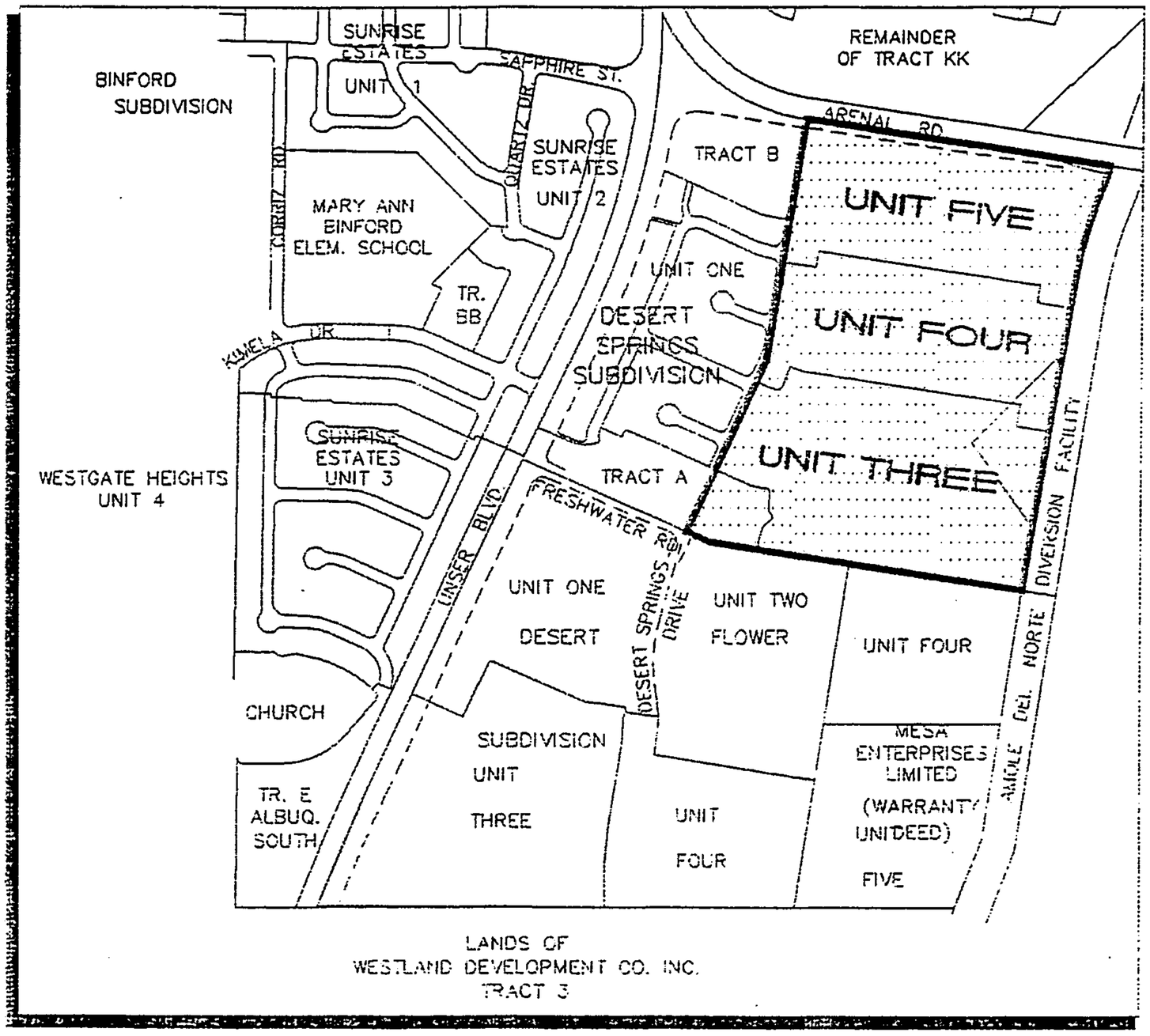
Appendix B: Arenal Road - 10-Year Dry Lane Analysis

Appendix C: Arenal/Unser Drainage Management Plan (M10/D10)
-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Pockets

Units Three-Five Drainage & Grading Plan

Drainage Management Plan Basin Map



1"=750'±

(M-10)

VICINITY MAP

INTRODUCTION

This report shall serve as the Drainage Report for Desert Springs Subdivision Unit Three. This unit has been previously addressed in the Revised Master Drainage Report for Desert Springs Subdivision Units Three-Five (M10/D8, approved 4/12/99).

This phase will consist of 137 single-family lots. All flows from this area are allowed free discharge to the Amole del Norte Diversion Channel as determined by the Arenal/Unser Drainage Management Plan approved by the City on September 18, 1997 (see Appendix C).

This study shall analyze the area wide drainage characteristics as they impact the site and offer solutions and recommendations to solve the hydrological and hydraulic conditions projected to occur in the event of the 100-year storm.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: Tract C-1, Desert Springs Subdivision Unit 2 (2-24-99, 99C-34), A portion of Tract B, Desert Springs Subdivision (2-20-97, 97C-55), and A portion of Tract A-1-15, Amole del Norte Diversion Facility (7-13-82, D 165-A, Pages 615-619)

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, PE
(505) 268-8828

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: RLT

NUMBER OF PROPOSED LOTS: 137

TOTAL AREA: 21.5519 Ac.
938,801 SF

II. SITE CHARACTERISTICS

FLOOD HAZARD: No portion of this unit falls within a floodplain as determined by Panels No. 350002-0336 and 35001C0337 of the September 20, 1996 Edition of the F.E.M.A. Maps (see attached).

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an average slope toward the east of 2 percent. It is located between Desert Springs Subdivision Units One and Two (to the west) and the Amole del Norte Diversion Channel (to the east). Desert Flower Subdivision Units Two and Six are located to the south and the land to the north is undeveloped at this time. Storm water generated from the site flows east into the side of the Amole del Norte Diversion Channel. A temporary retention pond located along the eastern boundary of Unit One captures the developed flows from Units One and Two of the Desert Springs



FEMA PANELS 336 & 337

Scale 1":500'

ISAACSON & ARFMAN, P.A.

SUBJECT _____ JOB NO. ____

BY _____ DATE _____ SHEET NO. ____ OF ____

Subdivision. Offsite storm waters generated from Unit Two of Sunrise Estates (to the west) are released into Unser Blvd. and are then conveyed by a combination of street flow and storm drain to the regional detention facility. Flows are slowly released from the pond through a storm drain system along Arenal Road, which deposits the discharge into the Amole del Norte Diversion Channel. Runoff south of the proposed development flows southeast into the Amole del Norte Diversion Channel and does not affect the site.

PROPOSED CONDITIONS:

Unit Three: The third phase of Desert Springs will consist of 137 lots. A storm drain system and an overland channel will be required to deposit the subdivision runoff into the Amole del Norte Diversion Channel. The temporary pond from Units One and Two will be removed with the development of this Unit. The flows from the previous units will be allowed to enter Unit Three and continue to the Amole del Norte Diversion Channel via street flow.

The flows from a portion of Units One and Two will enter this unit along Desert Canyon Place. It is assumed that the flows will split at Moonlit Rose Dr. (AP1) since there is no water bar at the intersection of the two streets. A minimum flow split of 25% to Moonlit Rose Dr. was used in AHYMO since Desert Canyon Place has a lower capacity

than Blue Avena Ave. (see attached justification of flow splits). If additional flows did happen to enter Moonlit Rose Dr., Blue Avena Ave. would have the capacity to convey up to 65% of the flows at AP1 (see Table 2, AP3**).

All runoff will be carried by street flow to the south boundary of the property. At AP5 a sump inlet (see Table 4) will pick up the runoff and convey it via 30" diameter storm drain to the Amole del Norte Diversion Channel. The emergency overflow for the sump will be via a pedestrian access between Lots 2 and 3, Block F (see the grading plan for cross-sectional detail of the emergency overflow).

The remaining flows from Unit One will enter this phase via Rainwater Road. A concrete rundown will be located at the eastern terminus of Rainwater Road (AP8). This rundown will accept the developed flows from Units One and Four as well as the runoff developed in Basins 105 and 107 of Unit Three.

Arenal Road: The portion of Arenal Road adjacent to Unit Five of the Desert Springs Subdivision will be constructed with this unit. The road has an easterly surface drainage pattern. 10-year street flows shall be collected by new catch basins installed with this unit and be conveyed to the Amole del Norte Diversion Channel by the existing storm drain along Arenal Road. The existing storm drain was

designed to accept these flows and was approved with CIP No. 803.91 (see Appendix B).

CONCLUSIONS & RECOMMENDATIONS

The Drainage Report for Desert Springs Unit Three is consistent with the Revised Master Drainage Report for Desert Springs Subdivision Units Three-Five previously approved by the Hydrology Division, P.W.D., City of Albuquerque. The Summary Tables provide a more in depth study of the street capacities, drainage basins, and inlet capacities. Attached FlowMaster calculation sheets show rundown sizing calculations. Please refer to the Appendices for further supplemental information.

The individual recommendations for Unit Three are:

- The existing retention pond along the boundary of Units One and Two will be removed and flows will be able to continue east via the street continuations.

- Berms or swale points shall be graded around the unit so that offsite runoff will not affect this site.

- Required storm drain for Unit Three to the Amole del Norte Diversion Channel has been included as part of the Unit Three required infrastructure.

- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Three construction.

- Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).

- The two required catch basins along the portion of Arenal Road fronting Unit Five have been included as part of the required infrastructure for Unit Three.

SUMMARY TABLES

TABLE 1
ONSITE BASIN SUMMARY

Basin ID	Area (Sq. Mi.)	Contributing Basins	Cumulative Area (Sq. Mi.)	% A	% B	% C	% D	Basin Q (cfs)	Cumulative Q (cfs)
1A	0.0114	1A	0.0114	0	19.5	19.5	61	26.40	26.40
1B	0.0005	1A	0.0119	0	0	0	100	1.41	27.80
2A	0.0063	2A	0.0063	0	19.5	19.5	61	14.59	14.59
2B	0.00350	2B	0.0035	0	19.5	19.5	61	8.12	8.12
2C	0.0076	2B	0.0111	0	19.5	19.5	61	17.60	25.72
2D	0.0006	2C*	0.0117	0	19.5	19.5	61	1.40	27.12
2E	0.0002	2A	0.0064	0	19.5	19.5	61	.48	15.07
100	0.0042	2D*	0.0159	0	19.5	19.5	61	9.74	36.12
101	0.00036	100*	0.00434	0	19.5	19.5	61	0.85	9.85
102A	0.0026	102A	0.0026	33	19	19	29	4.29	4.29
102	0.0027	102A, 101*	0.00964	0	19.5	19.5	61	6.26	20.06
103	0.0049	102*	0.01454	0	19.5	19.5	61	11.36	29.93
104	0.005	101*	0.0169	0	19.5	19.5	61	11.59	37.07
105	0.0086	2E*	0.01510	0	19.5	19.5	61	19.92	31.26
106	0.0026	104*, 103*	0.03406	0	19.5	19.5	61	6.03	72.79
107	0.0023	105*, 109	0.0247	0	19.5	19.5	61	5.34	52.41
108	0.001	108	0.001	0	19.5	19.5	61	2.33	2.33
109	0.0072	109	0.0072	0	19.5	19.5	61	16.68	16.68
110	0.0012	108	0.0022	0	19.5	19.5	61	2.79	5.12
111	0.0072	110	0.0072	0	19.5	19.5	61	16.68	16.68
112	0.0021	111	0.00930	0	19.5	19.5	61	4.88	21.55
113	0.00319	110*	0.00350	0	19.5	19.5	61	3.02	8.15
114	0.0072	114	0.0072	0	19.5	19.5	61	16.68	16.68
115	0.0016	114, 116*	0.02190	0	19.5	19.5	61	3.72	47.44
116	0.00960	113*	0.01310	0	19.5	19.5	61	22.23	27.43
117	0.0012	115*	0.02310	0	19.5	19.5	61	2.79	50.13

*Cumulative Q of basin

TABLE 2
FLOW DEPTHS @ KEY LOCATIONS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
AP6	32	STD	0.0158	31.26	0.48	0.74
AP4	28	STD	0.012	37.07	0.53	0.81
AP3**	28	STD	0.01	44.5	0.59	0.87
AP3	28	STD	0.01	29.93	0.51	0.72
AP2	28	MTBL	0.01	7.2	0.33	0.41
AP1	28	STD	0.012	36.12	0.55	0.80

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ
**STREET CAPACITY @ AP3 IF ADDITIONAL FLOWS WERE TO TURN DOWN MOONLIT ROSE DR (~65%)

TABLE 3
FLOW DEPTHS @ SUMP INLETS OR RUNDOWNS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)
AP5	32	STD	NA	60.74	0.65
AP8	32	STD	0.01	52.52	0.61

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ

TABLE 4
INLETS CAPACITY @ KEY LOCATIONS

INLET NO	INLET TYPE	LOCATION	STREET WIDTH & CURB TYPE	% SLOPE	Q 100 (CFS)	Dn (FT)	Q intercepted (CFS)	Q by-pass (cfs)
CB1 (2 inlets)	A	AP3	28' FF, STD	1.01%	29.93	0.51	6 ea = 12 cfs	17.93
CB2 (1 sumps)	A, Mod Throat	AP5	32' FF, STD	NA	60.74	0.65	60.74 **	0

*Q per inlet are calculated using DPM Plate 22.3, D-5
** See attached sump calculation sheet

ANALYZE SUMP INLETS

DATA:

Q = 60.74
H = 0.65
GRATE OPEN AREA:

GROSS AREA FOR ONE GRATE = 2' - 1 1/2" * 2' - 11 3/8 " =	6.28 SF
LESS BEARING BARS = (0.5")(1/12) * 2.95 * 13 =	1.60 SF
LESS CROSS BARS = (0.5")(1/12) * 2.13 * 7 =	0.62 SF
PLUS THE INTERSECTION COUNTED 2X = (0.5")(1/12) * (0.5")(1/12) *77 =	0.13 SF
TOTAL =	**4.2**

CALCULATIONS:

FLOW THROUGH THE GRATE = CA(2gH)^.5 =	9.103192
9.10 CFS * 4 GRATES =	36.41277
FLOW THROUGH DOUBLE THROAT = CA(2gH)^.5 =	29.04352

TOTAL CAPACITY= 65.46 EA

RECOMMENDATION:

USE A "MOD" TYPE A INLET WITH FOUR GRATES & A DOUBLE THROAT

EMERGENCY OVERFLOW @ AP5
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Emergency Overflow @ AP5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.017	
Channel Slope	0.021	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	8.00	ft
Discharge	72.74	cfs

Results		
Depth	0.77	ft
Flow Area	7.94	ft^2
Wetted Perimeter	12.87	ft
Top Width	12.62	ft
Critical Depth	1.17	ft
Critical Slope	0.004511	ft/ft
Velocity	9.16	ft/s
Velocity Head	1.30	ft
Specific Energy	2.07	ft
Froude Number	2.04	
Flow is supercritical.		

RUNDOWN @ AP8
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap8
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.036	ft/ft
Bottom Width	10.00	ft
Discharge	52.52	cfs

Results		
Depth	0.44	ft
Flow Area	4.43	ft^2
Wetted Perimeter	10.89	ft
Top Width	10.00	ft
Critical Depth	0.95	ft
Critical Slope	0.003159	ft/ft
Velocity	11.85	ft/s
Velocity Head	2.18	ft
Specific Energy	2.62	ft
Froude Number	3.14	
Flow is supercritical.		

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	1	72.79	30 c	170.5	4996.00	4999.50	2.052	4998.50*	5003.88*	0.00	End
2	4	12.00	18 c	89.8	5000.50	5001.67	1.304	5003.88*	5005.05*	0.00	1
3	5	6.00	18 c	26.0	5001.82	5002.16	1.309	5005.05*	5005.13*	0.18	2

Project File: ds3r.stm	I-D-F File: SAMPLE.IDF	Total No. Lines: 3	Run Date: 06-11-1999

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
1	30	72.79	4996.00	4998.50	2.50	4.91	14.83	3.42	5001.92	3.151	171	4999.50	5003.88	2.50	4.91	14.83	3.42	5007.29	3.150	3.151	5.373	0.00	0.00
2	18	12.00	5000.50	5003.88	1.50	1.77	6.79	0.72	5004.59	1.306	89.8	5001.67	5005.05	1.50	1.77	6.79	0.72	5005.76	1.306	1.306	1.172	0.00	0.00
3	18	6.00	5001.82	5005.05	1.50	1.77	3.40	0.18	5005.23	0.327	26.0	5002.16	5005.13	1.50	1.77	3.40	0.18	5005.31	0.326	0.327	0.085	1.00	0.18

Project File: ds3r.stm | I-D-F File: SAMPLE.IDF | Total number of lines: 3 | Run Date: 06-11-1999

NOTES: Initial tailwater elevation = 4998.5 (ft) , * Crown depth assumed., ** Critical depth assumed.

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

March 11, 1999

Ms. Susan Calongne, PE
City/County Floodplain Administrator
Hydrology Division
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Desert Springs Subdivision Units 3 thru 5
DRB No. 98-185

Dear Ms. Calongne:

Please find attached a calculation sheet justifying the flow split we assumed to occur between Moonlit Rose Drive and Desert Canyon Place in our hydrologic calculations for the Desert Springs Subdivision. Although the only way to provide a flow analysis which is 100% accurate would be to build a hydraulic model and test the actual flow conditions, we feel that this analysis provides a conservative estimate which is sufficient for application in this situation.

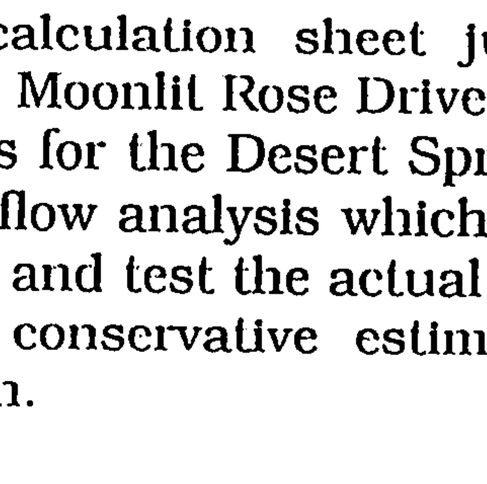
If you have any further questions, please feel free to contact me at 268-8828.

Respectfully yours,

ISAACSON & ARFMAN, P.A.

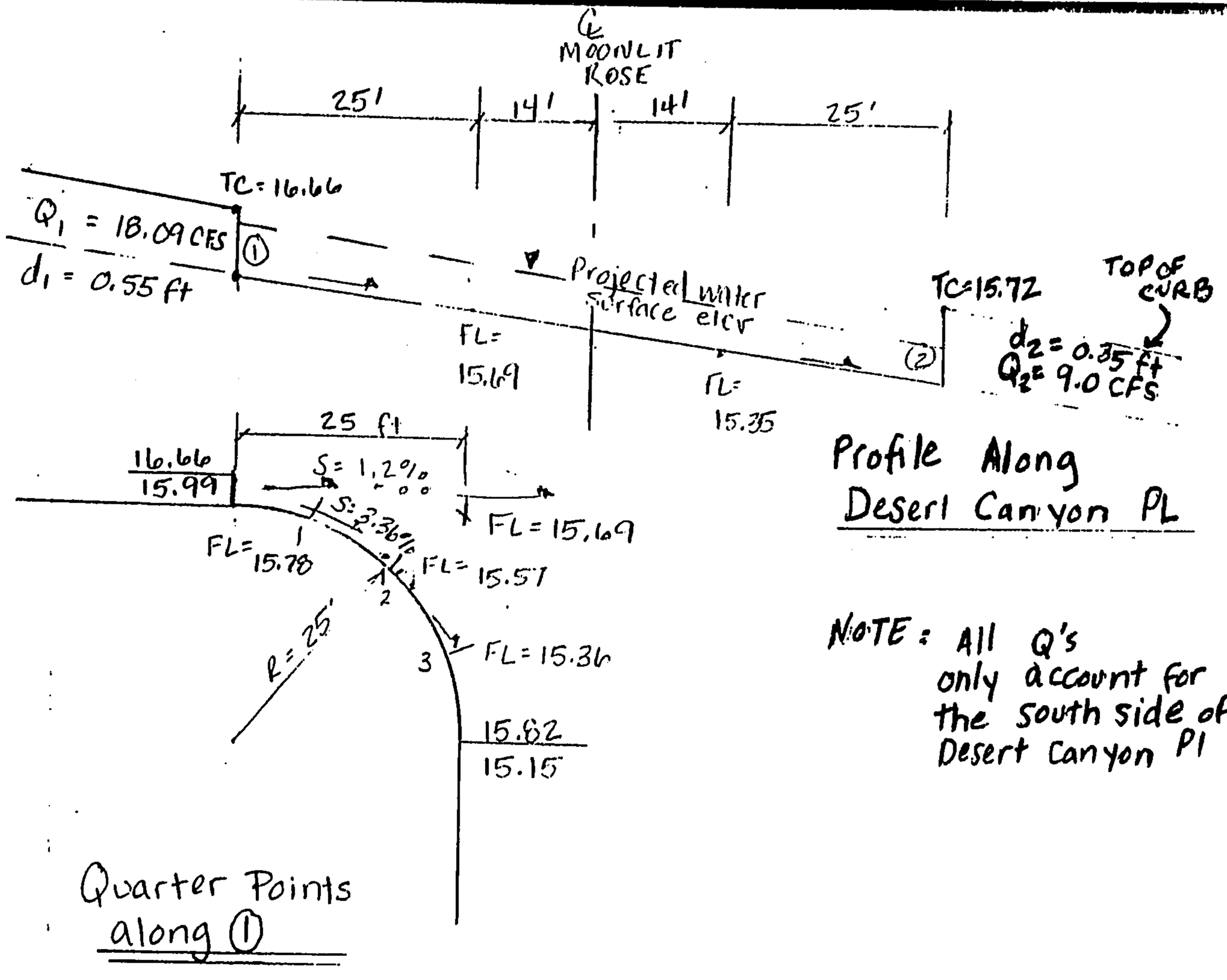
Melissa Combs

Melissa Combs
MC/rtl
Attachment



Fred C. Arfman, PE

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632



Quarter Points along ①

Profile Along Desert Canyon PL

NOTE: All Q's only account for the south side of Desert Canyon Pl

Assumptions

- Flow into Moonlit Rose functions as a weir
- Flow depth above the valley gutter depth (0.125 ft) are free to overflow
- 25% of all street flow will enter Moonlit Rose Q's from north Desert Canyon Pl will not cross the ℄ until after the intersection of Moonlit Rose.
- The Length of the weir will be equal to the distance from the curb return to the flowline. ≈25ft. Minimal overflow from the remainder of the intersection will be disregarded.
- Assume $d_{weir} = d_2 = .35$ ft (lowest flow depth for conservative analysis)

ISAACSON & ARFMAN, P.A.

SUBJECT Desert Springs Units 3-5 JOB NO.
BY MTC DATE 3/11/99 SHEET NO. 1 OF 2

$\therefore$ $Q = C\ L_{eff}(d)^{1.5} = 3.0(25)(.225)^{1.5} = 8.0 cfs$

based on 36.12 cfs total 22.1 % would enter Moonlit Rose

Since this estimate is **conservative** a flow split of 25% into Moonlit Rose **is an acceptable** assumption

Note:

- If additional flows enter Moonlit Rose Dr Blue Avena Ave has the **capacity to** convey the excess flows (**up to a 65% split** into Moonlit Rose Dr). See Table 2, AP3 **

APPENDIX A

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/19/1999
INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM3.DAT USER NO.= ISCARFNM.I01

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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR										
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)										
COMPUTE NM HYD	100.00	-	1	.01140	26.40	.922	1.51706	1.500	3.618	PER IMP= 61.00
*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN										
COMPUTE NM HYD	101.00	-	2	.00050	1.41	.052	1.96548	1.500	4.396	PER IMP= 100.00
ADD HYD	101.10	1& 2	3	.01190	27.80	.975	1.53585	1.500	3.651	
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING										
COMPUTE NM HYD	102.00	-	4	.00630	14.59	.510	1.51706	1.500	3.620	PER IMP= 61.00
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)										
COMPUTE NM HYD	103.00	-	5	.00350	8.12	.283	1.51706	1.500	3.623	PER IMP= 61.00
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)										
COMPUTE NM HYD	104.00	-	6	.00760	17.60	.615	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASINS 2C & 2B										
ADD HYD	104.10	6& 5	7	.01110	25.72	.898	1.51701	1.500	3.620	
*S **BASIN 2D (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	105.00	-	8	.00060	1.40	.049	1.51706	1.500	3.659	PER IMP= 61.00
*S **ADD BASINS 2C.1 TO 2D										
ADD HYD	105.10	7& 8	9	.01170	27.12	.947	1.51699	1.500	3.622	
*S ** ROUTE BASIN 2C.1 THROUGH 100										
ROUTE	105.20	9	10	.01170	26.76	.947	1.51703	1.533	3.574	
*S **BASIN 100										
COMPUTE NM HYD	106.00	-	11	.00420	9.74	.340	1.51706	1.500	3.622	PER IMP= 61.00
*S **ADD BASIN 100 & 2C.2										
ADD HYD	106.10	10&11	12	.01590	36.12	1.286	1.51700	1.533	3.549	
*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104										
DIVIDE HYD	106.20	12	13	.01192	27.09	.965	1.51699	1.533	3.549	
	106.30	AND	14	.00398	9.03	.322	1.51700	1.533	3.549	
*S **BASIN 101										
COMPUTE NM HYD	107.00	-	15	.00036	.85	.029	1.51706	1.500	3.688	PER IMP= 61.00
*S **ADD BASIN 101 & 100										
ADD HYD	107.10	15&14	16	.00434	9.85	.351	1.51689	1.533	3.549	
*S **COMPUTE BASIN 102A (PARK)										
COMPUTE NM HYD	108.00	-	17	.00260	4.29	.140	1.00753	1.500	2.580	PER IMP= 29.00
*S ** ROUTE BASIN 102A THROUGH 102										
ROUTE	108.10	17	18	.00260	4.20	.140	1.00761	1.533	2.524	
*S **COMPUTE BASIN 102										
COMPUTE NM HYD	109.00	-	19	.00270	6.26	.218	1.51706	1.500	3.625	PER IMP= 61.00
*S **ADD BASIN 102A & 102										
ADD HYD	109.10	19&18	20	.00530	10.22	.358	1.26700	1.533	3.013	
*S **ADD BASIN 101 & 102										
ADD HYD	109.20	20&16	21	.00964	20.06	.709	1.37943	1.533	3.254	
*S ** ROUTE BASIN 102.2 THROUGH 103										
ROUTE	109.30	21	22	.00964	19.24	.709	1.37948	1.567	3.120	
*S **COMPUTE BASIN 103										
COMPUTE NM HYD	110.00	-	23	.00490	11.36	.396	1.51706	1.500	3.621	PER IMP= 61.00
*S **ADD BASIN 102.3 & 103										
ADD HYD	110.10	23&22	24	.01454	29.93	1.105	1.42582	1.533	3.217	
*S **COMPUTE BASIN 104										

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	111.00	-	25	.00500	11.59	.405	1.51706	1.500	3.621	PER IMP= 61.00
*S ** ROUTE BASIN 100 THRU 104										
ROUTE	111.10	13	26	.01192	26.13	.965	1.51703	1.567	3.424	
*S **ADD BASIN 100 & 104										
ADD HYD	111.20	25&26	27	.01692	37.07	1.369	1.51700	1.533	3.422	
*S **COMPUTE BASIN 106										
COMPUTE NM HYD	112.00	-	28	.00260	6.03	.210	1.51706	1.500	3.626	PER IMP= 61.00
*S **ADD BASIN 106 & 104										
ADD HYD	112.10	28&27	29	.01952	42.86	1.580	1.51699	1.533	3.430	
*S **ADD BASIN 106 & 103										
ADD HYD	112.20	29&24	30	.03406	72.79	2.685	1.47808	1.533	3.339	
*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	113.00	-	31	.00020	.48	.016	1.51706	1.500	3.748	PER IMP= 61.00
*S **ADD BASIN 2E & 2A										
ADD HYD	113.10	31& 4	32	.00650	15.07	.526	1.51698	1.500	3.624	
*S ** ROUTE BASIN 2A.1 THROUGH 105										
ROUTE	113.20	32	1	.00650	12.62	.526	1.51707	1.567	3.033	
*S **COMPUTE BASIN 105										
COMPUTE NM HYD	114.00	-	2	.00860	19.92	.696	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 105 & 2A.1										
ADD HYD	114.10	1& 2	3	.01510	31.26	1.222	1.51700	1.533	3.234	
*S **COMPUTE BASIN 108										
COMPUTE NM HYD	115.00	-	4	.00100	2.33	.081	1.51706	1.500	3.641	PER IMP= 61.00
*S **COMPUTE BASIN 109										
COMPUTE NM HYD	116.00	-	8	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **COMPUTE BASIN 107										
COMPUTE NM HYD	117.00	-	10	.00230	5.34	.186	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 107 & 109										
ADD HYD	117.10	10& 8	11	.00950	22.02	.769	1.51700	1.500	3.621	
*S **ADD BASIN 107 & 105										
ADD HYD	117.20	11& 3	12	.02460	52.41	1.990	1.51700	1.533	3.329	
*S **COMPUTE BASIN 110										
COMPUTE NM HYD	118.00	-	13	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 110 & 108										
ADD HYD	118.10	13& 4	14	.00220	5.12	.178	1.51680	1.500	3.638	
*S **COMPUTE BASIN 113										
COMPUTE NM HYD	119.00	-	17	.00130	3.02	.105	1.51706	1.500	3.636	PER IMP= 61.00
*S **ADD BASIN 110 & 113										
ADD HYD	119.10	17&14	18	.00350	8.15	.283	1.51682	1.500	3.637	
*S ** ROUTE BASIN 113 THROUGH 116										
ROUTE	119.40	18	21	.00350	6.45	.283	1.51710	1.567	2.878	
*S **COMPUTE BASIN 116										
COMPUTE NM HYD	120.00	-	22	.00960	22.23	.777	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 116 & 113										
ADD HYD	120.10	21&22	23	.01310	27.43	1.060	1.51701	1.533	3.272	
*S **COMPUTE BASIN 111										
COMPUTE NM HYD	121.00	-	25	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **COMPUTE BASIN 112										
COMPUTE NM HYD	122.00	-	27	.00210	4.88	.170	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 111 & 112										
ADD HYD	122.10	25&27	28	.00930	21.55	.752	1.51700	1.500	3.621	
*S **COMPUTE BASIN 114										

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	123.00	-	30	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S ** ROUTE BASIN 114 THROUGH 115										
ROUTE	123.30	30	3	.00720	16.44	.583	1.51709	1.533	3.568	
*S **COMPUTE BASIN 115										
COMPUTE NM HYD	124.00	-	4	.00160	3.72	.129	1.51706	1.500	3.631	PER IMP= 61.00
*S **ADD BASIN 114 & 115										
ADD HYD	124.10	3& 4	5	.00880	20.01	.712	1.51699	1.533	3.553	
*S **ADD BASIN 115 & 116										
ADD HYD	124.20	5&23	6	.02190	47.44	1.772	1.51700	1.533	3.385	
*S **COMPUTE BASIN 117										
COMPUTE NM HYD	125.00	-	7	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 116 & 117										
ADD HYD	125.10	7& 6	8	.02310	50.13	1.869	1.51699	1.500	3.391	
FINISH										

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 03/19/1999
         START TIME (HR:MIN:SEC) = 11:07:30      USER NO.= ISCARFNM.I01
         INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM3.DAT

**** DESERT SPRINGS MASTER DRAINAGE REPORT****
****          MARCH 19, 1999           ****
****          DSTSPGM3.DAT             ****
START                 RAINFALL BEGINS AT 0.0 HRS
RAINFALL              TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                      RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

                 COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                 DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                    .0000   .0016   .0033   .0050   .0067   .0085   .0103
                    .0122   .0141   .0160   .0180   .0201   .0222   .0243
                    .0266   .0289   .0312   .0337   .0362   .0388   .0415
                    .0443   .0472   .0502   .0534   .0567   .0601   .0637
                    .0675   .0715   .0758   .0809   .0865   .0924   .1050
                    .1334   .1771   .2398   .3254   .4379   .5814   .7600
                    .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                   1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                   1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                   1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                   1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                   2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                   2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                   2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                   2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                   2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                   2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                   2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                   2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                   2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                   2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                   2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                   2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                   2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                   2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                   2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD        ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   27.455     CFS    UNIT VOLUME =     .9990       B =   526.28       P60 = 1.8700
    AREA =       .006954 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330
```

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 11.829 CFS UNIT VOLUME = .9993 B = 354.67 P60 = 1.8700
AREA = .004446 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=1   CODE=1
```

PARTIAL HYDROGRAPH 100.00

RUNOFF VOLUME = 1.51706 INCHES = .9224 ACRE-FEET
PEAK DISCHARGE RATE = 26.40 CFS AT 1.500 HOURS BASIN AREA = .0114 SQ. MI.

```
*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN
COMPUTE NM HYD      ID=2 HYD NO=101.00 AREA=0.0005 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.9740 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.8700
AREA = .000500 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=2   CODE=5
```

PARTIAL HYDROGRAPH 101.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.4	2.666	.0	4.000	.0	5.333	.0
.167	.0	1.500	1.4	2.833	.0	4.166	.0	5.499	.0
.333	.0	1.667	.7	3.000	.0	4.333	.0	5.666	.0
.500	.0	1.833	.5	3.166	.0	4.500	.0	5.833	.0
.667	.0	2.000	.3	3.333	.0	4.666	.0	5.999	.0
.833	.0	2.166	.2	3.500	.0	4.833	.0	6.166	.0
1.000	.0	2.333	.1	3.666	.0	4.999	.0	6.333	.0
1.167	.0	2.500	.0	3.833	.0	5.166	.0		

RUNOFF VOLUME = 1.96548 INCHES = .0524 ACRE-FEET
PEAK DISCHARGE RATE = 1.41 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

```
ADD HYD             ID=3 HYD NO=101.1 ID=1 ID=2
PRINT HYD           ID=3 CODE=1
```

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = 1.53585 INCHES = .9747 ACRE-FEET
PEAK DISCHARGE RATE = 27.80 CFS AT 1.500 HOURS BASIN AREA = .0119 SQ. MI.

```
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING
COMPUTE NM HYD       ID=4 HYD NO=102.00 AREA=0.0063 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   15.172   CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =      .003843 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   6.5373    CFS   UNIT VOLUME =    .9984       B =   354.67      P60 = 1.8700
    AREA =      .002457 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   102.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .5097 ACRE-FEET
    PEAK DISCHARGE RATE =      14.59 CFS  AT   1.500 HOURS   BASIN AREA =   .0063 SQ. MI.


*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD       ID=5 HYD NO=103.00 AREA=0.0035 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4291    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.6318    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001365 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=5   CODE=1

                                PARTIAL HYDROGRAPH   103.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .2832 ACRE-FEET
    PEAK DISCHARGE RATE =      8.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0035 SQ. MI.
```

```
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)
COMPUTE NM HYD       ID=6 HYD NO=104.00 AREA=0.0076 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.303    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004636 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.8862    CFS   UNIT VOLUME =    .9988       B =   354.67      P60 = 1.8700
    AREA =      .002964 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=6   CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .6149 ACRE-FEET
    PEAK DISCHARGE RATE =      17.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0076 SQ. MI.


*S **ADD BASINS 2C & 2B
ADD HYD              ID=7 HYD NO=104.1 ID=6 ID=5
PRINT HYD            ID=7 CODE=1

                                PARTIAL HYDROGRAPH   104.10


    RUNOFF VOLUME =     1.51701 INCHES      =        .8981 ACRE-FEET
    PEAK DISCHARGE RATE =      25.72 CFS  AT   1.500 HOURS   BASIN AREA =   .0111 SQ. MI.


*S **BASIN 2D (DESERT SPRINGS DRIVE)
COMPUTE NM HYD       ID=8 HYD NO=105.00 AREA=0.0006 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.4450    CFS   UNIT VOLUME =    .9911       B =   526.28      P60 = 1.8700
    AREA =      .000366 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .62260    CFS   UNIT VOLUME =    .9795       B =   354.67      P60 = 1.8700
    AREA =      .000234 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=8   CODE=1
```

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = 1.51706 INCHES = .0485 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

```
*S **ADD BASINS 2C.1 TO 2D
ADD HYD             ID=9 HYD NO=105.1 ID=7 ID=8
PRINT HYD           ID=9 CODE=1
```

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 1.51699 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.12 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

```
*S ** ROUTE BASIN 2C.1 THROUGH 100
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

```
COMPUTE TRAVEL TIME  ID=10 REACH NO=1 NO VS=1 L=510 FT
                     SLP=0.012
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1711
.071	.248	.33	.1078
.106	.557	.96	.0823
.141	.991	2.07	.0679
.176	1.548	3.75	.0585
.212	2.229	6.09	.0518
.247	3.034	9.19	.0468
.282	3.962	13.18	.0426
.317	4.946	19.05	.0368
.353	5.930	25.73	.0327
.388	6.914	33.18	.0295
.423	7.898	41.35	.0271
.458	8.883	50.21	.0251
.494	9.869	59.73	.0234
.529	10.854	69.89	.0220
.564	11.841	80.66	.0208
.599	12.827	92.01	.0197
.635	13.814	103.94	.0188
.670	14.801	116.42	.0180

ROUTE ID=10 HYD NO=105.2 INFLOW ID=9 DT=0.0 HR
PRINT HYD ID=10 CODE=1

PARTIAL HYDROGRAPH 105.20

RUNOFF VOLUME = 1.51703 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 26.76 CFS AT 1.533 HOURS BASIN AREA = .0117 SQ. MI.

*S **BASIN 100
COMPUTE NM HYD ID=11 HYD NO=106.00 AREA=0.0042 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.115 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002562 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 4.3582 CFS UNIT VOLUME = .9972 B = 354.67 P60 = 1.8700
AREA = .001638 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=11 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = 1.51706 INCHES = .3398 ACRE-FEET
PEAK DISCHARGE RATE = 9.74 CFS AT 1.500 HOURS BASIN AREA = .0042 SQ. MI.

*S **ADD BASIN 100 & 2C.2
ADD HYD ID=12 HYD NO=106.1 ID=10 ID=11
PRINT HYD ID=12 CODE=1

PARTIAL HYDROGRAPH 106.10

RUNOFF VOLUME = 1.51700 INCHES = 1.2864 ACRE-FEET
PEAK DISCHARGE RATE = 36.12 CFS AT 1.533 HOURS BASIN AREA = .0159 SQ. MI.

*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104
DIVIDE HYD ID=12 PER=-75 ID=13 HYD=106.2
ID=14 HYD=106.3
PRINT HYD ID=13 CODE=1

PARTIAL HYDROGRAPH 106.20

RUNOFF VOLUME = 1.51699 INCHES = .9648 ACRE-FEET
PEAK DISCHARGE RATE = 27.09 CFS AT 1.533 HOURS BASIN AREA = .0119 SQ. MI.

PRINT HYD ID=14 CODE=1

PARTIAL HYDROGRAPH 106.30

RUNOFF VOLUME = 1.51700 INCHES = .3216 ACRE-FEET
PEAK DISCHARGE RATE = 9.03 CFS AT 1.533 HOURS BASIN AREA = .0040 SQ. MI.

*S **BASIN 101
COMPUTE NM HYD ID=15 HYD NO=107.00 AREA=0.00036 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .86699 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.8700
AREA = .000220 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = .37356 CFS UNIT VOLUME = .9637 B = 354.67 P60 = 1.8700
AREA = .000140 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD          ID=15    CODE=1

                                PARTIAL HYDROGRAPH    107.00

     RUNOFF VOLUME =      1.51706 INCHES      =         .0291 ACRE-FEET
     PEAK DISCHARGE RATE =         .85 CFS   AT    1.500 HOURS    BASIN AREA =    .0004 SQ. MI.


*S **ADD BASIN 101 & 100
ADD HYD              ID=16 HYD NO=107.1 ID=15 ID=14
PRINT HYD            ID=16 CODE=1

                                PARTIAL HYDROGRAPH    107.10

     RUNOFF VOLUME =      1.51689 INCHES      =         .3507 ACRE-FEET
     PEAK DISCHARGE RATE =        9.85 CFS   AT    1.533 HOURS    BASIN AREA =    .0043 SQ. MI.


*S **COMPUTE BASIN 102A (PARK)
COMPUTE NM HYD       ID=17 HYD NO=108.00 AREA=0.0026 SQ MI
                     PER A=33   PER B=19   PER C=19   PER D=29
                     TP=-0.1333 HR    MASSRAIN=-1

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =    2.9768     CFS    UNIT VOLUME =     .9955        B =    526.28       P60 = 1.8700
     AREA =       .000754 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


     K =    .139463HR     TP =    .133300HR     K/TP RATIO =  1.046235      SHAPE CONSTANT, N =  3.374403
     UNIT PEAK =    4.3075     CFS    UNIT VOLUME =     .9968        B =    311.05       P60 = 1.8700
     AREA =       .001846 SQ MI     IA =     .52958 INCHES     INF =    1.33282 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=17    CODE=1

                                PARTIAL HYDROGRAPH    108.00

     RUNOFF VOLUME =      1.00753 INCHES      =         .1397 ACRE-FEET
     PEAK DISCHARGE RATE =        4.29 CFS   AT    1.500 HOURS    BASIN AREA =    .0026 SQ. MI.


*S ** ROUTE BASIN 102A THROUGH 102
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.33 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST   ELEV  DIST   ELEV  DIST   ELEV
                       0  100.33 0.1   100.00   14    100.28
                     27.9 100.00 28.0 100.33
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.02	.02	.01	1.74
100.03	.06	.05	3.47
100.05	.14	.15	5.21
100.07	.24	.31	6.94
100.09	.38	.57	8.68
100.10	.54	.93	10.41
100.12	.74	1.40	12.15
100.14	.96	2.00	13.88
100.16	1.22	2.73	15.62
100.17	1.51	3.62	17.35
100.19	1.82	4.67	19.09
100.21	2.17	5.88	20.82
100.23	2.55	7.28	22.56
100.24	2.95	8.88	24.29
100.26	3.39	10.67	26.03
100.28	3.86	12.67	27.77
100.30	4.34	15.35	27.98
100.31	4.83	18.31	27.99
100.33	5.32	21.46	28.00

COMPUTE TRAVEL TIME ID=18 REACH NO=1 NO VS=1 L=280 FT
SLP=0.01

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.017	.015	.01	.1504
.035	.060	.05	.0947
.052	.136	.15	.0723
.069	.241	.31	.0597
.087	.377	.57	.0514
.104	.543	.93	.0455
.122	.739	1.40	.0411
.139	.965	2.00	.0376
.156	1.221	2.73	.0348
.174	1.507	3.62	.0324
.191	1.824	4.67	.0304
.208	2.171	5.88	.0287
.226	2.547	7.28	.0272
.243	2.954	8.88	.0259
.261	3.391	10.67	.0247
.278	3.859	12.67	.0237
.295	4.345	15.35	.0220
.313	4.831	18.31	.0205
.330	5.317	21.46	.0193

ROUTE ID=18 HYD NO=108.1 INFLOW ID=17 DT=0.0 HR
PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 108.10

RUNOFF VOLUME = 1.00761 INCHES = .1397 ACRE-FEET
PEAK DISCHARGE RATE = 4.20 CFS AT 1.533 HOURS BASIN AREA = .0026 SQ. MI.

```
*S **COMPUTE BASIN 102
COMPUTE NM HYD      ID=19 HYD NO=109.00 AREA=0.0027 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.5024 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.8700
AREA = .001647 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 2.8017 CFS UNIT VOLUME = .9958 B = 354.67 P60 = 1.8700
AREA = .001053 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=19   CODE=1
```

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.51706 INCHES = .2185 ACRE-FEET
PEAK DISCHARGE RATE = 6.26 CFS AT 1.500 HOURS BASIN AREA = .0027 SQ. MI.

```
*S **ADD BASIN 102A & 102
ADD HYD             ID=20 HYD NO=109.1 ID=19 ID=18
PRINT HYD           ID=20 CODE=1
```

PARTIAL HYDROGRAPH 109.10

RUNOFF VOLUME = 1.26700 INCHES = .3581 ACRE-FEET
PEAK DISCHARGE RATE = 10.22 CFS AT 1.533 HOURS BASIN AREA = .0053 SQ. MI.

```
*S **ADD BASIN 101 & 102
ADD HYD             ID=21 HYD NO=109.2 ID=20 ID=16
PRINT HYD           ID=21 CODE=1
```

PARTIAL HYDROGRAPH 109.20

RUNOFF VOLUME = 1.37943 INCHES = .7088 ACRE-FEET
PEAK DISCHARGE RATE = 20.06 CFS AT 1.533 HOURS BASIN AREA = .0096 SQ. MI.

