CITY OF ALBUQUERQUE

May 30, 2007

Mr. Shahab Biazar, P.E.
Advanced Engineering & Consulting, LLC
4416 Anaheim Ave. NE
Albuquerque, NM 87113

RE: Tierra Morena Subdivision, (C-20/D033)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 06/18/2004
Engineers Certification dated 4/25/2007

Dear Mr. Biazar:

Based upon the information provided in your Engineer's Certification Submittal dated 5/24/2007, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, you can contact me at 924-3982

Sincerely,

Timothy Sims
Plan Checker-Hydrology
Development and Building Services

C: Marilyn Maldonado, COA # 745781
File

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

C-20/D33

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(Rev. 12/05)

PROJECT TITLE: TIERRA MORENA SUBDIVISION ZONE ATLAS/DRG. FILE #: C20 / D33

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: LOTS 29, 30, 31, & 32, BLOCK 4. TRACT 3, UNIT 3, NAA

CITY ADDRESS: _____

ENGINEERING FIRM: Advanced Engineering and Consulting, LLC CONTACT: Shahab Biazar
ADDRESS: 4416 Anaheim Ave., NE PHONE: (505) 899-5570
CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87113

OWNER: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

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

SURVEYOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

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

CHECK TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN 1ST SUBMITTAL
- ____ DRAINAGE PLAN RESUBMITTAL
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION (HYDROLOGY)
- ____ CLOMR / LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEER/ARCHITECT CERT (TCL)
- ____ ENGINEER/ARCHITECT CERT (DRB S.P.)
- ____ ENGINEER/ARCHITECT CERT (AA)
- ____ OTHER (SPECITY)

WO# 745781

CHECK TYPE OF APPROVAL SOUGHT:

- X SIA / FINANCIAL GUARANTEE RELEASE
- ____ 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 (PERM.)
- ____ CERTIFICATE OF OCCUPANCY (TEMP.)
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- X PAD CERTIFICATION

RECEIVED
MAY 24 2007
HYDROLOGY SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ____ YES
- X NO
- ____ COPY PROVIDED

DATE SUBMITTED: 04 / 25 / 2007 BY: Shahab Biazar, P.E.

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittals may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5).
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or containing five (5) acres or more.

ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection
Surveying

May 25, 2007

Mr. Bradley L. Bingham, P.E.
Sr. Engineer, Planing Dept.
Development and Building Services
600 Second Street NW
Albuquerque, New Mexico 87102

RE: PAD CERTIFICATION FOR TIERRA MORENA SUBDIVISION (C20/D33)

Dear Mr. Bingham:

This letter is in request of approval of Pad Certification for the above mentioned project. I Shahab Biazar, NMPE, of the Advanced Engineering, LLC hereby certify that project has been graded and will drain in substantial compliance with and design intent of the approved plan dated 06/18/2004. All the pavement and storm sewer pipes are in place.

Please contact me if there are any questions or concerns regarding this submittal.

Sincerely yours,

Shahab Biazar, P.E.

RECEIVED
MAY 24 2007
HYDROLOGY SECTION

4416 Anaheim Ave., N.E., Albuquerque, NM 87113 PH (505) 899-5570 FAX (505) 897-4996 EMAIL AECLLC@aol.com

CITY OF ALBUQUERQUE

July 19, 2004

Shahab Biazar PE
Advanced Engineering and Consulting
4416 Anaheim Ave. NE
Albuquerque, NM 87113

Re: Tierra Morena Subdivision Drainage Report
Engineer's Stamp dated 6-18-04 (C20/D33)

Dear Mr. Biazar,

Based upon the information provided in your submittal dated 6-18-04, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: file
Chuck Caruso

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection
Surveying

June 18, 2004

Mr. Bradley L. Bingham, P.E.
Sr. Engineer, Planing Dept.
Development and Building Services
600 Second Street NW
Albuquerque, New Mexico 87102

RE: GRADING AND DRAINAGE PLAN FOR TIERRA MORENA SUBDIVISION (C20 / D33)

Dear Mr. Bingham:

This letter is in reference to your comments received dated May 28, 2004. The following are responses to your comments:

1. The upstream flow in Barstow (North of Signal Ave.) is analyzed. See Barstow Basin Layout. The high point in Barstow is just north of Signal Ave. The high point was determined based on both the existing flow line elevations and construction plan as-built for Barstow. Only 3.17 cfs drain south from Barstow passed Signal Ave. The runoff on Signal Ave. has been determined from RTI Master Drainage Plan for NAA. Attached are portion of the basin map and runoff table from the master plan. A runoff of 43.28 cfs drains to Barstow from Signal Ave.

2. Additional inlets have been added on signal to intercept a total runoff of 28.90 cfs. The existing 24" RCP on Barstow does not have adequate capacity to handle the entire 43.28 cfs. See attached exhibit and capacity calculations for the 24" RCP. The 28.90 cfs along with the runoff from the subdivision located on the southeast corner of Signal Ave. and Barstow (18 cfs) will total to a runoff of 46.90 cfs. The capacity of the pipe at MH-A is only 40.20 cfs. We are assuming that the additional flow will not impact the capacity of the 24" RCP, since the MH is located at the downstream of the 24" RCP and may drain the runoff from Ashton Pl. prior to arrival of the runoff from upstream. Also, the inlet at the west end of Ashton is in a sump conditions, and it has adequate ponding capacity incase the runoff would back up into the storm pipe. The remaining runoff from Signal Ave. (14.38 cfs) along with the runoff from Barstow (3.17 cfs) will drain south on Barstow via surface at a flow rate of 17.55 cfs. This runoff will be intercepted by the existing inlets on Barstow. Barstow has more than enough runoff capacity (runoff capacity of 99.40 cfs) to handle the runoff of 17.55 cfs.