*S ** ROUTE BASIN 102.2 THROUGH 103
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 14 100.28
27.9 100.00 28.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=22 REACH NO=1 NO VS=1 L=600 FT
SLP=0.0101

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2013
.071	.248	.33	.1268
.106	.557	.96	.0968
.141	.991	2.07	.0799
.176	1.548	3.75	.0689
.212	2.229	6.09	.0610
.247	3.034	9.19	.0550
.282	3.962	13.18	.0501
.317	4.946	19.05	.0433
.353	5.930	25.73	.0384
.388	6.914	33.18	.0347
.423	7.898	41.35	.0318
.458	8.883	50.21	.0295
.494	9.869	59.73	.0275

```
                                .529       10.854        69.89        .0259
                                .564       11.841        80.66        .0245
                                .599       12.827        92.01        .0232
                                .635       13.814       103.94        .0222
                                .670       14.801       116.42        .0212
ROUTE                 ID=22 HYD NO=109.3 INFLOW ID=21 DT=0.0 HR
PRINT HYD             ID=22 CODE=1

                                    PARTIAL HYDROGRAPH   109.30


    RUNOFF VOLUME =     1.37948 INCHES     =         .7089 ACRE-FEET
    PEAK DISCHARGE RATE =      19.24 CFS  AT   1.567 HOURS   BASIN AREA =    .0096 SQ. MI.


*S **COMPUTE BASIN 103
COMPUTE NM HYD        ID=23 HYD NO=110.00 AREA=0.0049 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.801    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .002989 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.0846    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001911 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD             ID=23   CODE=1

                                    PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =     1.51706 INCHES     =         .3965 ACRE-FEET
    PEAK DISCHARGE RATE =      11.36 CFS  AT   1.500 HOURS   BASIN AREA =    .0049 SQ. MI.


*S **ADD BASIN 102.3 & 103
ADD HYD               ID=24 HYD NO=110.1 ID=23 ID=22
PRINT HYD             ID=24 CODE=1

                                    PARTIAL HYDROGRAPH   110.10


    RUNOFF VOLUME =     1.42582 INCHES     =        1.1053 ACRE-FEET
    PEAK DISCHARGE RATE =      29.93 CFS  AT   1.533 HOURS   BASIN AREA =    .0145 SQ. MI.
```

```
*S **COMPUTE BASIN 104
COMPUTE NM HYD       ID=25 HYD NO=111.00 AREA=0.0050 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   12.042    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .003050 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.1883    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001950 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=25   CODE=1

                                PARTIAL HYDROGRAPH   111.00

    RUNOFF VOLUME =     1.51706 INCHES      =         .4045 ACRE-FEET
    PEAK DISCHARGE RATE =      11.59 CFS  AT   1.500 HOURS   BASIN AREA =    .0050 SQ. MI.


*S ** ROUTE BASIN 100 THRU 104
COMPUTE TRAVEL TIME  ID=26 REACH NO=1 NO VS=1 L=620 FT
                     SLP=0.012

                TRAVEL TIME TABLE
                              REACH=  1.0

WATER          AVERAGE        FLOW          TRAVEL
DEPTH          AREA           RATE          TIME
FEET           SQ.FT.         CFS           HRS
   .035           .062            .05         .2081
   .071           .248            .33         .1311
   .106           .557            .96         .1000
   .141           .991           2.07         .0826
   .176          1.548           3.75         .0712
   .212          2.229           6.09         .0630
   .247          3.034           9.19         .0569
   .282          3.962          13.18         .0518
   .317          4.946          19.05         .0447
   .353          5.930          25.73         .0397
   .388          6.914          33.18         .0359
   .423          7.898          41.35         .0329
   .458          8.883          50.21         .0305
   .494          9.869          59.73         .0285
   .529         10.854          69.89         .0267
   .564         11.841          80.66         .0253
   .599         12.827          92.01         .0240
   .635         13.814         103.94         .0229
   .670         14.801         116.42         .0219
```

```
ROUTE                ID=26 HYD NO=111.1 INFLOW ID=13 DT=0.0 HR
PRINT HYD            ID=26 CODE=1

                                PARTIAL HYDROGRAPH   111.10

    RUNOFF VOLUME =     1.51703 INCHES      =        .9648 ACRE-FEET
    PEAK DISCHARGE RATE =      26.13 CFS  AT   1.567 HOURS   BASIN AREA =   .0119 SQ. MI.


*S **ADD BASIN 100 & 104
ADD HYD              ID=27 HYD NO=111.2 ID=25 ID=26
PRINT HYD            ID=27 CODE=1

                                PARTIAL HYDROGRAPH   111.20

    RUNOFF VOLUME =     1.51700 INCHES      =       1.3693 ACRE-FEET
    PEAK DISCHARGE RATE =      37.07 CFS  AT   1.533 HOURS   BASIN AREA =   .0169 SQ. MI.


*S **COMPUTE BASIN 106
COMPUTE NM HYD       ID=28 HYD NO=112.00 AREA=0.0026 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   6.2616    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
    AREA =      .001586 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.6979    CFS   UNIT VOLUME =    .9953       B =   354.67      P60 = 1.8700
    AREA =      .001014 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=28   CODE=1

                                PARTIAL HYDROGRAPH   112.00

    RUNOFF VOLUME =     1.51706 INCHES      =        .2104 ACRE-FEET
    PEAK DISCHARGE RATE =       6.03 CFS  AT   1.500 HOURS   BASIN AREA =   .0026 SQ. MI.


*S **ADD BASIN 106 & 104
ADD HYD              ID=29 HYD NO=112.1 ID=28 ID=27
PRINT HYD            ID=29 CODE=1

                                PARTIAL HYDROGRAPH   112.10
```

```
    RUNOFF VOLUME =     1.51699 INCHES      =       1.5797 ACRE-FEET
    PEAK DISCHARGE RATE =      42.86 CFS  AT   1.533 HOURS   BASIN AREA =    .0195 SQ. MI.


*S **ADD BASIN 106 & 103
ADD HYD             ID=30 HYD NO=112.2 ID=29 ID=24
PRINT HYD           ID=30 CODE=1

                                PARTIAL HYDROGRAPH   112.20

    RUNOFF VOLUME =     1.47808 INCHES      =       2.6850 ACRE-FEET
    PEAK DISCHARGE RATE =      72.79 CFS  AT   1.533 HOURS   BASIN AREA =    .0341 SQ. MI.


*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)
COMPUTE NM HYD      ID=31 HYD NO=113.00 AREA=0.0002 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .48166    CFS   UNIT VOLUME =    .9751       B =   526.28      P60 = 1.8700
    AREA =      .000122 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .20753    CFS   UNIT VOLUME =    .9360       B =   354.67      P60 = 1.8700
    AREA =      .000078 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=31   CODE=1

                                PARTIAL HYDROGRAPH   113.00

    RUNOFF VOLUME =     1.51706 INCHES      =        .0162 ACRE-FEET
    PEAK DISCHARGE RATE =       .48 CFS  AT   1.500 HOURS   BASIN AREA =    .0002 SQ. MI.


*S **ADD BASIN 2E & 2A
ADD HYD             ID=32 HYD NO=113.1 ID=31 ID=4
PRINT HYD           ID=32 CODE=1

                                PARTIAL HYDROGRAPH   113.10

    RUNOFF VOLUME =     1.51698 INCHES      =        .5259 ACRE-FEET
    PEAK DISCHARGE RATE =      15.07 CFS  AT   1.500 HOURS   BASIN AREA =    .0065 SQ. MI.
```

*S ** ROUTE BASIN 2A.1 THROUGH 105
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1010 FT
SLP=0.0158

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3389
.071	.248	.33	.2135
.106	.558	.96	.1629
.141	.992	2.07	.1345
.176	1.549	3.75	.1159
.212	2.231	6.10	.1026
.247	3.037	9.20	.0926
.282	3.966	13.13	.0847
.317	5.020	17.98	.0783
.353	6.144	25.01	.0689
.388	7.269	33.05	.0617
.423	8.395	41.95	.0561
.458	9.521	51.67	.0517
.494	10.647	62.16	.0481

```
                                .529        11.774         73.40         .0450
                                .564        12.901         85.36         .0424
                                .599        14.029         98.01         .0402
                                .635        15.157        111.33         .0382
                                .670        16.285        125.31         .0365
ROUTE                  ID=1 HYD NO=113.2 INFLOW ID=32 DT=0.0 HR
PRINT HYD              ID=1 CODE=1

                                  PARTIAL HYDROGRAPH    113.20

    RUNOFF VOLUME =      1.51707 INCHES      =          .5259 ACRE-FEET
    PEAK DISCHARGE RATE =       12.62 CFS  AT    1.567 HOURS    BASIN AREA =    .0065 SQ. MI.


*S **COMPUTE BASIN 105
COMPUTE NM HYD         ID=2 HYD NO=114.00 AREA=0.0086 SQ MI
                       PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                       TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   20.711     CFS    UNIT VOLUME =     .9988         B =   526.28       P60 = 1.8700
    AREA =       .005246 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   8.9239     CFS    UNIT VOLUME =     .9989         B =   354.67       P60 = 1.8700
    AREA =       .003354 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD              ID=2    CODE=1

                                  PARTIAL HYDROGRAPH    114.00

    RUNOFF VOLUME =      1.51706 INCHES      =          .6958 ACRE-FEET
    PEAK DISCHARGE RATE =       19.92 CFS  AT    1.500 HOURS    BASIN AREA =    .0086 SQ. MI.


*S **ADD BASIN 105 & 2A.1
ADD HYD                ID=3 HYD NO=114.1 ID=1 ID=2
PRINT HYD              ID=3 CODE=1

                                  PARTIAL HYDROGRAPH    114.10

    RUNOFF VOLUME =      1.51700 INCHES      =         1.2217 ACRE-FEET
    PEAK DISCHARGE RATE =       31.26 CFS  AT    1.533 HOURS    BASIN AREA =    .0151 SQ. MI.
```

```
*S **COMPUTE BASIN 108
COMPUTE NM HYD       ID=4 HYD NO=115.00 AREA=0.0010 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.4083    CFS   UNIT VOLUME =    .9949       B =   526.28      P60 = 1.8700
    AREA =      .000610 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.0377    CFS   UNIT VOLUME =    .9874       B =   354.67      P60 = 1.8700
    AREA =      .000390 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   115.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0809 ACRE-FEET
    PEAK DISCHARGE RATE =       2.33 CFS  AT   1.500 HOURS   BASIN AREA =    .0010 SQ. MI.


*S **COMPUTE BASIN 109
COMPUTE NM HYD       ID=8 HYD NO=116.00 AREA=0.0072 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=8   CODE=1

                                PARTIAL HYDROGRAPH   116.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5825 ACRE-FEET
    PEAK DISCHARGE RATE =      16.68 CFS  AT   1.500 HOURS   BASIN AREA =    .0072 SQ. MI.
```

```
*S **COMPUTE BASIN 107
COMPUTE NM HYD       ID=10 HYD NO=117.00 AREA=0.0023 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.5391    CFS   UNIT VOLUME =    .9973       B =   526.28      P60 = 1.8700
    AREA =      .001403 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.3866    CFS   UNIT VOLUME =    .9948       B =   354.67      P60 = 1.8700
    AREA =      .000897 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=10   CODE=1

                                PARTIAL HYDROGRAPH   117.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .1861 ACRE-FEET
    PEAK DISCHARGE RATE =       5.34 CFS  AT   1.500 HOURS   BASIN AREA =   .0023 SQ. MI.


*S **ADD BASIN 107 & 109
ADD HYD              ID=11 HYD NO=117.1 ID=10 ID=8
PRINT HYD            ID=11 CODE=1

                                PARTIAL HYDROGRAPH   117.10


    RUNOFF VOLUME =     1.51700 INCHES     =        .7686 ACRE-FEET
    PEAK DISCHARGE RATE =      22.02 CFS  AT   1.500 HOURS   BASIN AREA =   .0095 SQ. MI.


*S **ADD BASIN 107 & 105
ADD HYD              ID=12 HYD NO=117.2 ID=11 ID=3
PRINT HYD            ID=12 CODE=1

                                PARTIAL HYDROGRAPH   117.20


    RUNOFF VOLUME =     1.51700 INCHES     =       1.9903 ACRE-FEET
    PEAK DISCHARGE RATE =      52.41 CFS  AT   1.533 HOURS   BASIN AREA =   .0246 SQ. MI.


*S **COMPUTE BASIN 110
COMPUTE NM HYD       ID=13 HYD NO=118.00 AREA=0.0012 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.8900    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.2452    CFS   UNIT VOLUME =    .9896       B =   354.67      P60 = 1.8700
    AREA =      .000468 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=13   CODE=1

                                PARTIAL HYDROGRAPH   118.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0971 ACRE-FEET
    PEAK DISCHARGE RATE =       2.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.


*S **ADD BASIN 110 & 108
ADD HYD             ID=14 HYD NO=118.1 ID=13 ID=4
PRINT HYD           ID=14 CODE=1

                                PARTIAL HYDROGRAPH   118.10


    RUNOFF VOLUME =     1.51680 INCHES      =        .1780 ACRE-FEET
    PEAK DISCHARGE RATE =       5.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0022 SQ. MI.


*S **COMPUTE BASIN 113
COMPUTE NM HYD      ID=17 HYD NO=119.00 AREA=0.0013 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.1308    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000793 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.3490    CFS   UNIT VOLUME =    .9906       B =   354.67      P60 = 1.8700
    AREA =      .000507 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=17   CODE=1

                                PARTIAL HYDROGRAPH   119.00
```

RUNOFF VOLUME = 1.51706 INCHES = .1052 ACRE-FEET
PEAK DISCHARGE RATE = 3.02 CFS AT 1.500 HOURS BASIN AREA = .0013 SQ. MI.

*S **ADD BASIN 110 & 113
ADD HYD ID=18 HYD NO=119.1 ID=17 ID=14
PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 119.10

RUNOFF VOLUME = 1.51682 INCHES = .2831 ACRE-FEET
PEAK DISCHARGE RATE = 8.15 CFS AT 1.500 HOURS BASIN AREA = .0035 SQ. MI.

*S ** ROUTE BASIN 113 THROUGH 116
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=21 REACH NO=1 NO VS=1 L=1040 FT
SLP=0.008

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3490
.071	.248	.33	.2198
.106	.558	.96	.1678
.141	.992	2.07	.1385
.176	1.549	3.75	.1194
.212	2.231	6.10	.1057
.247	3.037	9.20	.0954
.282	3.966	13.13	.0872
.317	5.020	17.98	.0807
.353	6.144	25.01	.0710
.388	7.269	33.05	.0635
.423	8.395	41.95	.0578
.458	9.521	51.67	.0532
.494	10.647	62.16	.0495
.529	11.774	73.40	.0463
.564	12.901	85.36	.0437
.599	14.029	98.01	.0413
.635	15.157	111.33	.0393
.670	16.285	125.31	.0375

```
ROUTE                ID=21 HYD NO=119.4 INFLOW ID=18 DT=0.0 HR
PRINT HYD            ID=21 CODE=1

                          PARTIAL HYDROGRAPH   119.40

    RUNOFF VOLUME =     1.51710 INCHES     =        .2832 ACRE-FEET
    PEAK DISCHARGE RATE =       6.45 CFS  AT   1.567 HOURS   BASIN AREA =    .0035 SQ. MI.


*S **COMPUTE BASIN 116
COMPUTE NM HYD       ID=22 HYD NO=120.00 AREA=0.0096 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   23.120    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .005856 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   9.9616    CFS   UNIT VOLUME =    .9991       B =   354.67      P60 = 1.8700
    AREA =      .003744 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=22   CODE=1

                          PARTIAL HYDROGRAPH   120.00
```

```
    RUNOFF VOLUME =      1.51706 INCHES      =         .7767 ACRE-FEET
    PEAK DISCHARGE RATE =      22.23 CFS  AT    1.500 HOURS   BASIN AREA =    .0096 SQ. MI.


*S **ADD BASIN 116 & 113
ADD HYD             ID=23 HYD NO=120.1 ID=21 ID=22
PRINT HYD           ID=23 CODE=1

                                PARTIAL HYDROGRAPH   120.10

    RUNOFF VOLUME =      1.51701 INCHES      =        1.0599 ACRE-FEET
    PEAK DISCHARGE RATE =      27.43 CFS  AT    1.533 HOURS   BASIN AREA =    .0131 SQ. MI.


*S **COMPUTE BASIN 111
COMPUTE NM HYD      ID=25 HYD NO=121.00 AREA=0.0072 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=25   CODE=1

                                PARTIAL HYDROGRAPH   121.00

    RUNOFF VOLUME =      1.51706 INCHES      =         .5825 ACRE-FEET
    PEAK DISCHARGE RATE =      16.68 CFS  AT    1.500 HOURS   BASIN AREA =    .0072 SQ. MI.


*S **COMPUTE BASIN 112
COMPUTE NM HYD      ID=27 HYD NO=122.00 AREA=0.0021 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.0575    CFS   UNIT VOLUME =    .9973       B =   526.28      P60 = 1.8700
    AREA =      .001281 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 2.1791 CFS UNIT VOLUME = .9943 B = 354.67 P60 = 1.8700
AREA = .000819 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=27   CODE=1
```

PARTIAL HYDROGRAPH 122.00

RUNOFF VOLUME = 1.51706 INCHES = .1699 ACRE-FEET
PEAK DISCHARGE RATE = 4.88 CFS AT 1.500 HOURS BASIN AREA = .0021 SQ. MI.

```
*S **ADD BASIN 111 & 112
ADD HYD             ID=28 HYD NO=122.1 ID=25 ID=27
PRINT HYD           ID=28 CODE=1
```

PARTIAL HYDROGRAPH 122.10

RUNOFF VOLUME = 1.51700 INCHES = .7524 ACRE-FEET
PEAK DISCHARGE RATE = 21.55 CFS AT 1.500 HOURS BASIN AREA = .0093 SQ. MI.

```
*S **COMPUTE BASIN 114
COMPUTE NM HYD      ID=30 HYD NO=123.00 AREA=0.0072 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 17.340 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.8700
AREA = .004392 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 7.4712 CFS UNIT VOLUME = .9986 B = 354.67 P60 = 1.8700
AREA = .002808 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=30   CODE=1
```

PARTIAL HYDROGRAPH 123.00

RUNOFF VOLUME = 1.51706 INCHES = .5825 ACRE-FEET
PEAK DISCHARGE RATE = 16.68 CFS AT 1.500 HOURS BASIN AREA = .0072 SQ. MI.

*S ** ROUTE BASIN 114 THROUGH 115
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=200 FT
SLP=0.005

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.0671
.071	.248	.33	.0423
.106	.558	.96	.0323
.141	.992	2.07	.0266
.176	1.549	3.75	.0230
.212	2.231	6.10	.0203
.247	3.037	9.20	.0183
.282	3.966	13.13	.0168
.317	5.020	17.98	.0155
.353	6.144	25.01	.0136
.388	7.269	33.05	.0122
.423	8.395	41.95	.0111
.458	9.521	51.67	.0102
.494	10.647	62.16	.0095

```
                                .529       11.774        73.40        .0089
                                .564       12.901        85.36        .0084
                                .599       14.029        98.01        .0080
                                .635       15.157       111.33        .0076
                                .670       16.285       125.31        .0072
ROUTE                 ID=3 HYD NO=123.3 INFLOW ID=30 DT=0.0 HR
PRINT HYD             ID=3 CODE=1

                                    PARTIAL HYDROGRAPH    123.30


     RUNOFF VOLUME =      1.51709 INCHES      =         .5826 ACRE-FEET
     PEAK DISCHARGE RATE =       16.44 CFS  AT    1.533 HOURS    BASIN AREA =    .0072 SQ. MI.


*S **COMPUTE BASIN 115
COMPUTE NM HYD        ID=4 HYD NO=124.00 AREA=0.0016 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =    3.8533     CFS   UNIT VOLUME =     .9965        B =    526.28       P60 = 1.8700
     AREA =       .000976 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330
     K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
     UNIT PEAK =    1.6603     CFS   UNIT VOLUME =     .9923        B =    354.67       P60 = 1.8700
     AREA =       .000624 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD             ID=4    CODE=1

                                    PARTIAL HYDROGRAPH    124.00


     RUNOFF VOLUME =      1.51706 INCHES      =         .1295 ACRE-FEET
     PEAK DISCHARGE RATE =        3.72 CFS  AT    1.500 HOURS    BASIN AREA =    .0016 SQ. MI.


*S **ADD BASIN 114 & 115
ADD HYD               ID=5 HYD NO=124.1 ID=3 ID=4
PRINT HYD             ID=5 CODE=1

                                    PARTIAL HYDROGRAPH    124.10


     RUNOFF VOLUME =      1.51699 INCHES      =         .7120 ACRE-FEET
     PEAK DISCHARGE RATE =       20.01 CFS  AT    1.533 HOURS    BASIN AREA =    .0088 SQ. MI.
```

```
*S **ADD BASIN 115 & 116
ADD HYD             ID=6 HYD NO=124.2 ID=5 ID=23
PRINT HYD           ID=6 CODE=1

                                PARTIAL HYDROGRAPH   124.20


    RUNOFF VOLUME =     1.51700 INCHES      =       1.7718 ACRE-FEET
    PEAK DISCHARGE RATE =      47.44 CFS  AT   1.533 HOURS   BASIN AREA =    .0219 SQ. MI.


*S **COMPUTE BASIN 117
COMPUTE NM HYD      ID=7 HYD NO=125.00 AREA=0.0012 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.8900    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.2452    CFS   UNIT VOLUME =    .9896       B =   354.67      P60 = 1.8700
    AREA =      .000468 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD           ID=7   CODE=1

                                PARTIAL HYDROGRAPH   125.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0971 ACRE-FEET
    PEAK DISCHARGE RATE =       2.79 CFS  AT   1.500 HOURS   BASIN AREA =    .0012 SQ. MI.


*S **ADD BASIN 116 & 117
ADD HYD             ID=8 HYD NO=125.1 ID=7 ID=6
PRINT HYD           ID=8 CODE=1

                                PARTIAL HYDROGRAPH   125.10


    RUNOFF VOLUME =     1.51699 INCHES      =       1.8689 ACRE-FEET
    PEAK DISCHARGE RATE =      50.13 CFS  AT   1.500 HOURS   BASIN AREA =    .0231 SQ. MI.


FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 11:07:33
```

APPENDIX B

ARENAL ROAD – 10-YEAR DRY LANE ANALYSIS
(PREVIOUSLY APPROVED CID NO. 5803.91)

SUBJECT: **Arenal Road Dry Lane Analysis**

CRITERIA: 10-Year 6-Hour Storm (DPM Calculations)
Arenal & Unser Intersection Land Treatment: 90% D; 10% C
Arenal Road Land Treatment: 77% D; 23% C

SOLUTION: Storm drains will be placed along the back of curb along Arenal from the intersection of Arenal and Unser to the Amole del Norte Channel under a city public project. The inlet spacing for both north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 25 feet (see attached Exhibit C). Inlet spacing will provide for one dry lane under this original road cross section.

Calculate dry lane catch basin requirements for Arenal

pt ① Unser Pass Thru = 1.9 cfs
Sapphire Pass Thru = 0 cfs
Intersection of Arenal / Unser A = .74 AC
Land Treatment: 10% C; 90% D

$Q_{10-6} = 1.99(.07) + 2.89(.66) = 2.04$ cfs

Unser ST 21+80 to ST 20+00 A = .58 AC
Land Treatment: 20% B; 20% C; 60% D

$Q_{10-6} = 1.99(.116) + 2.89(.348) + .76(.116)$

$Q = 1.27$ cfs

Arenal ST 17 to ST 18+67 A = .96 AC
Land Treatment: 77% D; 23% C

$Q_{10-6} = 1.99(.\cdot\cdot) + 2.89(.\cdot\cdot) = 1.19$

$Q_{\text{total}} = 1.19 + 1.27 + 2.04 = 4.48/2 = 2.24$
$\frac{}{\text{½ street}}$

$Q_{\text{½ street}} = 2.24 + 1.9 = 4.1$ cfs

For one dry lane
$S_{avg} = 1.43\%$

$Q_{max\ ½} = \frac{1.486}{.017}(.125)^{.67}(.0143)^{.5}(1.58) = 4.1$ cfs

Per DPM plate D-5 one inlet $Q_{in} = 3.0$ cfs
at pt 1 place 2 grates; Type A inlet
PASS Through = 0 cfs

pt ② From 18+67 to ST 27+00
A = 2.98
$Q_{10-6} = 2.89(2.3) + 1.99(.69) = 7.67/2 = 3.84 < 4.10$ ✓ ok
Use a Single Grate Type A inlet
PASS Through Flow = 3.84 - 3.00 = .84 cfs

@ pt. 3 ST 27+00 to existing inlets
(L = 700')

A = 2.51 Ac

Q_{10-6} = 2.89(1.93) + 1.49(.62) = 6.50/2 = 3.25 cfs

Qinlet = 3.25 + .84 = 4.09 cfs < 4.10 ok

Pass Through Flow = 4.09 - 3.00 = 1.09 cfs

Check Flow Depth for 100 year - 6 hr Storm

pt (1)

Sapphire pass through = 10 cfs
Unser pass through = 3.5 cfs
Intersection of Arenal/Unser (per Sheet 1) = 3.09 cfs/2 = 1.55 cfs
Unser ST 21+80 to ST 20+00 (per Sheet 1) = 2.09 cfs/2 = 1.05 cfs
Arenal ST 17 to ST 18+67 (per Sheet 1) = 1.85 cfs/2 = .93 cfs
Assume no flows pass through from North Unser

Q_{TOTAL} = 10 + 3.5 + 1.55 + 1.05 + .93 = 17.03 cfs

S_{avg} = 1.43%

@ d = .67 $Q = 1.486/.017 (.0143)^{.5} (.33)^{.67} (8.98) = 42.17$ cfs

@ d = .33 $Q = 1.486/.017 (.0143)^{.5} (.126)^{.67} (1.59) = 4.15$ cfs

∴ @ Q = 17.03 d = .45 feet

From Plate 22.3 D-5 (DPM) a single grate type A inlet $Q_{in} \approx 5.5$ cfs

Pass Through 17.03 - 2(5.5) = 6.03 cfs

pt (2) From ST 18+67 to ST 27+00

$Q_{100} = 4.37(2.3) + 2.87(.69) = 12.03/2 = 6.02$ cfs

Q_{inlet} = 6.02 + 6.03 = 12.05 cfs

∴ @ Q = 12.05 cfs d = .40 feet

per dpm plate 22.3 D-5 Q_{in} = 4.6 cfs

Pass Through 12.05 - 4.6 = 7.45 cfs

pt (3) From ST 27+00 to existing inlets

$Q_{100} = 2.87(.62) + 1.93(4.37) = 10.24/2 = 5.1$ cfs

Q_{inlet} = 5.1 + 7.45 = 12.55 cfs

@ Q = 12.55 d = .91 ft (1)

per dpm plate 22.3 D-5 Q_{in} = 4.7 cfs (change existing to Type A inlets)

Q pass through = 12.55 - 4.7 = 7.85 cfs.

APPENDIX C

ARENAL/UNSER DRAINAGE MANAGEMENT PLAN (M10/D10)

-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Summary Excerpt from Arenal/Unser Drainage Management Plan

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and referencing datas gathered from BEC report make up the last part of the appendix in this section.

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7	.990	116.33
11	1.0	13.0	1.000	117.49
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 407
(SIDE FLOW 1650' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2103
DIFFERENCE IN ELEVATION ACROSS BASIN	=	32
SLOPE OF BASIN, (FT/FT)	=	0.0152
AREA OF BASIN, (ACRES)	=	32.26
AREA OF BASIN, (SQ MI)	=	0.05040
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	19.2
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.5
PEAK RUNOFF (CFS) (from AHYMO run)	=	104.81
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.14
3	.2	2.3	.100	10.48
4	.3	3.9	.190	19.91
5	.4	5.2	.310	32.49
6	.5	6.5	.470	49.26
7	.6	7.8	.660	69.17
8	.7	9.1	.820	85.94
9	.8	10.4	.930	97.46
10	.9	11.7	.990	103.75
11	1.0	13.0	1.000	104.81
12	1.1	14.3	.990	103.75
13	1.2	15.6	.930	97.46
14	1.3	16.9	.860	90.13
15	1.4	18.2	.780	81.74
16	1.5	19.5	.680	71.26
17	1.6	20.8	.560	58.69
18	1.7	22.1	.460	48.21
19	1.8	23.4	.390	40.87
20	1.9	24.7	.330	34.58
21	2.0	26.0	.280	29.34
22	2.2	28.6	.207	21.69
23	2.4	31.2	.147	15.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	11.21
25	2.8	36.4	.077	8.07
26	3.0	39.0	.055	5.76
27	3.2	41.6	.040	4.19
28	3.4	44.2	.029	3.04
29	3.6	46.8	.021	2.20
30	3.8	49.4	.015	1.57
31	4.0	52.0	.011	1.15
32	4.5	58.5	.005	0.52
33	5.0	65.0	.000	.00

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	404.10	7& 8	9	.15480	272.95	9.204	1.11492	1.533	2.755	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	880.30	32.016	1.08855	1.533	2.494	
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	190.04	32.016	1.08855	1.966	.538	AC-FT= 18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL										
ROUTE	405.30	11	12	.55146	190.02	32.016	1.08855	2.000	.538	
*S**********										
*S **CALC-BASIN 406										
COMPUTE NM HYD	406.00	-	13	.05743	117.49	3.920	1.27968	1.500	3.196	PER IMP= 42.00
*S **CALC BASIN 407										
COMPUTE NM HYD	407.00	-	14	.05040	104.81	3.491	1.29860	1.500	3.249	PER IMP= 42.00
*S **CALC BASIN 408										
COMPUTE NM HYD	408.00	-	15	.15736	327.60	10.899	1.29860	1.500	3.253	PER IMP= 42.00
*S**********										
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD										
COMPUTE NM HYD	500.00	-	16	.02491	51.80	1.725	1.29860	1.500	3.250	PER IMP= 42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING										
*S **DIRECTLY TO THE AMOLE CHANNEL										
COMPUTE NM HYD	501.00	-	17	.03663	76.18	2.537	1.29860	1.500	3.249	PER IMP= 42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE										
*S **LONGFORD SD										
ADD HYD	501.10	16&17	18	.06154	127.98	4.262	1.29859	1.500	3.250	
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD										
COMPUTE NM HYD	502.00	-	19	.05788	121.79	4.080	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN										
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.										
COMPUTE NM HYD	503.00	-	20	.03752	78.03	2.599	1.29860	1.500	3.249	PER IMP= 42.00
*S**********										
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @										
*S **A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	504.00	-	1	.03667	77.16	2.585	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.										
COMPUTE NM HYD	505.00	-	2	.02618	43.10	1.407	1.00753	1.500	2.572	PER IMP= 29.00
FINISH										

3.54	11.77	203.89	4.00
3.75	12.24	207.31	4.00
4.00	12.57	207.31	4.00

COMPUTE TRAVEL TIME ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

ROUTE ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0
PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA 405.30

RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

*S**********
*S**********
*S **CALC BASIN 406
COMPUTE NM HYD ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
PER A=4 PER B=27 PER C=27 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .121550HR TP = .133300HR K/TP RATIO = .911856 SHAPE CONSTANT, N = 3.983611
UNIT PEAK = 86.799 CFS UNIT VOLUME = 1.000 B = 347.33 P60 = 1.8700
AREA = .033312 SQ MI IA = .44052 INCHES INF = 1.08345 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=13 CODE=1

HYDROGRAPH FROM AREA 406.00

RUNOFF VOLUME = 1.27968 INCHES = 3.9198 ACRE-FEET
PEAK DISCHARGE RATE = 117.49 CFS AT 1.500 HOURS BASIN AREA = .0574 SQ. MI.

*S **CALC BASIN 407
COMPUTE NM HYD ID=14 HYD NO=407.00 AREA=0.0504 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 83.572 CFS UNIT VOLUME = .9992 B = 526.28 P60 = 1.8700
AREA = .021168 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 77.777 CFS UNIT VOLUME = 1.000 B = 354.67 P60 = 1.8700
AREA = .029232 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=14 CODE=1

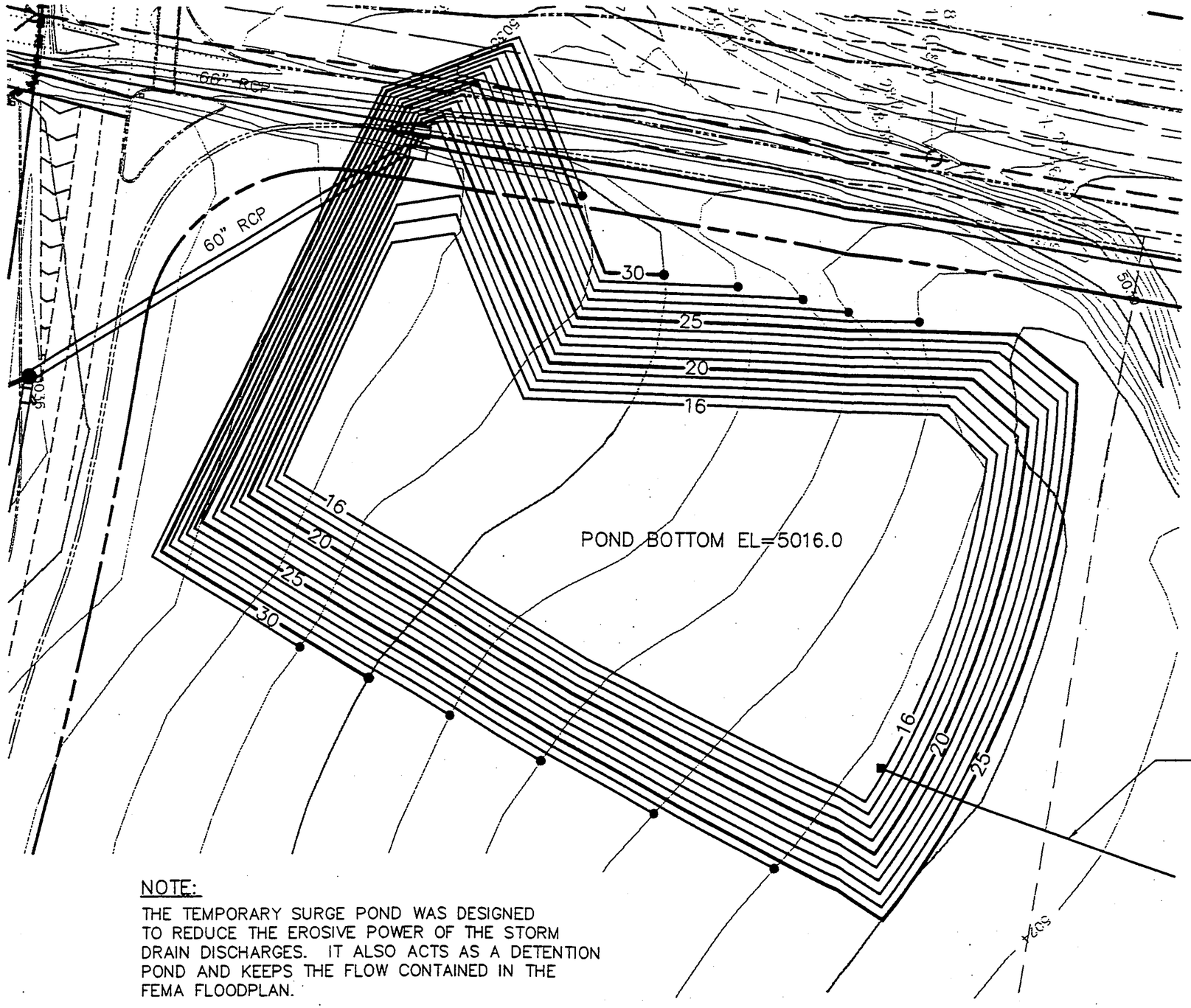
HYDROGRAPH FROM AREA 407.00

RUNOFF VOLUME = 1.29860 INCHES = 3.4906 ACRE-FEET
PEAK DISCHARGE RATE = 104.81 CFS AT 1.500 HOURS BASIN AREA = .0504 SQ. MI.

*S **CALC BASIN 408
COMPUTE NM HYD ID=15 HYD NO=408.00 AREA=0.15736 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .074258HR TP = .133300HR K/TP RATIO = .557073 SHAPE CONSTANT, N = 6.910316
UNIT PEAK = 256.33 CFS UNIT VOLUME = .9995 B = 516.99 P60 = 1.8700
AREA = .066091 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .115909HR TP = .133300HR K/TP RATIO = .869534 SHAPE CONSTANT, N = 4.085829
UNIT PEAK = 247.07 CFS UNIT VOLUME = 1.000 B = 360.85 P60 = 1.8700
AREA = .091269 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330



SCALE: 1"=60'

TEMPORARY SURGE POND

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

NOTE:

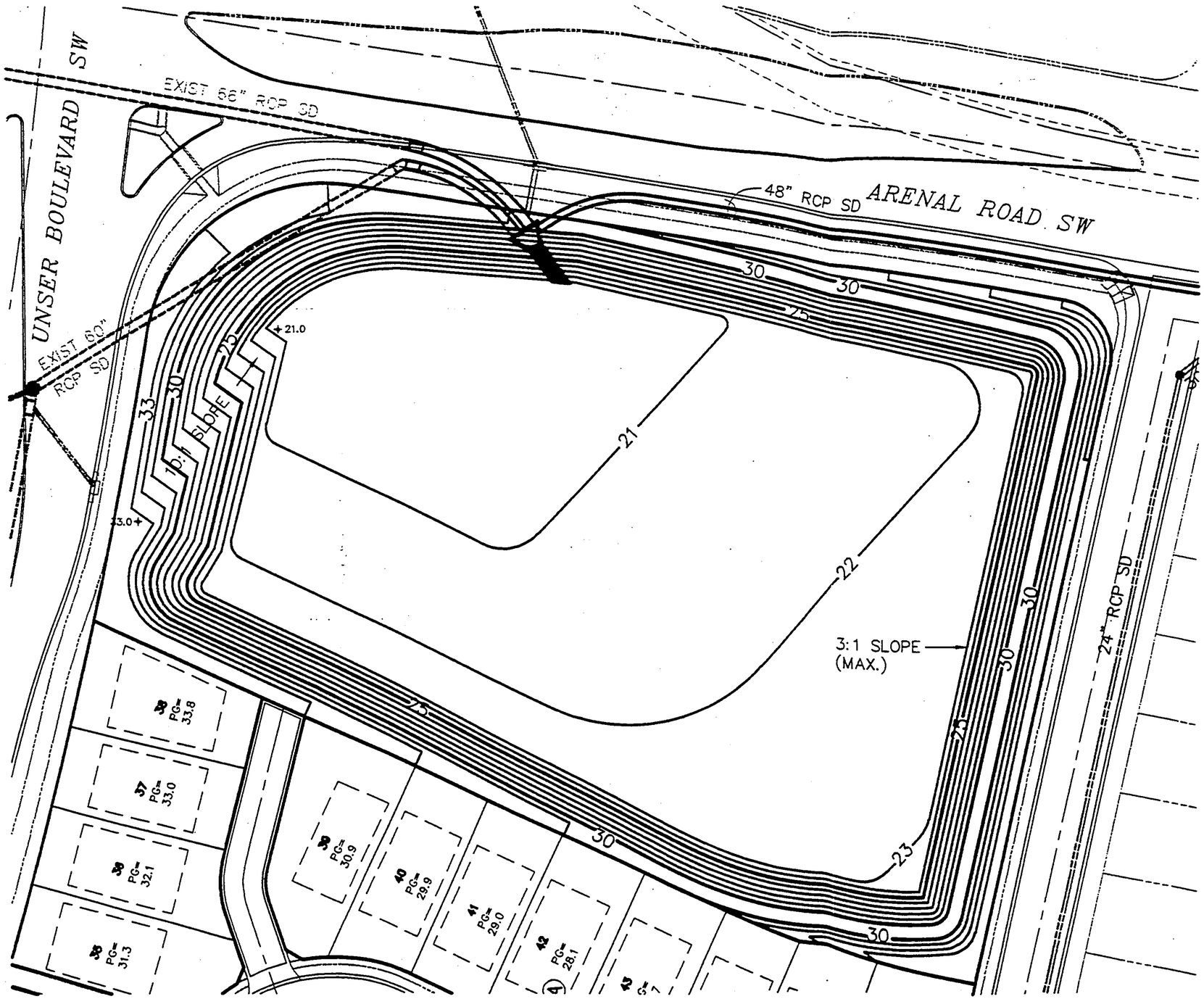
THE TEMPORARY SURGE POND WAS DESIGNED TO REDUCE THE EROSIVE POWER OF THE STORM DRAIN DISCHARGES. IT ALSO ACTS AS A DETENTION POND AND KEEPS THE FLOW CONTAINED IN THE FEMA FLOODPLAN.

FIGURE 1

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

903EXH13.DWGdlv

5/1/97



PERMANENT RETENTION POND

SCALE: 1"=60'

ELEV	H (ft)	AREA (ac)	STORAGE (af)
21	0	0.54	0
22	1	1.57	1.06
23	2	2.48	3.08
24	3	2.58	5.61
25	4	2.68	8.24
26	5	2.79	10.98
27	6	2.89	13.82
28	7	3.00	16.76
29	8	3.11	19.81
30	9	3.21	22.98

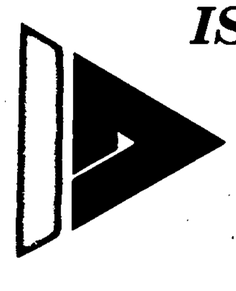
PEAK DISCHARGE TO POND = Q_{100} = 798cfs
= Q_{10} = 435 cfs

PEAK DISCHARGE = 183.8 cfs
MAX WATER SURFACE ELEV = 28.21 ft
POND STORAGE = 17.4 ac ft
MAX POND STORAGE = 22.98 ac ft

FIGURE 2

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque New Mexico

921EXH10.DWGems 09/16/97



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 18, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Revised Master Drainage Report for Desert Springs Subdivision Units Three Through Five, (M10/D8) Submitted for Preliminary Plat Approval and Rough Grading Approval, Engineer's Stamp Dated 3/2/99.

Dear Mr. Arfman:

Prior to Preliminary Plat and Rough Grading approval for above referenced subdivision, the following comments must be addressed:

1. The grading plan encompasses all of Units 3, 4 and 5. Is mass grading proposed for the entire site at one time? A grading and drainage certification is required for release of the SIA for each Unit.

2. Please label the Units on the grading plan. Also show all proposed walls on the grading plans. Label and show dimensions for all drainage easements on the plan.

3. Please provide a layout for the proposed storm drain system, labeling the pipe sizes, and catch basins. Show the locations of the driveways on the grading plan where inlets are proposed to demonstrate that there are no conflicts.

4. Provide a cross-section for the emergency overflow at AP5. Are the proposed pad elevations on Lots 2 and 3 higher than the EGL? A minimum 20' wide drainage easement is required for the public storm drain.

5. It appears that off-site flows from Desert Flower Unit 2 enter your site via Blue Avena Avenue. Provide existing, or proposed, street grades to the south of your subdivision to show how this street drains.

6. With respect to the proposed temporary retention facility for Unit 4, show the limits of the contributing basin on the basin map. Provide the volume calculation for the proposed pond.

7. The AHYMO assumes that the street flows split at several locations. The assumption that 25%, or 10%, of the flows turn at an intersection cannot be accepted without justification. Provide all details, sections and calculations for each intersection where this occurs to demonstrate how these flows will split. Revise the AHYMO run of necessary.

8. The street capacity calculations were not provided. Also, please examine the potential for hydraulic jumps at the T intersections on Desert Breeze Drive. Show the locations of the driveways on the east side at these intersections.

9. The plan shows that Lots in the northeast corner of the subdivision are being platted over an existing storm drain. Please clearly show the lot lines and easements in this area. Also show the proposed catch basin in Arenal.

10. It appears that grading is proposed within the Amole Del Norte Channel right-of-way. Permission from City Storm Drain Maintenance must be obtained prior to grading in this area.

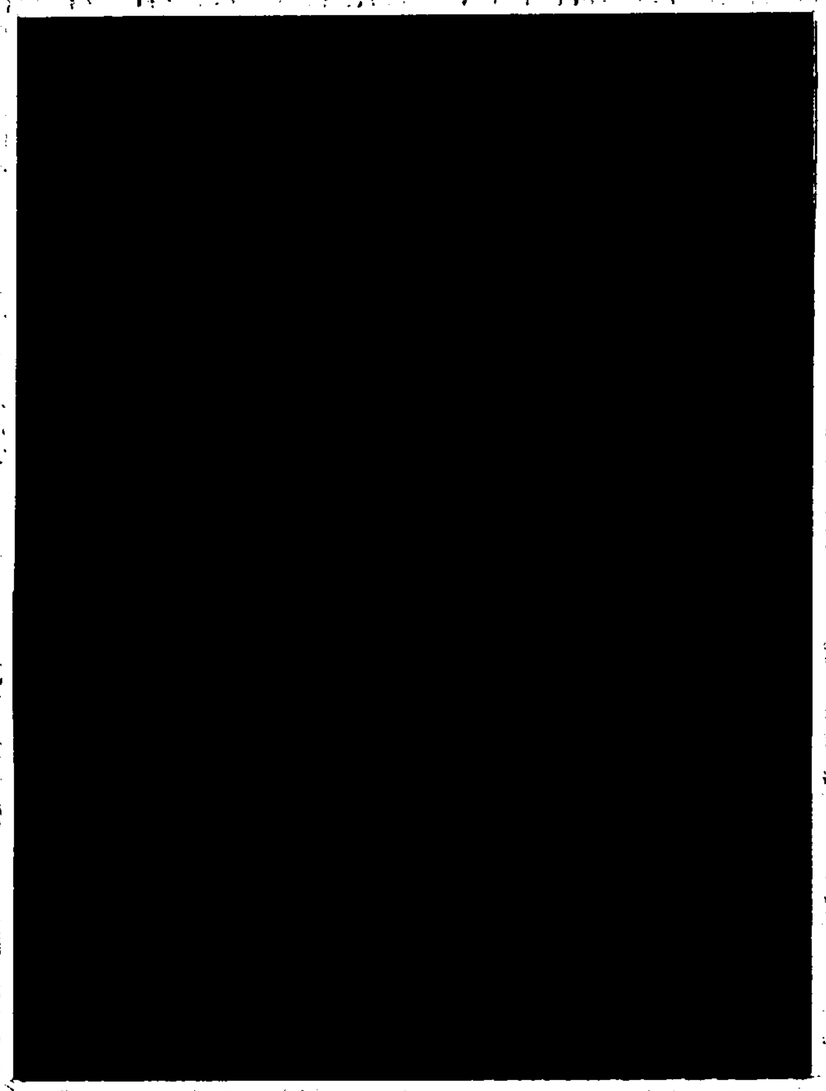
11. Show the approximate Unit boundaries on the FEMA map provided in the report. The existing FEMA floodplain is located on both Units 4 and 5. The Letter of Map Revision must be obtained from FEMA prior to release of the SIA for these Units. This requirement must be on the Infrastructure List.