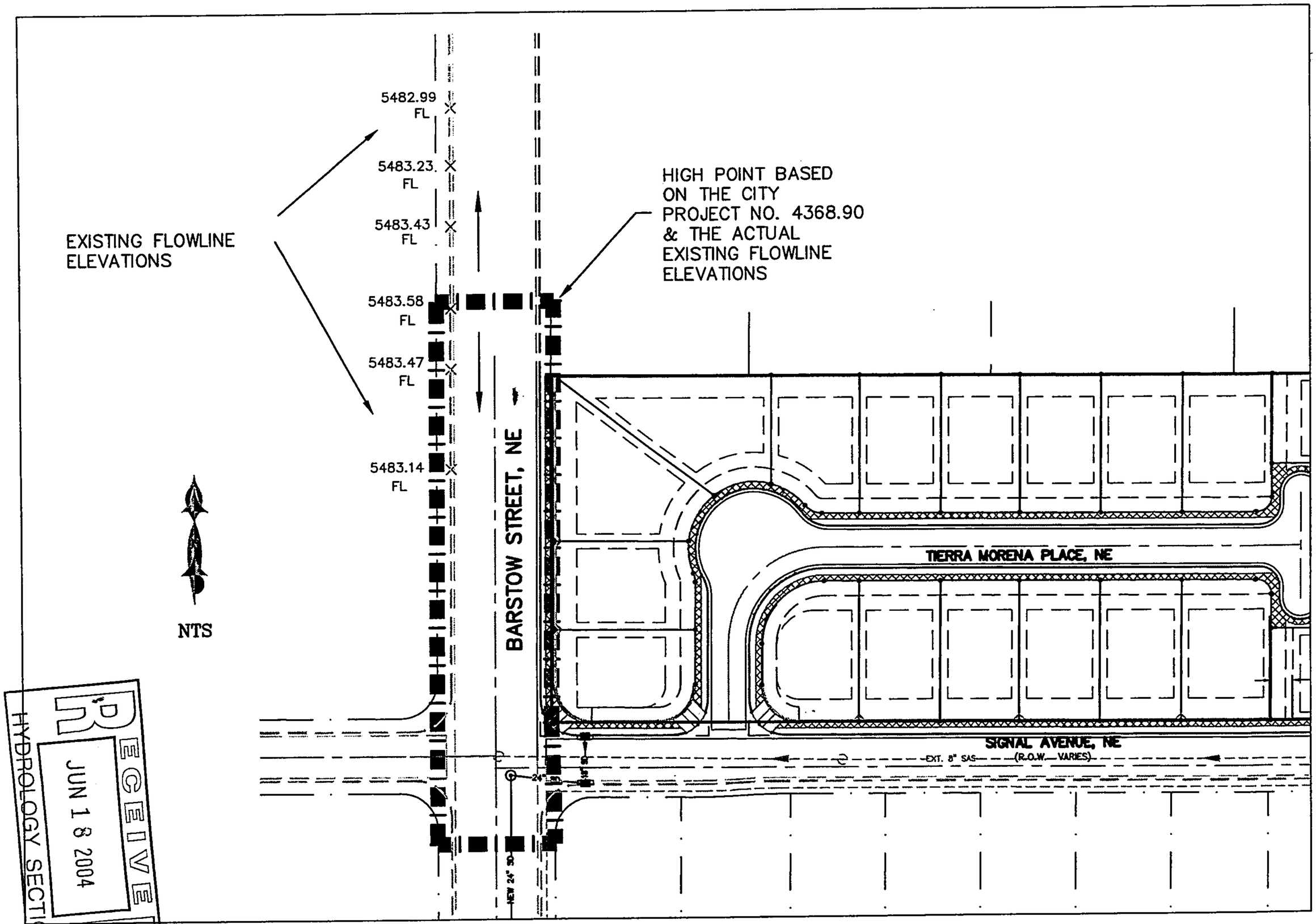
Please contact me if there are any questions or concerns regarding this submittal. The name of the subdivision has been changed to Tierra Morena Subdivision. Grades were also changed on site.

Sincerely yours,

Shahab Biazar, P.E.

RECEIVED
JUN 1 8 2004
HYDROLOGY SECTION

4416 Anaheim Ave., N.E., Albuquerque, NM 87113 PH (505) 899-5570 FAX (505) 897-4996 EMAIL AECLLC@aol.com



BARSTOW BASIN LAYOUT AT SIGNAL

RUNOFF CALCULATION RESULTS

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
BARSTOW	28774.01	0.6606	0.001032

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS	TREATMENT A, B, C, D
BARSTOW	3.17	2.07	0%, 10%, 0%, 90%

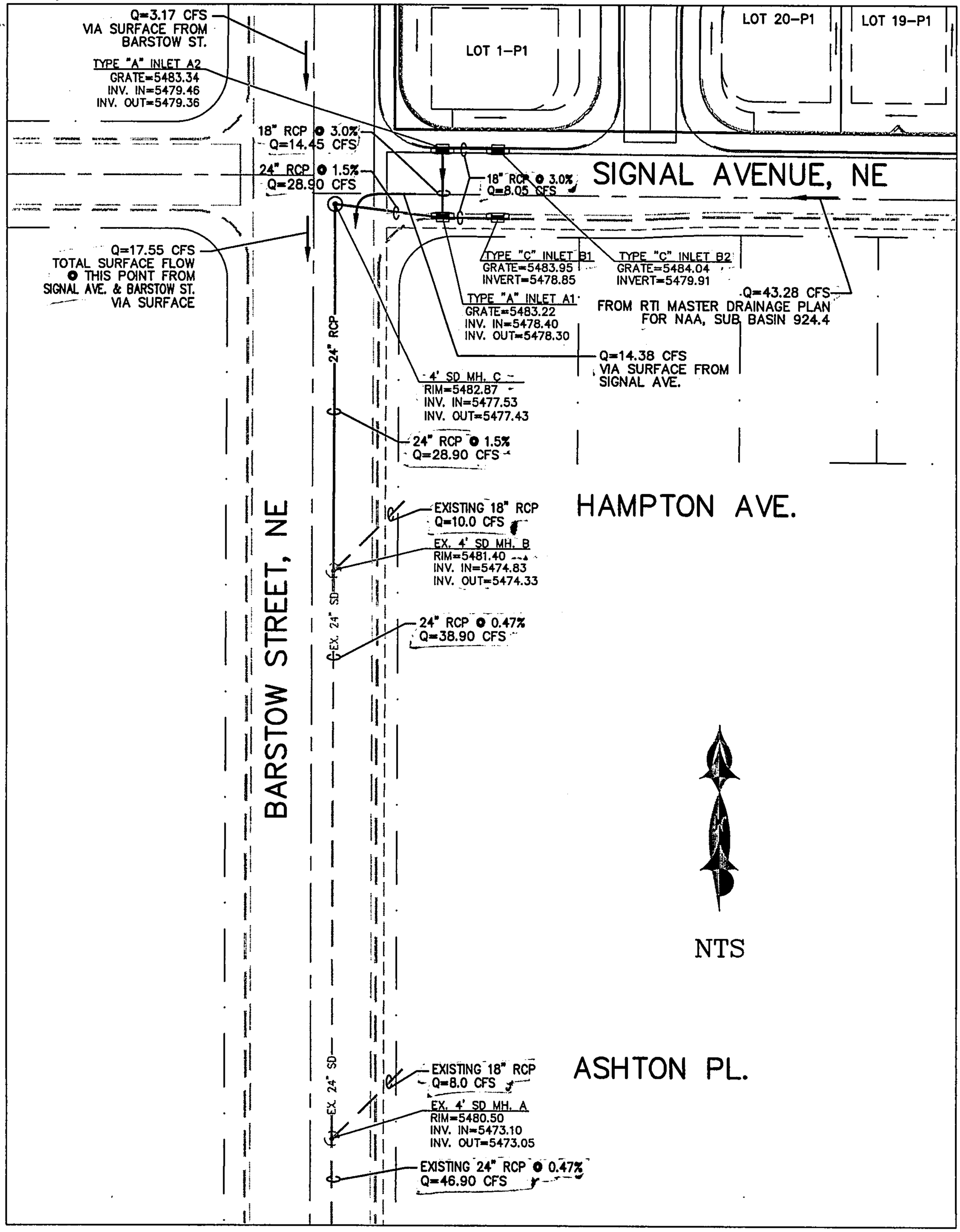
AHYMO INPUT FILE
TIERRA MORENA SUBDIVISION (BARSTOW BASIN)

```
*
**********************************************************************
*         100-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
**********************************************************************
*
START
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=2.14 IN RAIN SIX=2.60 IN
                      RAIN DELAY=3.10 IN DT=0.03333 HR
COMPUTE NM HYD        ID=1 HYD NO=101.0 AREA=0.001032 SQ MI
                      PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                      TP=0.1333 HR MASS RAINFALL=-1
*
**********************************************************************
*          10-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
**********************************************************************
*
START                 TIME=0.0
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.43 IN RAIN SIX=1.73 IN
                      RAIN DAY=2.07 IN DT=0.03333 HR
COMPUTE NM HYD        ID=1 HYD NO=111.0 AREA=0.001032 SQ MI
                      PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                      TP=0.1333 HR MASS RAINFALL=-1
*
**********************************************************************
*
FINISH
```

SUMMARY OUTPUT FILE
TIERRA MORENA SUBDIVISION (BARSTOW BASIN)

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02d RUN DATE (MON/DAY/YR) =06/17/2004
INPUT FILE = 20106BSW USER NO.= AHYMO-I-9702c01000R31-AH

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=	2.600
COMPUTE NM HYD	101.00	-	1	.00103	3.17	.122	2.21184	1.500	4.806	PER IMP=	90.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.730
COMPUTE NM HYD	111.00	-	1	.00103	2.07	.076	1.38160	1.500	3.131	PER IMP=	90.00
FINISH											

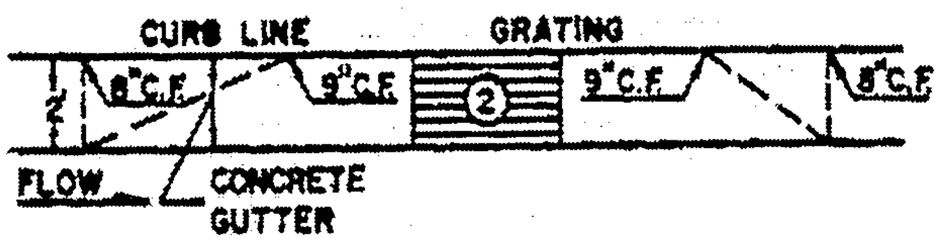


STORM SEWER & SURFACE FLOW EXHIBIT

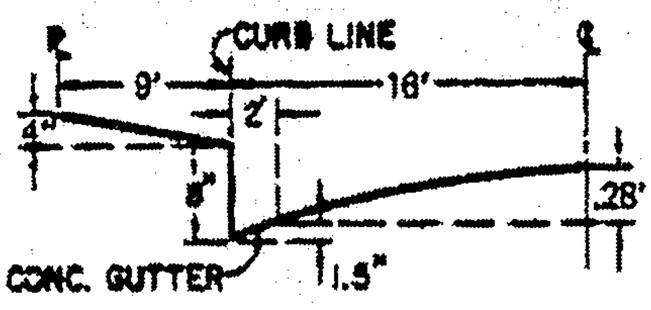
SIGNAL AVE.

INLETS A1, A2, B1, & B2

GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

PLATE 22.3 D-5

FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½

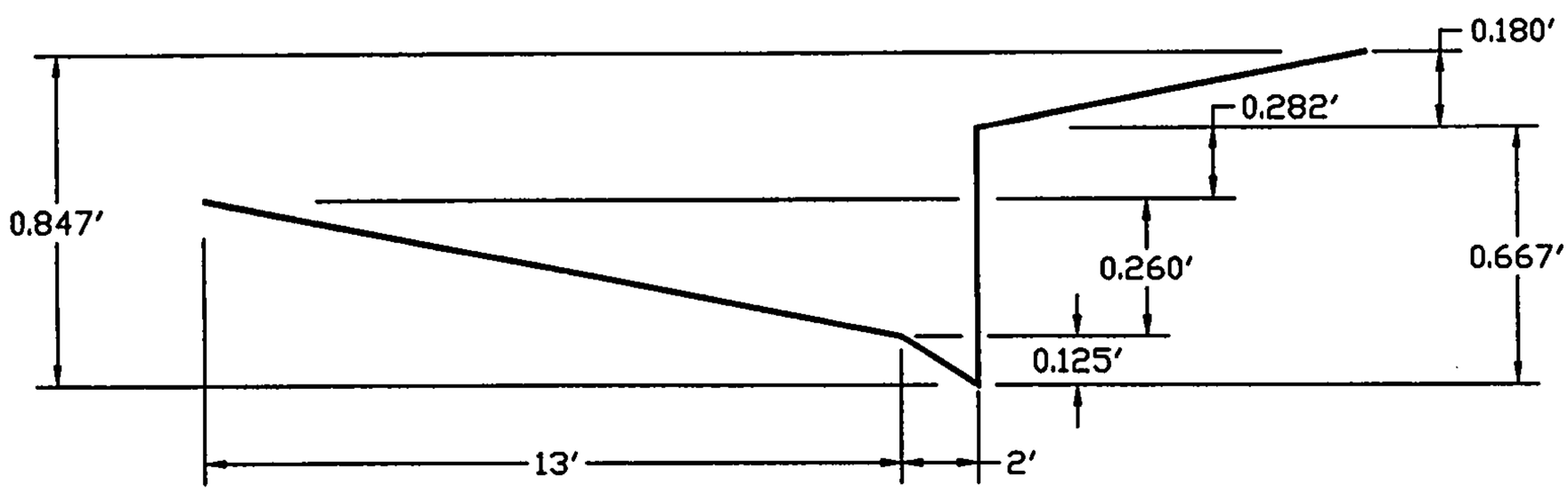
n = 0.017

SLOPE = 0.0320

48' ROW / 30 F-F

Singnal Avenue

HALF STREET DETAIL



HALF STREET CALCULATION

FULL STREET FLOW

@Y 0.125

A1 = ½ Y (Y / 0.0625) = 8 Y²

P1 = SQRT[Y² + (Y / 0.0625)²] + Y = SQRT(257 Y²) + Y

Y (FT)	A	P	(A/P)^2/3	Q	2Q	V	Fr	D*V	D2
0.0250	0.0050	0.4258	0.0517	0.00	0.01	0.81	0.90	0.0202	0.02
0.0500	0.0200	0.8516	0.0820	0.03	0.05	1.28	1.01	0.0641	0.05
0.1250	0.1250	2.1289	0.1511	0.30	0.59	2.36	0.03	0.2954	---