A complete resubmittal is required. If you have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo K. Johnson, P.E., Curb Inc.
File



REVISED MASTER DRAINAGE REPORT

FOR

DESERT SPRINGS SUBDIVISION
UNITS THREE THROUGH FIVE

A 314 LOT (THREE PHASE) SINGLE FAMILY RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO

FEBRUARY 1999

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
(505) 268-8828

FRED C. ARFMAN STATE OF 7322 NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

03-02-99

Fred C. Arfman, PE **Date**

DRAINAGE INFORMATION SHEET

PROJECT FILE: Desert Springs Units 3-5 ZONE ATLAS/DRNG. FILE#: M-10/D8

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: Tracts A & B Desert Springs Subdivision
Tract C-1 Desert Springs Unit 2

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs
ADDRESS: 128 Monroe Street NE PHONE: 268-8828
CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb Inc CONTACT: BO Johnson
ADDRESS: 6301 Indian School Rd Ste 680 PHONE: 881-9190
CITY, STATE: ABQ NM ZIP CODE: 87110

ARCHITECT: NA CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich
ADDRESS: _____ PHONE: 884-1990
CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: NA CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
X GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERTIFICATION
_____ OTHER

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

RECEIVED
FEB 19 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL
✓ PRELIMINARY PLAT APPROVAL
_____ S.DEV. PLAN FOR SUB'D. APPROVAL
_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_____ CERTIFICATE OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
✓ OTHER (SPECIFY) Rough Grading Approval

DATE SUBMITTED: 2/19/99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

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Vicinity Map
I. Project Information
II. Site Characteristics

Conclusion & Recommendations

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Table 2 - Flow Depth at Key Locations

Table 3 - Flow Depth at Sump Inlets and Rundowns

Table 4 - Inlets Capacity at Key Locations

FlowMaster Worksheets for Rundown Capacity

HydraFlow Worksheets for Storm Drain Calculations

Pond Sizing Calculations

Appendices

Appendix A: Onsite AHYMO Summary & Detailed Output 100-Year Storm

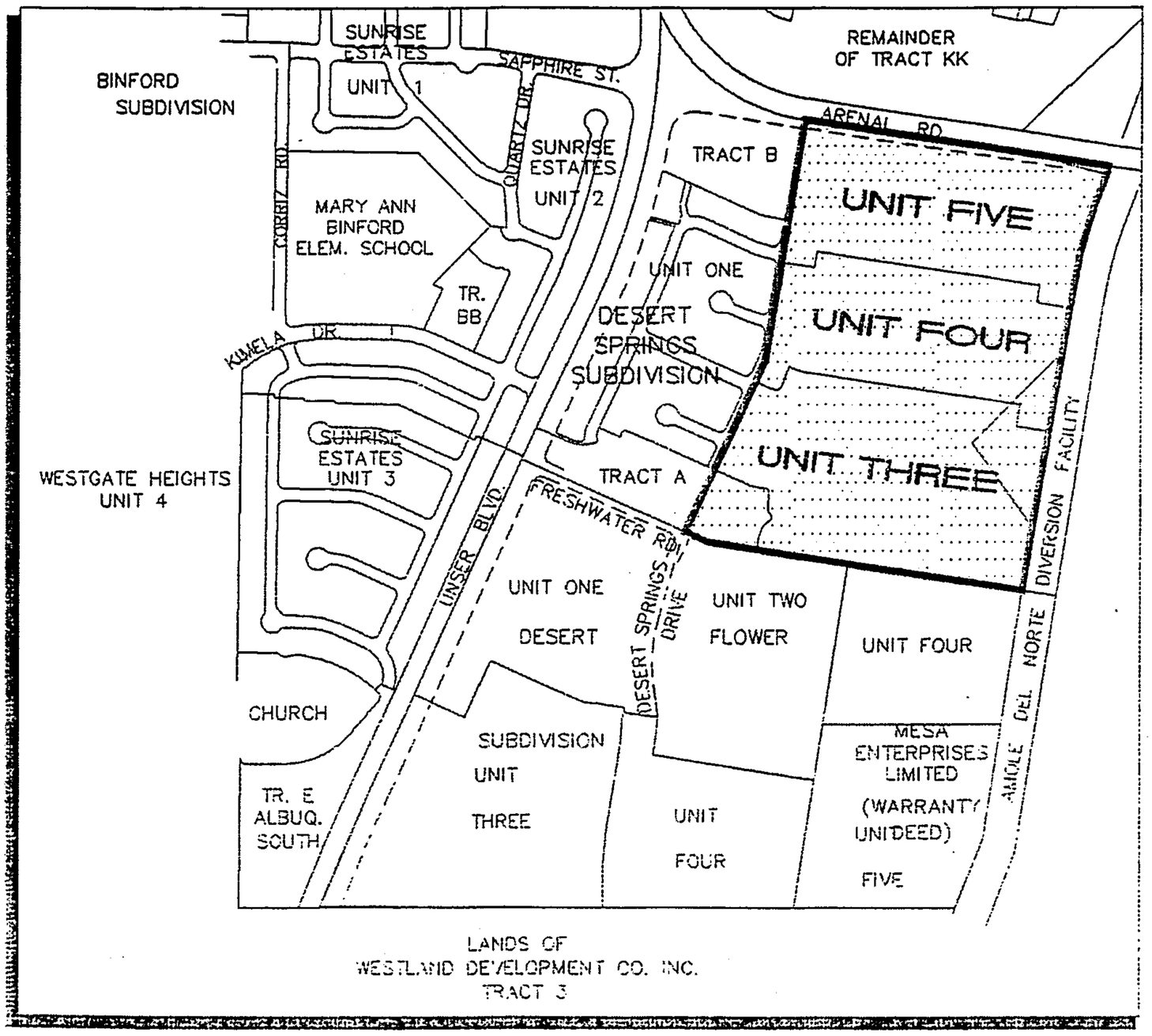
Appendix B: Arenal Road - 10-Year Dry Lane Analysis

Appendix C: Arenal/Unser Drainage Management Plan (M10/D10)
-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Pockets

Units Three-Five Drainage & Grading Plan

Drainage Management Plan Basin Map



1"=750'±

(M-10)

VICINITY MAP

INTRODUCTION

This report shall replace the portion of the Master Drainage Report for Desert Springs Subdivision, Units One-Five (M10/D8) which pertains to Units Three-Five. Units One and Two are presently under construction and follow the approved Master Drainage Report (M10/D8) and the Drainage Report for Unit One (M10/D8). The remaining land underlying the proposed Units Three-Five has been purchased by Curb, Inc. for development and therefore a new layout for the remaining units is being pursued.

The three phases will consist of 133, 90, and 91 single-family lots, respectively. All flows from this area are allowed free discharge to the Amole del Norte Diversion Channel as determined by the Arenal/Unser Drainage Management Plan approved by the City on September 18, 1997 (see Appendix C).

This study shall analyze the area wide drainage characteristics as they impact the site and offer solutions and recommendations to solve the hydrological and hydraulic conditions projected to occur in the event of the 100-year storm.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: Desert Springs Subdivision, Tracts A and B
(February 20, 1997, Book 97C, Page 55)
Desert Springs Subdivision, Unit Two, Tract C-1
(February 24, 1999, Book 99C, Page 34)

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, PE
(505) 268-8828

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: RLT

NUMBER OF PROPOSED LOTS:
Unit Three: 133
Unit Four: 90
Unit Five: 91

TOTAL AREA: 48.9316 Ac.
2,131,461 SF

II. SITE CHARACTERISTICS

FLOOD HAZARD: Portions of Units Four and Five lie within a Zone AO (depth 2) floodplain as determined by Panels No. 350002-0336 and 35001C0337 of the September 20, 1996 Edition of the F.E.M.A. Maps (see attached). Flows within this zone will be captured by the regional detention facility located in the southeast corner of the Unser Blvd. and Arenal Road intersection. The regional detention facility was previously approved in the Arenal/Unser Drainage Management Plan (M10/D10). Final grading of the regional detention facility and a Letter of Map Revision (LOMR) will be required for final plat approval of Unit Four. A request for the LOMR was submitted to the City of Albuquerque in February 1999.

AND TO FEMA



FEMA PANELS 336 & 337

Scale 1":500'

ISAACSON & ARFMAN, P.A.

4

SUBJECT _____ JOB NO. ____

BY _____ DATE _____ SHEET NO. ____ OF ____

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an average slope toward the east of 2 percent. It is adjacent to Arenal Road to the north and Desert Springs Subdivision Units One and Two to the west. The Amole del Norte Diversion Channel abuts the east boundary, and Desert Flower Subdivision the south. Storm water generated from the site flows east into the side of the Amole del Norte Diversion Channel. A temporary retention pond located along the eastern boundary of Unit One captures the developed flows from Units One and Two of the Desert Springs Subdivision. Offsite storm waters generated from Unit Two of Sunrise Estates (to the west) are released into Unser Blvd. and are then conveyed by a combination of street flow and storm drain to the regional detention facility. Flows are slowly released from the pond through a storm drain system along Arenal Road, which deposits the discharge into the Amole del Norte Diversion Channel. Runoff south of the proposed development flows southeast into the Amole del Norte Diversion Channel and does not affect the site.

PROPOSED CONDITIONS:

Unit Three: The third phase of Desert Springs will consist of 133 lots. It is located to the east of Unit Two, south of the future Unit Four, west of the Amole del Norte Diversion Channel, and north of the Desert Flower Subdivision (Units Two and Six). A storm drain system and an overland channel will be required to deposit the subdivision runoff into the Amole del Norte Diversion Channel. The temporary pond from Units One and Two will be removed with the developments of this Unit. The flows from the previous units will be allowed to enter Unit Three and continue to the Amole del Norte Diversion Channel via street flow.

The storm waters developed within the unit will be carried by street flow to the south boundary of the property. At AP5 two sump inlets (see Table 4) will pick up the runoff and convey it via 36" diameter storm drain to the Amole del Norte Diversion Channel. The emergency overflow for the sumps will be via a pedestrian access. between Lots 2 and 3, Block F.

A concrete rundown will be located at the eastern terminus of Rainwater Road (AP8). This rundown will accept the developed flows from Units One and Four as well as the runoff developed in Basins 105 and 107 of Unit Three. All of this discharge will be conveyed to the rundown via street flow (see Tables 2 & 3).

Unit Four: The fourth unit of Desert Springs Subdivision will consists of 90 lots and will not require the construction of a storm drain. This unit is bordered by Desert Springs Unit One to the west, the Amole del Norte Diversion Channel to the east, the future Desert Springs Unit Five to the north, and Unit Three to the south.

Basins 111 and 112 will contribute to Analysis Point 10. These flows will be conveyed via a concrete rundown to the Amole del Norte Diversion Channel (see FlowMaster sheet for sizing). The runoff generated within Basin 109 will be conveyed via street flow to AP8 (see Table 2 for street flow depths). There the flows will be collected by the existing rundown and conveyed to the Amole del Norte Diversion Channel. A small temporary retention facility will be located at the northeast property boundary to capture the developed flows from Basins 108 and 110.

Prior to final plat signature the regional detention facility will be regraded to its ultimate configuration and a LOMR will be granted.

Unit Five: The fifth phase of Desert Springs Subdivision is bordered by Unit One to the west, the Amole del Norte Diversion Channel to the east, Arenal Road to the north, and Desert Springs Unit Four to the south. The temporary retention facility constructed with Unit Four will be removed and flows will be allowed to enter the unit via the street continuation. Runoff generated within contributing Basins (106, 110, 113, 114, 116, and 117) (see Basin Map) will be conveyed via street flow to point AP13. Flows will then be conveyed by a concrete rundown to the Amole del Norte Diversion Channel (see attached FlowMaster sheet). The maximum street flow depth will equal 0.58' feet just prior to entering the rundown (refer to Table 3).

Arenal Road: The portion of Arenal Road adjacent to this phase will be constructed prior to construction of this unit. The road has an easterly surface drainage pattern. 10-year street flows shall be collected by new catch basins installed with this unit and be conveyed to the Amole del Norte Diversion Channel by the existing storm drain along Arenal Road. The existing storm drain was designed to accept these flows and was approved with CIP No. 5803.91 (see Appendix B).

CONCLUSIONS & RECOMMENDATIONS

Desert Springs Units Three through Five are proposed to be developed consecutively. Onsite and offsite runoffs have been addressed as to how the subdivision will have a cohesive drainage solution. The Summary Tables provide a more in depth study of the street capacities, drainage basins, and inlet capacities. Attached FlowMaster calculation sheets show rundown sizing calculations. Also, temporary pond sizing calculations have been included. Please refer to the Appendices for further supplemental information.

The recommendations for Units Three through Five construction are presented below:

- A temporary detention pond will be required at the downstream end of Unit Four where the runoffs will be discharged into future units. This pond will be covered by a City of Albuquerque Agreement and Covenant.
- The existing retention pond will be removed and flows will be able to continue east via the street continuations.
- Berms or swale points shall be graded around the developing unit so that offsite runoff will not affect this unit.
- Lots running parallel to Arenal Road shall be graded to be close in elevation to future street grades.
- All required storm drain from Unit Three to the Amole del Norte Diversion Channel shall be included as part of the Unit Three required infrastructure.

- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Three construction.
- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Four construction.
- A permanent overland outfall to the Amole del Norte Diversion Channel will be required with Unit Five construction.
- Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).
- A Letter of Map Revision will be required prior to final plat approval of Unit Four. AND 5
- Final grading of the regional detention facility will be required with Unit Four construction.
- Any required catch basins along the portion of Arenal Road fronting Unit Five shall be included as part of the required infrastructure.

SUMMARY TABLES

TABLE 1
ONSITE BASIN SUMMARY

Basin ID	Area (Sq. Mi.)	Contributing Basins	Cumulative Area (Sq. Mi.)	% A	% B	% C	% D	Basin Q (cfs)	Cumulative Q (cfs)
1A	0.0114	1A	0.0114	0	19.5	19.5	61	26.40	26.40
1B	0.0005	1A	0.0119	0	0	0	100	1.41	27.80
2A	0.0063	2A	0.0063	0	19.5	19.5	61	14.59	14.59
2B	0.00350	2B	0.0035	0	19.5	19.5	61	8.12	8.12
2C	0.0076	2B	0.0111	0	19.5	19.5	61	17.60	25.72
2D	0.0006	2C*	0.0117	0	19.5	19.5	61	1.40	27.12
2E	0.0002	2A	0.0064	0	19.5	19.5	61	.48	15.07
100	0.0042	2D*	0.0159	0	19.5	19.5	61	9.74	36.12
101	0.00036	100*	0.00434	0	19.5	19.5	61	0.85	9.85
102A	0.0026	102A	0.0026	33	19	19	29	4.29	4.29
102	0.0027	102A, 101*	0.00964	0	19.5	19.5	61	6.26	20.06
103	0.0049	102*	0.01454	0	19.5	19.5	61	11.36	29.93
104	0.005	101*	0.0169	0	19.5	19.5	61	11.59	26:13
105	0.0086	2E*	0.01510	0	19.5	19.5	61	19.92	31.26
106	0.0026	104*, 103*	0.03406	0	19.5	19.5	61	6.03	72.79
107	0.0023	105*, 109*	0.0247	0	19.5	19.5	61	5.34	52.52
108	0.001	108	0.001	0	19.5	19.5	61	2.33	2.33
109	0.0072	108	0.0073	0	19.5	19.5	61	16.68	16.76
110	0.0012	108	0.0021	0	19.5	19.5	61	2.79	4.89
111	0.0072	110*	0.00741	0	19.5	19.5	61	16.68	16.89
112	0.0021	111*	0.00951	0	19.5	19.5	61	4.88	21.76
113	0.00319	110*	0.00319	0	19.5	19.5	61	3.02	7.43
114	0.0072	113	0.00784	0	19.5	19.5	61	16.68	17.50
115	0.0016	114*, 116*	0.02159	0	19.5	19.5	61	3.72	46.59
116	0.00960	113	0.01215	0	19.5	19.5	61	22.23	25.80
117	0.0012	115*	0.02279	0	19.5	19.5	61	2.79	49.33

*Cumulative Q of basin

TABLE 2
FLOW DEPTHS @ KEY LOCATIONS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
AP12	32	STD	0.008	25.8	0.50	0.65
AP11	28	STD	0.01	17.5	0.43	0.57
AP9	28	STD	0.0143	16.89	0.40	0.57
AP7	28	STD	0.0151	16.76	0.40	0.57
AP6	32	STD	0.0158	31.26	0.48	0.74
AP4	28	STD	0.012	37.07	0.53	0.81
AP3	28	STD	0.01	35.54	0.51	0.72
AP2	28	MTBL	0.01	7.2	0.33	0.41
AP1	28	STD	0.012	36.12	0.55	0.80

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ

TABLE 3
FLOW DEPTHS @ SUMP INLETS OR RUNDOWNS

Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)
AP13	24	STD	0.0148	49.33	0.58
AP5	32	STD	NA	60.74	0.65
AP8	32	STD	0.01	52.52	0.61
AP10	32	STD	0.01	21.76	0.46

* ALL Q'S LISTED ARE FOR FULL STREET FLOWS
* ALL STREET DEPTHS WERE CALCULATED USING MANNING'S EQ

TABLE 4 INLETS CAPACITY @ KEY LOCATIONS								
INLET NO	**INLET TYPE**	**LOCATION**	**STREET WIDTH & CURB TYPE**	**% SLOPE**	**Q 100 (CFS)**	**Dn (FT)**	**Q intercepted (CFS)**	**Q by-pass (cfs)**
CB1 (2 inlets)	A	AP3	28' FF, STD	1.01%	35.54	0.51	6 ea = 12 cfs	23.54
CB3 (2 sumps)	A, Mod Throat	AP5	32' FF, STD	NA	60.74	0.65	60.74 **	0

*Q per inlet are calculated using DPM Plate 22.3, D-5
** See attached sump calculation sheet

ANALYZE SUMP INLETS

DATA:

Q = 60.74
H = 0.65
GRATE OPEN AREA:

GROSS AREA FOR ONE GRATE = 2' - 1 1/2" * 2' - 11 3/8 " =	6.28 SF
LESS BEARING BARS = (0.5")(1/12) * 2.95 * 13 =	1.60 SF
LESS CROSS BARS = (0.5")(1/12) * 2.13 * 7 =	0.62 SF
PLUS THE INTERSECTION COUNTED 2X = (0.5")(1/12) * (0.5")(1/12) *77 =	0.13 SF
TOTAL =	**4.2**

CALCULATIONS:

FLOW THROUGH THE GRATE = CA(2gH)^.5 = 9.103192
FLOW THROUGH DOUBLE THROAT = CA(2gH)^.5 = 29.04352

TOTAL CAPACITY= 38.15 EA

RECOMMENDATION:

USE TWO "MOD" TYPE A INLETS WITH SINGLE GRATE & DOUBLE THROAT

EMERGENCY OVERFLOW @ AP5
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Emergency Overflow @ AP5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.017	
Channel Slope	0.021	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	6.00	ft
Discharge	72.74	cfs

Results		
Depth	0.88	ft
Flow Area	7.61	ft²
Wetted Perimeter	11.57	ft
Top Width	11.28	ft
Critical Depth	1.32	ft
Critical Slope	0.004467	ft/ft
Velocity	9.56	ft/s
Velocity Head	1.42	ft
Specific Energy	2.30	ft
Froude Number	2.05	
Flow is supercritical.		

RUNDOWN @ AP8
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap8
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.036	ft/ft
Bottom Width	12.00	ft
Discharge	52.52	cfs

Results		
Depth	0.39	ft
Flow Area	4.73	ft^2
Wetted Perimeter	12.79	ft
Top Width	12.00	ft
Critical Depth	0.84	ft
Critical Slope	0.003107	ft/ft
Velocity	11.11	ft/s
Velocity Head	1.92	ft
Specific Energy	2.31	ft
Froude Number	3.12	
Flow is supercritical.		

RUNDOWN @ AP10
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap10
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.040	ft/ft
Bottom Width	12.00	ft
Discharge	21.76	cfs

Results		
Depth	0.22	ft
Flow Area	2.66	ft²
Wetted Perimeter	12.44	ft
Top Width	12.00	ft
Critical Depth	0.47	ft
Critical Slope	0.003507	ft/ft
Velocity	8.18	ft/s
Velocity Head	1.04	ft
Specific Energy	1.26	ft
Froude Number	3.06	
Flow is supercritical.		

RUNDOWN @ AP13
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsmdr.fm2
Worksheet	Rundown @ ap13
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.080	ft/ft
Bottom Width	15.00	ft
Discharge	49.33	cfs

Results		
Depth	0.26	ft
Flow Area	3.86	ft^2
Wetted Perimeter	15.51	ft
Top Width	15.00	ft
Critical Depth	0.70	ft
Critical Slope	0.003129	ft/ft
Velocity	12.79	ft/s
Velocity Head	2.54	ft
Specific Energy	2.80	ft
Froude Number	4.44	
Flow is supercritical.		

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	1	72.74	36 c	175.0	4996.00	4998.01	1.149	4999.50*	5001.58*	0.00	End
2	2	30.37	24 c	12.0	4999.01	4999.19	1.550	5001.58*	5001.80*	0.00	1
3	3	30.37	24 c	18.0	4999.01	4999.33	1.790	5001.58*	5001.91*	0.00	1
4	4	12.00	18 c	55.0	4999.51	5000.72	2.201	5001.58*	5002.30*	0.00	1
5	5	6.00	18 c	28.0	5000.95	5001.31	1.285	5002.45	5002.46	0.26	4

Project File: dsmdr.stm	I-D-F File: SAMPLE.IDF	Total No. Lines: 5	Run Date: 02-16-1999

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	72.74	4996.00	4999.50	3.00	7.07	10.29	1.65	5001.15	1.190	175	4998.01	5001.58	3.00	7.07	10.29	1.65	5003.23	1.190	1.190	2.082	0.00	0.00
2	24	30.37	4999.01	5001.58	2.00	3.14	9.67	1.45	5003.04	1.804	12.0	4999.19	5001.80	2.00	3.14	9.67	1.45	5003.25	1.803	1.803	0.216	0.00	0.00
3	24	30.37	4999.01	5001.58	2.00	3.14	9.67	1.45	5003.04	1.804	18.0	4999.33	5001.91	2.00	3.14	9.67	1.45	5003.36	1.803	1.803	0.325	0.00	0.00
4	18	12.00	4999.51	5001.58	1.50	1.77	6.79	0.72	5002.30	1.306	55.0	5000.72	5002.30	1.50	1.77	6.79	0.72	5003.02	1.306	1.306	0.718	0.00	0.00
5	18	6.00	5000.95	5002.45	1.50*	1.77	3.40	0.18	5002.63	0.327	28.0	5001.31	5002.46	1.15	1.46	4.11	0.26	5002.73	0.370	0.349	0.098	1.00	0.26

Project File: dsmdr.stm | I-D-F File: SAMPLE.IDF | Total number of lines: 5 | Run Date: 02-16-1999

NOTES: Initial tailwater elevation = 4999.5 (ft) , * Crown depth assumed., ** Critical depth assumed.

TEMPORARY RETENTION POND
(BETWEEN UNITS 4 & 5)

Total Contributing Ac = 1.34 — which basin?

$$P_{AVG} = \frac{(0.2613)(0.67) + (0.2613)(0.99) + (0.8174)(1.97)}{1.34} = 1.53''$$

V_{360} = (1.53 * 1.34) / 12 = 0.17 Ac·Ft

$$V_{10day} = 0.17 + \frac{0.8174(3.67 - 2.20)}{12} = 0.27 \text{ Ac·Ft}$$

volume required

— what is provided.

ISAACSON & ARFMAN, P.A.

SUBJECT Temp Retention Pond JOB NO.___
BY MJC DATE 3/1/99 SHEET NO. 1 OF 1

APPENDIX A

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =02/12/1999
INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM2.DAT USER NO.= ISCARFNM.I01

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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR										
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)										
COMPUTE NM HYD	100.00	-	1	.01140	26.40	.922	1.51706	1.500	3.618	PER IMP= 61.00
*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN										
COMPUTE NM HYD	101.00	-	2	.00050	1.41	.052	1.96548	1.500	4.396	PER IMP= 100.00
ADD HYD	101.10	1& 2	3	.01190	27.80	.975	1.53585	1.500	3.651	
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING										
COMPUTE NM HYD	102.00	-	4	.00630	14.59	.510	1.51706	1.500	3.620	PER IMP= 61.00
*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)										
COMPUTE NM HYD	103.00	-	5	.00350	8.12	.283	1.51706	1.500	3.623	PER IMP= 61.00
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)										
COMPUTE NM HYD	104.00	-	6	.00760	17.60	.615	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASINS 2C & 2B										
ADD HYD	104.10	6& 5	7	.01110	25.72	.898	1.51701	1.500	3.620	
*S **BASIN 2D (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	105.00	-	8	.00060	1.40	.049	1.51706	1.500	3.659	PER IMP= 61.00
*S **ADD BASINS 2C.1 TO 2D										
ADD HYD	105.10	7& 8	9	.01170	27.12	.947	1.51699	1.500	3.622	
*S ** ROUTE BASIN 2C.1 THROUGH 100										
ROUTE	105.20	9	10	.01170	26.76	.947	1.51703	1.533	3.574	
*S **BASIN 100										
COMPUTE NM HYD	106.00	-	11	.00420	9.74	.340	1.51706	1.500	3.622	PER IMP= 61.00
*S **ADD BASIN 100 & 2C.2										
ADD HYD	106.10	10&11	12	.01590	36.12	1.286	1.51700	1.533	3.549	
*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104										
DIVIDE HYD	106.20	12	13	.01192	27.09	.965	1.51699	1.533	3.549	
	106.30	AND	14	.00398	9.03	.322	1.51700	1.533	3.549	
*S **BASIN 101										
COMPUTE NM HYD	107.00	-	15	.00036	.85	.029	1.51706	1.500	3.688	PER IMP= 61.00
*S **ADD BASIN 101 & 100										
ADD HYD	107.10	15&14	16	.00434	9.85	.351	1.51689	1.533	3.549	
*S **COMPUTE BASIN 102A (PARK)										
COMPUTE NM HYD	108.00	-	17	.00260	4.29	.140	1.00753	1.500	2.580	PER IMP= 29.00
*S ** ROUTE BASIN 102A THROUGH 102										
ROUTE	108.10	17	18	.00260	4.20	.140	1.00761	1.533	2.524	
*S **COMPUTE BASIN 102										
COMPUTE NM HYD	109.00	-	19	.00270	6.26	.218	1.51706	1.500	3.625	PER IMP= 61.00
*S **ADD BASIN 102A & 102										
ADD HYD	109.10	19&18	20	.00530	10.22	.358	1.26700	1.533	3.013	
*S **ADD BASIN 101 & 102										
ADD HYD	109.20	20&16	21	.00964	20.06	.709	1.37943	1.533	3.254	
*S ** ROUTE BASIN 102.2 THROUGH 103										
ROUTE	109.30	21	22	.00964	19.24	.709	1.37948	1.567	3.120	
*S **COMPUTE BASIN 103										
COMPUTE NM HYD	110.00	-	23	.00490	11.36	.396	1.51706	1.500	3.621	PER IMP= 61.00
*S **ADD BASIN 102.3 & 103										
ADD HYD	110.10	23&22	24	.01454	29.93	1.105	1.42582	1.533	3.217	
*S **COMPUTE BASIN 104										

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	111.00	-	25	.00500	11.59	.405	1.51706	1.500	3.621	PER IMP= 61.00
*S ** ROUTE BASIN 100 THRU 104										
ROUTE	111.10	13	26	.01192	26.13	.965	1.51703	1.567	3.424	
*S **ADD BASIN 100 & 104										
ADD HYD	111.20	25&26	27	.01692	37.07	1.369	1.51700	1.533	3.422	
*S **COMPUTE BASIN 106										
COMPUTE NM HYD	112.00	-	28	.00260	6.03	.210	1.51706	1.500	3.626	PER IMP= 61.00
*S **ADD BASIN 106 & 104										
ADD HYD	112.10	28&27	29	.01952	42.86	1.580	1.51699	1.533	3.430	
*S **ADD BASIN 106 & 103										
ADD HYD	112.20	29&24	30	.03406	72.79	2.685	1.47808	1.533	3.339	
*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)										
COMPUTE NM HYD	113.00	-	31	.00020	.48	.016	1.51706	1.500	3.748	PER IMP= 61.00
*S **ADD BASIN 2E & 2A										
ADD HYD	113.10	31& 4	32	.00650	15.07	.526	1.51698	1.500	3.624	
*S ** ROUTE BASIN 2A.1 THROUGH 105										
ROUTE	113.20	32	1	.00650	12.62	.526	1.51707	1.567	3.033	
*S **COMPUTE BASIN 105										
COMPUTE NM HYD	114.00	-	2	.00860	19.92	.696	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 105 & 2A.1										
ADD HYD	114.10	1& 2	3	.01510	31.26	1.222	1.51700	1.533	3.234	
*S **COMPUTE BASIN 108										
COMPUTE NM HYD	115.00	-	4	.00100	2.33	.081	1.51706	1.500	3.641	PER IMP= 61.00
*S **SPLIT FLOWS TO GO THROUGH BASIN 109 & 110										
DIVIDE HYD	115.10	4	5	.00090	2.10	.073	1.51676	1.500	3.641	
	115.20	AND	6	.00010	.23	.008	1.51676	1.500	3.641	
*S ** ROUTE BASIN 108 THROUGH 109										
ROUTE	115.30	6	7	.00010	.13	.008	1.52048	1.633	1.989	
*S **COMPUTE BASIN 109										
COMPUTE NM HYD	116.00	-	8	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 109 & 108										
ADD HYD	116.10	8& 7	9	.00730	16.76	.591	1.51697	1.500	3.588	
*S **COMPUTE BASIN 107										
COMPUTE NM HYD	117.00	-	10	.00230	5.34	.186	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 107 & 109										
ADD HYD	117.10	10& 9	11	.00960	22.10	.777	1.51696	1.500	3.597	
*S **ADD BASIN 107 & 105										
ADD HYD	117.20	11& 3	12	.02470	52.52	1.998	1.51699	1.533	3.322	
*S **COMPUTE BASIN 110										
COMPUTE NM HYD	118.00	-	13	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 110 & 108										
ADD HYD	118.10	13& 5	14	.00210	4.89	.170	1.51681	1.500	3.638	
*S **SPLIT FLOWS TO GO THROUGH BASIN 111 & 113										
DIVIDE HYD	118.20	14	15	.00189	4.40	.153	1.51681	1.500	3.638	
	118.30	AND	16	.00021	.49	.017	1.51681	1.500	3.638	
*S **COMPUTE BASIN 113										
COMPUTE NM HYD	119.00	-	17	.00130	3.02	.105	1.51706	1.500	3.636	PER IMP= 61.00
*S **ADD BASIN 110 & 113										
ADD HYD	119.10	17&15	18	.00319	7.43	.258	1.51681	1.500	3.637	
*S **SPLIT FLOWS TO GO THROUGH BASIN 116 & 114										
DIVIDE HYD	119.20	18	19	.00255	5.94	.206	1.51681	1.500	3.637	
	119.30	AND	20	.00064	1.49	.052	1.51681	1.500	3.637	
*S ** ROUTE BASIN 113 THROUGH 116										

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	119.40	19	21	.00255	4.55	.206	1.51713	1.567	2.788	
*S **COMPUTE BASIN 116										
COMPUTE NM HYD	120.00	-	22	.00960	22.23	.777	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 116 & 113										
ADD HYD	120.10	21&22	23	.01215	25.80	.983	1.51700	1.500	3.318	
*S ** ROUTE BASIN 110 THROUGH 111										
ROUTE	118.50	16	24	.00021	.32	.017	1.51842	1.600	2.412	
*S **COMPUTE BASIN 111										
COMPUTE NM HYD	121.00	-	25	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 111 & 110										
ADD HYD	121.10	25&24	26	.00741	16.89	.600	1.51698	1.500	3.561	
*S **COMPUTE BASIN 112										
COMPUTE NM HYD	122.00	-	27	.00210	4.88	.170	1.51706	1.500	3.627	PER IMP= 61.00
*S **ADD BASIN 111 & 112										
ADD HYD	122.10	26&27	28	.00951	21.76	.769	1.51696	1.500	3.576	
*S ** ROUTE BASIN 113 THROUGH 114										
ROUTE	119.50	20	29	.00064	1.09	.052	1.51736	1.600	2.678	
*S **COMPUTE BASIN 114										
COMPUTE NM HYD	123.00	-	30	.00720	16.68	.583	1.51706	1.500	3.619	PER IMP= 61.00
*S **ADD BASIN 114 & 113										
ADD HYD	123.10	30&29	1	.00784	17.50	.634	1.51698	1.500	3.489	
*S ** ROUTE BASIN 114 THROUGH 115										
ROUTE	123.30	1	3	.00784	17.39	.634	1.51704	1.533	3.467	
*S **COMPUTE BASIN 115										
COMPUTE NM HYD	124.00	-	4	.00160	3.72	.129	1.51706	1.500	3.631	PER IMP= 61.00
*S **ADD BASIN 114 & 115										
ADD HYD	124.10	3& 4	5	.00944	20.96	.764	1.51697	1.533	3.471	
*S **ADD BASIN 115 & 116										
ADD HYD	124.20	5&23	6	.02159	46.59	1.747	1.51699	1.533	3.372	
*S **COMPUTE BASIN 117										
COMPUTE NM HYD	125.00	-	7	.00120	2.79	.097	1.51706	1.500	3.637	PER IMP= 61.00
*S **ADD BASIN 116 & 117										
ADD HYD	125.10	7& 6	8	.02279	49.33	1.844	1.51698	1.500	3.382	
FINISH										

```
   AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
        RUN DATE (MON/DAY/YR) = 02/12/1999
        START TIME (HR:MIN:SEC) = 15:48:15     USER NO.= ISCARFNM.I01
        INPUT FILE = C:\AHYMO\DESERT~1\DSTSPGM2.DAT

**** DESERT SPRINGS MASTER DRAINAGE REPORT****
****         FEBRUARY 12, 1999           ****
****         DSTSPGM2.DAT           ****
START              RAINFALL BEGINS AT 0.0 HRS
RAINFALL           TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                   RAIN SIX=2.20 RAIN DAY=0 DT=0.03333HR

             COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
             DT =    .033330 HOURS       END TIME =     5.999400 HOURS
                .0000   .0016   .0033   .0050   .0067   .0085   .0103
                .0122   .0141   .0160   .0180   .0201   .0222   .0243
                .0266   .0289   .0312   .0337   .0362   .0388   .0415
                .0443   .0472   .0502   .0534   .0567   .0601   .0637
                .0675   .0715   .0758   .0809   .0865   .0924   .1050
                .1334   .1771   .2398   .3254   .4379   .5814   .7600
                .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
               1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
               1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
               1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
               1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
               2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
               2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
               2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
               2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
               2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
               2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
               2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
               2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
               2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
               2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
               2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
               2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
               2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
               2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
               2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S **BASIN 1A (34 LOTS THAT DRAIN TO SILVERBERRY RD THEN TO DESERT SPRINGS DR
*S ** & 13 LOTS THAT DRAIN TO DESERT SPRINGS CT THEN TO DESERT SPRINGS DR)
COMPUTE NM HYD     ID=1 HYD NO=100.00 AREA=0.0114 SQ MI
                   PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                   TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   27.455    CFS   UNIT VOLUME =    .9990       B =   526.28      P60 = 1.8700
    AREA =      .006954 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   11.829    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
    AREA =      .004446 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1   CODE=1

                                PARTIAL HYDROGRAPH   100.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .9224 ACRE-FEET
    PEAK DISCHARGE RATE =      26.40 CFS  AT   1.500 HOURS   BASIN AREA =   .0114 SQ. MI.


*S **BASIN 1B (FLOW FROM 1A PLUS DESERT SPRINGS STREET FLOWS BACK TO CATCH BASIN
COMPUTE NM HYD      ID=2 HYD NO=101.00 AREA=0.0005 SQ MI
                    PER A=0 PER B=0 PER C=0 PER D=100
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.9740    CFS   UNIT VOLUME =    .9933       B =   526.28      P60 = 1.8700
    AREA =      .000500 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2   CODE=5

                                PARTIAL HYDROGRAPH   101.00
```

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.333	.4	2.666	.0	4.000	.0	5.333	.0
.167	.0	1.500	1.4	2.833	.0	4.166	.0	5.499	.0
.333	.0	1.667	.7	3.000	.0	4.333	.0	5.666	.0
.500	.0	1.833	.5	3.166	.0	4.500	.0	5.833	.0
.667	.0	2.000	.3	3.333	.0	4.666	.0	5.999	.0
.833	.0	2.166	.2	3.500	.0	4.833	.0	6.166	.0
1.000	.0	2.333	.1	3.666	.0	4.999	.0	6.333	.0
1.167	.0	2.500	.0	3.833	.0	5.166	.0		

```
    RUNOFF VOLUME =     1.96548 INCHES     =        .0524 ACRE-FEET
    PEAK DISCHARGE RATE =       1.41 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


ADD HYD             ID=3 HYD NO=101.1 ID=1 ID=2
PRINT HYD           ID=3 CODE=1

                                PARTIAL HYDROGRAPH   101.10


    RUNOFF VOLUME =     1.53585 INCHES     =        .9747 ACRE-FEET
    PEAK DISCHARGE RATE =      27.80 CFS  AT   1.500 HOURS   BASIN AREA =   .0119 SQ. MI.
```

```
*S **BASIN 2A (28 LOTS THAT DRAIN TO SHADETREE & RAINWATER THEN TO DESERT SPRING
COMPUTE NM HYD       ID=4 HYD NO=102.00 AREA=0.0063 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   15.172    CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =      .003843 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   6.5373    CFS   UNIT VOLUME =    .9984       B =   354.67      P60 = 1.8700
    AREA =      .002457 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   102.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .5097 ACRE-FEET
    PEAK DISCHARGE RATE =      14.59 CFS  AT   1.500 HOURS   BASIN AREA =   .0063 SQ. MI.


*S **BASIN 2B (14 LOTS THAT DRAIN TO DESERT CANYON THEN TO DESERT SPRINGS)
COMPUTE NM HYD       ID=5 HYD NO=103.00 AREA=0.0035 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.4291    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
    AREA =      .002135 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   3.6318    CFS   UNIT VOLUME =    .9969       B =   354.67      P60 = 1.8700
    AREA =      .001365 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=5   CODE=1

                                PARTIAL HYDROGRAPH   103.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .2832 ACRE-FEET
    PEAK DISCHARGE RATE =      8.12 CFS  AT   1.500 HOURS   BASIN AREA =   .0035 SQ. MI.
```

```
*S **BASIN 2C (SHADETREE DR & BLUE AVENIDA AVE)
COMPUTE NM HYD       ID=6 HYD NO=104.00 AREA=0.0076 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.303    CFS  UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004636 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.8862    CFS   UNIT VOLUME =    .9988       B =   354.67      P60 = 1.8700
    AREA =      .002964 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=6   CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .6149 ACRE-FEET
    PEAK DISCHARGE RATE =      17.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0076 SQ. MI.


*S **ADD BASINS 2C & 2B
ADD HYD              ID=7 HYD NO=104.1 ID=6 ID=5
PRINT HYD            ID=7 CODE=1

                                PARTIAL HYDROGRAPH   104.10


    RUNOFF VOLUME =     1.51701 INCHES      =        .8981 ACRE-FEET
    PEAK DISCHARGE RATE =      25.72 CFS  AT   1.500 HOURS   BASIN AREA =   .0111 SQ. MI.


*S **BASIN 2D (DESERT SPRINGS DRIVE)
COMPUTE NM HYD       ID=8 HYD NO=105.00 AREA=0.0006 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.4450    CFS   UNIT VOLUME =    .9911       B =   526.28      P60 = 1.8700
    AREA =      .000366 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .62260    CFS   UNIT VOLUME =    .9795       B =   354.67      P60 = 1.8700
    AREA =      .000234 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=8   CODE=1
```

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = 1.51706 INCHES = .0485 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

```
*S **ADD BASINS 2C.1 TO 2D
ADD HYD             ID=9 HYD NO=105.1 ID=7 ID=8
PRINT HYD           ID=9 CODE=1
```

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 1.51699 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 27.12 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

```
*S ** ROUTE BASIN 2C.1 THROUGH 100
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

```
COMPUTE TRAVEL TIME  ID=10 REACH NO=1 NO VS=1 L=510 FT
                     SLP=0.012
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.1711
.071	.248	.33	.1078
.106	.557	.96	.0823
.141	.991	2.07	.0679
.176	1.548	3.75	.0585
.212	2.229	6.09	.0518
.247	3.034	9.19	.0468
.282	3.962	13.18	.0426
.317	4.946	19.05	.0368
.353	5.930	25.73	.0327
.388	6.914	33.18	.0295
.423	7.898	41.35	.0271
.458	8.883	50.21	.0251
.494	9.869	59.73	.0234
.529	10.854	69.89	.0220
.564	11.841	80.66	.0208
.599	12.827	92.01	.0197
.635	13.814	103.94	.0188
.670	14.801	116.42	.0180

ROUTE ID=10 HYD NO=105.2 INFLOW ID=9 DT=0.0 HR
PRINT HYD ID=10 CODE=1

PARTIAL HYDROGRAPH 105.20

RUNOFF VOLUME = 1.51703 INCHES = .9466 ACRE-FEET
PEAK DISCHARGE RATE = 26.76 CFS AT 1.533 HOURS BASIN AREA = .0117 SQ. MI.

*S **BASIN 100
COMPUTE NM HYD ID=11 HYD NO=106.00 AREA=0.0042 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.115 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002562 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 4.3582 CFS UNIT VOLUME = .9972 B = 354.67 P60 = 1.8700
AREA = .001638 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=11 CODE=1

PARTIAL HYDROGRAPH 106.00

```
    RUNOFF VOLUME =      1.51706 INCHES      =          .3398 ACRE-FEET
    PEAK DISCHARGE RATE =        9.74 CFS  AT    1.500 HOURS    BASIN AREA =    .0042 SQ. MI.


*S **ADD BASIN 100 & 2C.2
ADD HYD              ID=12 HYD NO=106.1 ID=10 ID=11
PRINT HYD            ID=12 CODE=1

                                PARTIAL HYDROGRAPH   106.10

    RUNOFF VOLUME =      1.51700 INCHES      =         1.2864 ACRE-FEET
    PEAK DISCHARGE RATE =       36.12 CFS  AT    1.533 HOURS    BASIN AREA =    .0159 SQ. MI.


*S **SPLIT FLOWS TO GO THROUGH BASIN 101 & 104
DIVIDE HYD           ID=12  PER=.75    ID=13 HYD=106.2
                                ID=14 HYD=106.3
PRINT HYD            ID=13  CODE=1

                                PARTIAL HYDROGRAPH   106.20

    RUNOFF VOLUME =      1.51699 INCHES      =          .9648 ACRE-FEET
    PEAK DISCHARGE RATE =       27.09 CFS  AT    1.533 HOURS    BASIN AREA =    .0119 SQ. MI.


PRINT HYD            ID=14  CODE=1

                                PARTIAL HYDROGRAPH   106.30

    RUNOFF VOLUME =      1.51700 INCHES      =          .3216 ACRE-FEET
    PEAK DISCHARGE RATE =        9.03 CFS  AT    1.533 HOURS    BASIN AREA =    .0040 SQ. MI.


*S **BASIN 101
COMPUTE NM HYD       ID=15 HYD NO=107.00 AREA=0.00036 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    .86699     CFS   UNIT VOLUME =     .9862       B =   526.28      P60 = 1.8700
    AREA =       .000220 SQ MI    IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    .37356     CFS   UNIT VOLUME =     .9637       B =   354.67      P60 = 1.8700
    AREA =       .000140 SQ MI    IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330
```

valley gutter
- how do flows split? 75% down 25% left

```
PRINT HYD            ID=15   CODE=1

                                  PARTIAL HYDROGRAPH   107.00

    RUNOFF VOLUME =      1.51706 INCHES      =         .0291 ACRE-FEET
    PEAK DISCHARGE RATE =         .85 CFS  AT   1.500 HOURS   BASIN AREA =   .0004 SQ. MI.


*S **ADD BASIN 101 & 100
ADD HYD              ID=16 HYD NO=107.1 ID=15 ID=14
PRINT HYD            ID=16 CODE=1

                                  PARTIAL HYDROGRAPH   107.10

    RUNOFF VOLUME =      1.51689 INCHES      =         .3507 ACRE-FEET
    PEAK DISCHARGE RATE =        9.85 CFS  AT   1.533 HOURS   BASIN AREA =   .0043 SQ. MI.


*S **COMPUTE BASIN 102A (PARK)
COMPUTE NM HYD       ID=17 HYD NO=108.00 AREA=0.0026 SQ MI
                     PER A=33  PER B=19  PER C=19  PER D=29
                     TP=-0.1333 HR   MASSRAIN=-1
    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.9768    CFS   UNIT VOLUME =     .9955       B =   526.28      P60 = 1.8700
    AREA =       .000754 SQ MI    IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =    .139463HR    TP =    .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   4.3075    CFS   UNIT VOLUME =     .9968       B =   311.05      P60 = 1.8700
    AREA =       .001846 SQ MI    IA =     .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=17   CODE=1

                                  PARTIAL HYDROGRAPH   108.00

    RUNOFF VOLUME =      1.00753 INCHES      =         .1397 ACRE-FEET
    PEAK DISCHARGE RATE =        4.29 CFS  AT   1.500 HOURS   BASIN AREA =   .0026 SQ. MI.


*S ** ROUTE BASIN 102A THROUGH 102
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.33 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.33 0.1  100.00   14   100.28
                     27.9 100.00 28.0 100.33
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.02	.02	.01	1.74
100.03	.06	.05	3.47
100.05	.14	.15	5.21
100.07	.24	.31	6.94
100.09	.38	.57	8.68
100.10	.54	.93	10.41
100.12	.74	1.40	12.15
100.14	.96	2.00	13.88
100.16	1.22	2.73	15.62
100.17	1.51	3.62	17.35
100.19	1.82	4.67	19.09
100.21	2.17	5.88	20.82
100.23	2.55	7.28	22.56
100.24	2.95	8.88	24.29
100.26	3.39	10.67	26.03
100.28	3.86	12.67	27.77
100.30	4.34	15.35	27.98
100.31	4.83	18.31	27.99
100.33	5.32	21.46	28.00

COMPUTE TRAVEL TIME ID=18 REACH NO=1 NO VS=1 L=280 FT
SLP=0.01

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.017	.015	.01	.1504
.035	.060	.05	.0947
.052	.136	.15	.0723
.069	.241	.31	.0597
.087	.377	.57	.0514
.104	.543	.93	.0455
.122	.739	1.40	.0411
.139	.965	2.00	.0376
.156	1.221	2.73	.0348
.174	1.507	3.62	.0324
.191	1.824	4.67	.0304
.208	2.171	5.88	.0287
.226	2.547	7.28	.0272
.243	2.954	8.88	.0259
.261	3.391	10.67	.0247
.278	3.859	12.67	.0237
.295	4.345	15.35	.0220
.313	4.831	18.31	.0205
.330	5.317	21.46	.0193

ROUTE ID=18 HYD NO=108.1 INFLOW ID=17 DT=0.0 HR
PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 108.10

RUNOFF VOLUME = 1.00761 INCHES = .1397 ACRE-FEET
PEAK DISCHARGE RATE = 4.20 CFS AT 1.533 HOURS BASIN AREA = .0026 SQ. MI.