@ 0.125 < Y < 0.385 & Y1 = Y - 0.125

A2 = A1 + ½ Y1(Y1 / 0.02) + 2 Y1 = A1 + 25 Y1² + 2 Y1

P2 = P1 + SQRT[Y1² + (Y1 / 0.01)²] + Y1 = P1 + SQRT(2501 Y1²) + Y1

0.2000	0.4156	6.0797	0.1672	1.09	2.17	2.62	1.03	0.5230	0.21
0.2500	0.7656	8.6302	0.1989	2.38	4.76	3.11	1.10	0.7778	0.28
0.3500	1.8406	13.7312	0.2619	7.54	15.08	4.10	1.22	1.4339	0.45
0.3850	2.3350	15.5165	0.2829	10.33	20.67	4.43	1.26	1.7037	0.52

@ 0.425 < Y < 0.6667 & Y2 = Y - 0.385

A3 = A2 + 15 Y2

P3 = P2 + Y2

0.4000	2.5600	15.5315	0.3006	12.04	24.08	4.70	1.31	1.8809	0.57
0.4300	3.0100	15.5615	0.3345	15.75	31.49	5.23	1.41	2.2495	0.67
0.4500	3.3100	15.5815	0.3560	18.43	36.87	5.57	1.46	2.5059	0.73
0.4724	3.6463	15.6089	0.3794	21.64	43.28	5.93	1.52	2.8034	0.81
0.5000	4.0600	15.6315	0.4071	25.85	51.70	6.37	1.59	3.1837	0.90
0.5500	4.8100	15.6815	0.4548	34.22	68.44	7.11	1.69	3.9127	1.07
0.6000	5.5600	15.7315	0.4999	43.47	86.95	7.82	1.78	4.6914	1.24
0.6667	6.5601	15.7982	0.5566	57.11	114.22	8.71	1.88	5.8040	1.47

Runoff East of Inlets B1 & B2

FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½

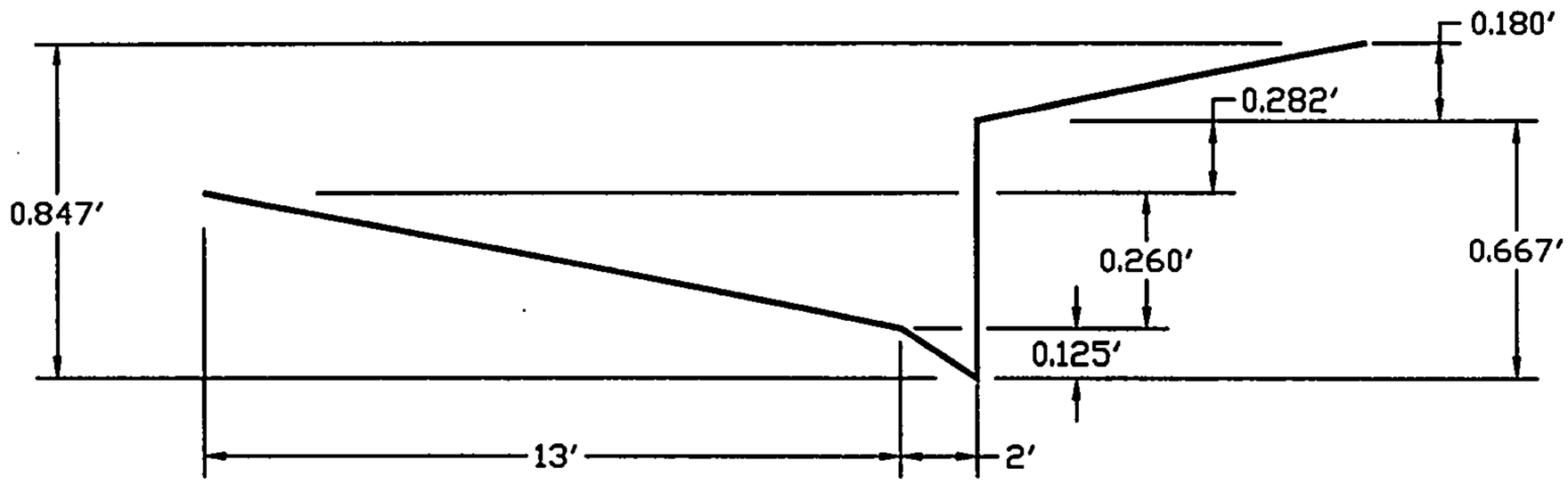
n = 0.017

SLOPE = 0.0320

48' ROW 30 F-F

Singnal Avenue

HALF STREET DETAIL



HALF STREET CALCULATION

FULL STREET FLOW

@Y 0.125

A1 = ½ Y (Y / 0.0625) = 8 Y²

P1 = SQRT[Y² + (Y / 0.0625)²] + Y = SQRT(257 Y²) + Y

Y (FT)	A	P	(A/P)^2/3	Q	2Q	V	Fr	D*V	D2
0.0250	0.0050	0.4258	0.0517	0.00	0.01	0.81	0.90	0.0202	0.02
0.0500	0.0200	0.8516	0.0820	0.03	0.05	1.28	1.01	0.0641	0.05
0.1250	0.1250	2.1289	0.1511	0.30	0.59	2.36	0.03	0.2954	---

@ 0.125 < Y < 0.385 & Y1 = Y - 0.125

A2 = A1 + ½ Y1(Y1 / 0.02) + 2 Y1 = A1 + 25 Y1² + 2 Y1

P2 = P1 + SQRT[Y1² + (Y1 / 0.01)²] + Y1 = P1 + SQRT(2501 Y1²) + Y1

0.2000	0.4156	6.0797	0.1672	1.09	2.17	2.62	1.03	0.5230	0.21
0.2500	0.7656	8.6302	0.1989	2.38	4.76	3.11	1.10	0.7778	0.28
0.3500	1.8406	13.7312	0.2619	7.54	15.08	4.10	1.22	1.4339	0.45
0.3850	2.3350	15.5165	0.2829	10.33	20.67	4.43	1.26	1.7037	0.52