```
*S **COMPUTE BASIN 102
COMPUTE NM HYD      ID=19 HYD NO=109.00 AREA=0.0027 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.5024 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.8700
AREA = .001647 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 2.8017 CFS UNIT VOLUME = .9958 B = 354.67 P60 = 1.8700
AREA = .001053 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD           ID=19   CODE=1
```

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.51706 INCHES = .2185 ACRE-FEET
PEAK DISCHARGE RATE = 6.26 CFS AT 1.500 HOURS BASIN AREA = .0027 SQ. MI.

```
*S **ADD BASIN 102A & 102
ADD HYD             ID=20 HYD NO=109.1 ID=19 ID=18
PRINT HYD           ID=20 CODE=1
```

PARTIAL HYDROGRAPH 109.10

RUNOFF VOLUME = 1.26700 INCHES = .3581 ACRE-FEET
PEAK DISCHARGE RATE = 10.22 CFS AT 1.533 HOURS BASIN AREA = .0053 SQ. MI.

```
*S **ADD BASIN 101 & 102
ADD HYD             ID=21 HYD NO=109.2 ID=20 ID=16
PRINT HYD           ID=21 CODE=1
```

PARTIAL HYDROGRAPH 109.20

RUNOFF VOLUME = 1.37943 INCHES = .7088 ACRE-FEET
PEAK DISCHARGE RATE = 20.06 CFS AT 1.533 HOURS BASIN AREA = .0096 SQ. MI.

*S ** ROUTE BASIN 102.2 THROUGH 103
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT

DIST	ELEV	DIST	ELEV	DIST	ELEV
0	100.67	0.1	100.00	14	100.28
27.9	100.00	28.0	100.67		

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=22 REACH NO=1 NO VS=1 L=600 FT
SLP=0.0101

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2013
.071	.248	.33	.1268
.106	.557	.96	.0968
.141	.991	2.07	.0799
.176	1.548	3.75	.0689
.212	2.229	6.09	.0610
.247	3.034	9.19	.0550
.282	3.962	13.18	.0501
.317	4.946	19.05	.0433
.353	5.930	25.73	.0384
.388	6.914	33.18	.0347
.423	7.898	41.35	.0318
.458	8.883	50.21	.0295
.494	9.869	59.73	.0275

```
                                .529      10.854       69.89       .0259
                                .564      11.841       80.66       .0245
                                .599      12.827       92.01       .0232
                                .635      13.814      103.94       .0222
                                .670      14.801      116.42       .0212
ROUTE                 ID=22 HYD NO=109.3 INFLOW ID=21 DT=0.0 HR
PRINT HYD             ID=22 CODE=1

                                  PARTIAL HYDROGRAPH   109.30


    RUNOFF VOLUME =     1.37948 INCHES     =        .7089 ACRE-FEET
    PEAK DISCHARGE RATE =      19.24 CFS  AT   1.567 HOURS   BASIN AREA =   .0096 SQ. MI.


*S **COMPUTE BASIN 103
COMPUTE NM HYD        ID=23 HYD NO=110.00 AREA=0.0049 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.801    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .002989 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.0846    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001911 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD             ID=23   CODE=1

                                  PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .3965 ACRE-FEET
    PEAK DISCHARGE RATE =      11.36 CFS  AT   1.500 HOURS   BASIN AREA =   .0049 SQ. MI.


*S **ADD BASIN 102.3 & 103
ADD HYD               ID=24 HYD NO=110.1 ID=23 ID=22
PRINT HYD             ID=24 CODE=1

                                  PARTIAL HYDROGRAPH   110.10


    RUNOFF VOLUME =     1.42582 INCHES     =       1.1053 ACRE-FEET
    PEAK DISCHARGE RATE =      29.93 CFS  AT   1.533 HOURS   BASIN AREA =   .0145 SQ. MI.
```

```
*S **COMPUTE BASIN 104
COMPUTE NM HYD       ID=25 HYD NO=111.00 AREA=0.0050 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   12.042    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .003050 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   5.1883    CFS   UNIT VOLUME =    .9978       B =   354.67      P60 = 1.8700
    AREA =      .001950 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=25   CODE=1

                                PARTIAL HYDROGRAPH   111.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .4045 ACRE-FEET
    PEAK DISCHARGE RATE =      11.59 CFS  AT   1.500 HOURS   BASIN AREA =    .0050 SQ. MI.


*S ** ROUTE BASIN 100 THRU 104
COMPUTE TRAVEL TIME  ID=26 REACH NO=1 NO VS=1 L=620 FT
SLP=0.012

          TRAVEL TIME TABLE
                          REACH=  1.0

          WATER        AVERAGE      FLOW         TRAVEL
          DEPTH        AREA         RATE         TIME
          FEET         SQ.FT.       CFS          HRS
             .035          .062          .05        .2081
             .071          .248          .33        .1311
             .106          .557          .96        .1000
             .141          .991         2.07        .0826
             .176         1.548         3.75        .0712
             .212         2.229         6.09        .0630
             .247         3.034         9.19        .0569
             .282         3.962        13.18        .0518
             .317         4.946        19.05        .0447
             .353         5.930        25.73        .0397
             .388         6.914        33.18        .0359
             .423         7.898        41.35        .0329
             .458         8.883        50.21        .0305
             .494         9.869        59.73        .0285
             .529        10.854        69.89        .0267
             .564        11.841        80.66        .0253
             .599        12.827        92.01        .0240
             .635        13.814       103.94        .0229
             .670        14.801       116.42        .0219
```

```
ROUTE                ID=26 HYD NO=111.1 INFLOW ID=13 DT=0.0 HR
PRINT HYD            ID=26 CODE=1

                                PARTIAL HYDROGRAPH   111.10

    RUNOFF VOLUME =     1.51703 INCHES      =        .9648 ACRE-FEET
    PEAK DISCHARGE RATE =      26.13 CFS  AT   1.567 HOURS   BASIN AREA =    .0119 SQ. MI.


*S **ADD BASIN 100 & 104
ADD HYD              ID=27 HYD NO=111.2 ID=25 ID=26
PRINT HYD            ID=27 CODE=1

                                PARTIAL HYDROGRAPH   111.20

    RUNOFF VOLUME =     1.51700 INCHES      =       1.3693 ACRE-FEET
    PEAK DISCHARGE RATE =      37.07 CFS  AT   1.533 HOURS   BASIN AREA =    .0169 SQ. MI.


*S **COMPUTE BASIN 106
COMPUTE NM HYD       ID=28 HYD NO=112.00 AREA=0.0026 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   6.2616    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
    AREA =      .001586 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.6979    CFS   UNIT VOLUME =    .9953       B =   354.67      P60 = 1.8700
    AREA =      .001014 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=28   CODE=1

                                PARTIAL HYDROGRAPH   112.00

    RUNOFF VOLUME =     1.51706 INCHES      =        .2104 ACRE-FEET
    PEAK DISCHARGE RATE =       6.03 CFS  AT   1.500 HOURS   BASIN AREA =    .0026 SQ. MI.


*S **ADD BASIN 106 & 104
ADD HYD              ID=29 HYD NO=112.1 ID=28 ID=27
PRINT HYD            ID=29 CODE=1

                                PARTIAL HYDROGRAPH   112.10
```

```
    RUNOFF VOLUME =     1.51699 INCHES      =       1.5797 ACRE-FEET
    PEAK DISCHARGE RATE =      42.86 CFS  AT   1.533 HOURS   BASIN AREA =    .0195 SQ. MI.


*S **ADD BASIN 106 & 103
ADD HYD             ID=30 HYD NO=112.2 ID=29 ID=24
PRINT HYD           ID=30 CODE=1

                                PARTIAL HYDROGRAPH   112.20


    RUNOFF VOLUME =     1.47808 INCHES      =       2.6850 ACRE-FEET
    PEAK DISCHARGE RATE =      72.79 CFS  AT   1.533 HOURS   BASIN AREA =    .0341 SQ. MI.


*S **COMPUTE BASIN 2E (DESERT SPRINGS DRIVE)
COMPUTE NM HYD      ID=31 HYD NO=113.00 AREA=0.0002 SQ MI
                    PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                    TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .48166    CFS   UNIT VOLUME =    .9751       B =   526.28      P60 = 1.8700
    AREA =      .000122 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   .20753    CFS   UNIT VOLUME =    .9360       B =   354.67      P60 = 1.8700
    AREA =      .000078 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=31   CODE=1

                                PARTIAL HYDROGRAPH   113.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0162 ACRE-FEET
    PEAK DISCHARGE RATE =        .48 CFS  AT   1.500 HOURS   BASIN AREA =    .0002 SQ. MI.


*S **ADD BASIN 2E & 2A
ADD HYD             ID=32 HYD NO=113.1 ID=31 ID=4
PRINT HYD           ID=32 CODE=1

                                PARTIAL HYDROGRAPH   113.10


    RUNOFF VOLUME =     1.51698 INCHES      =        .5259 ACRE-FEET
    PEAK DISCHARGE RATE =      15.07 CFS  AT   1.500 HOURS   BASIN AREA =    .0065 SQ. MI.
```

*S ** ROUTE BASIN 2A.1 THROUGH 105
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1010 FT
SLP=0.0158

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3389
.071	.248	.33	.2135
.106	.558	.96	.1629
.141	.992	2.07	.1345
.176	1.549	3.75	.1159
.212	2.231	6.10	.1026
.247	3.037	9.20	.0926
.282	3.966	13.13	.0847
.317	5.020	17.98	.0783
.353	6.144	25.01	.0689
.388	7.269	33.05	.0617
.423	8.395	41.95	.0561
.458	9.521	51.67	.0517
.494	10.647	62.16	.0481

```
                                .529       11.774        73.40        .0450
                                .564       12.901        85.36        .0424
                                .599       14.029        98.01        .0402
                                .635       15.157       111.33        .0382
                                .670       16.285       125.31        .0365
ROUTE                 ID=1 HYD NO=113.2 INFLOW ID=32 DT=0.0 HR
PRINT HYD             ID=1 CODE=1

                                  PARTIAL HYDROGRAPH   113.20


    RUNOFF VOLUME =     1.51707 INCHES      =         .5259 ACRE-FEET
    PEAK DISCHARGE RATE =      12.62 CFS  AT   1.567 HOURS   BASIN AREA =    .0065 SQ. MI.


*S **COMPUTE BASIN 105
COMPUTE NM HYD        ID=2 HYD NO=114.00 AREA=0.0086 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   20.711    CFS   UNIT VOLUME =     .9988       B =   526.28      P60 = 1.8700
    AREA =       .005246 SQ MI    IA =     .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    8.9239    CFS   UNIT VOLUME =     .9989       B =   354.67      P60 = 1.8700
    AREA =       .003354 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD             ID=2   CODE=1

                                  PARTIAL HYDROGRAPH   114.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .6958 ACRE-FEET
    PEAK DISCHARGE RATE =      19.92 CFS  AT   1.500 HOURS   BASIN AREA =    .0086 SQ. MI.


*S **ADD BASIN 105 & 2A.1
ADD HYD               ID=3 HYD NO=114.1 ID=1 ID=2
PRINT HYD             ID=3 CODE=1

                                  PARTIAL HYDROGRAPH   114.10


    RUNOFF VOLUME =     1.51700 INCHES      =        1.2217 ACRE-FEET
    PEAK DISCHARGE RATE =      31.26 CFS  AT   1.533 HOURS   BASIN AREA =    .0151 SQ. MI.
```

```
*S **COMPUTE BASIN 108
COMPUTE NM HYD       ID=4 HYD NO=115.00 AREA=0.0010 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.4083    CFS   UNIT VOLUME =    .9949       B =   526.28      P60 = 1.8700
    AREA =      .000610 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.0377    CFS   UNIT VOLUME =    .9874       B =   354.67      P60 = 1.8700
    AREA =      .000390 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=4   CODE=1

                                PARTIAL HYDROGRAPH   115.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0809 ACRE-FEET
    PEAK DISCHARGE RATE =       2.33 CFS  AT   1.500 HOURS   BASIN AREA =   .0010 SQ. MI.


*S **SPLIT FLOWS TO GO THROUGH BASIN 109 & 110
DIVIDE HYD           ID=4  PER=-90    ID=5 HYD=115.1
                                      ID=6 HYD=115.2
PRINT HYD            ID=5  CODE=1

                                PARTIAL HYDROGRAPH   115.10

    RUNOFF VOLUME =     1.51676 INCHES      =        .0728 ACRE-FEET
    PEAK DISCHARGE RATE =       2.10 CFS  AT   1.500 HOURS   BASIN AREA =   .0009 SQ. MI.


PRINT HYD            ID=6  CODE=1

                                PARTIAL HYDROGRAPH   115.20

    RUNOFF VOLUME =     1.51676 INCHES      =        .0081 ACRE-FEET
    PEAK DISCHARGE RATE =        .23 CFS  AT   1.500 HOURS   BASIN AREA =   .0001 SQ. MI.
```

Split flows @ intersection

*S ** ROUTE BASIN 108 THROUGH 109
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 14 100.28
27.9 100.00 28.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=7 REACH NO=1 NO VS=1 L=820 FT
SLP=0.0151

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2752
.071	.248	.33	.1733
.106	.557	.96	.1323
.141	.991	2.07	.1092
.176	1.548	3.75	.0941
.212	2.229	6.09	.0833
.247	3.034	9.19	.0752
.282	3.962	13.18	.0685
.317	4.946	19.05	.0592
.353	5.930	25.73	.0525
.388	6.914	33.18	.0475
.423	7.898	41.35	.0435
.458	8.883	50.21	.0403
.494	9.869	59.73	.0376

```
                                .529      10.854       69.89       .0354
                                .564      11.841       80.66       .0334
                                .599      12.827       92.01       .0318
                                .635      13.814      103.94       .0303
                                .670      14.801      116.42       .0290
ROUTE                 ID=7 HYD NO=115.3 INFLOW ID=6 DT=0.0 HR
PRINT HYD             ID=7 CODE=1

                                  PARTIAL HYDROGRAPH   115.30


    RUNOFF VOLUME =     1.52048 INCHES     =        .0081 ACRE-FEET
    PEAK DISCHARGE RATE =        .13 CFS  AT   1.633 HOURS   BASIN AREA =   .0001 SQ. MI.


*S **COMPUTE BASIN 109
COMPUTE NM HYD        ID=8 HYD NO=116.00 AREA=0.0072 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD             ID=8   CODE=1

                                  PARTIAL HYDROGRAPH   116.00


    RUNOFF VOLUME =     1.51706 INCHES     =        .5825 ACRE-FEET
    PEAK DISCHARGE RATE =       16.68 CFS  AT   1.500 HOURS   BASIN AREA =   .0072 SQ. MI.


*S **ADD BASIN 109 & 108
ADD HYD               ID=9 HYD NO=116.1 ID=8 ID=7
PRINT HYD             ID=9 CODE=1

                                  PARTIAL HYDROGRAPH   116.10


    RUNOFF VOLUME =     1.51697 INCHES     =        .5906 ACRE-FEET
    PEAK DISCHARGE RATE =       16.76 CFS  AT   1.500 HOURS   BASIN AREA =   .0073 SQ. MI.
```

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*S **COMPUTE BASIN 107
COMPUTE NM HYD       ID=10 HYD NO=117.00 AREA=0.0023 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.5391    CFS   UNIT VOLUME =    .9973       B =   526.28      P60 = 1.8700
    AREA =      .001403 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   2.3866    CFS   UNIT VOLUME =    .9948       B =   354.67      P60 = 1.8700
    AREA =      .000897 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=10   CODE=1

                                PARTIAL HYDROGRAPH   117.00


    RUNOFF VOLUME =     1.51706 INCHES     =         .1861 ACRE-FEET
    PEAK DISCHARGE RATE =       5.34 CFS  AT   1.500 HOURS   BASIN AREA =    .0023 SQ. MI.


*S **ADD BASIN 107 & 109
ADD HYD              ID=11 HYD NO=117.1 ID=10 ID=9
PRINT HYD            ID=11 CODE=1

                                PARTIAL HYDROGRAPH   117.10


    RUNOFF VOLUME =     1.51696 INCHES     =         .7767 ACRE-FEET
    PEAK DISCHARGE RATE =      22.10 CFS  AT   1.500 HOURS   BASIN AREA =    .0096 SQ. MI.


*S **ADD BASIN 107 & 105
ADD HYD              ID=12 HYD NO=117.2 ID=11 ID=3
PRINT HYD            ID=12 CODE=1

                                PARTIAL HYDROGRAPH   117.20


    RUNOFF VOLUME =     1.51699 INCHES     =        1.9984 ACRE-FEET
    PEAK DISCHARGE RATE =      52.52 CFS  AT   1.533 HOURS   BASIN AREA =    .0247 SQ. MI.


*S **COMPUTE BASIN 110
COMPUTE NM HYD       ID=13 HYD NO=118.00 AREA=0.0012 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

```
    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.8900    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.2452    CFS   UNIT VOLUME =    .9896       B =   354.67      P60 = 1.8700
    AREA =      .000468 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=13   CODE=1

                                PARTIAL HYDROGRAPH   118.00


    RUNOFF VOLUME =     1.51706 INCHES      =        .0971 ACRE-FEET
    PEAK DISCHARGE RATE =       2.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.


*S **ADD BASIN 110 & 108
ADD HYD             ID=14 HYD NO=118.1 ID=13 ID=5
PRINT HYD           ID=14 CODE=1

                                PARTIAL HYDROGRAPH   118.10

    RUNOFF VOLUME =     1.51681 INCHES      =        .1699 ACRE-FEET
    PEAK DISCHARGE RATE =       4.89 CFS  AT   1.500 HOURS   BASIN AREA =   .0021 SQ. MI.


*S **SPLIT FLOWS TO GO THROUGH BASIN 111 & 113
DIVIDE HYD          ID=14  PER=-90    ID=15 HYD=118.2
                                      ID=16 HYD=118.3
PRINT HYD           ID=15  CODE=1

                                PARTIAL HYDROGRAPH   118.20

    RUNOFF VOLUME =     1.51681 INCHES      =        .1529 ACRE-FEET
    PEAK DISCHARGE RATE =       4.40 CFS  AT   1.500 HOURS   BASIN AREA =   .0019 SQ. MI.


PRINT HYD           ID=16  CODE=1

                                PARTIAL HYDROGRAPH   118.30

    RUNOFF VOLUME =     1.51681 INCHES      =        .0170 ACRE-FEET
    PEAK DISCHARGE RATE =        .49 CFS  AT   1.500 HOURS   BASIN AREA =   .0002 SQ. MI.
```

```
*S **COMPUTE BASIN 113
COMPUTE NM HYD       ID=17 HYD NO=119.00 AREA=0.0013 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   3.1308    CFS   UNIT VOLUME =     .9955       B =   526.28      P60 = 1.8700
    AREA =       .000793 SQ MI    IA =     .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.3490    CFS   UNIT VOLUME =     .9906       B =   354.67      P60 = 1.8700
    AREA =       .000507 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=17   CODE=1

                                PARTIAL HYDROGRAPH   119.00


    RUNOFF VOLUME =     1.51706 INCHES      =         .1052 ACRE-FEET
    PEAK DISCHARGE RATE =       3.02 CFS  AT   1.500 HOURS   BASIN AREA =    .0013 SQ. MI.


*S **ADD BASIN 110 & 113
ADD HYD              ID=18 HYD NO=119.1 ID=17 ID=15
PRINT HYD            ID=18 CODE=1

                                PARTIAL HYDROGRAPH   119.10

    RUNOFF VOLUME =     1.51681 INCHES      =         .2581 ACRE-FEET
    PEAK DISCHARGE RATE =       7.43 CFS  AT   1.500 HOURS   BASIN AREA =    .0032 SQ. MI.


*S **SPLIT FLOWS TO GO THROUGH BASIN 116 & 114
DIVIDE HYD           ID=18  PER=-80    ID=19 HYD=119.2
                                       ID=20 HYD=119.3
PRINT HYD            ID=19  CODE=1

                                PARTIAL HYDROGRAPH   119.20


    RUNOFF VOLUME =     1.51681 INCHES      =         .2064 ACRE-FEET
    PEAK DISCHARGE RATE =       5.94 CFS  AT   1.500 HOURS   BASIN AREA =    .0026 SQ. MI.


PRINT HYD            ID=20  CODE=1

                                PARTIAL HYDROGRAPH   119.30
```

RUNOFF VOLUME = 1.51681 INCHES = .0516 ACRE-FEET
PEAK DISCHARGE RATE = 1.49 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

*S ** ROUTE BASIN 113 THROUGH 116
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 16 100.32
31.9 100.00 32.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

COMPUTE TRAVEL TIME ID=21 REACH NO=1 NO VS=1 L=1040 FT
SLP=0.008

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.3490
.071	.248	.33	.2198
.106	.558	.96	.1678
.141	.992	2.07	.1385
.176	1.549	3.75	.1194
.212	2.231	6.10	.1057
.247	3.037	9.20	.0954
.282	3.966	13.13	.0872
.317	5.020	17.98	.0807

```
                                .353        6.144        25.01        .0710
                                .388        7.269        33.05        .0635
                                .423        8.395        41.95        .0578
                                .458        9.521        51.67        .0532
                                .494       10.647        62.16        .0495
                                .529       11.774        73.40        .0463
                                .564       12.901        85.36        .0437
                                .599       14.029        98.01        .0413
                                .635       15.157       111.33        .0393
                                .670       16.285       125.31        .0375
ROUTE                 ID=21 HYD NO=119.4 INFLOW ID=19 DT=0.0 HR
PRINT HYD             ID=21 CODE=1

                                PARTIAL HYDROGRAPH   119.40

    RUNOFF VOLUME =      1.51713 INCHES      =         .2065 ACRE-FEET
    PEAK DISCHARGE RATE =        4.55 CFS  AT    1.567 HOURS    BASIN AREA =    .0026 SQ. MI.


*S **COMPUTE BASIN 116
COMPUTE NM HYD        ID=22 HYD NO=120.00 AREA=0.0096 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    23.120     CFS    UNIT VOLUME =     .9988        B =   526.28       P60 = 1.8700
    AREA =        .005856 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    9.9616     CFS    UNIT VOLUME =     .9991        B =   354.67       P60 = 1.8700
    AREA =        .003744 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD             ID=22   CODE=1

                                PARTIAL HYDROGRAPH   120.00

    RUNOFF VOLUME =      1.51706 INCHES      =         .7767 ACRE-FEET
    PEAK DISCHARGE RATE =       22.23 CFS  AT    1.500 HOURS    BASIN AREA =    .0096 SQ. MI.


*S **ADD BASIN 116 & 113
ADD HYD               ID=23 HYD NO=120.1 ID=21 ID=22
PRINT HYD             ID=23 CODE=1

                                PARTIAL HYDROGRAPH   120.10
```

RUNOFF VOLUME = 1.51700 INCHES = .9832 ACRE-FEET
PEAK DISCHARGE RATE = 25.80 CFS AT 1.500 HOURS BASIN AREA = .0122 SQ. MI.

*S ** ROUTE BASIN 110 THROUGH 111
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
MIN ELEV=100.00 FT MAX ELEV=100.67 FT
CH SLP=.02 FP SLP=.02 N=.017 DIST=28 FT
DIST ELEV DIST ELEV DIST ELEV
0 100.67 0.1 100.00 14 100.28
27.9 100.00 28.0 100.67

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.02
100.11	.56	.96	10.53
100.14	.99	2.07	14.05
100.18	1.55	3.75	17.56
100.21	2.23	6.09	21.07
100.25	3.03	9.19	24.58
100.28	3.96	13.18	27.88
100.32	4.95	19.05	27.89
100.35	5.93	25.73	27.91
100.39	6.91	33.18	27.92
100.42	7.90	41.35	27.93
100.46	8.88	50.21	27.94
100.49	9.87	59.73	27.95
100.53	10.85	69.89	27.96
100.56	11.84	80.66	27.97
100.60	12.83	92.01	27.98
100.63	13.81	103.94	27.99
100.67	14.80	116.42	28.00

COMPUTE TRAVEL TIME ID=24 REACH NO=1 NO VS=1 L=820 FT
SLP=0.0143

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2752
.071	.248	.33	.1733
.106	.557	.96	.1323
.141	.991	2.07	.1092
.176	1.548	3.75	.0941
.212	2.229	6.09	.0833
.247	3.034	9.19	.0752
.282	3.962	13.18	.0685
.317	4.946	19.05	.0592

```
                                .353        5.930        25.73        .0525
                                .388        6.914        33.18        .0475
                                .423        7.898        41.35        .0435
                                .458        8.883        50.21        .0403
                                .494        9.869        59.73        .0376
                                .529       10.854        69.89        .0354
                                .564       11.841        80.66        .0334
                                .599       12.827        92.01        .0318
                                .635       13.814       103.94        .0303
                                .670       14.801       116.42        .0290
ROUTE                 ID=24 HYD NO=118.5 INFLOW ID=16 DT=0.0 HR
PRINT HYD             ID=24 CODE=1

                                  PARTIAL HYDROGRAPH   118.50

    RUNOFF VOLUME =     1.51842 INCHES      =         .0170 ACRE-FEET
    PEAK DISCHARGE RATE =        .32 CFS  AT    1.600 HOURS    BASIN AREA =    .0002 SQ. MI.


*S **COMPUTE BASIN 111
COMPUTE NM HYD        ID=25 HYD NO=121.00 AREA=0.0072 SQ MI
                      PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                      TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =       .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =       .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD             ID=25   CODE=1

                                  PARTIAL HYDROGRAPH   121.00

    RUNOFF VOLUME =     1.51706 INCHES      =         .5825 ACRE-FEET
    PEAK DISCHARGE RATE =       16.68 CFS  AT    1.500 HOURS    BASIN AREA =    .0072 SQ. MI.


*S **ADD BASIN 111 & 110
ADD HYD               ID=26 HYD NO=121.1 ID=25 ID=24
PRINT HYD             ID=26 CODE=1

                                  PARTIAL HYDROGRAPH   121.10
```

```
    RUNOFF VOLUME =      1.51698 INCHES      =         .5995 ACRE-FEET
    PEAK DISCHARGE RATE =       16.89 CFS  AT    1.500 HOURS    BASIN AREA =    .0074 SQ. MI.


*S **COMPUTE BASIN 112
COMPUTE NM HYD       ID=27 HYD NO=122.00 AREA=0.0021 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    5.0575     CFS   UNIT VOLUME =     .9973        B =    526.28       P60 = 1.8700
    AREA =       .001281 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR     TP =    .133300HR     K/TP RATIO =    .888442      SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    2.1791     CFS   UNIT VOLUME =     .9943        B =    354.67       P60 = 1.8700
    AREA =       .000819 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=27   CODE=1

                                PARTIAL HYDROGRAPH   122.00


    RUNOFF VOLUME =      1.51706 INCHES      =         .1699 ACRE-FEET
    PEAK DISCHARGE RATE =        4.88 CFS  AT    1.500 HOURS    BASIN AREA =    .0021 SQ. MI.


*S **ADD BASIN 111 & 112
ADD HYD              ID=28 HYD NO=122.1 ID=26 ID=27
PRINT HYD            ID=28 CODE=1

                                PARTIAL HYDROGRAPH   122.10


    RUNOFF VOLUME =      1.51696 INCHES      =         .7694 ACRE-FEET
    PEAK DISCHARGE RATE =       21.76 CFS  AT    1.500 HOURS    BASIN AREA =    .0095 SQ. MI.


*S ** ROUTE BASIN 113 THROUGH 114
COMPUTE TRAVEL TIME  ID=29 REACH NO=1 NO VS=1 L=820 FT
                     SLP=0.01
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.2752
.071	.248	.33	.1733
.106	.557	.96	.1323
.141	.991	2.07	.1092
.176	1.548	3.75	.0941
.212	2.229	6.09	.0833
.247	3.034	9.19	.0752
.282	3.962	13.18	.0685
.317	4.946	19.05	.0592
.353	5.930	25.73	.0525
.388	6.914	33.18	.0475
.423	7.898	41.35	.0435
.458	8.883	50.21	.0403
.494	9.869	59.73	.0376
.529	10.854	69.89	.0354
.564	11.841	80.66	.0334
.599	12.827	92.01	.0318
.635	13.814	103.94	.0303
.670	14.801	116.42	.0290

```
ROUTE                ID=29 HYD NO=119.5 INFLOW ID=20 DT=0.0 HR
PRINT HYD            ID=29 CODE=1
```

PARTIAL HYDROGRAPH 119.50

```
    RUNOFF VOLUME =     1.51736 INCHES      =         .0516 ACRE-FEET
    PEAK DISCHARGE RATE =       1.09 CFS  AT   1.600 HOURS   BASIN AREA =    .0006 SQ. MI.


*S **COMPUTE BASIN 114
COMPUTE NM HYD       ID=30 HYD NO=123.00 AREA=0.0072 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.340    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004392 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   7.4712    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
    AREA =      .002808 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=30   CODE=1
```

PARTIAL HYDROGRAPH 123.00

RUNOFF VOLUME = 1.51706 INCHES = .5825 ACRE-FEET
PEAK DISCHARGE RATE = 16.68 CFS AT 1.500 HOURS BASIN AREA = .0072 SQ. MI.

```
*S **ADD BASIN 114 & 113
ADD HYD             ID=1 HYD NO=123.1 ID=30 ID=29
PRINT HYD           ID=1 CODE=1
```

PARTIAL HYDROGRAPH 123.10

RUNOFF VOLUME = 1.51698 INCHES = .6341 ACRE-FEET
PEAK DISCHARGE RATE = 17.50 CFS AT 1.500 HOURS BASIN AREA = .0078 SQ. MI.

```
*S ** ROUTE BASIN 114 THROUGH 115
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=1
                     MIN ELEV=100.00 FT MAX ELEV=100.67 FT
                     CH SLP=.02 FP SLP=.02 N=.017 DIST=32 FT
                     DIST  ELEV  DIST  ELEV  DIST  ELEV
                       0  100.67 0.1  100.00   16   100.32
                     31.9 100.00 32.0 100.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.04	.06	.05	3.51
100.07	.25	.33	7.03
100.11	.56	.96	10.54
100.14	.99	2.07	14.06
100.18	1.55	3.75	17.57
100.21	2.23	6.10	21.09
100.25	3.04	9.20	24.60
100.28	3.97	13.13	28.12
100.32	5.02	17.98	31.63
100.35	6.14	25.01	31.91
100.39	7.27	33.05	31.92
100.42	8.40	41.95	31.93
100.46	9.52	51.67	31.94
100.49	10.65	62.16	31.95
100.53	11.77	73.40	31.96
100.56	12.90	85.36	31.97
100.60	14.03	98.01	31.98
100.63	15.16	111.33	31.99
100.67	16.28	125.31	32.00

```
COMPUTE TRAVEL TIME  ID=3 REACH NO=1 NO VS=1 L=200 FT
                     SLP=0.005
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.062	.05	.0671
.071	.248	.33	.0423
.106	.558	.96	.0323
.141	.992	2.07	.0266
.176	1.549	3.75	.0230
.212	2.231	6.10	.0203
.247	3.037	9.20	.0183
.282	3.966	13.13	.0168
.317	5.020	17.98	.0155
.353	6.144	25.01	.0136
.388	7.269	33.05	.0122
.423	8.395	41.95	.0111
.458	9.521	51.67	.0102
.494	10.647	62.16	.0095
.529	11.774	73.40	.0089
.564	12.901	85.36	.0084
.599	14.029	98.01	.0080
.635	15.157	111.33	.0076
.670	16.285	125.31	.0072

```
ROUTE                ID=3 HYD NO=123.3 INFLOW ID=1 DT=0.0 HR
PRINT HYD            ID=3 CODE=1
```

PARTIAL HYDROGRAPH 123.30

RUNOFF VOLUME = 1.51704 INCHES = .6342 ACRE-FEET
PEAK DISCHARGE RATE = 17.39 CFS AT 1.533 HOURS BASIN AREA = .0078 SQ. MI.

```
*S **COMPUTE BASIN 115
COMPUTE NM HYD       ID=4 HYD NO=124.00 AREA=0.0016 SQ MI
                     PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
                     TP=-0.1333 HR   MASSRAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.8533 CFS UNIT VOLUME = .9965 B = 526.28 P60 = 1.8700
AREA = .000976 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 1.6603 CFS UNIT VOLUME = .9923 B = 354.67 P60 = 1.8700
AREA = .000624 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
PRINT HYD            ID=4   CODE=1
```

PARTIAL HYDROGRAPH 124.00

RUNOFF VOLUME = 1.51706 INCHES = .1295 ACRE-FEET
PEAK DISCHARGE RATE = 3.72 CFS AT 1.500 HOURS BASIN AREA = .0016 SQ. MI.

*S **ADD BASIN 114 & 115
ADD HYD ID=5 HYD NO=124.1 ID=3 ID=4
PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 124.10

RUNOFF VOLUME = 1.51697 INCHES = .7636 ACRE-FEET
PEAK DISCHARGE RATE = 20.96 CFS AT 1.533 HOURS BASIN AREA = .0094 SQ. MI.

*S **ADD BASIN 115 & 116
ADD HYD ID=6 HYD NO=124.2 ID=5 ID=23
PRINT HYD ID=6 CODE=1

PARTIAL HYDROGRAPH 124.20

RUNOFF VOLUME = 1.51699 INCHES = 1.7468 ACRE-FEET
PEAK DISCHARGE RATE = 46.59 CFS AT 1.533 HOURS BASIN AREA = .0216 SQ. MI.

*S **COMPUTE BASIN 117
COMPUTE NM HYD ID=7 HYD NO=125.00 AREA=0.0012 SQ MI
PER A=0 PER B=19.5 PER C=19.5 PER D=61.0
TP=-0.1333 HR MASSRAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.8900 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.8700
AREA = .000732 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 1.2452 CFS UNIT VOLUME = .9896 B = 354.67 P60 = 1.8700
AREA = .000468 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=7 CODE=1

PARTIAL HYDROGRAPH 125.00

RUNOFF VOLUME = 1.51706 INCHES = .0971 ACRE-FEET
PEAK DISCHARGE RATE = 2.79 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

```
*S **ADD BASIN 116 & 117
ADD HYD              ID=8 HYD NO=125.1 ID=7 ID=6
PRINT HYD            ID=8 CODE=1

                                PARTIAL HYDROGRAPH   125.10

    RUNOFF VOLUME =      1.51698 INCHES      =        1.8438 ACRE-FEET
    PEAK DISCHARGE RATE =      49.33 CFS  AT   1.500 HOURS   BASIN AREA =    .0228 SQ. MI.


FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 15:48:18
```

APPENDIX B

ARENAL ROAD – 10-YEAR DRY LANE ANALYSIS
(PREVIOUSLY APPROVED CID NO. 5803.91)

SUBJECT: **Arenal Road Dry Lane Analysis**

CRITERIA: 10-Year 6-Hour Storm (DPM Calculations)
Arenal & Unser Intersection Land Treatment: 90% D; 10% C
Arenal Road Land Treatment: 77% D; 23% C

SOLUTION: Storm drains will be placed along the back of curb along Arenal from the intersection of Arenal and Unser to the Amole del Norte Channel under a city public project. The inlet spacing for both north and south bound lanes shall be the same based upon each lane having a contributing cross section width of 25 feet (see attached Exhibit C). Inlet spacing will provide for one dry lane under this original road cross section.

Calculate dry lane catch basin requirements for Arenal

pt (1) Unser PASS Thru = 1.9 cfs
Sapphire Pass Thru = 0 cfs
Intersection of Arenal / Unser A = .74 AC
Land Treatment: 10% C; 90% D

$Q_{10\text{-}6} = 1.49(.07) + 2.89(.66) = 2.04$ cfs

Unser ST 21+80 to ST 20+00 A = .58 AC
Land Treatment: 20% B; 20% C; 60% D

$Q_{10\text{-}6} = 1.49(.116) + 2.89(.348) + .76(.116)$

$Q = 1.27$ cfs

Arenal ST 17 to ST 18+67 A = .46 AC
Land Treatment: 77% D; 23% C

$Q_{10\text{-}6} = 1.49(\cdots) + 2.89(\cdots) = 1.19$

$Q_{\text{total } 1/2 \text{ street}} = 1.19 + 1.27 + 2.04 = 4.48/2 = 2.24$

$Q_{1/2 \text{ street}} = 2.24 + 1.9 = 4.1$ cfs

For one dry lane

$S_{avg} = 1.43\%$ $Q_{max\ 1/2} = \frac{1.486}{.017}(.125)^{.67}(.0143)^{.5}(1.58) = 4.1$ cfs

per DPM plate D-5 one inlet $Q_{in} = 3.0$ cfs
at pt 1 place 2 grates; Type A inlet
PASS Through = 0 cfs

pt (2) From 18+67 to ST 27+00
A = 2.98
$Q_{10\text{-}6} = 2.89(2.3) + 1.49(.69) = 7.67/2 = 3.84 < 4.10$ ok
Use a Single Grate Type A inlet
PASS Through Flow = 3.84 - 3.00 = .84 cfs

@ pt. 3 ST 27+00 to existing inlets
(L = 700')

A = 2.51 Ac

Q_{10-6} = 2.89(1.93) + 1.49(.62) = 6.50/2 = 3.25 cfs

Qinlet = 3.25 + .84 = 4.09 cfs < 4.10 ✓OK

Pass Through Flow = 4.09 - 3.00 = 1.09 cfs

Check Flow Depth for 100 year - 6 hr Storm

pt ① Sapphire pass through = 10 cfs
Unser pass through = 3.5 cfs
Intersection of Arenal/Unser (per Sheet 1) = 3.09 cfs / 2 = 1.55 cfs
Unser St 21+80 to St 20+00 (per Sheet 1) = 2.09 cfs / 2 = 1.05 cfs
Arenal St 17 to St 18+67 (per Sheet 1) = 1.85 cfs / 2 = .93 cfs
Assume no flows pass through from North Unser

$Q_{TOTAL} = 10 + 3.5 + 1.55 + 1.05 + .93 = 17.03$ cfs

$S_{avg} = 1.43\%$

@ $d = .67$ $Q = 1.486/.017 (.0193)^{.5} (.33)^{.67} (8.98) = 42.17$ cfs

@ $d = .33$ $Q = 1.486/.017 (.0143)^{.5} (.126)^{.67} (1.59) = 4.15$ cfs

$\therefore$ @ $Q = 17.03$ $d = .45$ feet

From Plate 22.3 D-5 (DPM) a single grate type A inlet $Q_{in} = 5.5$ cfs

Pass Through $17.03 - 2(5.5) = 6.03$ cfs

pt ② From St 18+67 to St 27+00

$Q_{100} = 4.37(2.3) + 2.87(.69) = 12.03/2 = 6.02$ cfs

$Q_{inlet} = 6.02 + 6.03 = 12.05$ cfs

$\therefore$ @ $Q = 12.05$ cfs $d = .40$ feet

per dPM plate 22.3 D-5 $Q_{in} = 4.6$ cfs

Pass Through $12.05 - 4.6 = 7.45$ cfs

pt ③ From St 27+00 to existing inlets

$Q_{100} = 2.87(.62) + 1.93(4.37) = 10.24/2 = 5.1$ cfs

$Q_{inlet} = 5.1 + 7.45 = 12.55$ cfs

@ $Q = 12.55$ $d = .41$ ft ⓪

per dpm plate 22.3 D-5 $Q_{in} = 4.7$ cfs (change existing to Type A inlets)

Q pass through = $12.55 - 4.7 = 7.85$ cfs.

APPENDIX C

ARENAL/UNSER DRAINAGE MANAGEMENT PLAN (M10/D10)

-Summary Information
-Basins 406 and 407 AHYMO Calculations
-Regional Detention Facility Map
-Basin Map

Summary Excerpt from Arenal/Unser Drainage Management Plan

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and referencing datas gathered from BEC report make up the last part of the appendix in this section.

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7	.990	116.33
11	1.0	13.0	1.000	117.49
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 407
(SIDE FLOW 1650' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2103
DIFFERENCE IN ELEVATION ACROSS BASIN	=	32
SLOPE OF BASIN, (FT/FT)	=	0.0152
AREA OF BASIN, (ACRES)	=	32.26
AREA OF BASIN, (SQ MI)	=	0.05040
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	19.2
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.5
PEAK RUNOFF (CFS) (from AHYMO run)	=	104.81
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.14
3	.2	2.3	.100	10.48
4	.3	3.9	.190	19.91
5	.4	5.2	.310	32.49
6	.5	6.5	.470	49.26
7	.6	7.8	.660	69.17
8	.7	9.1	.820	85.94
9	.8	10.4	.930	97.46
10	.9	11.7	.990	103.75
11	1.0	13.0	1.000	104.81
12	1.1	14.3	.990	103.75
13	1.2	15.6	.930	97.46
14	1.3	16.9	.860	90.13
15	1.4	18.2	.780	81.74
16	1.5	19.5	.680	71.26
17	1.6	20.8	.560	58.69
18	1.7	22.1	.460	48.21
19	1.8	23.4	.390	40.87
20	1.9	24.7	.330	34.58
21	2.0	26.0	.280	29.34
22	2.2	28.6	.207	21.69
23	2.4	31.2	.147	15.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	11.21
25	2.8	36.4	.077	8.07
26	3.0	39.0	.055	5.76
27	3.2	41.6	.040	4.19
28	3.4	44.2	.029	3.04
29	3.6	46.8	.021	2.20
30	3.8	49.4	.015	1.57
31	4.0	52.0	.011	1.15
32	4.5	58.5	.005	0.52
33	5.0	65.0	.000	.00

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	404.10	7& 8	9	.15480	272.95	9.204	1.11482	1.533	2.755	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	880.30	32.016	1.08855	1.533	2.494	
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	190.04	32.016	1.08855	1.966	.538	AC-FT= 18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL										
ROUTE	405.30	11	12	.55146	190.02	32.016	1.08855	2.000	.538	
*S**********										
*S**********										
*S **CALC BASIN 406										
COMPUTE NM HYD	406.00	-	13	.05743	117.49	3.920	1.27968	1.500	3.196	PER IMP= 42.00
*S **CALC BASIN 407										
COMPUTE NM HYD	407.00	-	14	.05040	104.81	3.491	1.29860	1.500	3.249	PER IMP= 42.00
*S **CALC BASIN 408										
COMPUTE NM HYD	408.00	-	15	.15736	327.60	10.899	1.29860	1.500	3.253	PER IMP= 42.00
*S**********										
*S**********										
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD										
COMPUTE NM HYD	500.00	-	16	.02491	51.80	1.725	1.29860	1.500	3.250	PER IMP= 42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING										
*S **DIRECTLY TO THE AMOLE CHANNEL										
COMPUTE NM HYD	501.00	-	17	.03663	76.18	2.537	1.29860	1.500	3.249	PER IMP= 42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE										
*S **LONGFORD SD										
ADD HYD	501.10	16&17	18	.06154	127.98	4.262	1.29859	1.500	3.250	
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD										
COMPUTE NM HYD	502.00	-	19	.05788	121.79	4.080	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN										
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.										
COMPUTE NM HYD	503.00	-	20	.03752	78.03	2.599	1.29860	1.500	3.249	PER IMP= 42.00
*S**********										
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @										
*S **A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	504.00	-	1	.03667	77.16	2.585	1.32159	1.500	3.288	PER IMP= 44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.										
COMPUTE NM HYD	505.00	-	2	.02618	43.10	1.407	1.00753	1.500	2.572	PER IMP= 29.00
FINISH										

3.54	11.77	203.89	4.00
3.75	12.24	207.31	4.00
4.00	12.57	207.31	4.00

COMPUTE TRAVEL TIME ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

ROUTE ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0
PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA 405.30

RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

*S**********
*S**********
*S **CALC BASIN 406
COMPUTE NM HYD ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
PER A=4 PER B=27 PER C=27 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .121550HR TP = .133300HR K/TP RATIO = .911856 SHAPE CONSTANT, N = 3.883611
UNIT PEAK = 86.799 CFS UNIT VOLUME = 1.000 B = 347.33 P60 = 1.8700
AREA = .033312 SQ MI IA = .44052 INCHES INF = 1.08345 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=13 CODE=1

HYDROGRAPH FROM AREA 406.00

RUNOFF VOLUME = 1.27968 INCHES = 3.9198 ACRE-FEET
PEAK DISCHARGE RATE = 117.49 CFS AT 1.500 HOURS BASIN AREA = .0574 SQ. MI.