@ 0.425 < Y < 0.6667 & Y2 = Y - 0.385

A3 = A2 + 15 Y2

P3 = P2 + Y2

Runoff Passed Inlets B1 & B2

0.4000	2.5600	15.5315	0.3006	12.04	24.08	4.70	1.31	1.8809	0.57
0.4129	**2.7540**	**15.5444**	**0.3154**	**13.59**	**27.18**	**4.93**	**1.35**	**2.0374**	**0.61**
0.4500	3.3100	15.5815	0.3560	18.43	36.87	5.57	1.46	2.5059	0.73
0.4700	3.6100	15.6015	0.3769	21.28	42.56	5.90	1.52	2.7708	0.80
0.5000	4.0600	15.6315	0.4071	25.85	51.70	6.37	1.59	3.1837	0.90
0.5500	4.8100	15.6815	0.4548	34.22	68.44	7.11	1.69	3.9127	1.07
0.6000	5.5600	15.7315	0.4999	43.47	86.95	7.82	1.78	4.6914	1.24
0.6667	6.5601	15.7982	0.5566	57.11	114.22	8.71	1.88	5.8040	1.47

Runoff East of Inlets A1 & A2.

(43.28 - 2(8.05) = 27.18 cfs)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 200106A

Comment: INLET B1 & B2 TO INLET A1 & A2

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0300 ft/ft
Manning's n.....	0.012
Discharge.....	8.05 cfs

Computed Results:

Depth.....	0.67 ft
Velocity.....	10.59 fps
Flow Area.....	0.76 sf
Critical Depth....	1.10 ft
Critical Slope....	0.0064 ft/ft
Percent Full.....	44.50 %
Full Capacity.....	19.71 cfs
QMAX @.94D.....	21.20 cfs
Froude Number.....	2.61 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 200106A

Comment: INLET A2 INLET A1

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0300 ft/ft
Manning's n.....	0.012
Discharge.....	14.45 cfs

Computed Results:

Depth.....	0.95 ft
Velocity.....	12.18 fps
Flow Area.....	1.19 sf
Critical Depth....	1.39 ft
Critical Slope....	0.0140 ft/ft
Percent Full.....	63.61 %
Full Capacity.....	19.71 cfs
QMAX @.94D.....	21.20 cfs
Froude Number.....	2.37 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 200106B

Comment: INLET A1 TO MH-C & MH-C TO MH-B

Solve For Actual Depth

Given Input Data:

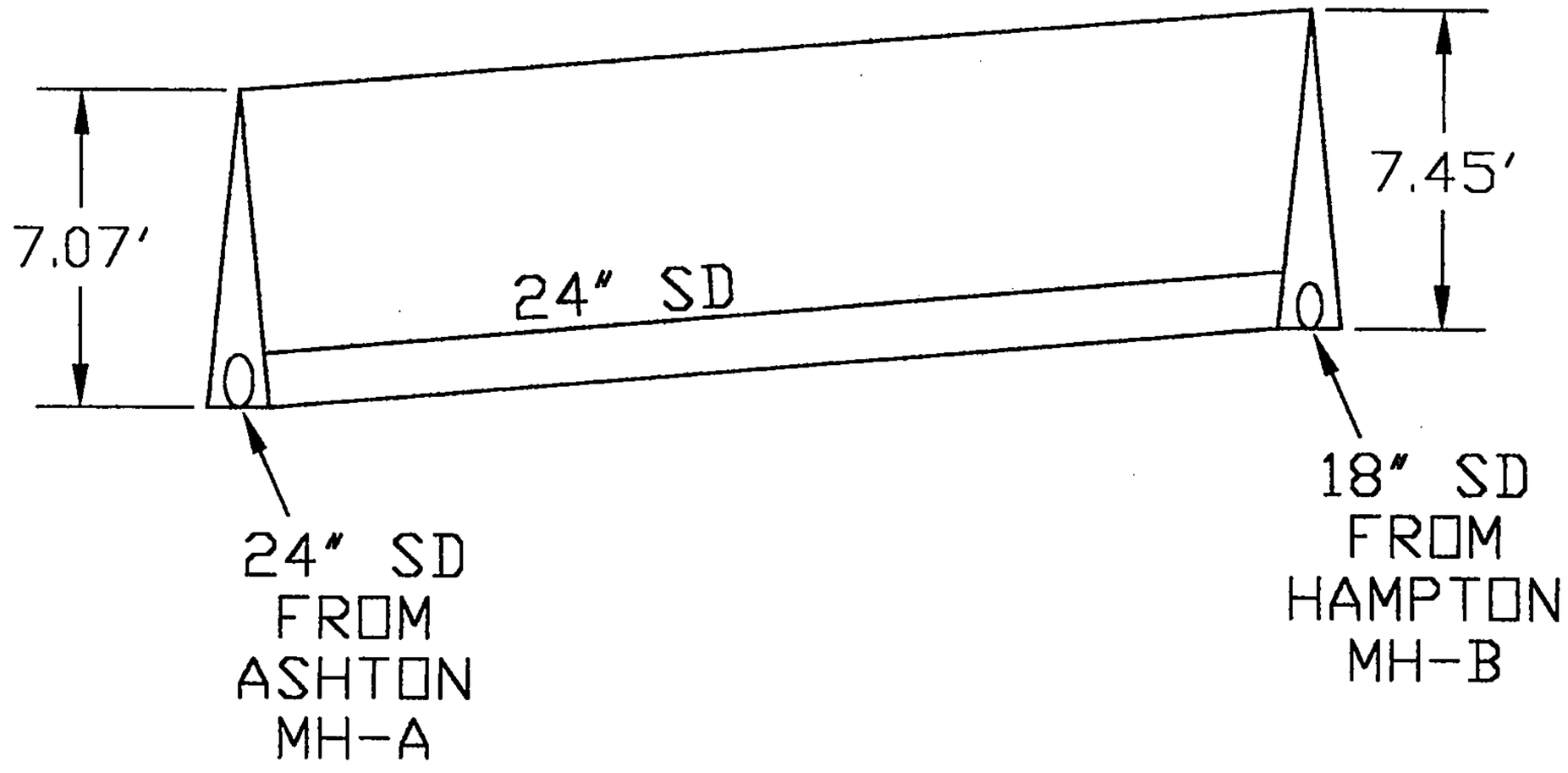
Diameter.....	2.00 ft
Slope.....	0.0150 ft/ft
Manning's n.....	0.012
Discharge.....	28.90 cfs