*S **CALC BASIN 407
COMPUTE NM HYD ID=14 HYD NO=407.00 AREA=0.0504 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 83.572 CFS UNIT VOLUME = .9992 B = 526.28 P60 = 1.8700
AREA = .021168 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 77.777 CFS UNIT VOLUME = 1.000 B = 354.67 P60 = 1.8700
AREA = .029232 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=14 CODE=1

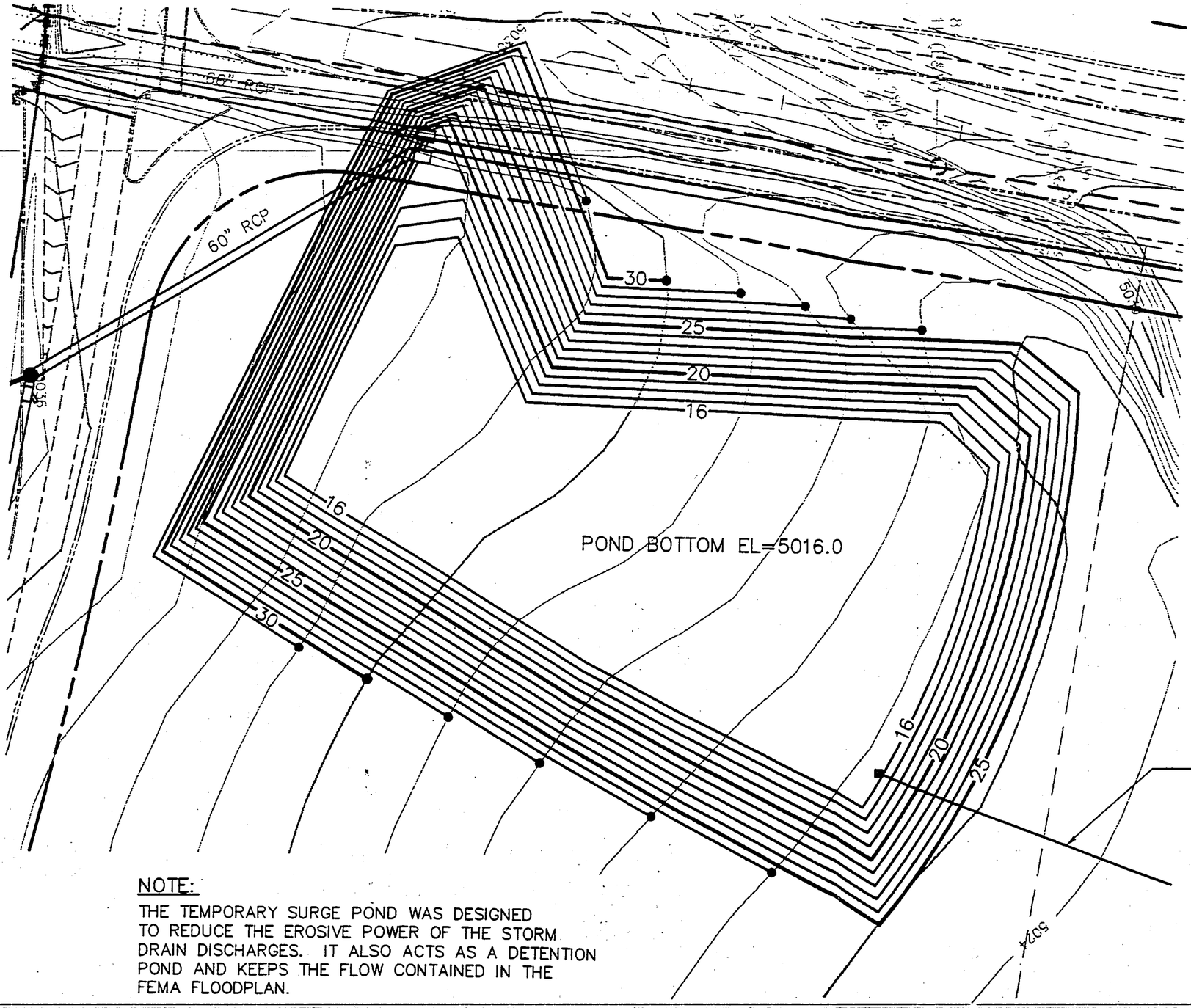
HYDROGRAPH FROM AREA 407.00

RUNOFF VOLUME = 1.29860 INCHES = 3.4906 ACRE-FEET
PEAK DISCHARGE RATE = 104.81 CFS AT 1.500 HOURS BASIN AREA = .0504 SQ. MI.

*S **CALC BASIN 408
COMPUTE NM HYD ID=15 HYD NO=408.00 AREA=0.15736 SQ MI
PER A=0 PER B=29 PER C=29 PER D=42
TP=-0.1333 HR MASS RAIN=-1

K = .074258HR TP = .133300HR K/TP RATIO = .557073 SHAPE CONSTANT, N = 6.910316
UNIT PEAK = 256.33 CFS UNIT VOLUME = .9995 B = 516.99 P60 = 1.8700
AREA = .066091 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .115909HR TP = .133300HR K/TP RATIO = .869534 SHAPE CONSTANT, N = 4.085829
UNIT PEAK = 247.07 CFS UNIT VOLUME = 1.000 B = 360.85 P60 = 1.8700
AREA = .091269 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330



SCALE: 1"=60'

TEMPORARY SURGE POND

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

NOTE:

THE TEMPORARY SURGE POND WAS DESIGNED TO REDUCE THE EROSIVE POWER OF THE STORM DRAIN DISCHARGES. IT ALSO ACTS AS A DETENTION POND AND KEEPS THE FLOW CONTAINED IN THE FEMA FLOODPLAN.

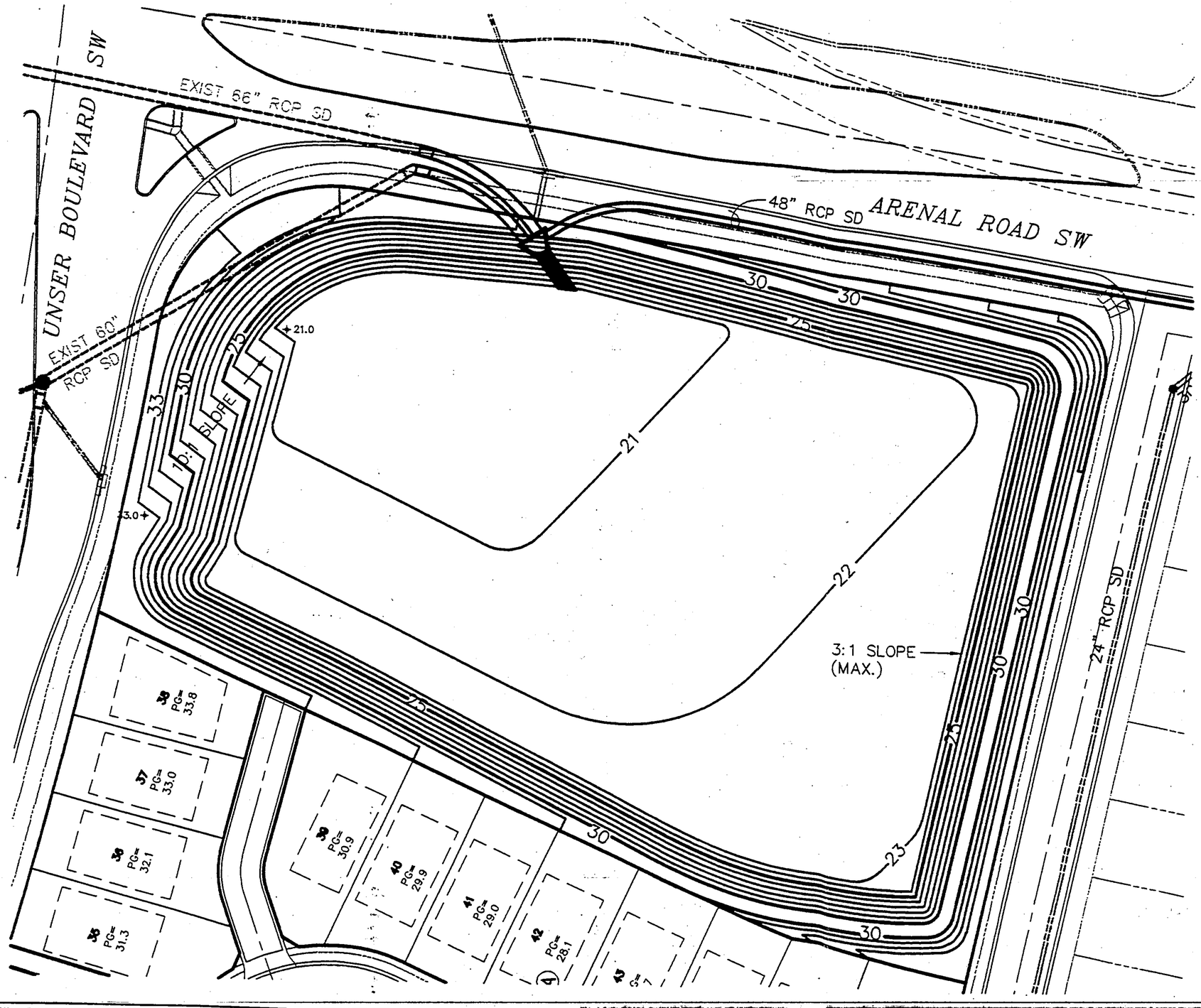
FIGURE 1

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque — *New Mexico*

903EXH13.DWGdlv

5/1/97

PERMANENT RETENTION POND



SCALE: 1"=60'

ELEV	H (ft)	AREA (ac)	STORAGE (af)
21	0	0.54	0
22	1	1.57	1.06
23	2	2.48	3.08
24	3	2.58	5.61
25	4	2.68	8.24
26	5	2.79	10.98
27	6	2.89	13.82
28	7	3.00	16.76
29	8	3.11	19.81
30	9	3.21	22.98

PEAK DISCHARGE TO POND = Q_{100} = 798cfs
= Q_{10} = 435 cfs

PEAK DISCHARGE = 183.8 cfs
MAX WATER SURFACE ELEV = 28.21 ft
POND STORAGE = 17.4 ac ft
MAX POND STORAGE = 22.98 ac ft

FIGURE 2

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque New Mexico

921EXH10.DWGems 09/16/97

DRAINAGE INFORMATION SHEET

PROJECT FILE: DESERT SPRINGS SUBD., UNIT ONE ZONE ATLAS/DRNG. FILE#: M-10/D8

DRB # 96-435 EPC # _____ WORK ORDER # 578581

LEGAL DESCRIPTION: DESERT SPRINGS SUBD, UNIT ONE

CITY ADDRESS: SE CORNER UNSER BLVD. & ARENAL RD.

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Fred Arfman

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: BUILDERS INVESTMENT CO. OF NM CONTACT: H. GRIFF RICKARD

ADDRESS: 7007 WYOMING BLVD., STE D-4 PHONE: 828-1100

CITY, STATE: ABQ. NM 87109 ZIP CODE: 87109

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: ~~PAO GRADE~~ ~~DAVE CLAUSEN~~ / ALDRICH LAND SURVEYING INC CONTACT: T. ALDRICH

ADDRESS: _____ PHONE: 884-1990

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: SPARLING CONSTRUCTION CO. CONTACT: PAT WYLIE

ADDRESS: _____ PHONE: 821-1034

CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
X ENGINEER'S CERTIFICATION (INCL. WALLS)
_____ OTHER

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL
_____ PRELIMINARY PLAT APPROVAL
_____ S.DEV. PLAN FOR SUB'D. APPROVAL
_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_____ CERTIFICATE OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ G.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
X OTHER (SPECIFY) CITY OF ABQ. ACCEPTANCE

RECEIVED
OCT 13 1999
HYDROLOGY SECTION

DATE SUBMITTED: 10.12.99

BY: FRED C. ARFMAN
FOR ISAACSON & ARFMAN, P.A.

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

December 30, 1999

Ms. Susan Calongne, PE
City/County Floodplain Administrator
Hydrology Division/PWD
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Desert Springs Subdivision Units 4 & 5

Dear Ms. Calongne;

I am sending you revised copies of the Grading & Drainage Plans for Desert Springs Units 4 and 5. The pad grades and rear lot grades have been raised 0.3 ft for earthwork balancing concerns. The top of curb and front lot grades have been dropped by 0.33 ft in areas where a change from standard to mountable curb was approved in October of this year. No street grades have been changed from the originally approved plans.

Please feel free to call me if you have any questions regarding these changes. I can be reached at 268-8828. Thank you for your time.

Sincerely,
ISAACSON & ARFMAN, P.A.

Genny Donart

GD/rtl
Attachments

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 12, 2000

Fred C. Arfman, P.E.
ISAACSON & ARFMAN
128 Monroe Street NE
Albuquerque, NM 87108

Re: Grading and Drainage Certification – Desert Springs Subdivision Unit Two (M-10/D008) Submitted for Release of Financial Guaranty

Engineer's Stamp dated 5/29/1998

Engineering Certification Stamp dated 12-12-2000

Dear Mr. Arfman:

Based upon the information provided in your submittal dated 12-12-2000, the Engineering Certification for the above referenced subdivision is approved for Release of Financial Guaranty.

If I can be of further assistance, please contact me at 924-3986

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: Arlene Portillo, PWD – #578582
file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT #: DESERT SPRINGS SUBD., UNIT TWO — ZONE ATLAS/DRNG. FILE #: M-10/D-8

DRB # 98-185 — EPC # N/A — WORK ORDER # 578582

LEGAL DESCRIPTION: DESERT SPRINGS SUBD., UNIT TWO

CITY ADDRESS:

ENGINEERING FIRM: Isaacson & Arfman, P.A. — CONTACT: Fred Arfman

ADDRESS: 128 Monroe Street NE — PHONE: 268-8828

CITY, STATE: Albuquerque, NM — ZIP CODE: 87108

OWNER: BUILDERS INVESTMENT CO. OF NM — CONTACT: GRIFF PICKARD

ADDRESS: 7007 WYOMING BLVD. N.E., STE D-6 — PHONE: 828-1100

CITY, STATE: ABQ., NM — ZIP CODE: 87109

ARCHITECT: N/A — CONTACT:

ADDRESS: — PHONE:

CITY, STATE: — ZIP CODE:

SURVEYOR: ALDRICH LAND SURVEYING (BOUNDARY & TOPO) — CONTACT: TIM ALDRICH

ADDRESS: P.O. BOX 30701 — PHONE: 884-1990

CITY, STATE: ABQ. NM — ZIP CODE: 87190

CONTRACTOR: SPARLING CONSTRUCTION — CONTACT: PAT WYLIE

ADDRESS: P.O. BOX 90548 — PHONE: 821-1034

CITY, STATE: ABQ. NM — ZIP CODE: 87199-0548

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- ____ NO
- ____ COPY PROVIDED

RECEIVED
DEC 12 2000
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S.DEV. PLAN FOR SUB'D. APPROVAL
- ____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- X OTHER (SPECIFY) W.O. CLOSEOUT & GRADING CERTIFICATION

DATE SUBMITTED: 12.12.00

BY: FRED ARFMAN

FOR ISAACSON & ARFMAN, P.A.

City of Albuquerque

March 27, 2000

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Grading and Drainage Certification Plan for Desert Springs Subdivision, Unit Three, (M10/D8) Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated 3/21/00.

Dear Mr. Arfman:

Based on the information provided, the above referenced plan is adequate to satisfy the Grading and Drainage Certification requirement per the Infrastructure List dated April 13, 1999, and revised on July 1, 1999, for the release of Financial Guarantees for Desert Springs Subdivision, Unit Three.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-98-185
Bo K. Johnson, P.E., Curb Inc.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

October 18, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Grading and Drainage Certification Plan for Desert Springs Subdivision, Unit One, (M10/D8) Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated 6/19/98.

Dear Mr. Arfman:

Based on the information provided, the above referenced plan is adequate to satisfy the Grading and Drainage Certification requirement per the Infrastructure List dated August 26, 1997, and revised on October 14, 1997, for the release of Financial Guarantees for Unit 1 of the Desert Springs Subdivision.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB-96-435, City Project No. 5785.81
H. Griff Pickard, Builders Investment Co. of NM
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

Larry Blair

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 06 1999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 99-06-844P

The Honorable Jim Baca
Mayor, City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Community: City of Albuquerque, NM
Community No.: 350002
Map Panels Affected: 35001C0336 D
and 0337 D

116

FEMA MAP SERVICE CENTER
99 SEP -7 AM 8:39

Dear Mayor Baca:

In a Letter of Map Revision dated April 15, 1999, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) for Bernalillo County, New Mexico and Incorporated Areas (the effective FIRM for your community). These determinations were for an existing detention pond near the intersection of Unser Boulevard and Arenal Road and construction of a storm drain system along Arenal Road from the detention pond to Amole del Norte Diversion Channel. The 90-day appeal period that was initiated on May 28, 1999, when the Federal Emergency Management Agency (FEMA) published a notice of proposed base flood elevations (BFEs) in the *Albuquerque Journal*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs that became effective on April 15, 1999, remain valid and revise the FIRM that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93- 234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community number(s) and suffix code(s) are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, we urge you to contact the Director, Mitigation Division of FEMA in Denton,

Texas, at (940) 898-5127. If you have any questions concerning the proposed modified BFEs or mapping issues in general, please contact Mr. Alan Johnson of our staff in Washington, DC, either by telephone at (202) 646-3403 or by facsimile at (202) 646-4596.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 24, 1999

Mr. Monther S. Madanat
Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304-6439

RE: Request for a Letter of Map Revision for Desert Springs Subdivision, City of Albuquerque, New Mexico, Community No. 350002, FIRM Panels 35001C0336D and 35001C0337D.

Dear Mr. Madanat:

The purpose of this submittal is to request a Letter of Map Revision for the above referenced project. This request consists of the removal of the floodplain due to the construction of a permanent detention pond and storm drain system. No submittal was made to FEMA for the Conditional Letter of Map Revision for this project.

Enclosed with this letter are the Application and Certification forms for requesting revisions to the National Flood Insurance Program maps, along with the As-Built drawings for the improvements. A check in the amount of $4300.00 for the review is also included.

As the Community official, I have reviewed and approved the analyses and plans provided with this submittal . Our Community would greatly appreciate your prompt response and approval for this Letter of Map Revision. If you have any questions concerning this submittal, please call me at (505) 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

Attachments

c: Fred C. Arfman, P.E., Isaacson & Arfman, P.A. (Letter only)
Bo K. Johnson, P.E., Curb Inc. (Letter only)
File M10/D8 (Letter only)

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM

Isaacson &
Arfman, P.A.

Consulting Engineering
Associates

Letter of Transmittal

To Susan Calongne
Hydrology Department

Date 8/19/97

Job No. 921

Attn: _____

Reference Desert Springs Unit One Hydrology Report

Gentlemen:

We transmit to you _____ copy(ies) of the following

- ☐ _____ Plats
- ☒ Grading Plans
- ☐ Specifications
- ☐ _____ Report
- ☒ Flows depth Calcs & Sump Calcs
- ☐ _____

- ☐ Shop Drawings
- ☐ Submittals
- ☐ Material Specifications
- ☐ Copy of Letter

This information is transmitted:

- ☒ As per your request
- ☐ For your review & approval
- ☐ For your information
- ☐ For your attention
- ☐ For your signature
- ☐ _____
- ☐ _____

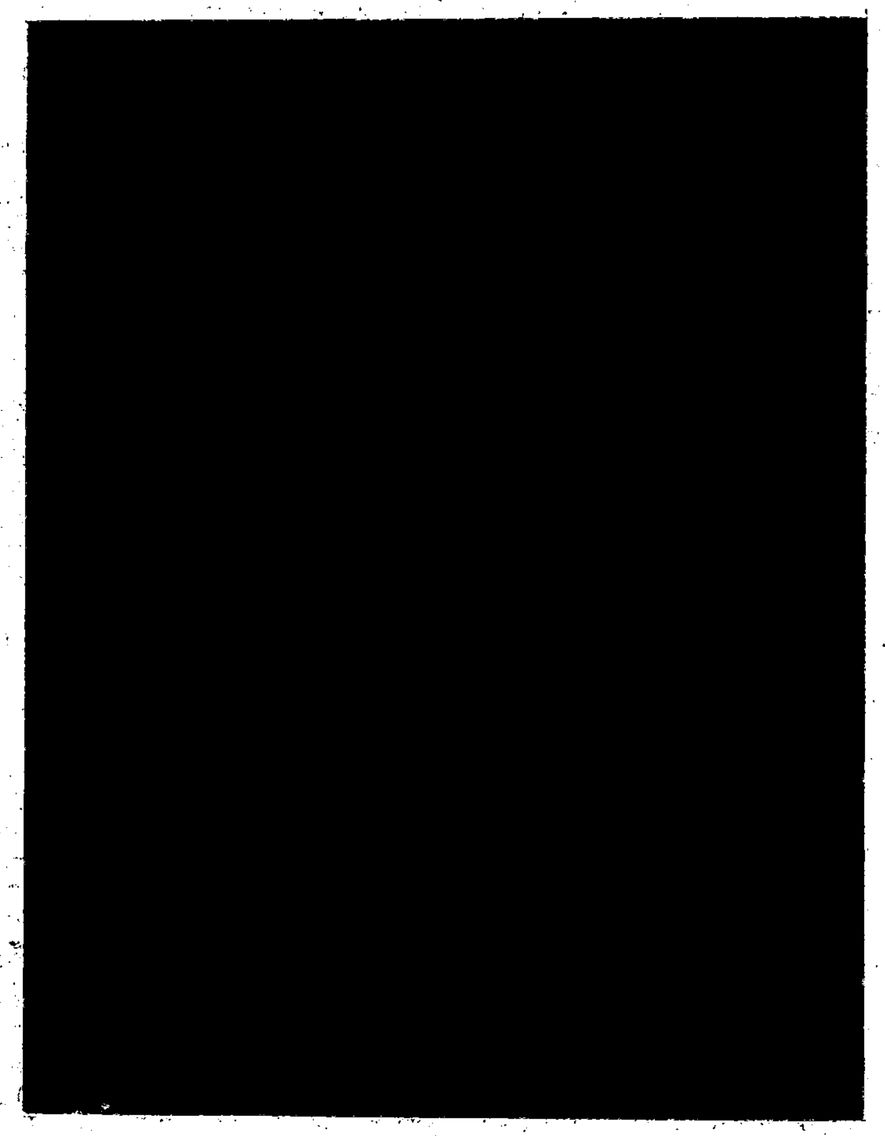
- ☐ For your files
- ☐ For your use
- ☐ Please review & return
- ☐ For return to your files
- ☐ Please advise

Remarks: _____

By: Melissa Combs

Copies To _____

128 Monroe, NE • Albuquerque, NM 87108 • (505) 268-8828



CITY OF
Albuquerque

May 16, 1997

Martin J. Chávez, Mayor

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Revised Conceptual Grading and Drainage Plan for Desert Springs Subdivision Unit 1 (M10/D8) Submitted for Preliminary Plat Approval, Engineer's Stamp Dated 5/14/97.

Dear Mr. Arfman:

The submittal received on May 15, 1997 is incomplete and will not be reviewed. Please address my comments of May 12, 1997. A complete resubmittal is required.

A Master Drainage Plan for this area must be submitted to and approved by City Hydrology. Until the Master Plan is approved, the above referenced subdivision will not be approved for Preliminary Plat action.

If you should have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: DESERT SPRINGS S/D UNIT ONE ZONE ATLAS/DRNG. FILE #: M-10/D8

DRB #: 96-435 EPC #: N/A WORK ORDER #: ☆

LEGAL DESCRIPTION: TR. B, ALBUQUERQUE SOUTH, UNIT ONE

CITY ADDRESS: _____

ENGINEERING FIRM: ISAACSON & ARFMAN P.A. CONTACT: FRED C. ARFMAN 87108

ADDRESS: 128 MONROE ST. N.E. PHONE: 268-8828

OWNER: CURB INC. CONTACT: BO JOHNSON

ADDRESS: 6301 IND. SCH. RD. PHONE: 881-9190

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: _____ PHONE: 884-1990

CONTRACTOR: N/A. CONTACT: _____

ADDRESS: _____ PHONE: _____

RECEIVED
MAY 15 1997
HYDROLOGY SECTION

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

__X__ CONCEPTUAL GRADING & DRAINAGE PLAN REVISED

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

____ NO

____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

__X__ PRELIMINARY PLAT APPROVAL

____ S. DEV. PLAN FOR SUB'D. APPROVAL

____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: MAY 14, 1997

BY: FRED C. ARFMAN, P.E.

FOR: ISAACSON & ARFMAN, P.A.

CITY OF
Albuquerque
Public Works Department

May 12, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Conceptual Grading and Drainage Plan for Desert Springs Subdivision Unit 1 (M10/D8) Submitted for Preliminary Plat Approval, Report dated 4/18/97.

Dear Mr. Arfman:

Prior to approval for Preliminary Plat action, more information is required. Please address the following comments:

1. Although this plan is part of a Master Drainage Plan, the above referenced report must be able to stand alone. This report must contain the pertinent information from the Master plan.

2. What is the status of the Master Drainage Plan? Until the Master Plan is approved, this subdivision will not be approved.

3. Please provide a map showing the locations of the four different phases. Where is the regional detention facility located?

4. The report should identify whether you are proposing to request a Letter of Map Revision from FEMA for this project. Also, show the limits of the existing floodplain on the plan.

5. Provide the drainage basins maps for both the existing and proposed conditions. Label all on-site and off-site drainage basins and analysis points. The report is hard to follow without the map.

6. Do existing off-site flows impact this site?

7. The engineer's stamp on the grading plan was not signed or dated.

8. Where is the 66" diameter storm drain located?

9. Please label all streets and show the storm drains and ponds on the grading plan. What size storm drain is proposed? The on-site drainage patterns cannot be followed without the street names. Include the north arrow on the grading plan. Where is the "Typical Lot Grading Detail?"

10. Provide the runoff calculations for both existing and proposed conditions. Was AHYMO used? Also provide the street capacity calculations and pond volume calculations. Provide the AHYMO for the pond routing.

11. Please explain Recommendation number 6 in the report.

12. For preliminary plat approval, please submit copies of the plat and infrastructure list so that I may review them prior to the DRB meeting. What is the DRB number?

If you should have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo Johnson, Owner
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: DESERT SPRINGS S/D UNIT ONE ZONE ATLAS/DRNG. FILE #: M-10/D8

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: TR. B, ALBUQUERQUE SOUTH, UNIT ONE

CITY ADDRESS: _____

ENGINEERING FIRM: ISAACSON & ARFMAN P.A. CONTACT: FRED C. ARFMAN
87108

ADDRESS: 128 MONROE ST. N.E. PHONE: 268-8828

OWNER: CURB INC. CONTACT: BO JOHNSON

ADDRESS: 6301 IND. SCH. RD. PHONE: 881-9190

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: _____ PHONE: 884-1990

CONTRACTOR: N/A. CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

__X__ CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

____ NO

____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

__X__ PRELIMINARY PLAT APPROVAL

____ S. DEV. PLAN FOR SUB'D. APPROVAL

____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: APRIL 18, 1997

BY: FRED C. ARFMAN, P.E.

FOR: ISAACSON & ARFMAN, P.A.

RECEIVED
APR 18 1997
HYDROLOGY SECTION

FAX

PUBLIC WORKS DEPARTMENT
DEVELOPMENT AND BUILDING SERVICES
CENTER (ONE STOP SHOP)
600 2ND STREET - PLAZA DEL SOL- 2ND FLOOR W
FAX NO. 924-3864

DATE: 5-8-97

TIME: 11:35

No. of Pages: 2
(Including Cover Page)

To: FRED ARFMAN

From: SUSAN CALONGNE

Comments: I'm REVIEWING THE REPORT FOR DESERT SPRINGS UNIT 1 (SEE INFO SHEET) CAN YOU PLEASE ~~fax~~ me a copy of a VICINITY MAP (Zone Atlas) to show me where this site is? Also - where are the other Units? Does this plan go with a master plan or is there something I can look at (basin map?) that will make the review easier?

let me know — S

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

FAX NO. (505) 268-2632

*** FAX COVER SHEET ***

TO: SUSAN CALONGNE DATE: 05-08-97
HYDROLOGY

FAX #: 924-3864

REFERENCE: DESERT SPRINGS S/D, UNIT ONE

TOTAL NUMBER OF PAGES, INCLUDING THIS PAGE: 2

☐ Hard copy to follow via mail.

If you do not receive any of these pages, please call (505) 268-8828.

MESSAGE:

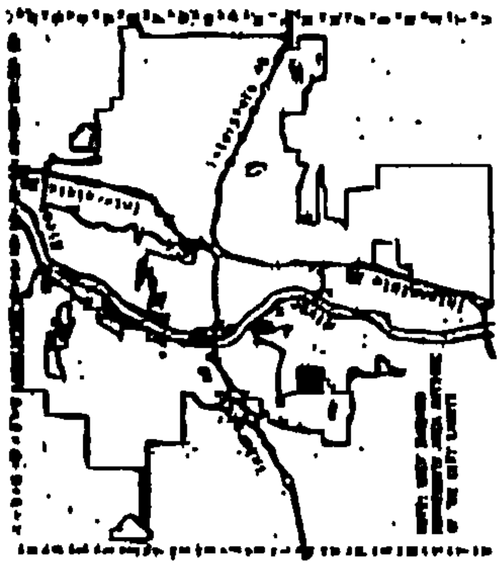
- ATTACHED VICINITY MAP
- DRAINAGE MANAGEMENT PLAN @ JOHN CUBBAGE'S OFFICE
- MASTERPLAN ROAD AND LOT EXHIBIT (REDUCED)

FROM: FRED C. ARFMAN

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

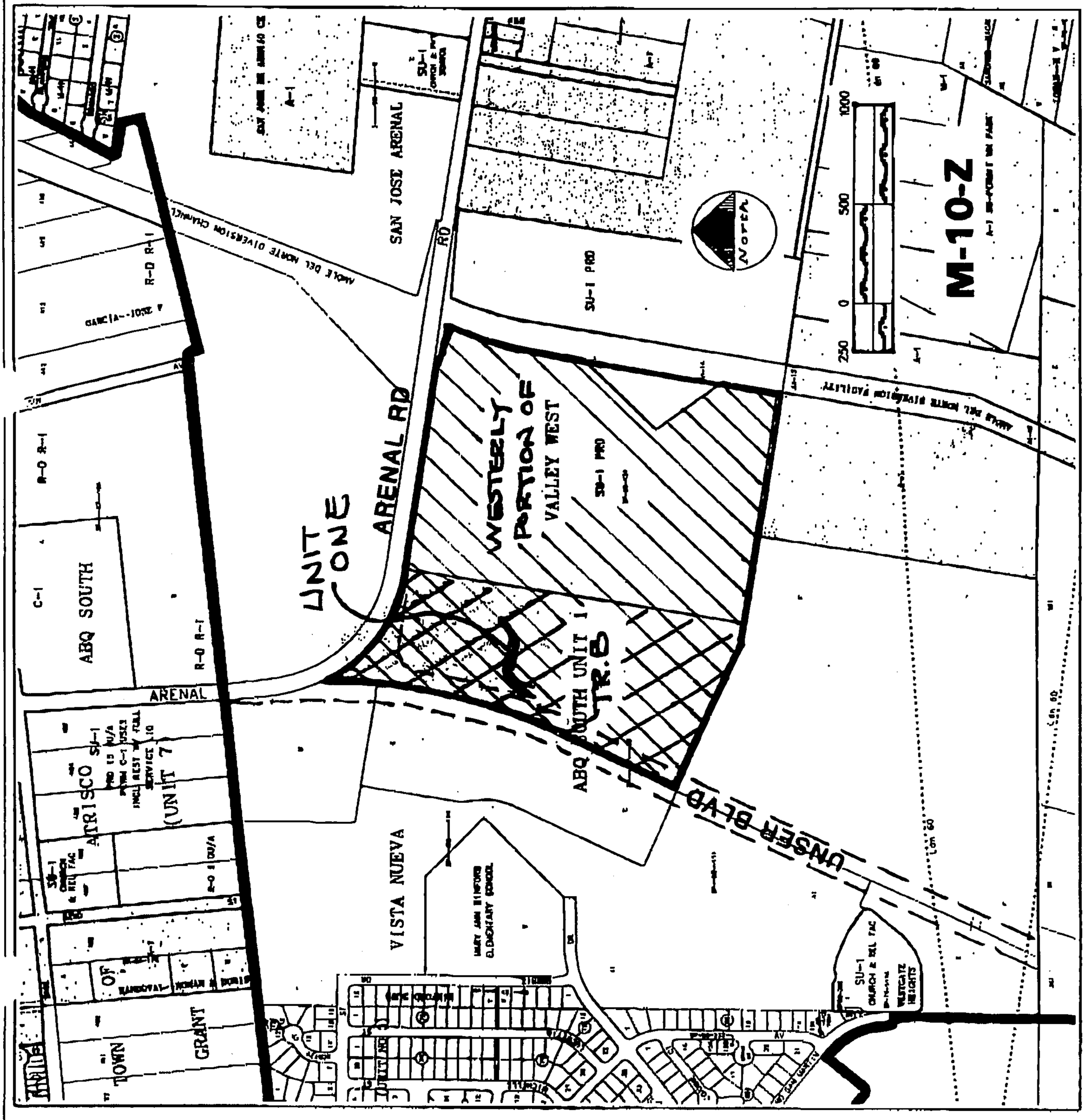
SCALE IN FEET

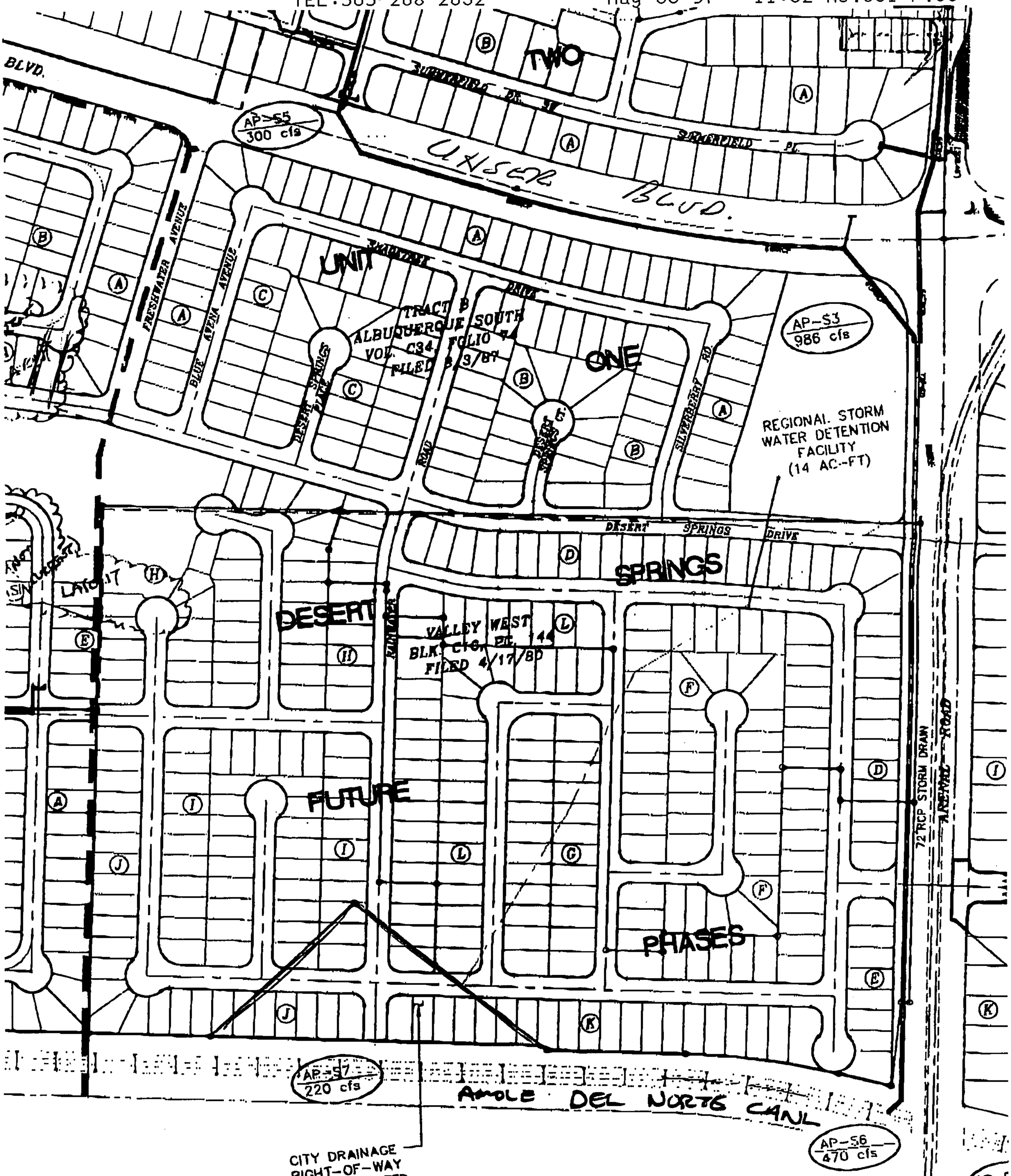
PHOTOCOPY--NOT TO SCALE



LEGAL DESCRIPTION

UNIFORM PROPERTY CODE




BLVD.
AP-55
300 cfs
UNSER BLVD.
SUNFLOWER DR. SE
SUNFIELD PL.
UNIT TWO
UNIT ONE
PRESTWATER AVENUE
BLUE AVENA AVENUE
DESERT SPRINGS DRIVE
TRACT B
ALBUQUERQUE SOUTH
VOL. C34, FOLIO
FILED 3/81
AP-53
986 cfs
REGIONAL STORM WATER DETENTION FACILITY (14 AC.-FT)
SILVERBERRY RD.
DESERT SPRINGS DRIVE
DESERT SPRINGS
VALLEY WEST PH. 4
BLK. C10
FILED 4/17/80
PAINT LOCK ROAD
FUTURE PHASES
72" RCP STORM DRAIN
ARROYO DEL NORTE CANAL
AP-57
220 cfs
AP-56
470 cfs
CITY DRAINAGE RIGHT-OF-WAY TO BE VACATED

DRAINAGE REPORT

FOR

DESERT SPRINGS SUBDIVISION
UNIT ONE

A 99 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION

ALBUQUERQUE NEW MEXICO
APRIL 1997

Prepared by:

ISAACSON & ARFMAN, P.A.
128 Monroe Street, NE
Albuquerque, NM 87108
(505) 268-8828

RECEIVED
APR 18 1997
HYDROLOGY SECTION

FRED C. ARFMAN
STATE OF NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

Fred C. Arfman 4/18/97

Fred C. Arfman, P.E. **Date**

INTRODUCTION

The Desert Springs Subdivision is a masterplan community consisting of multiple phases.

The four phases in this community extend from this property, which is situated at the southeast corner of Unser Blvd. and Arenal Road, to the east ending at the Amole del Norte Channel. The first phase of development (Unit One) is located in the northern corner of the community and is connected to the future phases by Rainwater Road to the east and Blue Avena Avenue to the south. Units Two, Three, and Four will be developed from north to south, with Unit Two bordering Unit One to the east and Unit Four bordering Unit One to the south. Flows from this community will be conveyed to the Amole del Norte Channel, initially as surface flows and ultimately as both storm drain and street flows. This drainage report primarily addresses the flows generated within Unit One. Unit One will utilize temporary detention ponds as an interim measure to accommodate onsite flows until the phased development of this community is continued.

I. PROJECT INFORMATION

LEGAL DESCRIPTION: A parcel of land comprising part of Tract B, Albuquerque South, Unit One (08-03-87, Volume C34, Folio 74).

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
Attn: Fred C. Arfman, P.E.
(505) 268-8828

SURVEYOR: Aldrich Land Surveying, Inc.
Attn: Tim Aldrich, NMPLS No. 7719
(505) 884-1990

BENCHMARK: ACS Monument "1-M10" located at the southeast quadrant of Sage Road and Unser Blvd. SW.
Elevation: 5079.88

ZONING: R-LT

NUMBER OF EXISTING TRACTS: 1

NUMBER OF PROPOSED LOTS: 99

TOTAL AREA: 28.80 Ac.
1,254,528 Sq. Ft.

II. SITE CHARACTERISTICS

FLOOD HAZARD: A small part of this development lies within a Zone AO (depth 2) floodplain area as determined by Panel No. 350002-0336 of the September 20, 1996 Edition of the F.E.M.A. Maps (refer to

Exhibit A). Flows within this zone are planned to be captured within a regional detention facility to be located within a proposed right-of-way dedication along the northern property boundary.

EXISTING CONDITIONS: This site is currently undeveloped and mostly undisturbed with native ground cover, typical of the City's west side (Land Treatment A). The site has an overall slope downward toward the east at slopes ranging from 1 to 5 percent. Near the center of the site there is a gentle ridge which divides the flow to both the northeast and southeast. Flows along Unser Blvd. are presently carried to the temporary detention pond, located where the regional detention facility will be located. Additionally, undeveloped overland flows from the future residential tract to the southwest cross over the southern portion of the proposed Tract A.

PROPOSED CONDITIONS:

Unit One: The development of the 99 lots of this phase will require the construction of a storm drain from the eastern end of Silverberry Road to the 66" diameter storm drain planned as a public project at Arenal Road. All flows will drain from the back of the lots to the front, and will be conveyed via street flow until captured by either a

temporary pond or storm drain. Two temporary detention ponds and one temporary retention pond will be required to catch runoff until future phases of this subdivision are constructed. Undisturbed flows will be overland sheet.

A. The beginning of the storm drain will be just north of the intersection of Silverberry Road and Desert Springs Drive. Two modified Type 'A' drop inlets functioning in sump conditions will capture 100% of the flows generated in Watersheds B and C. The storm drain will be a 36" diameter pipe capable of conveying 29.83 cfs at the projected slope of 0.20% (see Flowmaster Worksheet). — can't follow w/o map

Interim: Flows conveyed by the storm drain will be discharged into a retention pond located at the entrance of Unit One on Desert Springs Drive (see grading plan for detail). Show ponds, label streets identify storm drain

Ultimate: The 36" diameter line will be connected to the planned public storm line (66" diameter) upon completion. where?

B. The 21.04 cfs generated in Watershed D will flow as street flow to the temporary detention pond located at the east end of Rainwater Road. Once a 100-year 6-hour capacity is reached the pond will drain across the eastern boundary, as sheet flow to the Amole del Norte Channel (refer to grading plan for further detail). In the future phases these flows will be captured and conveyed to the Amole del Norte Channel by street flow and storm drain.

C. A second temporary detention pond will be located at the southeastern end of Shadetree Drive. It is also designed to provide a 100-year 6-hour capacity before draining. Flows will exit the pond from the northeast corner and flow overland to the Amole del Norte Channel (refer to grading plan for further detail). In future phases these flows will continue to the Amole del Norte Channel by street flows and storm drain.

Map showing phases
- Basin Map - existing and proposed (on & off-site)
- grading plan not dated
- north arrow analysis pts.
- label streets, ponds,
- show storm drain

master plan approved?

CONCLUSIONS & RECOMMENDATIONS

The recommendations for Desert Springs Subdivision, Unit One drainage study are presented below:

1. An interim retention pond is required near the intersection of Desert Springs Drive and Arenal Road to capture flows carried by the storm drain until the public storm drain line in Arenal Road is in place. Upon completion of the public line, the storm drain in Desert Springs Drive will be connected and the pond will no longer be needed.
2. A temporary detention pond is required at the easterly terminus of Rainwater Road and at the southerly terminus of Shadetree Drive.
3. All ponds identified above shall be covered by a City of Albuquerque Covenant and Maintenance Agreement.
4. Downstream offsite runoff is allowed per the previously recorded blanket drainage easement.
5. The reach of the Desert Springs Drive storm drain to the retention pond should be constructed as part of the Unit One construction.
6. Developer should have the option of constructing the hard lined connection between the storm drain outfall to the Amole del Norte Diversion Channel as temporary, permanent or a combination of both.

7. No rear yard ponding shall be allowed in this portion of the development (see Typical Lot Grading Detail). not shown

8. Adjacent lots may share a common lot line drainage swale (see Typical Lot Grading Detail).

runoff calcs - Atlymo?
street capacity calcs?
pond volume calcs.