Computed Results:

Depth.....	1.58 ft
Velocity.....	10.88 fps
Flow Area.....	2.66 sf
Critical Depth....	1.84 ft
Critical Slope....	0.0121 ft/ft
Percent Full.....	78.81 %
Full Capacity.....	30.02 cfs
QMAX @.94D.....	32.29 cfs
Froude Number.....	1.50 (flow is Supercritical)

PIPE FLOW CAPACITY

(EXISTING 24" SD PIPE FLOW CAPACITY
IN BARSTOW USING ORIFICE EQUATION)



$$Q = CA\sqrt{2gh}$$

$$C = 0.60$$

$$A = 3.14 \times 1.00^{2} = 3.14$$

$$h_{MH-A} = 7.07'$$

$$Q_{MH-A} = 0.6 \times 3.14 \sqrt{2 \times 32.2 \times 7.07} = 40.20 \text{ cfs}$$

$$h_{MH-B} = 7.45'$$

$$Q_{MH-B} = 0.6 \times 3.14 \sqrt{2 \times 32.2 \times 7.45} = 41.27 \text{ cfs}$$

From Resource Technology Inc. Report

TABLE A-6

NORTH DOMINGO BACA EXISTING CONDITION

Sub-basin	Area (acres)	100-yr Vol (ac-ft)	100-yr Qp (cfs)	100-yr Vol (ac-ft)	100-yr Qp (cfs)
922	.0210	1.398	32.59		
922.1	.0070	.394	11.18		
922.2	.0148	1.396	35.69		
922.3	.0415	3.913	100.3		
923.0	.0070	.370	11.32		
924.1	.0190	.733	24.11		
924.2	.0070	.335	10.16		
924.3	.0270	2.753	68.50		
924.4	.0172	.862	26.21		
925.1	.0640	6.547	162.20		
925.2	.0140	.536	17.65		
925.3	.0105	1.063	26.43		
925.4	.0370	3.887	96.45		
926.0	.0375	2.624	72.25		
926.1	.0120	.836	24.21		
929.0	.0240	2.752	65.77		
930.0	.0850	8.468	211.88		
931.0	.0605	6.185	104.39		
932.1	.0073	.766	19.08		
932.2	.0073	.766	18.89		
932.3	.0313	3.284	80.93		
932.4	.0574	6.135	150.03		
934.1	.0468	4.148	107.84		

From Resource Technology Inc., Report

TABLE A-7

NORTH DOMINGO BACA FUTURE CONDITION

Sub-basin	Area (sq. mi.)	10-yr Vol (ac-ft)	10-yr Qp (cfs)	100-yr Vol (ac-ft)	100-yr Qp (cfs)
922.0	.0210	.713	17.26	1.462	33.77
922.1	.0070	.412	10.43	1.443	41.55
922.2	.0148	.784	21.04	1.396	35.69
922.3	.0415	2.199	58.97	3.913	100.03
923.0	.0070	.515	12.15	.844	19.32
19.32924.1	.0250	1.487	38.43		
924.4	.0190	1.130	29.21		
924.3	.0270	1.593	41.20	2.753	68.50
924.4	.0172	1.006	25.91	1.741	43.28
925.3	.0105	.6140	15.82	1.063	26.43
925.4	.0370	2.255	58.52		
926.0	.0578	3.381	87.05	5.850	145.40
926.1	.0120	.709	18.12	1.228	30.38
929.0	.0240	1.658	41.00	2.752	65.77
930.0	.0850	4.874	125.30	8.468	211.88
931.0	.0605	3.878	66.31	6.529	109.47
932.1	.0073	.450	11.58	.766	19.08
932.2	.0073	.450	11.46	.766	18.89
932.3	.0313	1.928	49.09	3.284	80.93
932.4	.0574	3.605	91.59	6.135	150.03
934.1	.1031	5.911	151.58	10.243	257.43
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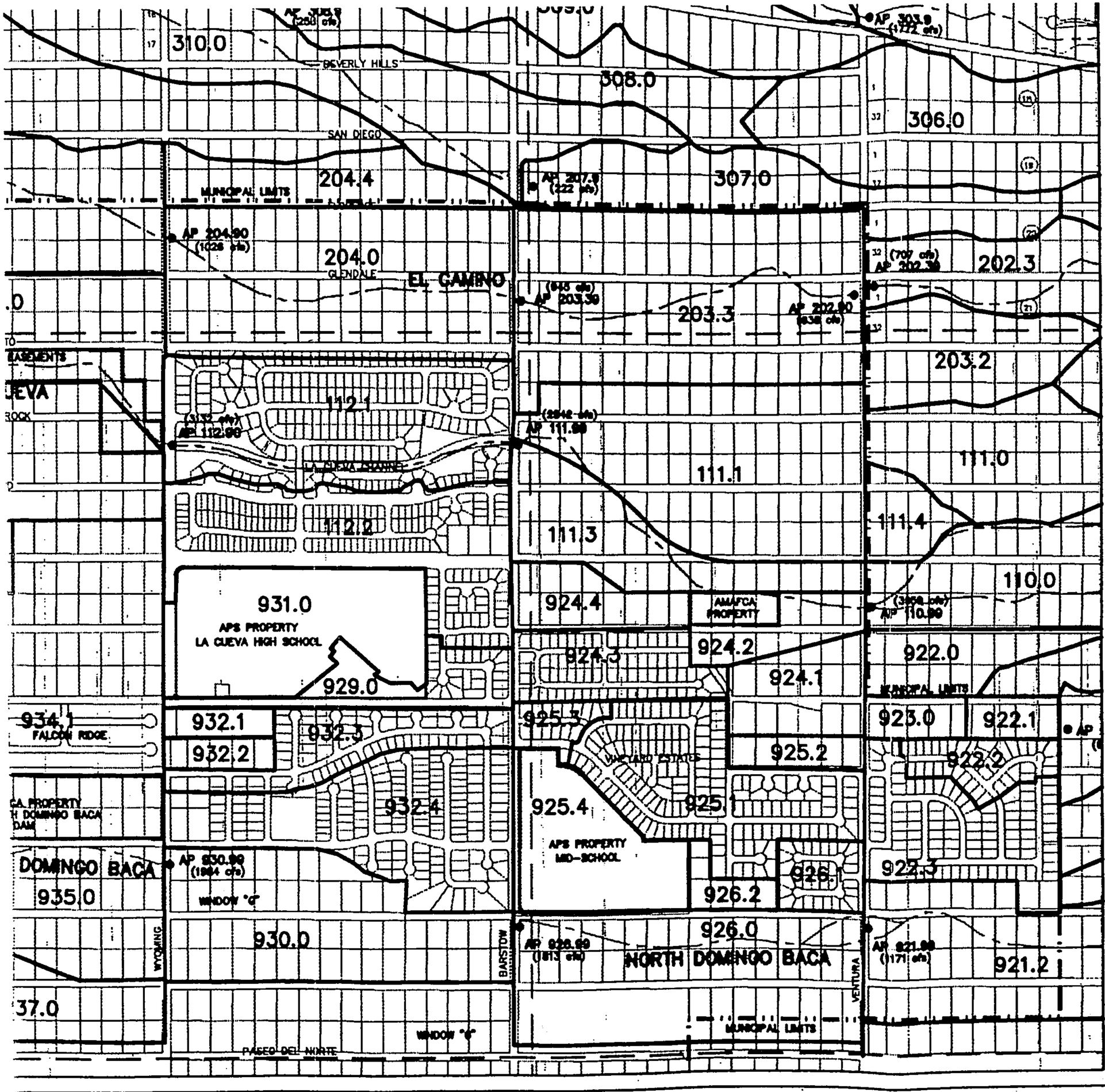
937.0	.0452	2.592	66.86	4.491	112.45



LEGEND

- 107.1 SUBBASIN DESIGNATION
- SUBBASIN BOUNDARY
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- AP 107.20 (2704 cfs) ANALYSIS POINT AND FUTURE CONDITION FLOW RATE
- * FLOW RATE NOT BULKED FOR SEDIMENT
- # 2 POTENTIAL AVULSION LOCATION
- MUNICIPAL LIMITS

NORTH ALBUQUERQUE ACRES
MASTER DRAINAGE PLAN

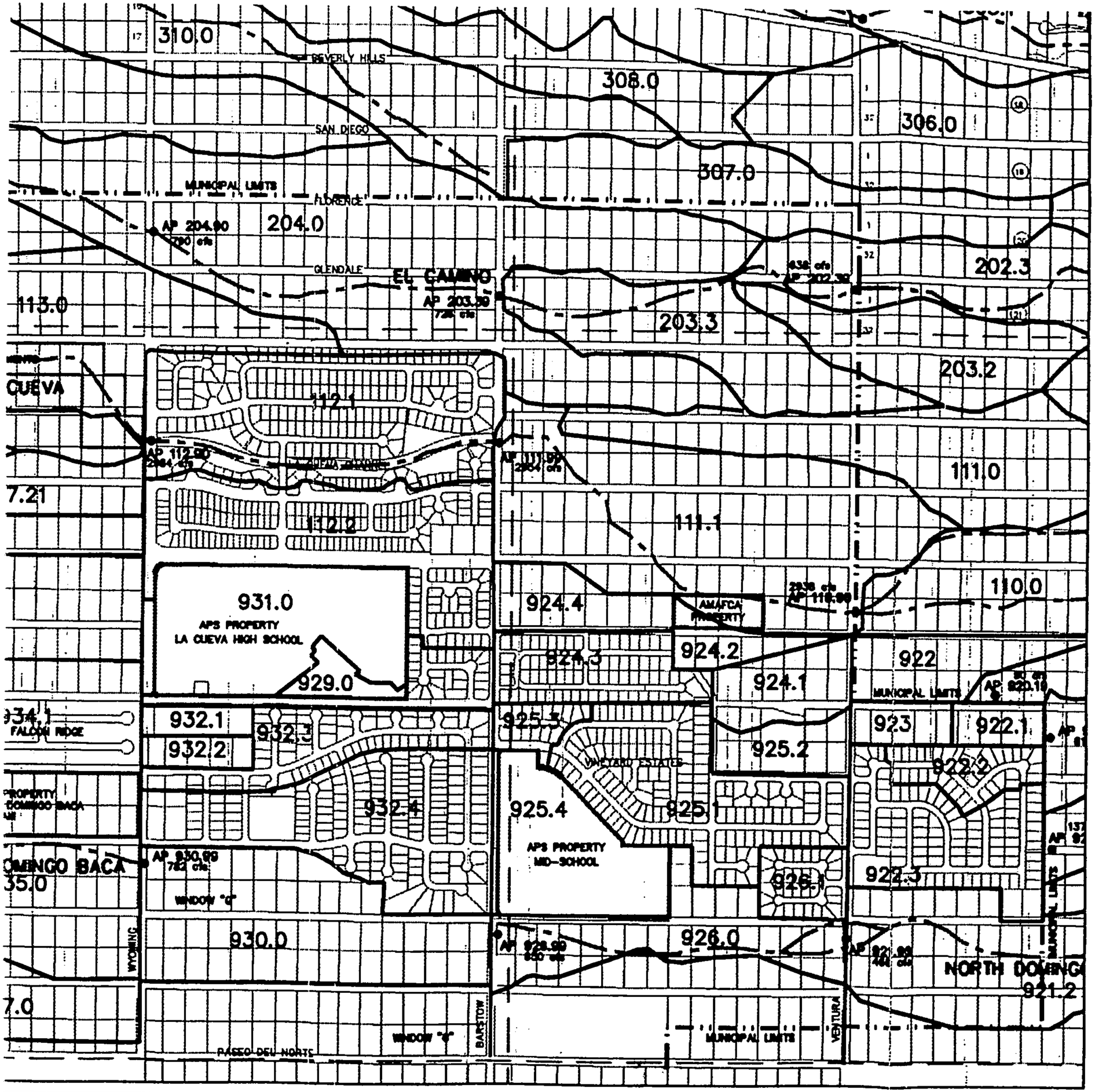
FUTURE CONDITION

FIGURE 4A

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

CITY OF Albuquerque

Resource Technology, Inc.
CMI Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@rtinc.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400



LEGEND

- 107.1 SUBBASIN DESIGNATION
- SUBBASIN BOUNDARY
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- ANALYSIS POINT AND EXISTING CONDITION FLOW RATE
- * FLOW RATE NOT BULKED FOR SEDIMENT
- # 2 POTENTIAL AVULSION LOCATION
- MUNICIPAL LIMITS