FLOWMASTER WORKSHEETS

TABLE 1

FLOWS AT ANALYSIS POINTS

AP	Q_{100} (CFS)	OUTFALL
1	.69	STREET FLOW
2	.84	36" RCP @ S = .02% & STREET FLOW
3	16.25	36" RCP @ S = .02% & STREET FLOW
4	8.03	36" RCP @ S = .02% & STREET FLOW
5	21.04	STREET FLOW TO DETENTION POND
6	.146	STREET FLOW & OVERLAND FLOW
7	1.4	STREET FLOW TO DETENTION POND
8	2.79	FUTURE FLOW TO 36" RCP @ S = .02% & STREET FLOW

BASIN AREAS & FLOWS

BASIN ID	AREA (AC)	Q_{100} (CFS)
A	.157	.69
B	7.44	25.3
C	.638	2.79
D	6.23	21.04
E	.044	.146
F	1.4	4.67

RUNOFF CALCULATIONS FOR Q_{100}

Precip. Zone	Q_{100} Runoff Rates (cfs/ac)			
	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.70
3	1.87	2.60	3.45	5.02
4	2.20	2.92	3.73	5.25

Analysis Point	Land Treatment Areas (ac)					Q_{100} (cfs)	Remarks
	A_T	A_A	A_B	A_C	A_D		
AP1	.157	----	----	----	.157	.69	
AP2	.191	----	----	----	.191	.84	
AP3	4.87	----	1.31	1.31	2.25	16.25	
AP4	2.33	----	.56	.56	1.21	8.03	
Catch Basin 1	7.44	----	1.87	1.87	3.70	25.33	*Located on the west side of road. Includes flows from AP 2, 3, & 4
AP5	6.23	----	1.61	1.61	3.01	21.04	
AP6	.044	----	.012	.012	.02	.146	
AP7	1.4	----	.377	.377	.647	4.67	
Catch Basin 2	.638	----	----	----	.638	2.79	

Analyze Sump Inlets @ Desert Springs Drive

Q_{100} (West) = 25.3 cfs

Q_{100} (East) = 2.79 cfs

Inlet type: Use Modified Type "A" with Single grate and Double Throat

Grate Open Area:

Gross Area/grate: 2'-1½" x 2'-11 3/8" = 6.28 ft²

Less Bearing Bars: (.5") 1/12 x 2.95 x 13ea = 1.60 ft²

Less Cross Bars: (.5") 1/12 x 2.13 x 7ea = .62 ft²

Plus Intersection Counted 2x: (.5")(1/12) x .5(1/12) x 77EA = 1.13 ft²

Total 4.19 = 9.2 ft²

Calculate for Tc

h = .67 + .17 = .84'

Flow through grate = $CA\sqrt{2gh}$ = .67 (4.2/2) $\sqrt{64.4(.84)}$ = 10.4 cfs

Flow through double throat = $CA\sqrt{2gh}$ = .67(.5)(13.4) $\sqrt{64.4(.84)}$

= 33.0 cfs

Total capacity = 43.4 cfs

2 x 43.4 cfs = 86.8 cfs > 28.03 cfs.

RUNOFF VOLUME CALCULATIONS

Precip. Zone	Excess Precipitation, E (inches)			
	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

Analysis Point	Land Treatment Areas (ac)					Weighted E (in)	V_{100} (cf)	Remarks
	A_T	A_A	A_B	A_C	A_D			
AP1	7.55	----	1.87	1.87	3.81	1.41	38514	$V_{100\text{-}100} = 38514 + \left(\frac{3.81(3.67-2.20)}{12}\right)43560 = 58844$
AP5	6.23	----	1.61	1.61	3.01	1.38	31218	
AP7	1.4	----	.377	.377	.647	1.36	6897	

Weighted E = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D) \div A_T$

Volume = $\frac{\text{Weighted E}}{12} \times A_T \times 43{,}560$

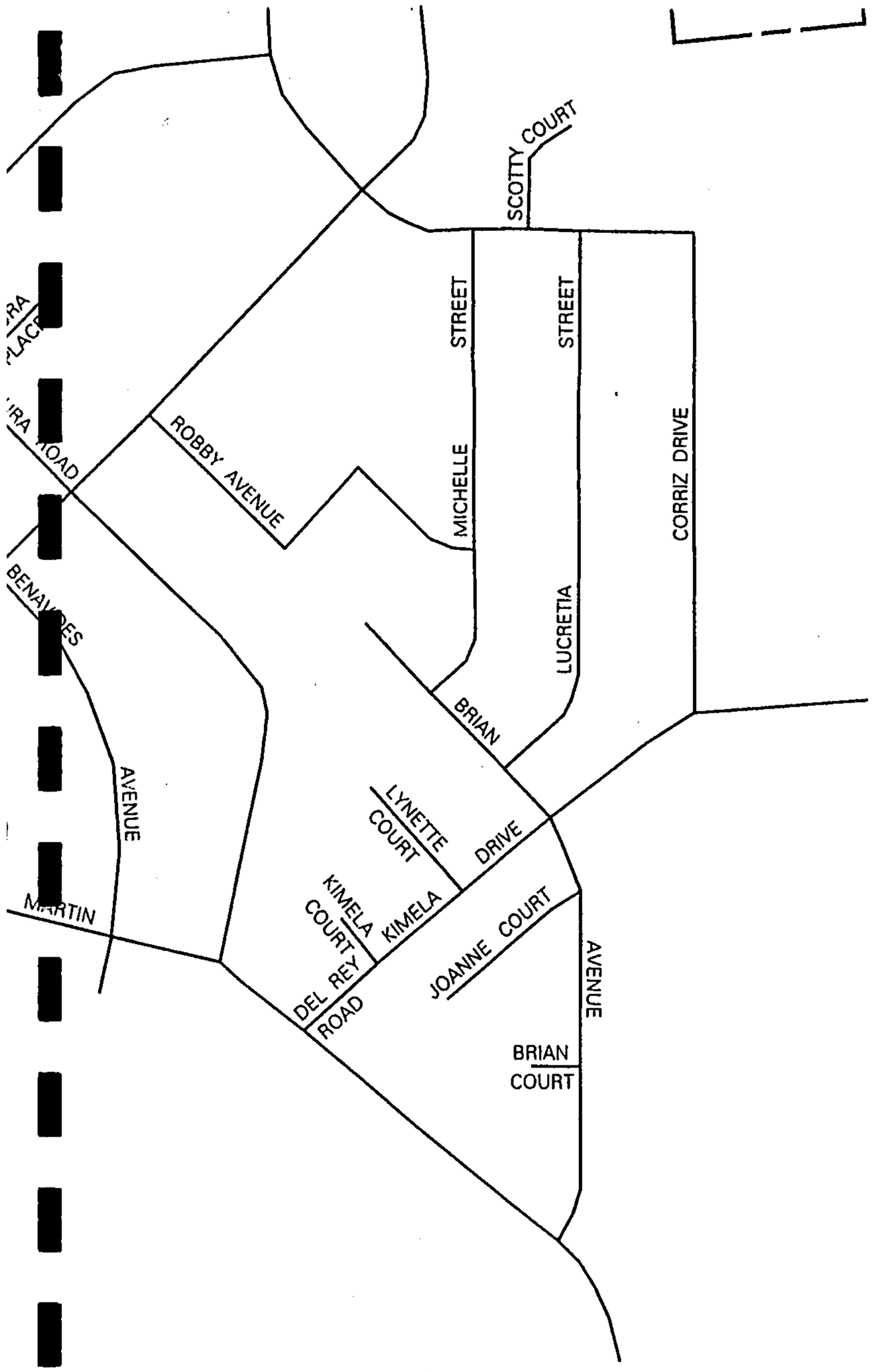
Haestad Methods FlowMaster I version 3.43

Circular Channel: Mannings Equation

* Desert Springs Drive Storm Drain Sizing

Solve for: Actual Discharge

Diameter	3 ft	Velocity	4.22 fps
Slope	.002 ft/ft	Flow Area	7.07 sf
Mannings N	.013	Critial Slope	.0097 ft/ft
Discharge	29.83 cfs	Critial Depth	1.77 ft
Depth	3 ft	Percent Full	100%
		Froude Number	Full
		Full Capacity	29.83 cfs
		Q max @ .99D	32.03 cfs



CITY OF ALBUQUERQUE
350002

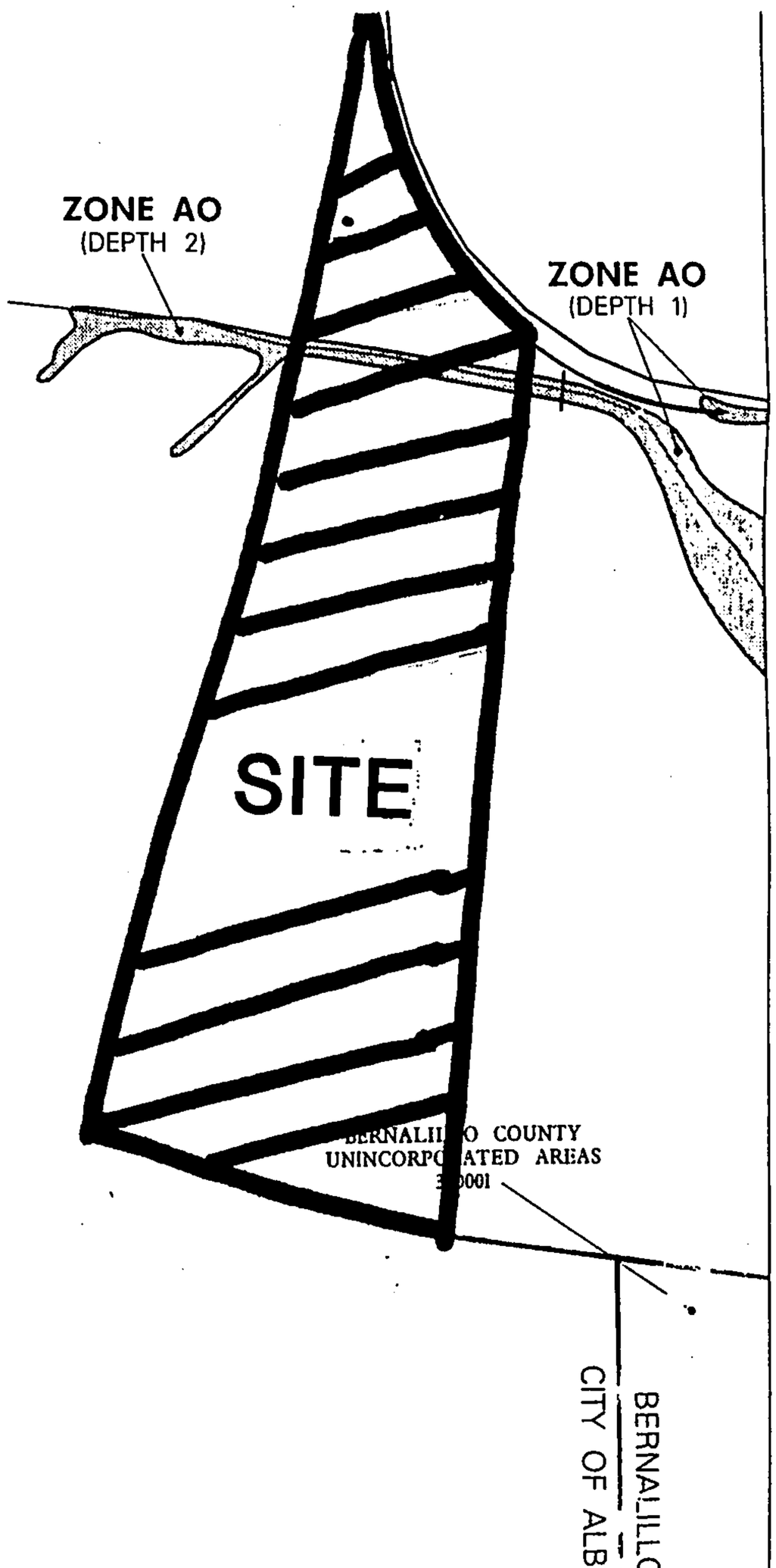


EXHIBIT A

ZONE X

scale 1:500

DRAINAGE INFORMATION SHEET

NEW

PROJECT FILE: Master Drainage Report Desert Springs SD and Drainage Report Desert Springs SD Unit 2

ZONE ATLAS/DRNG. FILE#: M-10 / D9

DRB #_____ EPC #_____ WORK ORDER #_____

LEGAL DESCRIPTION: Desert Springs Subdivision Unit One Tract A; Desert Springs Subdivision Tracts A, B, & C

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Builders Investment Co of NM Ltd Inc CONTACT: Stan Lane

ADDRESS: 7007 Wyoming Blvd NE, Ste D-6 PHONE: 828-1100

CITY, STATE: Albuquerque NM ZIP CODE: 87109

ARCHITECT: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich

ADDRESS: PO Box 30701 PHONE: 884-1990

CITY, STATE: Albuquerque NM ZIP CODE: 87190

CONTRACTOR: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

- ✓ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ✓ ~~CONCEPTUAL~~ GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ✓ OTHER MASTER DRAINAGE REPORT

PRE-DESIGN MEETING:

- ____ YES
- ✓ NO
- ____ COPY PROVIDED

RECEIVED
MAY 29 1998
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ✓ PRELIMINARY PLAT APPROVAL
- ____ S.DEV. PLAN FOR SUB'D. APPROVAL
- ____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ✓ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ✓ OTHER (SPECIFY) Work Order (Unit Two)

DATE SUBMITTED: 5-29-98

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

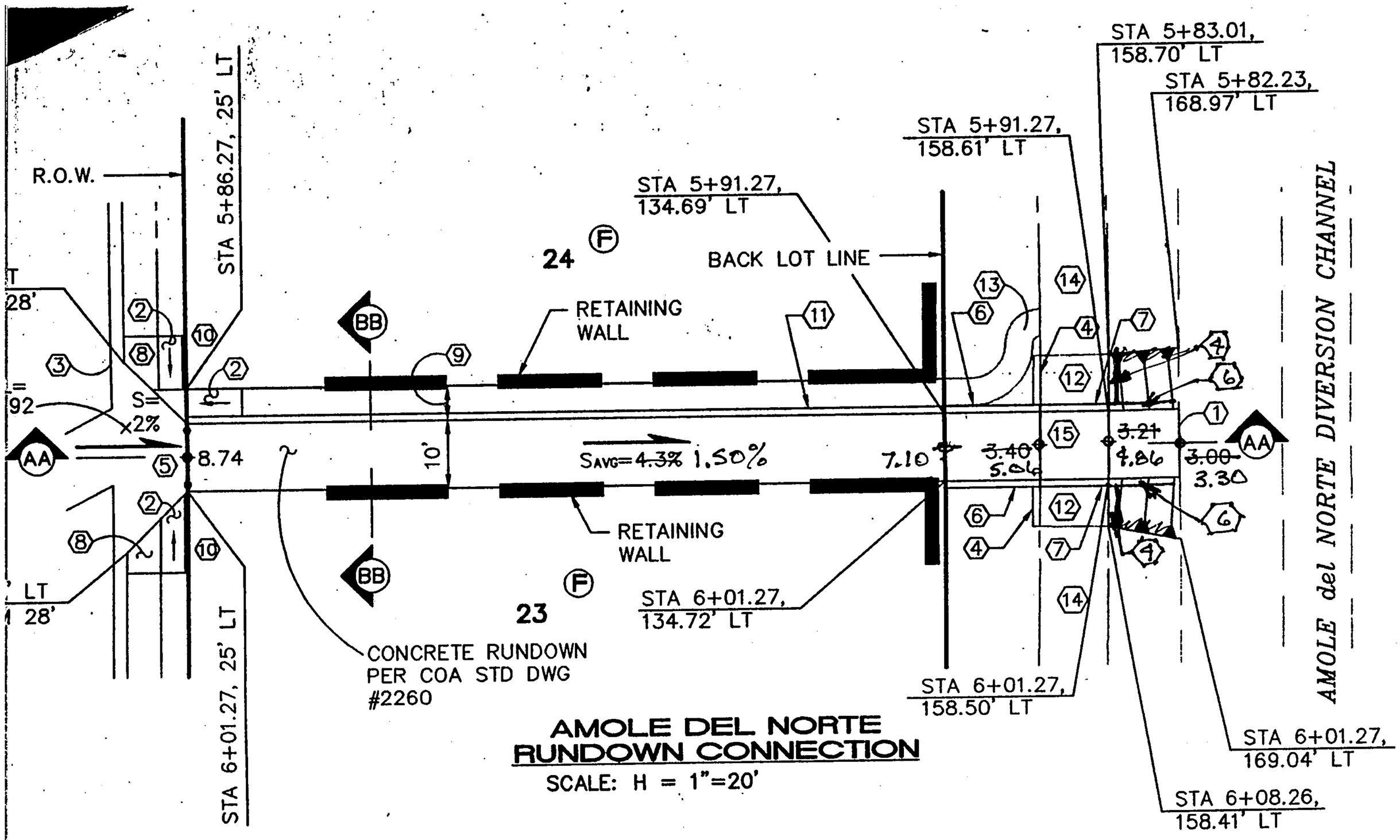
Desert Springs Unit 4 (Revised 5-2-00)
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\dsrtspgm.fm2
Worksheet	Concrete Rundown in Unit 4 (Revised)
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Bottom Width	8.00	ft
Discharge	21.55	cfs

Results		
Depth	0.39	ft
Flow Area	3.09	ft^2
Wetted Perimeter	8.77	ft
Top Width	8.00	ft
Critical Depth	0.61	ft
Critical Slope	0.003510	ft/ft
Velocity	6.98	ft/s
Velocity Head	0.76	ft
Specific Energy	1.14	ft
Froude Number	1.98	
Flow is supercritical.		

SMC
5-4-00



AMOLE DEL NORTE RUNDOWN CONNECTION

SCALE: H = 1"=20'

ALL STATIONING BASED ON DESERT BREEZE DRIVE ℄

KEYED CONSTRUCTION NOTES ⬡

1. PLACE EXPANSION JOINT BETWEEN THE CHANNEL AND PROPOSED SIDE INLET.

7. TEMPORARY EXTRUDED ASPHALT CURB PER COA STD DWG #2415.

THE CONCRETE CHANNEL CONTINUE 12:1 SLOPE TO MATCH EXISTING GRADE ALONG SIDEWALK ALIGNMENT.

3. PLACE TACK COAT BETWEEN ASPHALT AND CONCRETE RUNDOWN CONNECTION.

4. FUTURE CMU BLOCK WALL DECREASES FROM 1 FT TO 0 FT BETWEEN THE BOTTOM OF THE CHANNEL AND THE TOP OF THE TRAIL CROSSING.

5. PLACE REMOVABLE YELLOW BOLLARDS WITH RED REFLECTORIZED TAPE @ 4'-0" ON CENTER ACROSS CHANNEL OPENING.

6. 1'-0" HIGH BLOCK WALL (TYP).

STONE PER COA STD DWG #2430.

9. 5' ASPHALT TRAIL. 2" ASPHALT PER COA STD DWG #2415.

10. 8" HEADER CURB PER COA STD DWG #2415.

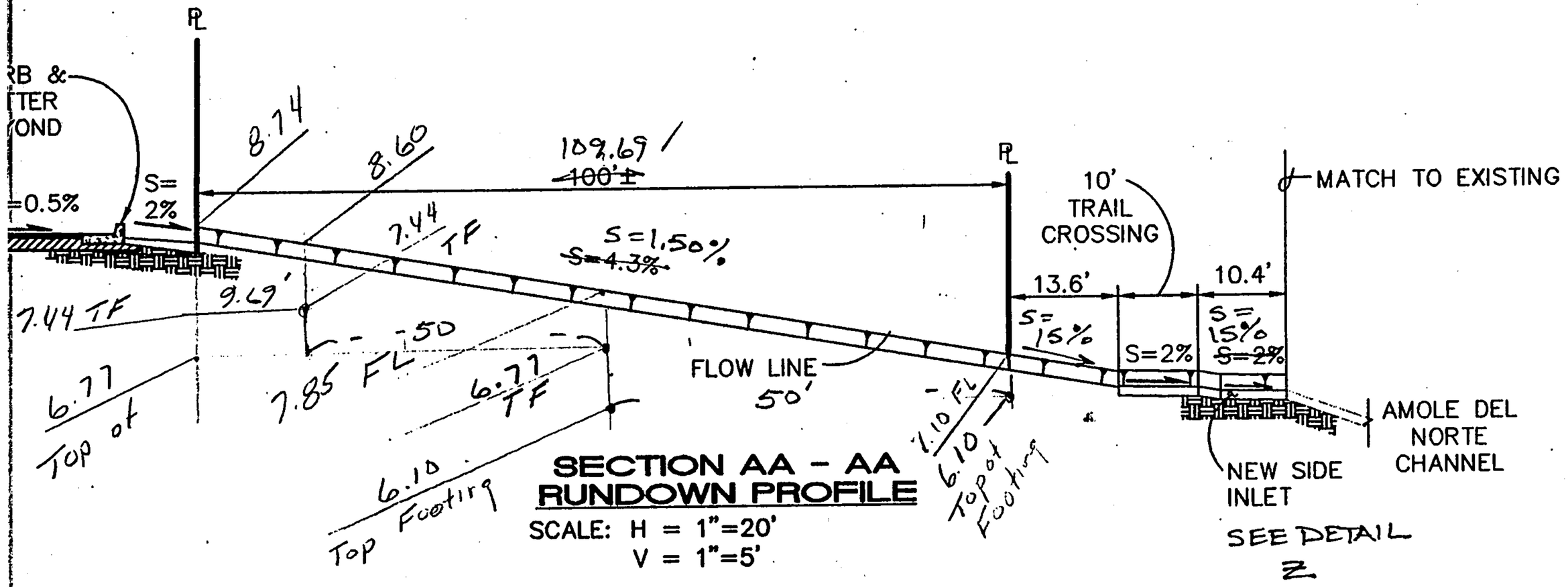
11. 8" CMU BLOCK WALL (TYP).

12. FUTURE 12:1 HANDICAP RAMPS FROM CHANNEL BOTTOM TO FUTURE TRAIL.

13. FUTURE 5' ASPHALT TRAIL CONNECTION BY OTHERS.

14. FUTURE 10' ASPHALT TRAIL BY OTHERS.

15. TRAIL CROSSING 2% MAX SLOPE.



SECTION AA - AA
RUNDOWN PROFILE
SCALE: H = 1"=20'
V = 1"=5'

DESERT SPRINGS UNIT 4

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Springs Unit 1 ZONE ATLAS/DRNG. FILE #: M-10 D008

DRB #: 97-185 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Tract B, Albuquerque South, Unit One, Filed 08-03-87, Vol C39 Folio 74

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman PA CONTACT: Melissa Combs

ADDRESS: 128 Monroe St NE 87108 PHONE: 268-8828

OWNER: Builders Investment Co CONTACT: Stan Lane

ADDRESS: 7007 Wyoming Blvd NE Suite D-6 PHONE: 828-1100

ARCHITECT: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich

ADDRESS: _____ PHONE: 884-1990

CONTRACTOR: NA CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

___ OTHER

PRE-DESIGN MEETING:

___ YES

___ NO

___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

___ S. DEV. PLAN FOR SUB'D. APPROVAL

___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

___ SECTOR PLAN APPROVAL

X FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

X OTHER W.O. Approval (SPECIFY)

RECEIVED
AUG 1 ^ 1997
HYDROLOGY SECTION

DATE SUBMITTED: 8-1-97

BY: Melissa Combs

CITY OF
Albuquerque
Public Works Department

August 22, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Drainage Report and Grading and Drainage Plan for Desert Springs Subdivision Unit 1 (M10/D8) Submitted for Preliminary Plat Approval, Engineer's Stamp Dated 8/20/97.

Dear Mr. Arfman:

Based on the information provided in the submittals of August 1, 1997 and August 21, 1997, the above referenced drainage report is acceptable to City Hydrology. However, prior to Preliminary Plat approval, the grading and drainage plan must be revised to show the locations of all retaining walls which are required where the grades between lots differ by more than 18". It appears that walls are also needed along Unser Boulevard. A typical wall detail must be provided on the plans. The revised grading plans must be submitted to the members of the DRB as well as to this office.

Prior to Work Order or Final Plat approval, the Master Drainage Plan for this area must be finalized and approved by my office. Blanket drainage easements and Agreement and Covenants must also be in place for the temporary retention ponds.

If you should have any questions, please call me at 924-3982.

Sincerely,

Susan Calongne

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Stan Lane, Builders Investment Co.
Fred Aguirre, DRB 96-435
File

Isaacson &
Arfman, P.A.

Consulting Engineering
Associates

Letter of Transmittal

To Susan Calongne
Hydrology Department

Date 8/21/97

Job No. 921

Attn: _____

Reference Desert Springs Unit One Hydrology Report : Revised

Gentlemen:

We transmit to you 1 copy(ies) of the following

- ☐ _____ Plats
- ☐ _____ Plans
- ☐ Specifications
- ☒ hydrology Report
- ☐ _____
- ☐ _____
- ☐ Shop Drawings
- ☐ Submittals
- ☐ Material Specifications
- ☐ Copy of Letter

This information is transmitted:

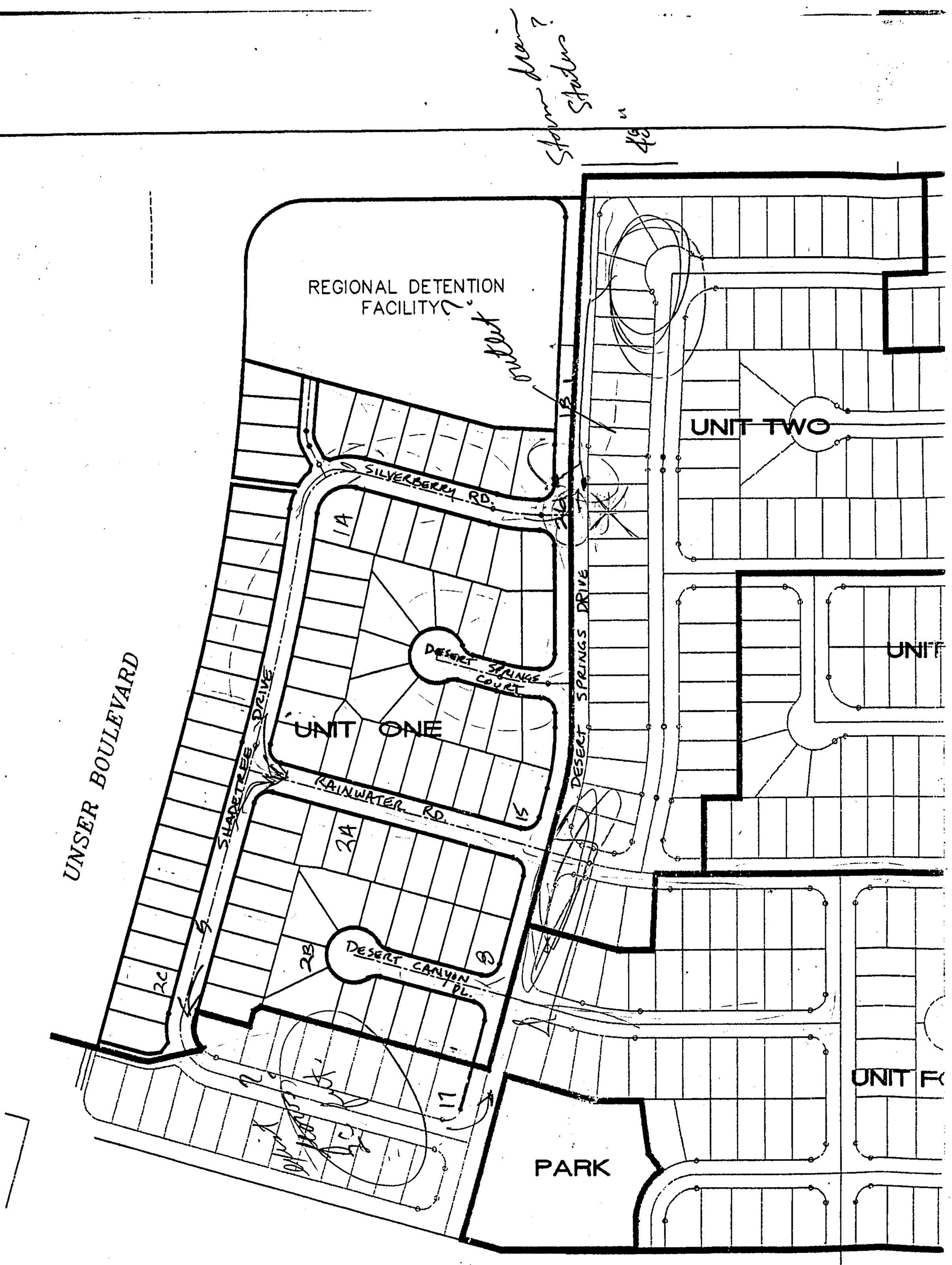
- ☒ As per your request
- ☒ For your review & approval
- ☐ For your information
- ☐ For your attention
- ☐ For your signature
- ☐ For your files
- ☐ For your use
- ☐ Please review & return
- ☐ For return to your files
- ☐ Please advise
- ☐ _____
- ☐ _____

Remarks: _____

By: Melissa Cambst

Copies To _____

128 Monroe, NE • Albuquerque, NM 87108 • (505) 268-8828



DESERT FLOWER SUBDIVISION (FUTURE)

Isaacson &
Arfman, P.A.

Consulting Engineering
Associates

RECEIVED
AUG 1 , 1997
HYDROLOGY SECTION

Letter of Transmittal

To CoA Hydrology Dept

Date 8-1-97

Job No. _____

Attn: Susan Calonge

Reference Desert Springs Unit One

Gentlemen:

We transmit to you 1 copy(ies) of the following

- ☐ _____ Plats
- ☐ _____ Plans
- ☐ Specifications
- ☒ Revised Hydrology Report
- ☐ _____
- ☐ _____
- ☐ Shop Drawings
- ☐ Submittals
- ☐ Material Specifications
- ☐ Copy of Letter

RECEIVED
JUL 13 1997
HYDROLOGY SECTION

This information is transmitted:

- ☐ As per your request
- ☒ For your review & approval
- ☐ For your information
- ☐ For your attention
- ☐ For your signature
- ☐ _____
- ☐ _____
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- ☐ Please advise

RECEIVED
AUG 1 , 1997
HYDROLOGY SECTION

Remarks: Please find attached a revised copy of the Desert Springs Unit One Hydrology report which addresses your comments from 5-12-97.

By: Melissa Combs

Copies To File

128 Monroe. NE • Albuquerque, NM 87108 • (505) 268-8828

Isaacson &
Arfman, P.A.

Consulting Engineering
Associates

Letter of Transmittal

To City Hydrology Date 08-15-97

Job No.

Attn: FRED AGUIRRE

Reference DESERT SPRINGS S/D, DRB-96-435

Gentlemen:

We transmit to you 1 copy(ies) of the following

- ☐ _____ Plat's
- ☐ _____ Plans
- ☐ Specifications
- ☐ _____ Report
- ☒ REVISED INFRAST. LISTING
- ☐ _____
- ☐ Shop Drawings
- ☐ Submittals
- ☐ Material Specifications
- ☐ Copy of Letter

This information is transmitted:

- ☐ As per your request
- ☐ For your review & approval
- ☐ For your information
- ☐ For your attention
- ☐ For your signature
- ☐ _____
- ☐ _____
- ☒ For your files
- ☒ For your use
- ☐ Please review & return
- ☐ For return to your files
- ☐ Please advise

Remarks: _____

By: FRED ARFMAN

Copies To _____

128 Monroe, NE • Albuquerque, NM 87108 • (505) 268-8828

Sump inlets

grading future area 2C

Depth of flow in Silverberry (before intersection with Desert Springs Dr)

$A = 5.03$ AC

Land Treatment: %B = 19.5
%C = 19.5
%D = 61

$Q_{P_{100}} = .98(2.03) + .98(2.87) + 3.07(4.37) = 18.22$ cfs (per dpm)

$Q_{P\ 1/2\ street} = 9.11$ cfs

per dpm plate 22.3 D-1 $d = .48$ ft

Depth of flow @ Desert Springs Drive

from drainage report: $Q_{1/2\ street\ required} = 13.9$ cfs

@ $d = .67$ $Q_{1/2\ street} = 24.48$ cfs

@ $d = .33$ ft

$A_{1/2\ street} = \frac{.205 * 16}{2} + .125 + 2(.205) = 2.18\ ft^2$

$W_p = .33 + 2 + 10.25 = 12.58$ ft

$Q = \frac{1.486}{.017}(.173)^{.67}(.005)^{.5}(2.18) = 4.16$ cfs

∴ by interpolation $d = .49$ feet @ $Q = 13.9$ cfs.

Analyze Sump Inlets at Desert Springs Drive

Variables:

Q_{100} = 27.81 cfs

Inlet Type: Modified Type "A" with single grate and double throat

Grate Open Area:

	Gross Area/Grate = 2'-1 ½" * 2' –11 3/8" =	6.28 ft^2
Less	Bearing Bars = (0.5 * 1/12) * 2.95 * 13 =	1.60 ft^2
Less	Cross Bars = (0.5 * 1/12) * 2.13 * 7 =	.62 ft^2
Plus	Intersection Counted 2x = (0.5 *1/12) * (0.5 * 1/12) * 77 =	.13 ft^2
	Total =	4.20 ft^2

Depth of flow at sump inlets (H) : .49 feet

Use the Orifice equation to calculate inlet capacity:

Grate Flow = $CA(2gH)^{.5}$ = .67 * 4.2 * (64.4 *.49) $^{.5}$ = 15.81 cfs
Double Throat Flow = $CA(2gH)^{.5}$ = .67 * .5 * 13.4 * (64.4 *.49) $^{.5}$ = 25.22 cfs

Inlet Capacity = 25.22 + 15.81 = 41.02 cfs/ inlet
Apply a .6 clogging factor = 41.02 * .6 = 24.61 cfs/inlet

Total Capacity = 24.61 * 2 = 49.22 cfs > 28.03 cfs ✓ ok

City of Albuquerque

October 13, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Supplemental Street Capacity Calculations for Desert Springs Subdivision, Units Three through Five, (M10/D8) Submitted for Work Order Approval.

Dear Mr. Arfman:

Based on the information provided, the above referenced supplemental street calculations are adequate to justify changing the standard curbs to mountable curbs on the streets indicated in your submittal. Please let me know what I can do to help make this change in the Work Order plans.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo K. Johnson, P.E., Curb Inc.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT FILE: DESERT SPRINGS, UNITS 3-5 ZONE ATLAS/DRNG. FILE#: M10/D8

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: DESERT SPRINGS SUBD, UNITS 3 THRU 5

CITY ADDRESS: N/A

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: FRED C. ARFMAN

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB INC. % BOKAY CONST. CONTACT: BO JOHNSON

ADDRESS: 5905 AZUELO NW PHONE: 899-9656

CITY, STATE: ABQ. NM ZIP CODE: 87120

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: _____ PHONE: 884-1990

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: NEW CONCEPTS INC CONTACT: TOM LAKEMAN

ADDRESS: 508 PARAGON RD. S.E. PHONE: 452-8910

CITY, STATE: ABQ. NM ZIP CODE: 87105

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERTIFICATION
X OTHER (SUPPLSMENTAL ST. CAP. CALCS)

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

RECEIVED
OCT 6 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL
_____ PRELIMINARY PLAT APPROVAL
_____ S.DEV. PLAN FOR SUB'D. APPROVAL
_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
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_____ FOUNDATION PERMIT APPROVAL
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_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
X OTHER (SPECIFY) WORK ORDER

DATE SUBMITTED: 10.06.99

BY: FRED C. ARFMAN
FOR ISAACSON & ARFMAN, P.A.

RECEIVED
OCT 8 1999
HYDROLOGY SECTION

PARK

WATER DETENTION FACILITY (14 AC-FT)

DESERT SPRINGS DRIVE

COOL SPRINGS DRIVE

APRIL FLOWER PLACE

BLUE AVENA AVENUE

DESERT CANYON PLACE

RAINWATER ROAD

AUTUMN SKY ROAD

AUTUMN BREEZE ROAD

DESERT MORNING ROAD

DESERT BREEZE DRIVE

ARENAL ROAD

UNIT ONE

UNIT TWO

UNIT THREE

UNIT FOUR

UNIT FIVE

PHASES

16.97

17.2

14.3

12.8

1.5%

2.0%

STREET CAPACITY CALCULATIONS

Street	Location	Street Width	Curb Type	Slope (ft/ft)	Q100(cfs)	Depth (ft)	EG (ft)
DESERT MORNING RD	@ EAST PL OF LOT 29	32	MTBL	0.008	12.8	0.33	0.42
COOL SPRINGS DRIVE	@ DESERT MORNING RD	32	MTBL	0.006	6.75	0.28	0.32
COOL SPRINGS DRIVE	@ NORTH PHASE LINE UNIT 4	32	MTBL	0.006	4.95**	0.32	0.39
AUTUMN BREEZE	@ WEST PL OF LOT 15	28	MTBL	0.01	14.3	0.32	0.49
AUTUMN SKY	@ AP 9	28	MTBL	0.0143	17.2	0.32	0.50
RAINMAKER RD	@ AP 7	28	MTBL	0.0151	16.97	0.32	0.50

* Q'S LISTED ARE FULL STREET FLOWS UNLESS MARKED WITH **

RECEIVED
OCT 8 1999
HYDROLOGY SECTION

STREET CAPACITY CALCULATIONS

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* Q'S LISTED ARE FULL STREET FLOWS UNLESS MARKED WITH **

RECEIVED
OCT 6 1999
HYDROLOGY SECTION

PARK

WATER DE
FACILITY
(14 AC-FT)

DESERT SPRINGS DRIVE

SPRINGS

COOL SPRINGS DRIVE

DESERT

UNIT THREE

UNIT FOUR

UNIT FIVE

PHASES

APRIL FLOWER PLACE

BLUE AVENA AVENUE

DESERT CANYON PLACE

RAINWATER ROAD

AUTUMN SKY ROAD

DESERT BREEZE DRIVE

DESERT MORNING ROAD

ARENAL ROAD

ITY

RECEIVED
OCT 6 1999
HYDROLOGY SECTION

DRAINAGE INFORMATION SHEET

PROJECT TITLE: DESERT SPRINGS, UNITS 3-5 ZONE ATLAS/DRNG. FILE#: M10/D8

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: DESERT SPRINGS SUBD, UNITS 3 THRU 5

CITY ADDRESS: N/A

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: FRED C. ARFMAN

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB INC. % BOKAT CONST. CONTACT: BO JOHNSON

ADDRESS: 5905 AZUELO NW PHONE: 899-9656

CITY, STATE: ABQ. NM ZIP CODE: 87120

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: _____ PHONE: 884-1990

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: NEW CONCEPTS INC CONTACT: TOM LAKEMAN

ADDRESS: 508 PARAGON RD. S.E. PHONE: 452-8810

CITY, STATE: ABQ. NM ZIP CODE: 87105

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERTIFICATION
X OTHER (SUPPLSMENTAL ST. CAP. CALCS)

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

RECEIVED
OCT 8 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

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_____ CERTIFICATE OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
X OTHER (SPECIFY) WORK ORDER RESUBMITTAL TO SHOW Q @ CRITICAL PTS.

10.08.99

DATE SUBMITTED: 10.06.99

BY: FRED C. ARFMAN

FOR ISAACSON & ARFMAN, P.A.

DRAINAGE INFORMATION SHEET

PROJECT TITLE: DESERT SPRINGS SUBDIVISION, UNIT 3 ZONE ATLAS/DRNG. FILE#: M-10 / D008

DRB # 98-185 EPC # _____ WORK ORDER # _____

LEGAL DESCRIPTION: TRACT C-1, DESERT SPRINGS UNIT 2 & A PORTION OF TRACT B, DESERT SPRINGS SUBDIVISION

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: FRED ARFMAN
ADDRESS: 128 Monroe Street NE PHONE: 268-8828
CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB INC. CONTACT: BO JOHNSON
ADDRESS: 6301 INDIAN SCHOOL RD, STE 680 PHONE: 881-9190
CITY, STATE: ALBQ., NM ZIP CODE: 87110

ARCHITECT: N/A CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: WALKER SURVEYING CO. CONTACT: _____
ADDRESS: 424 SHIRK LN SW PHONE: 266-6209
CITY, STATE: ALBQ., NM ZIP CODE: 87105

CONTRACTOR: SALLS BROS CONTACT: FRED SALLS
ADDRESS: _____ PHONE: 873-8780
CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
___ GRADING PLAN
___ EROSION CONTROL PLAN
X ENGINEER'S CERTIFICATION
___ OTHER

PRE-DESIGN MEETING:

___ YES
___ NO
___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
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___ S.DEV. PLAN FOR SUB'D. APPROVAL
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___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
X OTHER (SPECIFY) CLOSE-OUT & REL. OF FINANCIAL GUARANTEE

RECEIVED
MAR 21 2000
HYDROLOGY SECTION

DATE SUBMITTED: 03.21.00

BY: FRED C. ARFMAN
FOR ISAACSON & ARFMAN, P.A.

RECEIVED
DEC 29 1999
HYDROLOGY SECTION

Letter of Transmittal

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque, New Mexico 87108

To: COA HYDROLOGY

Date: 12/29/99

Job No. 1104

Attn: SUSAN CALONGNE

Reference: DESERT SPRINGS SUBD. UNITS 3-5

We transmit to you 1 copy(ies) of the following:

- ☐ _____ Plats
- ☐ GRADING + DRAINAGE Plans
- ☐ _____ Disks
- ☐ _____ Report
- ☐ _____
- ☐ _____
- ☐ _____

- ☐ Specifications
- ☐ Submittals
- ☐ Shop Drawings
- ☐ Copy of Letter

This information is transmitted:

- ☐ As per your request
- ☒ For your review & approval
- ☐ For your information
- ☐ For you attention
- ☐ For your signature
- ☐ _____
- ☐ _____

- ☐ For your files
- ☐ For your use
- ☐ Please review & return
- ☐ For return to your files
- ☐ Please advise

Remarks: _____

By: _____ Copies to: _____

(505) 268 - 8828; FAX: (505) 268 - 2632; EMAIL: iamengrs@swcp.com

DRAINAGE INFORMATION SHEET

PROJECT #: DESERT SPRINGS, UNITS 3-5 ZONE ATLAS/DRNG. FILE#: M10/D8

DRB # 98-185 EPC # WORK ORDER #

LEGAL DESCRIPTION: DESERT SPRINGS SUBD., UNITS 3 THROUGH 5

CITY ADDRESS: N/A

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: GENNY DONART

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB INC C/O BOKAY CONST CONTACT: BO JOHNSON

ADDRESS: 5905 AZUELO NW PHONE: 899-9656

CITY, STATE: ABQ, NM ZIP CODE: 87120

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: PHONE: 884-1990

CITY, STATE: ZIP CODE:

CONTRACTOR: NEW CONCEPTS, INC. CONTACT: TOM LAKEMAN

ADDRESS: 508 PARAGON RD SE PHONE: 452-8910

CITY, STATE: ABQ, NM ZIP CODE: 87105

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

____ NO

____ COPY PROVIDED

prop grades do not conflict w/ approved plan

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ S.DEV. PLAN FOR SUB'D. APPROVAL

____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

X OTHER (SPECIFY) WORK ORDER

DATE SUBMITTED: 12/30/99

BY: GENNY DONART

FOR ISAACSON & ARFMAN, P.A.

Master 3-5
app 4-5-99
6-17-99

COPY

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 99-06-844P

The Honorable Jim Baca
Mayor, City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Community: City of Albuquerque, New Mexico
Community No.: 350002
Panels Affected: 35001C0336 D and 0337 D
Effective Date of This Revision: APR 15 1999

102-D-A

Dear Mayor Baca:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Bernalillo County, New Mexico and Incorporated Areas (the effective FIRM for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 24, 1999, Ms. Susan M. Calongne, P.E., City/County Floodplain Administrator, City of Albuquerque/Bernalillo County, requested that FEMA revise the FIRM to show the effects of improvements to an existing detention pond near the intersection of Unser Boulevard and Arenal Road and construction of a storm drain system along Arenal Road from the detention pond to the Amole del Norte Diversion Channel.

All data required to complete our review of this request were submitted with letters from Mr. Fred C. Arfman, P.E., Vice President, and Ms. Melissa Combs, both of Isaacson & Arfman, P.A., and Ms. Calongne.

We have completed our review of the submitted data and the flood data shown on the effective FIRM. We have revised the FIRM to show that the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) is contained in the detention pond southeast of the intersection of Unser Boulevard and Arenal Road, in the storm drain system, and along the Arenal Road right-of-way. In addition, we have revised the FIRM to remove the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, from just downstream of the detention pond to the Amole del Norte Diversion Channel. The modifications are shown on the enclosed annotated copies of FIRM Panel(s) 35001C0336 D and 35001C0337 D. This Letter of Map Revision (LOMR) hereby revises the above-referenced panel(s) of the effective FIRM dated September 20, 1996.

The modifications are effective as of the date shown above. The map panel(s) as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

APRIL 15, 1999

COMR

ISSUED.

The following table is a partial listing of existing and modified base flood elevations (BFEs):

Location	Existing BFE (feet)*	Modified BFE (feet)*
Along Arenal Road from the confluence with Amole del Norte Channel to approximately 700 feet east of the intersection of Unser Boulevard and Arenal Road	1[1]	None[2]
Approximately 700 feet southeast of the intersection of Unser Boulevard and Arenal Road	1[1]	None[2]

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot
[1] Depth in feet above ground, rounded to the nearest whole foot
[2] Base flood contained in detention pond and storm drain system

Public notification of the modified BFEs will be given in the *Albuquerque Journal* on or about May 21 and May 28, 1999. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Albuquerque Journal*, a citizen may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs presented in this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and Flood Insurance Study (FIS) report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a detention pond and storm drain project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the detention pond and storm drain rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria are the minimum requirements and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR.

FEMA makes flood insurance available in participating communities; in addition, we encourage communities to develop their own loss reduction and prevention programs. Our Project Impact initiative, developed by FEMA Director James Lee Witt, seeks to focus the energy of businesses, citizens, and communities in the United States on the importance of reducing their susceptibility to the impact of all natural disasters, including floods, hurricanes, severe storms, earthquakes, and wildfires. Natural hazard mitigation is most effective when it is planned for and implemented at the local level, by the entities who are most knowledgeable of local conditions and whose economic stability and safety are at stake. For your information, we are enclosing a Project Impact Fact Sheet. For additional information on Project Impact, please visit our Web site at **www.fema.gov**.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by contacting the Director, Mitigation Division of FEMA in Denton, Texas, at (940) 898-5127. If you have any technical questions regarding this LOMR, please contact Mr. Alan Johnson of our staff in Washington, DC, either by telephone at (202) 646-3403 or by facsimile at (202) 646-4596.

Sincerely,

Alan Johnson, P.E., Project Engineer
Hazards Study Branch
Mitigation Directorate

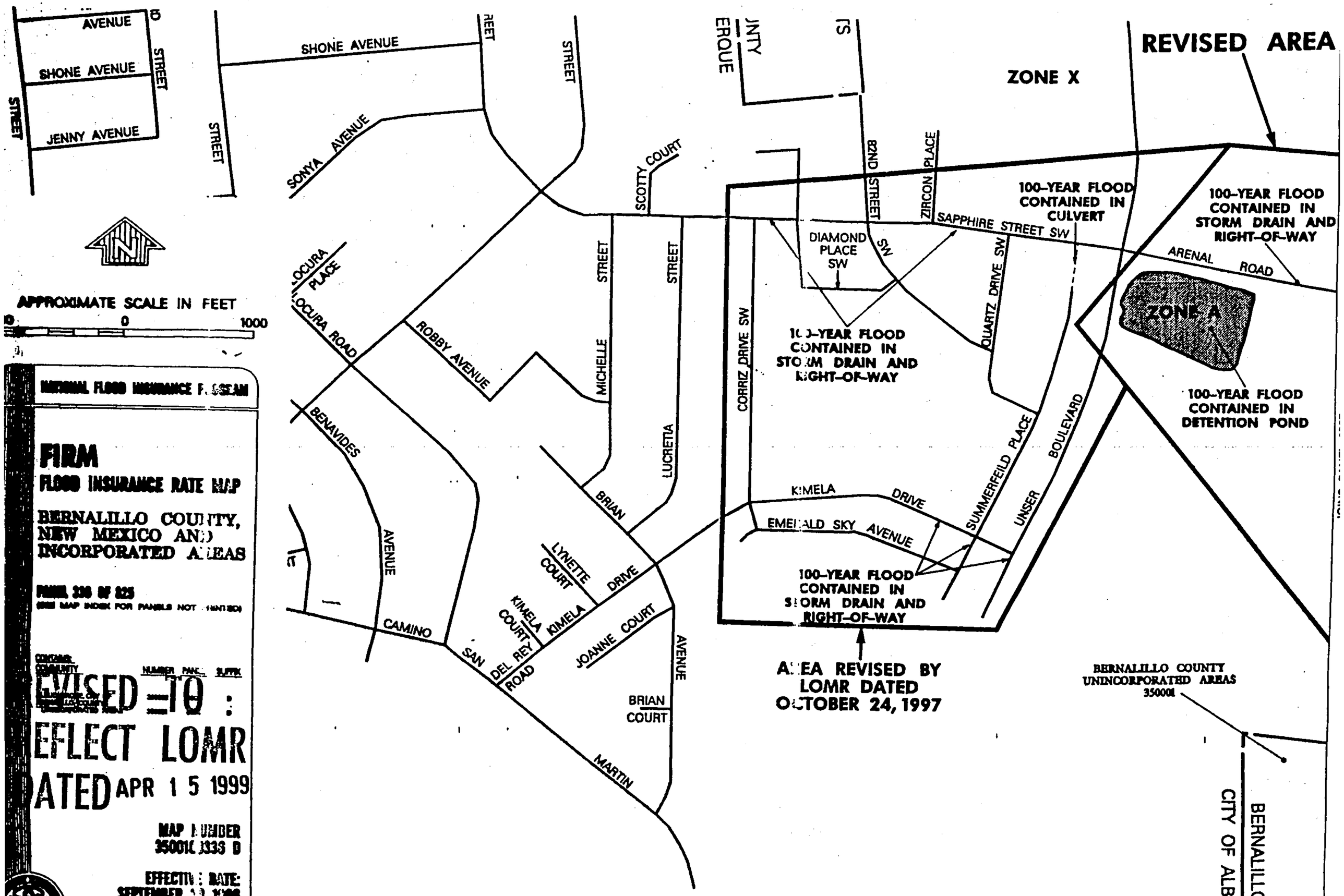
For: Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosure(s)

cc: Ms. Susan M. Calongne, P.E.
City/County Floodplain Administrator
City of Albuquerque/Bernalillo County

Mr. Fred C. Arfman, P.E.
Vice President
Isaacson & Arfman, P.A.

Ms. Melissa Combs
Isaacson & Arfman, P.A.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 336 OF 825

SEE MAP INDEX FOR PANELS NOT PRINTED

COMMUNITY NUMBER PANEL SUFFIX

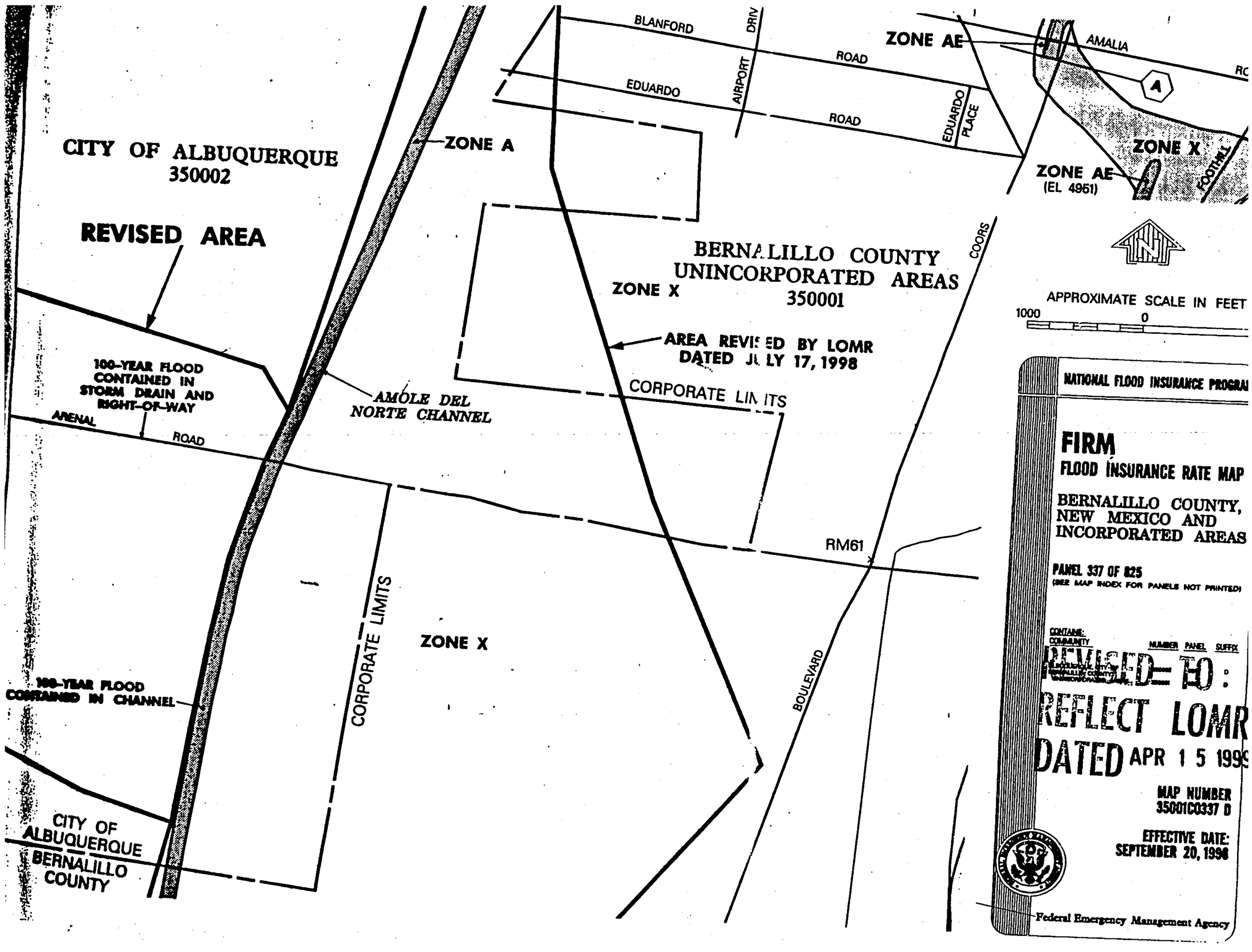
REVISED TO REFLECT LOMR DATED APR 15 1999

MAP NUMBER 350001C 0336 D

EFFECTIVE DATE: SEPTEMBER 20, 1996

Federal Emergency Management Agency

CITY OF ALBUQUERQUE
350002


BLANFORD
DRIV
AIRPORT
ROAD
EDUARDO
ROAD
ZONE AE
AMALIA
RC
A
EDUARDO
PLACE
ZONE X
ZONE AE
(EL 4951)
FOOTHILL
ZONE A
CITY OF ALBUQUERQUE
350002
REVISED AREA
BERNALILLO COUNTY
UNINCORPORATED AREAS
350001
ZONE X
COORS
AREA REVISED BY LOMR
DATED JULY 17, 1998
CORPORATE LIMITS
100-YEAR FLOOD
CONTAINED IN
STORM DRAIN AND
RIGHT-OF-WAY
ARENAL
ROAD
AMOLE DEL
NORTE CHANNEL
RM61
CORPORATE LIMITS
ZONE X
BOULEVARD
100-YEAR FLOOD
CONTAINED IN CHANNEL
CITY OF
ALBUQUERQUE
BERNALILLO
COUNTY
APPROXIMATE SCALE IN FEET
1000
0
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO AND
INCORPORATED AREAS
PANEL 337 OF 825
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
REVISED TO:
REFLECT LOMR
DATED APR 15 199
MAP NUMBER
350010337 D
EFFECTIVE DATE:
SEPTEMBER 20, 1996
Federal Emergency Management Agency

ORIGINAL

DRB Case No. 98-185
DRC Project No.
Date Submitted: 2/17/99
Prelim. Plat Approved: 4-13-99
Prelim. Plat Expires: 4-13-2000

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (DRB)
REQUIRED INFRASTRUCTURE LIST
DRB 98-185
TRACTS A & B, DESERT SPRINGS SUBDIVISION &
TRACT C-1, DESERT SPRINGS SUBDIVISION UNIT TWO
BEING REPLATTED AS

DESERT SPRINGS SUBDIVISION, UNITS 3-5

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are Subdivider responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

SIZE	IMPROVEMENT	LOCATION	FROM	TO
UNIT THREE				
28' F-F	Res. Paving	Blue Avena Ave.	April Flower Pl.	Desert Breeze Dr.
4'*	PCC Sidewalk**	"	"	"
MTBL	Curb & Gutter**	"	"	Moonlit Rose Dr.
STD	Curb & Gutter**	"	Moonlit Rose Dr.	Desert Breeze Dr.
6"	Waterline	"	April Flower Pl.	"
8"	SAS	"	Lot 1/Blk C	"
28' F-F	Res. Paving	Moonlit Rose Dr.	Blue Avena Ave.	Desert Canyon Pl.
4'*	PCC Sidewalk**	"	"	"
MTBL	Curb & Gutter**	"	"	"
6"	Waterline	"	"	"
28' F-F	Res. Paving	Desert Canyon Pl.	Desert Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk**	"	"	"
STD	Curb & Gutter**	"	"	"
6"	Waterline	"	"	"
8"	SAS	"	Lot 42/Blk D	"

SIZE	IMPROVEMENT	LOCATION	FROM	TO
32' F-F	Res. Paving	Rainwater Rd.	Desert Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk**	"	"	"
STD	Curb & Gutter**	"	"	"
6"	Waterline	"	"	"
8"	SAS	"	Lot 38/Blk D	"
32' F-F	Res. Paving	Desert Breeze Dr.	Blue Avena Ave.	North Property Line Lot 18/Blk E
25' ~~24'~~ F-F	Res. Paving	"	"	Lot 1/Blk F
4'*	PCC Sidewalk**	"	~~Lot 1/Blk F~~ "	North Property Line Lot 18/Blk E
MTBL	Curb & Gutter**	"	Blue Avena Ave.	Lot 1/Blk F
STD	Curb & Gutter**	"	"	North Property Line Lot 18/Blk E
8"	Waterline	"	Lot 1/Blk F	"
8"	SAS	"	"	"
4'*	PCC Sidewalk (east only)	"	"	Blue Avena Ave.
32' F-F	Res. Paving	Cool Springs Dr.	Rainwater Rd.	North Property Line Lot 1/Blk E
4'*	PCC Sidewalk**	"	"	"
STD	Curb & Gutter**	"	"	"
6"	Waterline	"	"	"
T.B.D. @ DRC	Concrete Rundown	(15' R/W) East Terminus Rainwater Rd.	Desert Breeze Dr.	Amole del Norte Diversion Channel
36" DIA	Storm Drain & Emergency Overflow	(20' R/W) East Terminus Blue Avena Ave.	"	"
4'*	PCC Sidewalk (east only)	Desert Springs Dr.	Freshwater Rd.	Rainwater Rd.
12' ~~8'~~ F-E	Res. Paving	"	"	"
STD	Curb & Gutter (east only)	"	"	"
25' F-F	Art. Paving	Arenal Rd.	Desert Springs Dr.	Amole del Norte Diversion Channel
STD	Curb & Gutter (south only)	"	"	"
EXT ~~ASPH~~ PCC	Curb (south only)	"	"	"
6'	PCC Sidewalk (south only)	"	"	"
2	Catch Basins	"		

SIZE	IMPROVEMENT	LOCATION	FROM	TO
UNIT FOUR				
28' F-F	Res. Paving	Rainmaker Rd.	Cool Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
6"	Waterline	"	"	"
8"	SAS	"	Lot 34/Blk E	"
28' F-F	Res. Paving	Autumn Sky Rd.	Cool Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
6"	Waterline	"	"	"
8"	SAS	"	Lot 33/Blk G	"
32' F-F	Res. Paving	Cool Springs Dr.	So. Property Line Lot 35/Blk E	North Property Line Lot 1/Blk H
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
6"	Waterline	"	"	"
32' F-F	Res. Paving	Desert Breeze Dr.	So. Property Line Lot 19/Blk E	North Property Line Lot 17/Blk H
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
8"	Waterline	"	"	"
8"	SAS	"	"	"
T.B.D. @ DRC	Concrete Rundown	15' R/W East Terminus Autumn Sky Rd.	Desert Breeze Dr.	Amole del Norte Diversion Channel
12' 8 F-E	Res. Paving	Desert Springs Dr.	Rainwater Rd.	Silverberry Rd.
4'*	PCC Sidewalk (east only)	"	"	"
STD	Curb & Gutter (east only)	"	"	"

- TEmporary Retention Pond with a COA Agreement & Covenant at the north end of Cool Springs Dr.

- Final Grading of the Arenal/Unser regional detention facility.

SIZE	IMPROVEMENT	LOCATION	FROM	TO
UNIT FIVE				
28' F-F	Res. Paving	Autumn Breeze Rd	Cool Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
6"	Waterline	"	"	"
8"	SAS	"	Lot 33/Blk H	"
32' F-F	Res. Paving	Desert Morning Rd	Cool Springs Dr.	Desert Breeze Dr.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	Lot 34/Blk F
25' ~~24'~~ F-F	Res. Paving	"	Desert Breeze Dr.	Lot 34/Blk F
4'*	PCC Sidewalk (north only)	"	"	"
25' ~~24'~~ F-F	Res. Paving	"	Cool Springs Dr.	Lot 20/Blk J
MTBL	Curb & Gutter	"	"	"
4'*	PCC Sidewalk (north only)	"	"	"
6"	Waterline	"	Lot 20/Blk J	Secret Valley Dr.
8"	Waterline	"	Secret Valley Dr.	Desert Breeze Dr.
8"	SAS	"	"	Lot 34/Blk F
8"	SAS	"	Cool Springs Dr.	Lot 20/Blk J
6"	Waterline	"	Desert Breeze Dr.	Lot 34/Blk F
T.B.D. @ DRC	Concrete Rundown	" (36' R/W)	East Terminus Desert Morning Rd.	Amole del Norte Diversion Channel
32' F-F	Res. Paving	Desert Breeze Dr.	So. Property Line Lot 18/Blk H	Desert Morning Rd.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
8"	Waterline	"	"	"
8"	SAS	"	Lot 27/Block F	"
32' F-F	Res. Paving	Cool Springs Dr.	So. Property Line Lot 34/Blk H	Desert Morning Rd.
4'*	PCC Sidewalk	"	"	"
STD	Curb & Gutter	"	"	"
6"	Waterline	"	"	"
40' F-F	Res. Paving	Secret Valley Dr.	Arenal Rd.	Desert Morning Rd.
STD	Curb & Gutter	"	"	"
4'	PCC Sidewalk	"	"	"
8"	Waterline	"	"	"

SIZE	IMPROVEMENT	LOCATION	FROM	TO
4'*	PCC Sidewalk (east only)	Desert Springs Dr.	Silverberry Rd.	Arenal Rd.

MISCELLANEOUS

Street lighting per DPM.

Grading & Drainage: Certification per DPM for each Unit (prior to release of financial guarantees). To include private retaining walls as required on the approved Grading Plan

All storm drains to include catch basins, manholes, connector pipes, and other appurtenances per DPM and final DRC approved plans.

A letter of Map Revision (LOMR) is required prior to release of the SIA & financial guarantees for Units 4.

All water to include fire hydrants, valves, and appurtenances per DPM.

TEMP IMPROVEMENTS TO THE UNSER/ARENAL INTERSECTION MAY BE REQUIRED.

*To be deferred under Sidewalk Deferral Agreement.

++ Both Sides

Prepared By: Fred C. Arfman — 02-19-99

Fred C. Arfman, PE
Isaacson & Arfman, P.A.

Date

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

Development Review Board Member Approvals

Transportation Development Division — 4-13-99 Date

Utility Development Division — 4/13/99 Date

Parks Design & Development/CIP — 4-13-99 Date

City Engineer/AMAFCA — 4-13-99 Date

DRB Chair — 4/13/99 Date

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Springs Units 3-5 ZONE ATLAS/DRNG. FILE#: M-10

DRB # 98-185 EPC # WORK ORDER #

LEGAL DESCRIPTION: Tracts A & B Desert Springs Subdivision

CITY ADDRESS: Tract C-1 Desert Springs Unit 2

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb Inc CONTACT: BO Johnson

ADDRESS: 6301 Indian School Rd Ste 680 PHONE: 881-9190

CITY, STATE: ABQ NM ZIP CODE: 87110

ARCHITECT: NA CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich

ADDRESS: PHONE: 884-1990

CITY, STATE: ZIP CODE:

CONTRACTOR: NA CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN
_____ CONCEPTUAL GRADING & DRAINAGE PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERTIFICATION
X OTHER Supplemental

PRE-DESIGN MEETING:

_____ YES
_____ NO
_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL
✓ PRELIMINARY PLAT APPROVAL
_____ S.DEV. PLAN FOR SUB'D. APPROVAL
_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_____ CERTIFICATE OF OCCUPANCY APPROVAL
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ S.A.D. DRAINAGE REPORT
_____ DRAINAGE REQUIREMENTS
✓ OTHER (SPECIFY) Rough Grading Approval

DATE SUBMITTED: 3-11-99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Springs Units 3-5 ZONE ATLAS/DRNG. FILE#: M-10/D8

DRB # 98-185 EPC # WORK ORDER #

LEGAL DESCRIPTION: Tracts A & B Desert Springs Subdivision

CITY ADDRESS: Tract C-1 Desert Springs Unit 2

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Melissa Combs

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb Inc CONTACT: BO Johnson

ADDRESS: 6301 Indian School Rd Ste. 680 PHONE: 881-9190

CITY, STATE: ABQ NM ZIP CODE: 87110

ARCHITECT: NA CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich

ADDRESS: PHONE: 884-1990

CITY, STATE: ZIP CODE:

CONTRACTOR: NA CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- ____ NO
- ____ COPY PROVIDED

RECEIVED
MAR 03 1999
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAT APPROVAL
- ✓ PRELIMINARY PLAT APPROVAL
- ____ S.DEV. PLAN FOR SUB'D. APPROVAL
- ____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S.A.D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ✓ OTHER (SPECIFY) Rough Grading Approval

DATE SUBMITTED: 2/19/99 3/3/99

BY: Melissa Combs
FOR ISAACSON & ARFMAN, P.A.

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

March 11, 1999

Ms. Susan Calongne, PE
City/County Floodplain Administrator
Hydrology Division
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Desert Springs Subdivision Units 3 thru 5
DRB No. 98-185

Dear Ms. Calongne:

Please find attached a calculation sheet justifying the flow split we assumed to occur between Moonlit Rose Drive and Desert Canyon Place in our hydrologic calculations for the Desert Springs Subdivision. Although the only way to provide a flow analysis which is 100% accurate would be to build a hydraulic model and test the actual flow conditions, we feel that this analysis provides a conservative estimate which is sufficient for application in this situation.

If you have any further questions, please feel free to contact me at 268-8828.

Respectfully yours,
ISAACSON & ARFMAN, P.A.

Melissa Combs

Melissa Combs
MC/rtl
Attachment

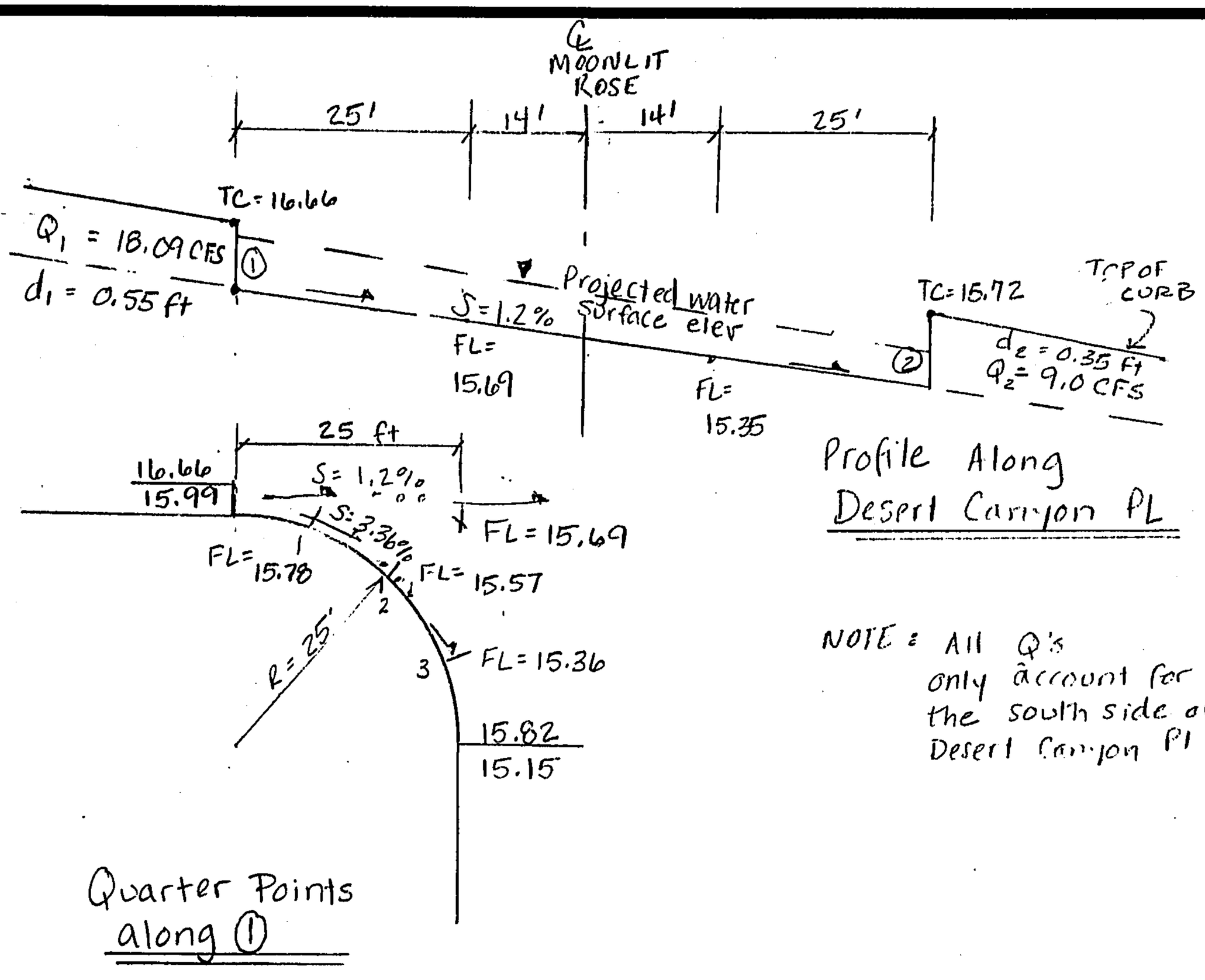
RECEIVED
MAR 15 1999
HYDROLOGY SECTION

FRED C. ARFMAN
STATE OF NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

Fred C. Arfman

Fred C. Arfman, PE

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632



NOTE: All Q's only account for the south side of Desert Canyon Pl

Assumptions

- Flow into Moonlit Rose Functions as a weir
- Flow depth above the valley gutter depth (0.175 ft) are free to overflow
- 25% of all street flow will enter Moonlit Rose. Q's from north Desert Canyon Pl will not cross the ℄ until after the intersection of Moonlit Rose.
- The Length of the weir will be equal to the distance from the curb return to the flowline - 25ft. Minimal overflow from the remainder of the intersection will be disregarded.
- Assume $d_{weir} = d_2$ = .35 ft (lowest flow depth for conservative analysis)

$\therefore \quad Q = C \, L_{eff} (d)^{1.5} = 3.0(25)(.225)^{1.5} = 8.0 \text{ cfs}$

based on 36.12 cfs total 22.1 % would enter Moonlit Rose

Since this estimate is conservative a flow split of 25% into Moonlit Rose is an acceptable assumption

Federal Emergency Management Agency

Washington, D.C. 20472

March 8, 1999

Ms. Susan M. Calongne, P.E.
City/County Floodplain Administrator
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

IN REPLY REFER TO:
Case No.: 99-06-844P
Community: City of Albuquerque, New Mexico
Community No.: 350002

316-ACK.FRQ

Dear Ms. Calongne:

This responds to your request dated February 24, 1999, that the Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Bernalillo County, New Mexico and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Desert Springs Subdivision
Flooding Sources:	Ponding Area 22 and Shallow Flooding
FIRM Panel(s) Affected:	35001C0336 D and 0337 D

We have completed an inventory of the items that you submitted. We have received the data and the review and processing fee ($4,300) required to begin a detailed technical review of your request. If additional data are required, we will inform you within 30 days of the date of this letter.

Please direct all questions concerning your request to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Attention: Ms. Laura D. Bittner
(703) 317-6292

When you write us about your request, you must include the case number referenced above in your letter.

If you have any questions concerning FEMA policy, or the National Flood Insurance Program in general, please contact Mr. John Gambel of our staff in Washington, DC, either by telephone at (202) 646-2724 or by facsimile at (202) 646-4596.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

cc: Mr. Fred C. Arfman, P.E.
Vice President
Isaacson & Arfman, P.A.

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

June 24, 1999

Mr. Glen Jurgensen
Storm Drain/Arroyo Maintenance
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Grading & Drainage Along the Amole del Norte Diversion Channel For Desert Springs Subdivision

Dear Mr. Jurgensen:

Please find attached a copy of the proposed grading and drainage for the lots adjacent to the Amole del Norte Diversion Channel and a typical lot detail. As per our previous discussions, we are proposing that these lots be allowed to discharge from their backyards across the city right-of-way to the channel. There is no proposed grading within the city right-of-way. Please sign in the space provided below if you concur with the proposed grading. If additional information is required on this action, please contact our office for assistance.

Respectfully yours,
ISAACSON & ARFMAN, P.A.

Fred C. Arfman, PE
FCA/rtl
Attachments

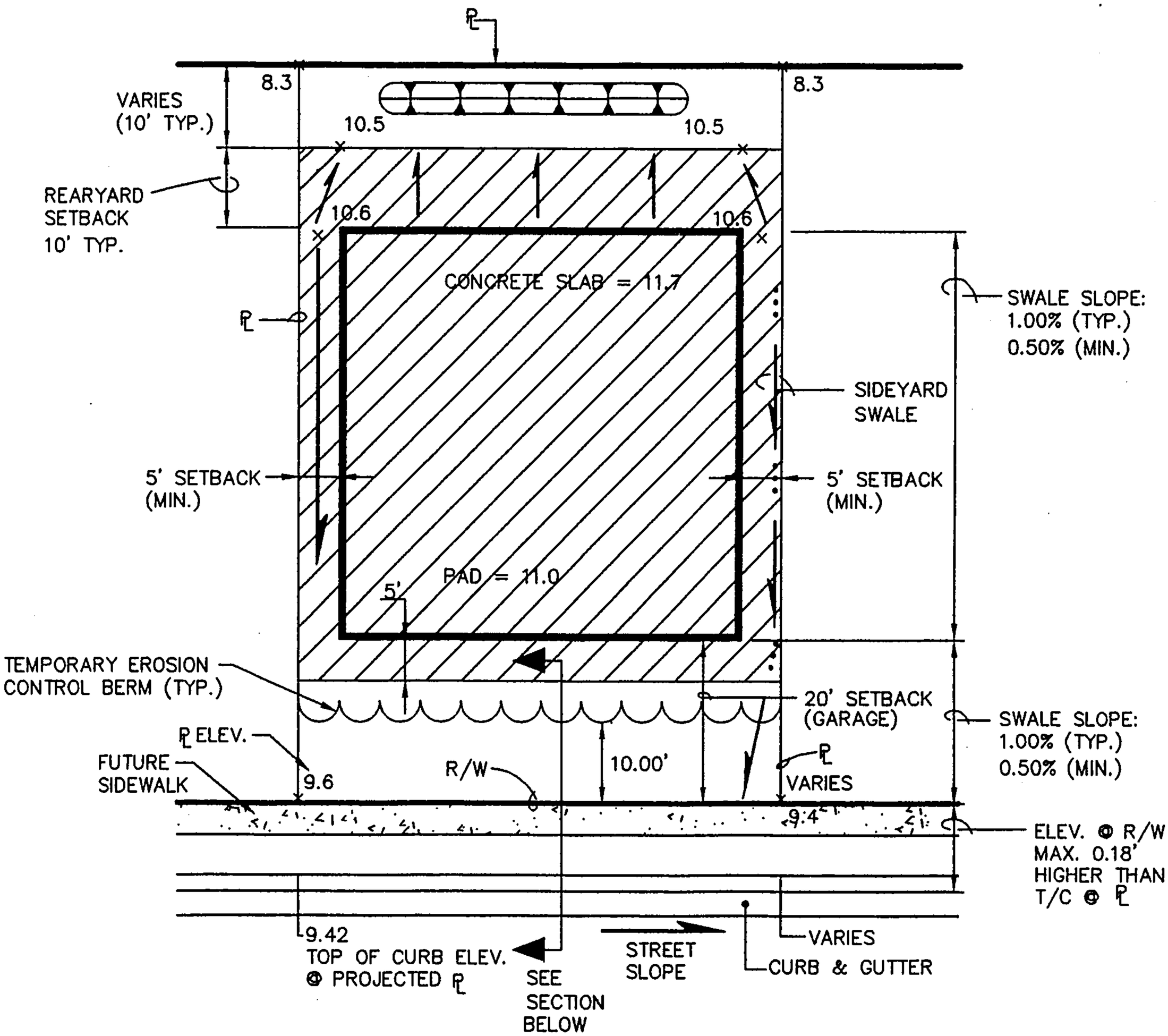
I concur with the proposed grading as outlined on the attached sheets.

Glen Jurgensen
Storm Drainage/Arroyo Maintenance
City of Albuquerque

6-29-99
Date

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

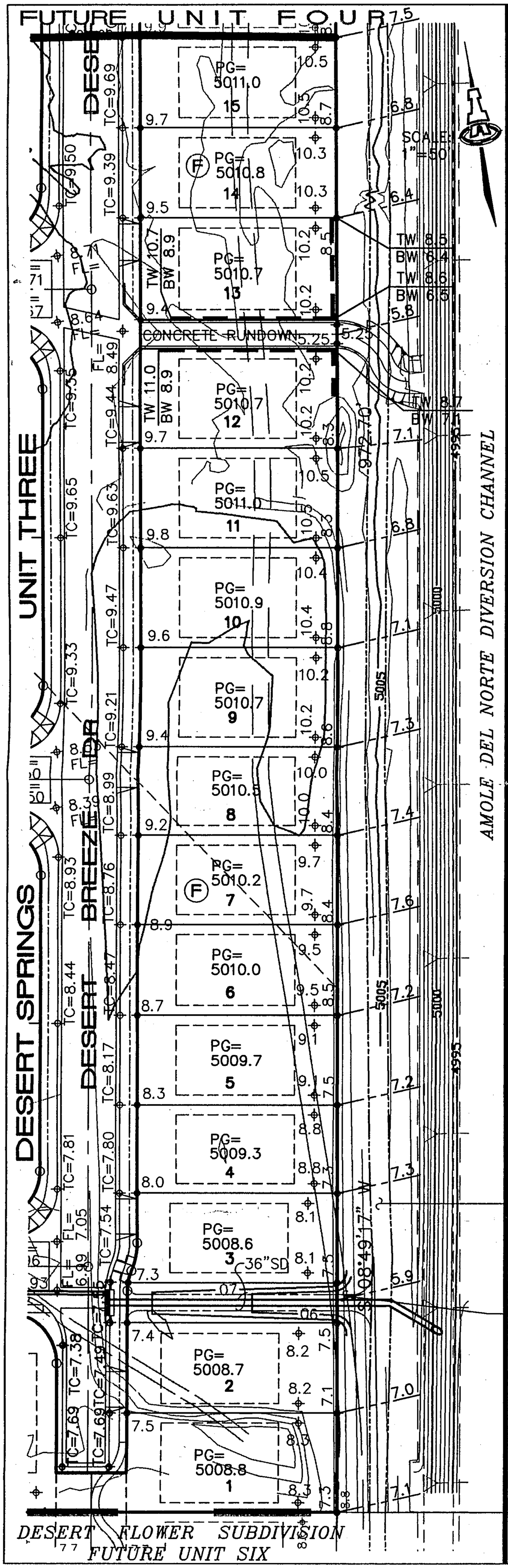
COMPACTION ZONE– CONSTRACTOR SHALL COMPACT SOILS IN THIS AREA TO A MINIMUM OF 95% COMPACTION PER ASTM D698, FOR A DEPTH OF 12 INCES.



TYPICAL LOT GRADING SHOWING COMPACTION ZONE

1"=20'

*ALONG DESERT BREEZE DRIVE ONLY



SCALE: 1"=50'

NO GRADING TO OCCUR WITHIN THE CITY R/W

LOTS 1–7: 0 – 1.5 FT RETAINING REQUIRED

FUTURE 10' ASPHALT TRAIL W/ 2' SHOULDERS

EMERGENCY OVERFLOW & 8' PEDESTRIAN ACCESS

DESERT SPRINGS UNITS 3-5 GRADING STUDY

SHEET 1

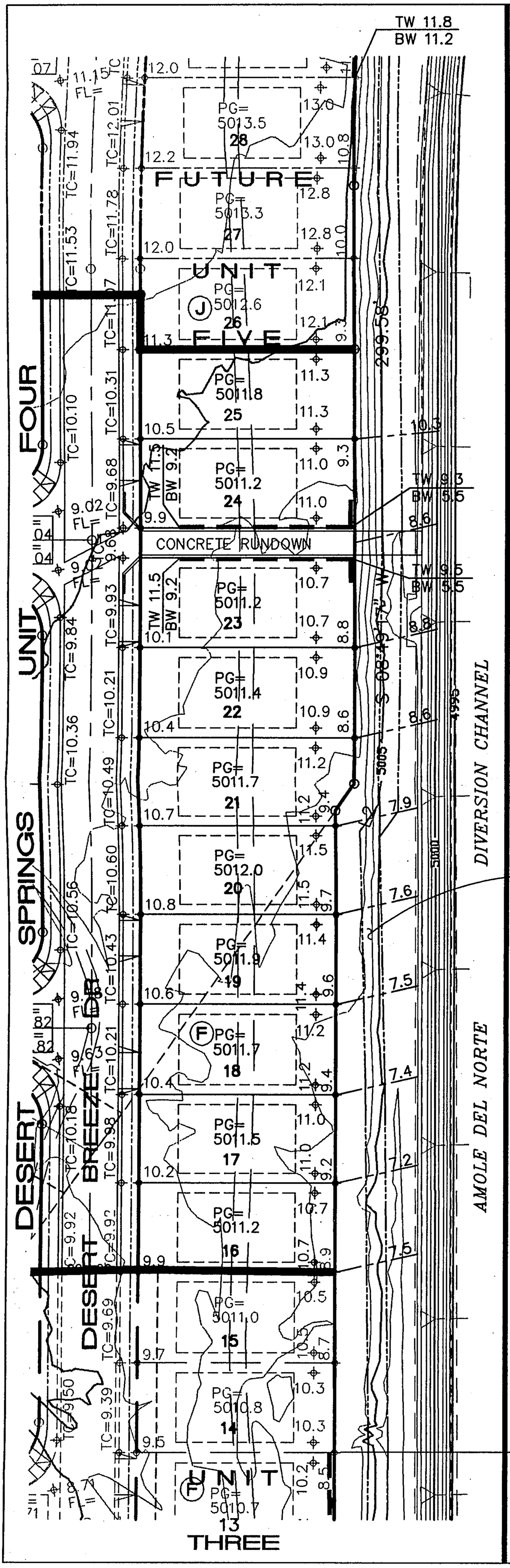
ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

128 Monroe Street N.E.

Albuquerque *New Mexico*

052GEXH1.DWGems 06/16/99



SCALE:
1"=50'

NO GRADING REQUIRED WITHIN CITY R/W

NO RETAINING REQUIRED

1.4' – 2.1' RETAINING REQUIRED

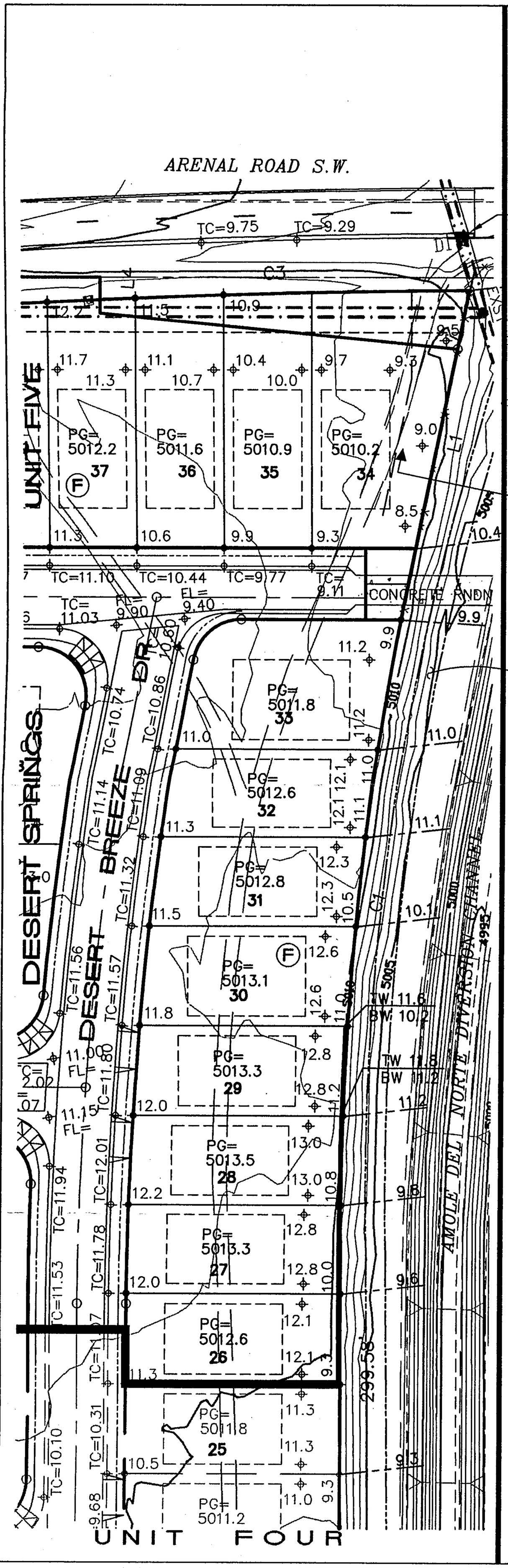
FUTURE
10' ASPHALT
TRAIL W/
2' SHOULDERS

DESERT SPRINGS UNITS 3-5 GRADING STUDY

SHEET 2

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

052GEXH2.DWGems 06/16/99



SCALE: 1"=50'

NO GRADING WITHIN CITY R/W REQUIRED

LOTS 25–33: 0.0' TO 1.0' RETAINING REQUIRED

DESERT SPRINGS UNITS 3-5 GRADING STUDY

SHEET 3

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

052GEXH3.DWGems 06/16/99

DRAINAGE INFORMATION SHEET

PROJECT TITLE: El Rancho Grande, Units 1 & 2 & 3 ZONE ATLAS#: M-9 / D019

DRB#: _____ EPC# _____ WORKORDER#: _____

LEGAL DESCRIPTION: Tracts C & D, ABQ South, Unit 4, TRACT E, ABQ SOUTH, UNIT 1 AND PARCEL 4, EL RANCHO GRANDE I

CITY ADDRESS: _____

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	Gregory J. Krenik
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	Curb, Inc.	CONTACT:	Chuck Haegelin
ADDRESS:	6301 Indian School Road NE	PHONE:	881-9190
ARCHITECT:	N/A	CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	
CONTACTOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL

X ENGINEER'S CERTIFICATION FOR POND RE-EVALUATION

___ OTHER

___ EASEMENT VACATION

PRE-DESIGN MEETING:

___ YES

___ NO

___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ S. DEV. PLAN FOR SUB'D APPROVAL

___ S. DEV. PLAN FOR BLDG PERMIT APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

___ CERTIFICATION OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

X OTHER - GRADING CERTIFICATION FOR POND RE-EVALUATION

X RELEASE OF FINANCIAL GUARANTY IF THERE IS ONE

___ TRAFFIC CIRCULATION LAYOUT

RECEIVED
MAY 22 2001
HYDROLOGY SECTION

A COPY REQUESTED

DATE SUBMITTED: 5-23-01

BY: _____

Gregory J. Krenik PE

ELEV	AREA (SF)	STORAGE (AF)	
21	25,831	0	
22	88.979	1.318	
23	107,567	3.574	
24	115485	6.134	
WATER SURFACE 25	120,508	8.843	STORAGE VOLUME
26.06 26	124.484	11.655	11.83
27	128,994	14.565	
28	133,486	17.577	

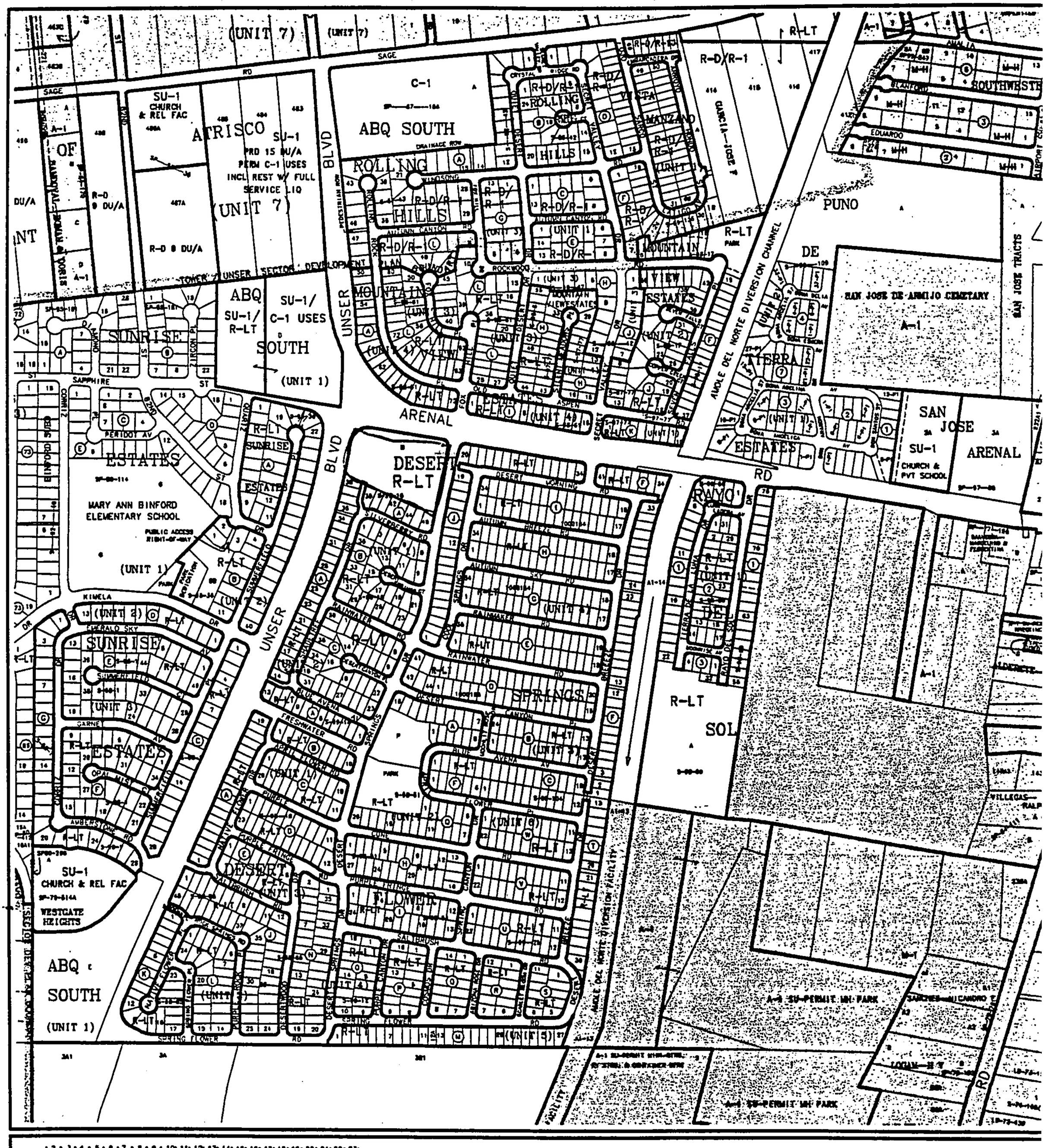
GREGORY JAMES KRENIK
NEW MEXICO
11929
REGISTERED PROFESSIONAL ENGINEER
5-22-01

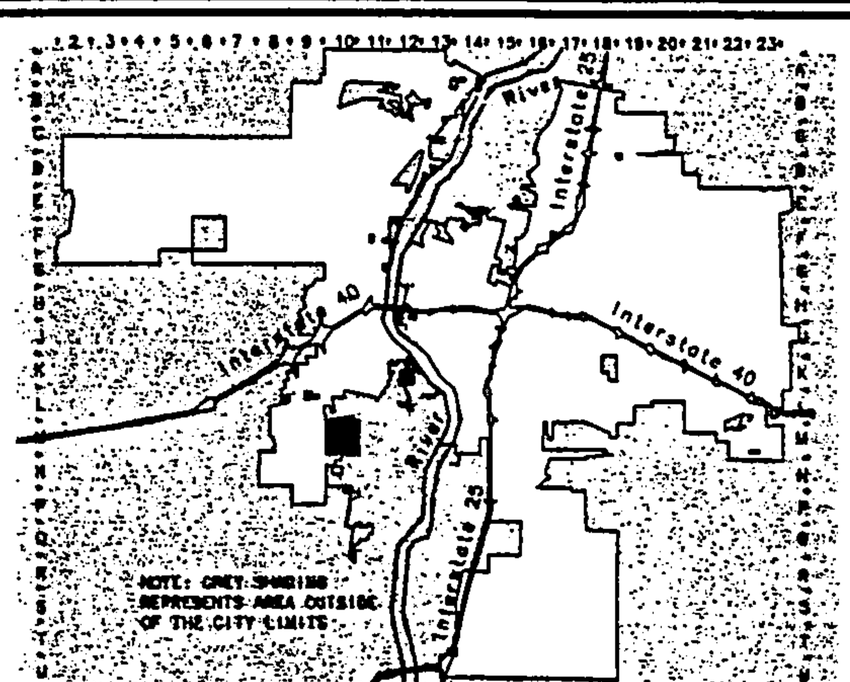
SCALE: 1"=60'

ASBUILT ARENAL/UNSER DETENTION POND

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

A1010DES\PONDCERT.dwg\05-22-01





CITY OF Albuquerque

A lbuquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

Map Amended through August 15, 2000

DRAINAGE INFORMATION SHEET

PROJECT TITLE: DESERT SPRINGS, UNIT 1 ZONE ATLAS/DRNG. FILE #: M-10/D8

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: DESERT SPRING SUBD., UNIT ONE

CITY ADDRESS: _____

ENGINEERING FIRM: ISAACSON & ARFMAN, P.A. CONTACT: _____

ADDRESS: 128 MONROE ST. NE PHONE: 268-8828 (F) 268-2632

OWNER: BUILDERS INVESTMENT CO. CONTACT: STAN LANE

ADDRESS: 7007 WYOM. BLVD, STE D-7 PHONE: 828-1100 (205)

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: CLAUSEN SURVEYING CONTACT: DAVE CLAUSEN

ADDRESS: _____ PHONE: 821-1039

CONTRACTOR: SPARLING CONST. CO. CONTACT: PAT WYLIE 821-1034

ADDRESS: _____ PHONE: (F) 821-1537

Submittal withdrawn 7-2-98 Fred Arfman to resubmit Sure

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
___ GRADING PLAN
___ EROSION CONTROL PLAN
X ENGINEER'S CERTIFICATION
___ OTHER

PRE-DESIGN MEETING:

___ YES
___ NO
___ COPY PROVIDED

RECEIVED
JUN 19 1998
HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D. APPROVAL
___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
X OTHER W.O./REL OF E.G. (SPECIFY)

— 2 sheet 5's no sheet 4 retaining walls required / must be certified

DATE SUBMITTED: 06-19-98

BY: FRED C. ARFMAN, P.E.

FOR: ISAACSON & ARFMAN, P.A.

CITY OF
Albuquerque

June 26, 1998

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Master Drainage Report for Desert Springs Subdivision and Grading and Drainage Plan for Desert Springs Unit 2 (M10/D8) Submitted for Preliminary Plat Approval and Work Order Approval for Unit 2, Engineer's Stamp Dated 5/29/98.

Dear Mr. Arfman:

Based on the information provided in the submittal of May 29, 1998, the above referenced Master Drainage Report for Desert Springs Subdivision, Units One through Five, is approved. The Grading and Drainage plan for Desert Springs Unit Two is also approved for Preliminary Plat action.

Prior to Final Plat approval of each Unit, the SIA must be in place for each Unit. As you are aware, the development of each Unit must be in compliance with this approved Master Plan. Grading and Drainage Certifications are required prior to release of financial guarantees of each Unit.

The above referenced plan is acceptable for Work Order approval for Unit 2. The easement and Agreement and Covenant for the temporary pond must be in place prior to plan sign-off.

If you should have any questions, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Stan Lane, Builders Investment Co.
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 14, 2001

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe NE
Albuquerque, New Mexico 87108

RE: **Grading and Drainage Certification**
Submitted for Release of Financial Guaranty
Desert Springs Subdivision Unit Five (5) (M-10/D08)
Engineers Stamp Dated 6/17/1999
Engineer's Certification Stamp Dated 11/20/2000

Dear Mr. Arfman:

Based upon the information provided in your submittal dated 11/21/2000 for the Engineers Certification of Desert Springs Subdivision Unit 5, and also based upon a submittal by Mark Goodwin & Assoc., dated May 22, 2001, for the Grading Certification for the pond re-evaluation at Unser and Arenal, the above referenced project is adequate to satisfy the Grading and Drainage Certification requirements for release of financial guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Public Works Department
BLB

C: Arlene Portillo, PWD – #635981
File

DRAINAGE INFORMATION SHEET

PROJECT #: 98-185 PROJECT DESERT SPRINGS SUBDIVISION, UNIT FIVE ZONE ATLAS/DRNG. FILE#: M-10/B8

DRB # 1000154 EPC # _____ WORK ORDER # 6359.81

LEGAL DESCRIPTION: DESERT SPRINGS SUBDIVISION, UNIT FIVE

CITY ADDRESS: DNA

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: _____

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB, INC CONTACT: CHUCK HAEGLIN

ADDRESS: 6301 INDIAN SCHOOL RD NE PHONE: 881-9190

CITY, STATE: ABQ, NM ZIP CODE: 87110

ARCHITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: STEPHEN E. WALKER CONTACT: STEVE WALKER

ADDRESS: 424 SHIRK LANE SW PHONE: 266-6209

CITY, STATE: ABQ, NM ZIP CODE: 87105

CONTRACTOR: SALLS BROTHERS CONSTRUCTION CONTACT: FRED SALLS

ADDRESS: 7301 READING DR SE PHONE: 873-8780

CITY, STATE: ABQ, NM ZIP CODE: 87105

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT

_____ DRAINAGE PLAN

_____ CONCEPTUAL GRADING & DRAINAGE PLAN

_____ GRADING PLAN

_____ EROSION CONTROL PLAN

_X_ ENGINEER'S CERTIFICATION

_____ OTHER

PRE-DESIGN MEETING:

_____ YES

_____ NO

_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL

_____ PRELIMINARY PLAT APPROVAL

_____ S.DEV. PLAN FOR SUB'D. APPROVAL

_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL

_____ SECTOR PLAN APPROVAL

_____ FINAL PLAT APPROVAL

_____ FOUNDATION PERMIT APPROVAL

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY APPROVAL

_____ GRADING PERMIT APPROVAL

_____ PAVING PERMIT APPROVAL

_____ S.A.D. DRAINAGE REPORT

_____ DRAINAGE REQUIREMENTS

_X_ OTHER (SPECIFY) PROJECT ACCEPTANCE FOR WORK ORDER CLOSE-OUT

RECEIVED
NOV 21 2000
HYDROLOGY SECTION

DATE SUBMITTED: 11-21-00

BY: FRED C. AREMAN
FOR ISAACSON & AREMAN, P.A.

DRAINAGE INFORMATION SHEET

PROJECT TITLE: El Rancho Grande, Units 1 & 2 & 3 ZONE ATLAS#: M-9 / D019

DRB#: _____ EPC# _____ WORKORDER#: _____

LEGAL DESCRIPTION: Tracts C & D, ABQ South, Unit 4, TRACT E, ABQ SOUTH, UNIT 1 AND PARCE 4, EL RANCHO GRANDE I

CITY ADDRESS: _____

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	Gregory J. Krenik
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	Curb, Inc.	CONTACT:	Chuck Haegelin
ADDRESS:	6301 Indian School Road NE	PHONE:	881-9190
ARCHITECT:	N/A	CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	
CONTACTOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL

X ENGINEER'S CERTIFICATION FOR POND RE-EVALUATION

___ OTHER

___ EASEMENT VACATION

PRE-DESIGN MEETING:

___ YES

___ NO

___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ S. DEV. PLAN FOR SUB'D APPROVAL

___ S. DEV. PLAN FOR BLDG PERMIT APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

___ CERTIFICATION OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

X OTHER - GRADING CERTIFICATION FOR POND RE-EVALUATION

X RELEASE OF FINANCIAL GUARANTY IF THERE IS ONE ALREADY RELEASED

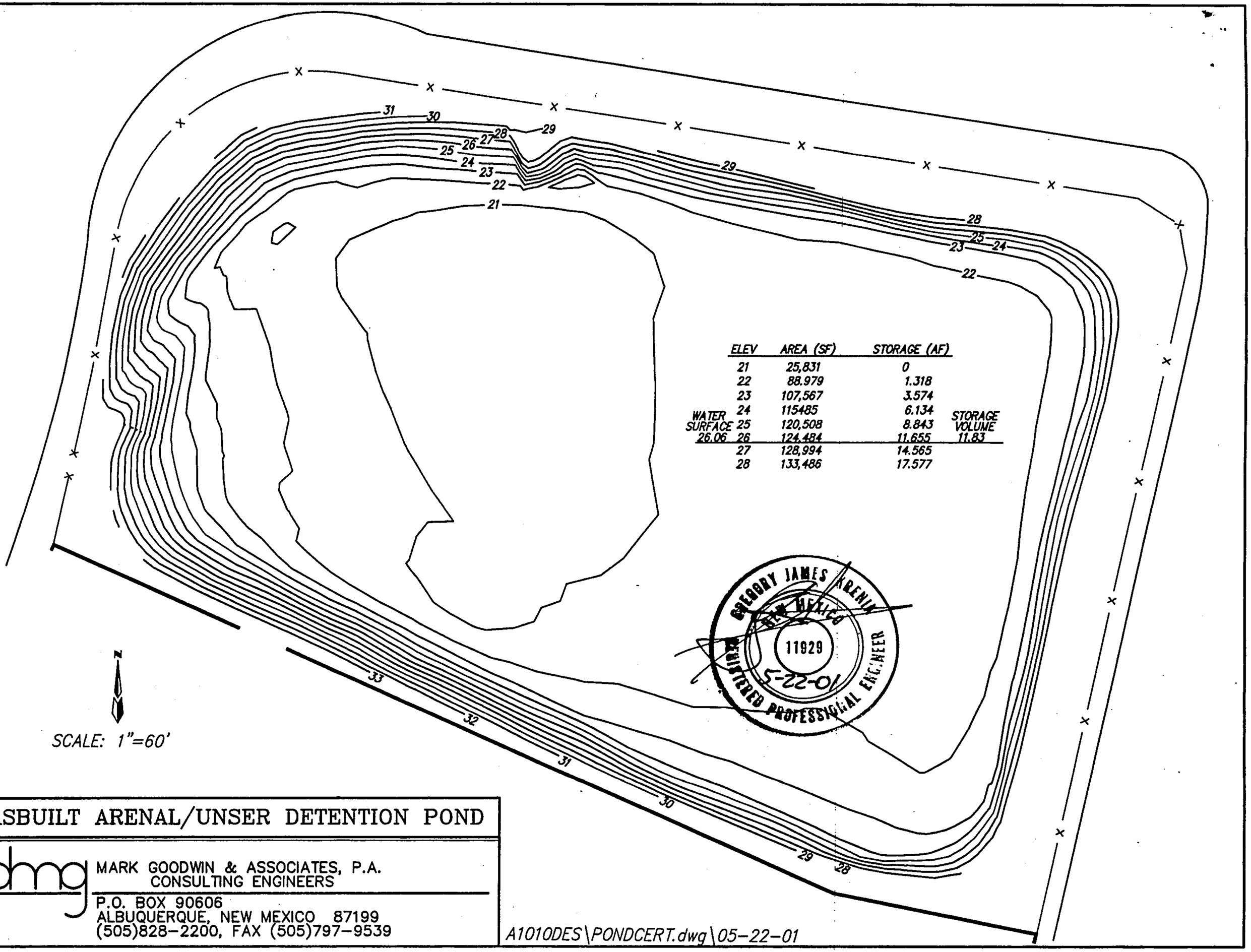
___ TRAFFIC CIRCULATION LAYOUT

RECEIVED
MAY 22 2001
HYDROLOGY SECTION

DATE SUBMITTED: 5-23-01

BY: _____

Gregory J. Krenik PE



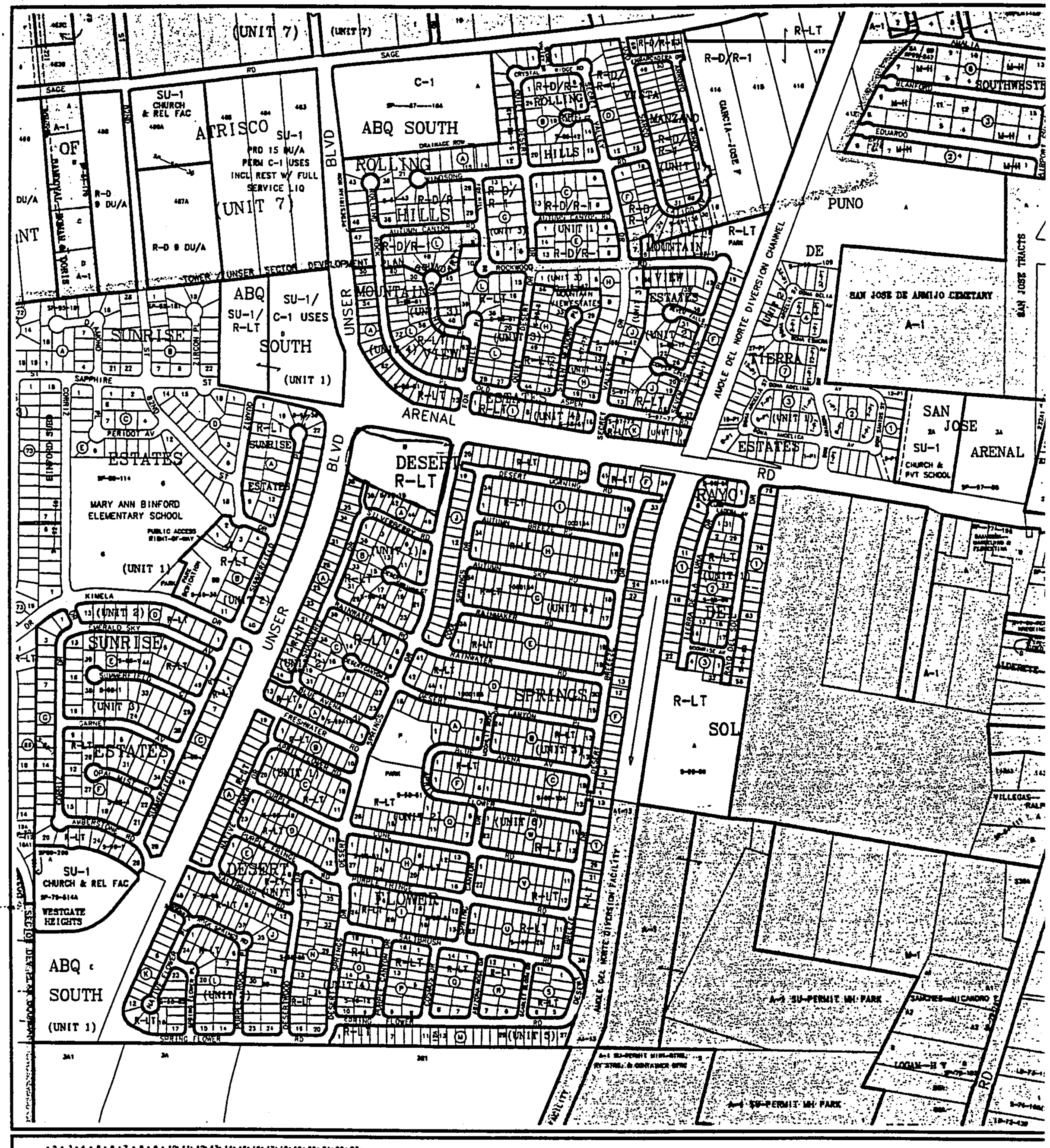
ELEV	AREA (SF)	STORAGE (AF)	
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22	88.979	1.318	
23	107,567	3.574	
24	115485	6.134	
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26.06 26	124,484	11.655	11.83
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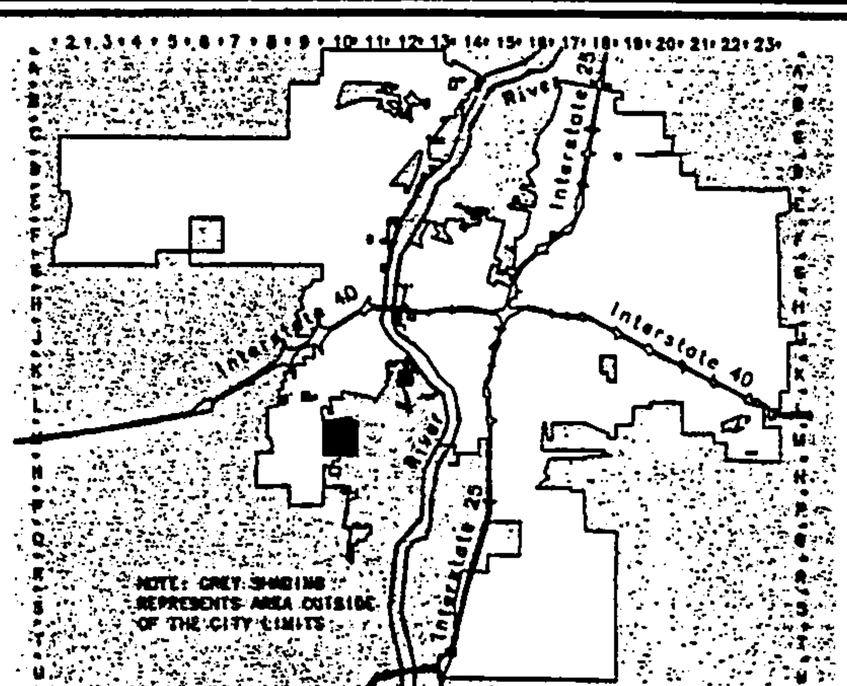
GREGORY JAMES KRENIK
NEW MEXICO
11929
REGISTERED PROFESSIONAL ENGINEER
5-22-01

ASBUILT ARENAL/UNSER DETENTION POND

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

A1010DES\PONDCERT.dwg\05-22-01





CITY OF
Albuquerque

A business Geographic Information System

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

Map Amended through August 15, 2000

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 5, 2000

Gregory J. Krenik, P.E.
Mark Goodwin & Associates, PA
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Drainage Report Re-Evaluating the Arenal/Unser Detention Pond for El Rancho Grande I Subdivision, and Desert Springs Subdivision, Unit Three, (M10/D8), Engineer's Stamp Dated 5/12/00.

Dear Mr. Krenik:

Based on the information provided with the submittal of May 12, 2000, the above referenced Report is approved.

Since the final improvements for the Arenal/Unser detention pond are required by the Infrastructure List for Desert Springs Subdivision Unit 4, your revised configuration for the pond is acceptable for the change order to the Work Order plans.

Since the final volume of the Arenal/Unser pond is over 10 acre-feet, approval from the State Engineer's Office for the pond is also required. Please provide me with a copy of the state's approval letter for my files.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

NO-LOAD
EMBANKMENT ON
SITE.

c: Bo K. Johnson, P.E., Curb Inc.
File

Report filed w/ Master Plan M10/D10

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

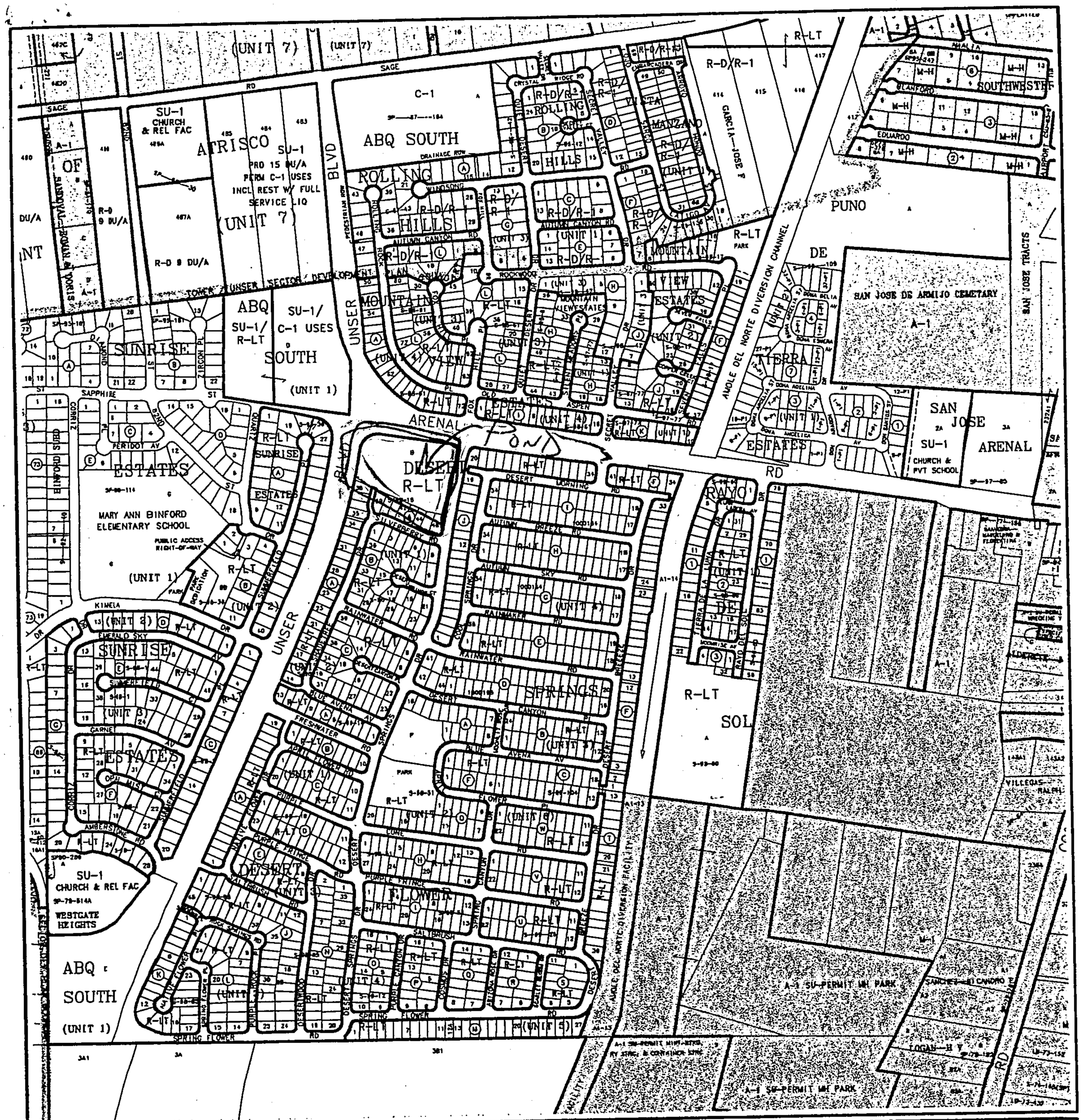


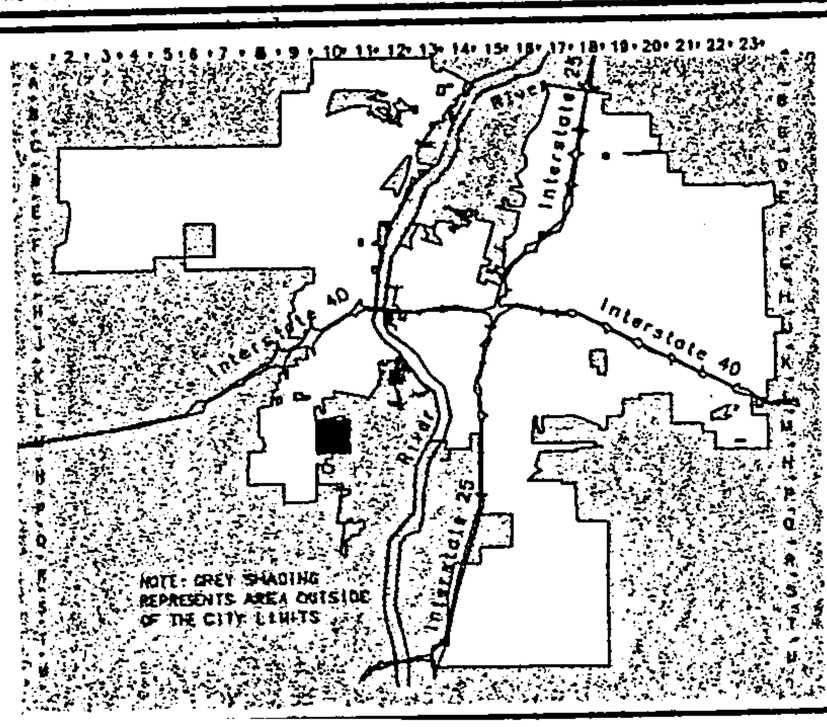












CITY OF Albuquerque

A buquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

Map Amended through August 15, 2000

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 5, 2000

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico

RE: Revised Grading and Drainage Plan for Desert Springs Subdivision Units Three Through Five, (M10/D8) Submitted for Work Order Approval, Engineer's Stamp Dated 12/3/99.

Dear Mr. Arfman:

City Hydrology has no problem with the proposed grades presented in the above referenced plan. Please keep in mind however that the Grading and Drainage Certification must be based on the grading plan that was approved by the DRB. It appears from my records that the plan that was approved by DRB to revise the Unit boundaries was dated June 17, 1999. Please advise me if this date is incorrect.

As you are aware, the Grading and Drainage Certification is required prior to release of the Subdivision Improvements Agreement (SIA) for each Unit. Approval from the State Engineer's Office for the Arenal/Unser regional detention facility will be required prior to release of the SIA for Units 4 or 5. The final grading of this pond must also be completed to the City's satisfaction.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Bo K. Johnson, P.E., Bokay Construction
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 12, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe Street NE
Albuquerque, New Mexico 87108

RE: Revised Master Drainage Report for Desert Springs Subdivision Units Three Through Five, (M10/D8) Submitted for Preliminary and Final Plat Approval and Rough Grading Approval, Engineer's Stamp Dated 3/22/99 on Report and Plans Dated 4/5/99.

Dear Mr. Arfman:

Based on the information provided in the submittals of March 22, 1999 and April 6, 1999, the above referenced Plans for Desert Springs Units Three through Five are approved for Preliminary Plat action.

The above referenced plans are also approved for Grading Permit release, however, no grading may occur within the Amole Del Norte Diversion Channel right-of-way until concurrence from City Storm Drain Maintenance is obtained. City Storm Drain Maintenance must also approve the proposed connections to this channel.

The Letter of Map Revision must be received from FEMA prior to release of the SIA or financial guarantees for Units 4 or 5 Approval from the State Engineer's Office for the Arenal/Unser regional detention facility is also required prior to release of the SIA or financial guarantees for Units 4 or 5.

As you are aware, the SIA is required prior to Final Plat sign-off, and the Grading and Drainage Certification is required prior to release of the SIA or financial guarantees for each Unit.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Fred Aguirre, DRB-98-185
Bo K. Johnson, P.E., Curb Inc.
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 14, 2001

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe NE
Albuquerque, New Mexico 87108

RE: **Grading and Drainage Certification**
Submitted for Release of Financial Guaranty
Desert Springs Subdivision Unit Four (4) (M-10/D08)
Engineers Stamp Dated 6/17/1999
Engineer's Certification Stamp Dated 11/20/2000

Dear Mr. Arfman:

Based upon the information provided in your submittal dated 11/21/2000 for the Engineers Certification of Desert Springs Subdivision Unit 4, and also based upon a submittal by Mark Goodwin & Assoc., dated May 22, 2001, for the Grading Certification for the pond re-evaluation at Unser and Arenal, the above referenced project is adequate to satisfy the Grading and Drainage Certification requirements for release of financial guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Public Works Department

PLD

C: Arlene Portillo, PWD – #622781
File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 8, 2001

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, New Mexico 87108

RE: ENGINEERS CERTIFICATION FOR RELEASE OF FINANCIAL GUARANTY:
DESERT SPRINGS SUBD UNITS 4 & 5 (M-10/D008)
ENGINEERS STAMP DATED 6/17/1999
ENGINEERS CERTIFICATION DATED 11/20/2000

Dear Mr. Arfman:

Based on the information provided on your submittal November 21, 2000, the above referenced project **can not** be approved for release of financial guarantees at this time.

Letter dated January 5, 2000, the following conditions must be met prior to release of financial guaranty for Desert Springs Subdivision Units 4 and 5:
"Approval from the State Engineers Office for the Arenal/Unser regional detention facility will be required prior tto release of the SIA for Units 4 or 5. The final grading of this pond must also be completed to the City's satisfaction."

POND CONT. OK.

Also note letter dated June 5, 2000:
"Since the final volume of the Arenal/Unser pond is over 10 acre-feet, approval from the Stte Engineer's Office for the pond is also required. Please provide me with a copy of the State's approval letter for my files."

NOT NEEDED!

When the above conditions have been met, please resubmit a new engineers certification for the release of the financal guarantees.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, P.E.
Senior Civil Engineer, Hydrology
Public Works Department

c: Arlene Portillo
File
(Attachments)

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT: DESERT SPRINGS SUBDIVISION, UNIT FOUR ZONE ATLAS/DRNG. FILE#: M-10/B8

98-185

DRB # 1000154 EPC # WORK ORDER # 6227.81

LEGAL DESCRIPTION: DESERT SPRINGS SUBDIVISION, UNIT FOUR

CITY ADDRESS: DNA

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT:

ADDRESS: 128 Monroe Street NE PHONE: 268-8828

CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: CURB, INC CONTACT: CHUCK HAEGLIN

ADDRESS: 6301 INDIAN SCHOOL RD NE PHONE: 881-9190

CITY, STATE: ABQ, NM ZIP CODE: 87110

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: STEPHEN E. WALKER CONTACT: STEVE WALKER

ADDRESS: 424 SHIRK LANE SW PHONE: 266-6209

CITY, STATE: ABQ, NM ZIP CODE: 87105

CONTRACTOR: SALLS BROTHERS CONSTRUCTION CONTACT: FRED SALLS

ADDRESS: 7301 READING DR SE PHONE: 873-8780

CITY, STATE: ABQ, NM ZIP CODE: 87105

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT

_____ DRAINAGE PLAN

_____ CONCEPTUAL GRADING & DRAINAGE PLAN

_____ GRADING PLAN

_____ EROSION CONTROL PLAN

_X_ ENGINEER'S CERTIFICATION

_____ OTHER

PRE-DESIGN MEETING:

_____ YES

_____ NO

_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAT APPROVAL

_____ PRELIMINARY PLAT APPROVAL

_____ S.DEV. PLAN FOR SUB'D. APPROVAL

_____ S.DEV. PLAN FOR BLDG. PERMIT APPROVAL

_____ SECTOR PLAN APPROVAL

_____ FINAL PLAT APPROVAL

_____ FOUNDATION PERMIT APPROVAL

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY APPROVAL

_____ GRADING PERMIT APPROVAL

_____ PAVING PERMIT APPROVAL

_____ S.A.D. DRAINAGE REPORT

_____ DRAINAGE REQUIREMENTS

_X_ OTHER (SPECIFY) PROJECT ACCEPTANCE FOR WORK ORDER CLOSE-OUT

RECEIVED
NOV 21 2000
HYDROLOGY SECTION

DATE SUBMITTED: 11-21-00

BY: FRED C. AREMAN
FOR ISAACSON & AREMAN, P.A.

DRAINAGE INFORMATION SHEET

PROJECT TITLE: El Rancho Grande, Units 1 & 2 & 3 ZONE ATLAS#: M-9 / D019

DRB#: _____ EPC# _____ WORKORDER#: _____

LEGAL DESCRIPTION: Tracts C & D, ABQ South, Unit 4, TRACT E, ABQ SOUTH, UNIT 1 AND PARCE 4, EL RANCHO GRANDE I

CITY ADDRESS: _____

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	Gregory J. Krenik
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	Curb, Inc.	CONTACT:	Chuck Haegelin
ADDRESS:	6301 Indian School Road NE	PHONE:	881-9190
ARCHITECT:	N/A	CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	
CONTACTOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
___ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
___ GRADING PLAN
___ EROSION CONTROL
X ENGINEER'S CERTIFICATION FOR POND RE-EVALUATION
___ OTHER
___ EASEMENT VACATION

PRE-DESIGN MEETING:

___ YES
___ NO
___ COPY PROVIDED

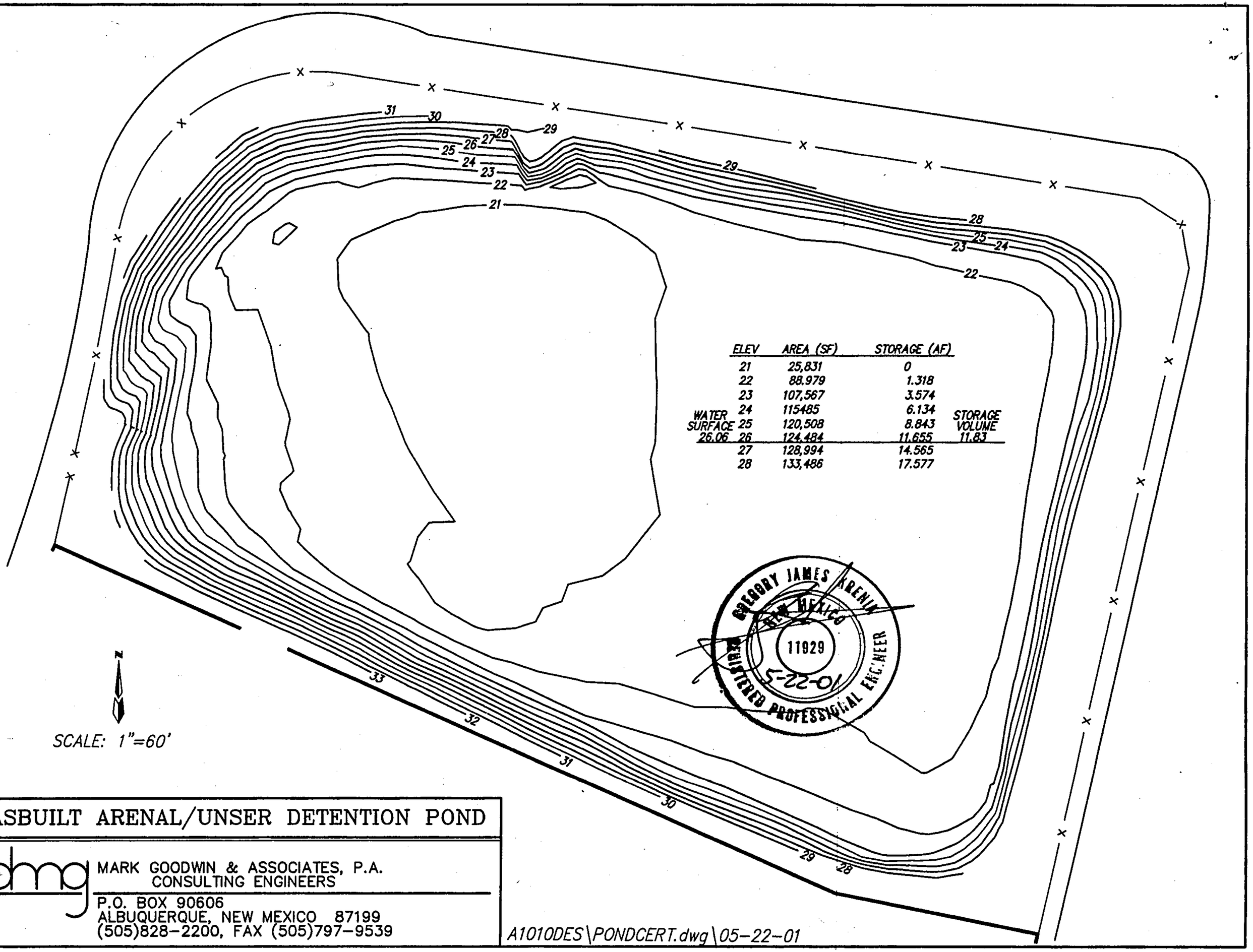
DATE SUBMITTED: 5-23-01

BY: _____
Gregory J. Krenik PE

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D APPROVAL
___ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATION OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
X OTHER - GRADING CERTIFICATION FOR POND RE-EVALUATION
X RELEASE OF FINANCIAL GUARANTY IF THERE IS ONE ALREADY RELEASED
___ TRAFFIC CIRCULATION LAYOUT

RECEIVED
MAY 22 2001
HYDROLOGY SECTION



ELEV	AREA (SF)	STORAGE (AF)	
21	25,831	0	
22	88.979	1.318	
23	107,567	3.574	
24	115485	6.134	
WATER SURFACE 25	120,508	8.843	STORAGE VOLUME
26.06 26	124.484	11.655	11.83
27	128,994	14.565	
28	133,486	17.577	

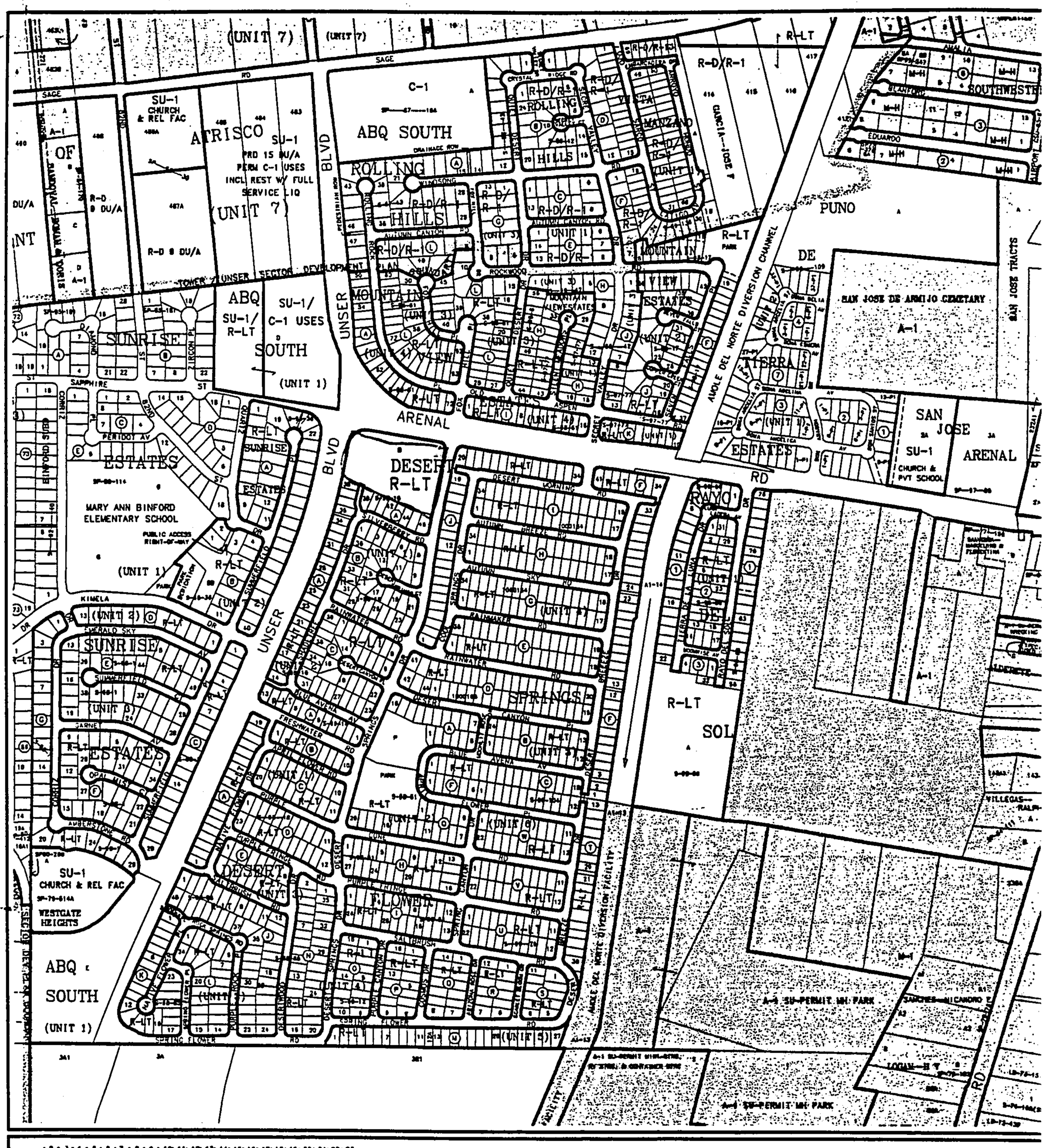
ASBUILT ARENAL/UNSER DETENTION POND

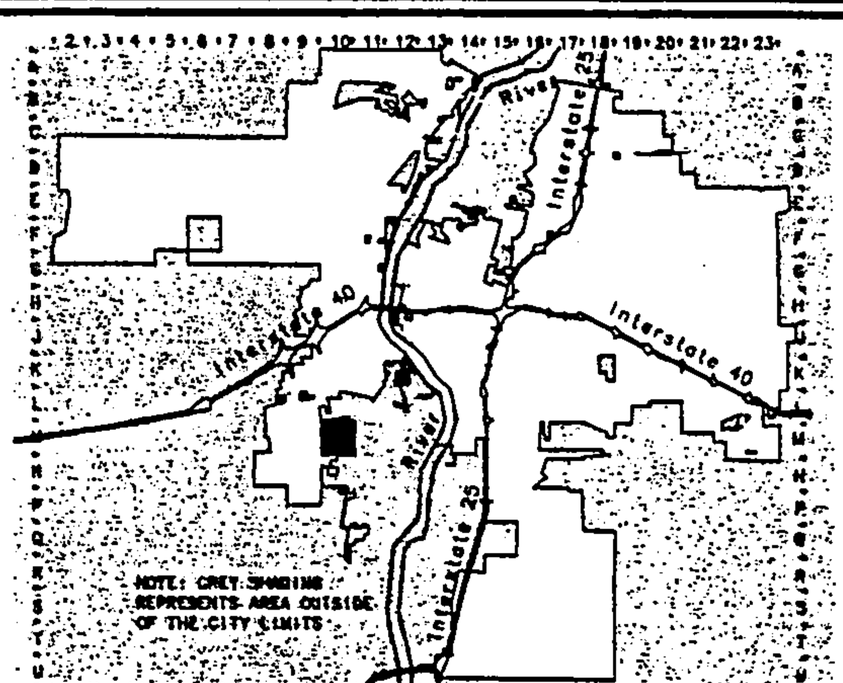
dmg

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS

P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

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CITY OF Albuquerque

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M-10-Z

Map Amended through August 15, 2000