NORTH ALBUQUERQUE ACRES MASTER DRAINAGE PLAN

EXISTING CONDITION

FIGURE 3A

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

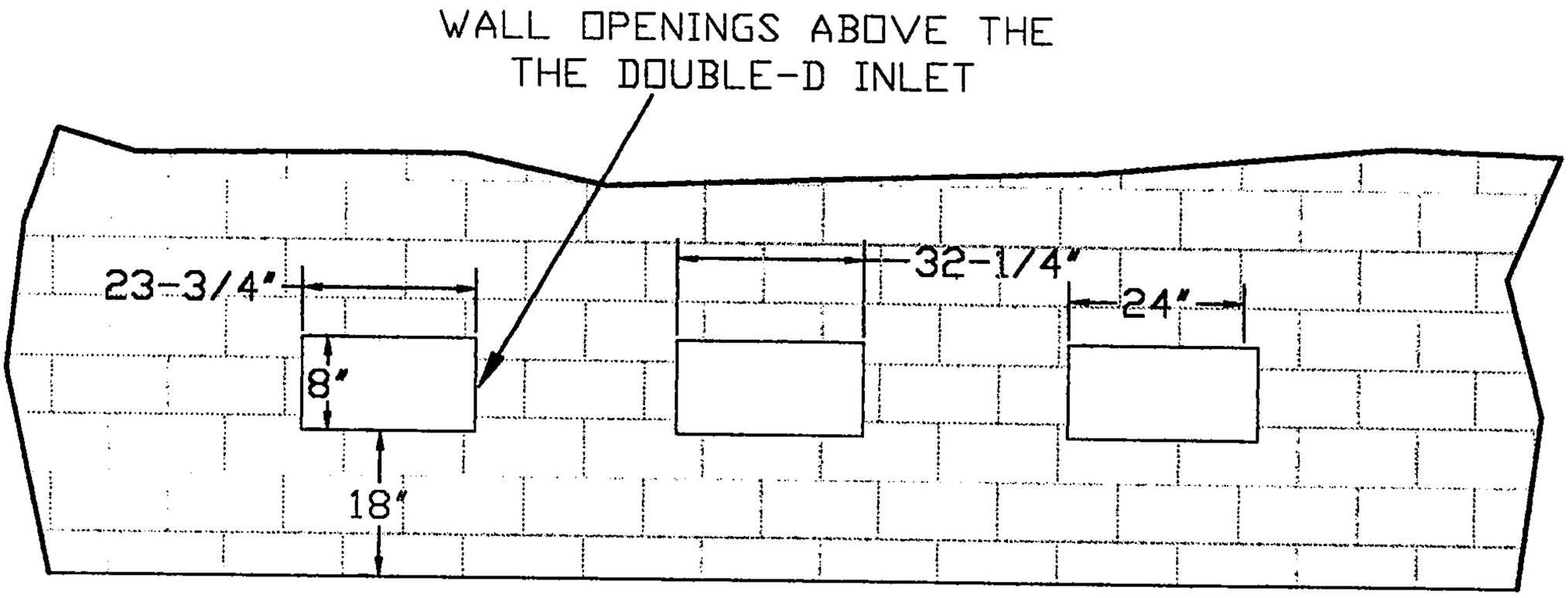
Resource Technology, Inc.

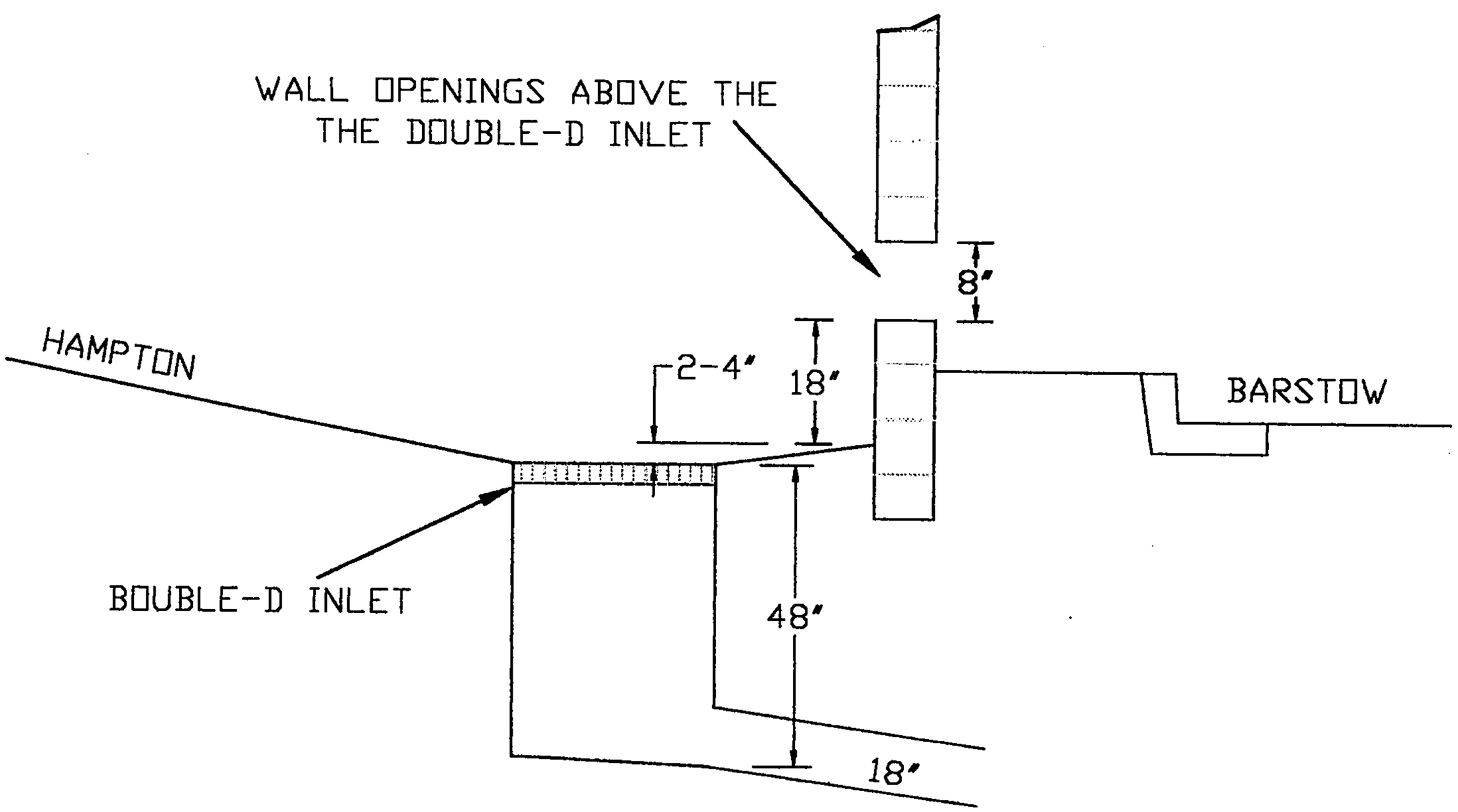
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning

1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@rtinis.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400

INLET AT THE WEST END OF HAMPTON AVE.

(CARRINGTON SUBDIVISION)





$Q = CA\sqrt{2gh}$

$C = 0.60$

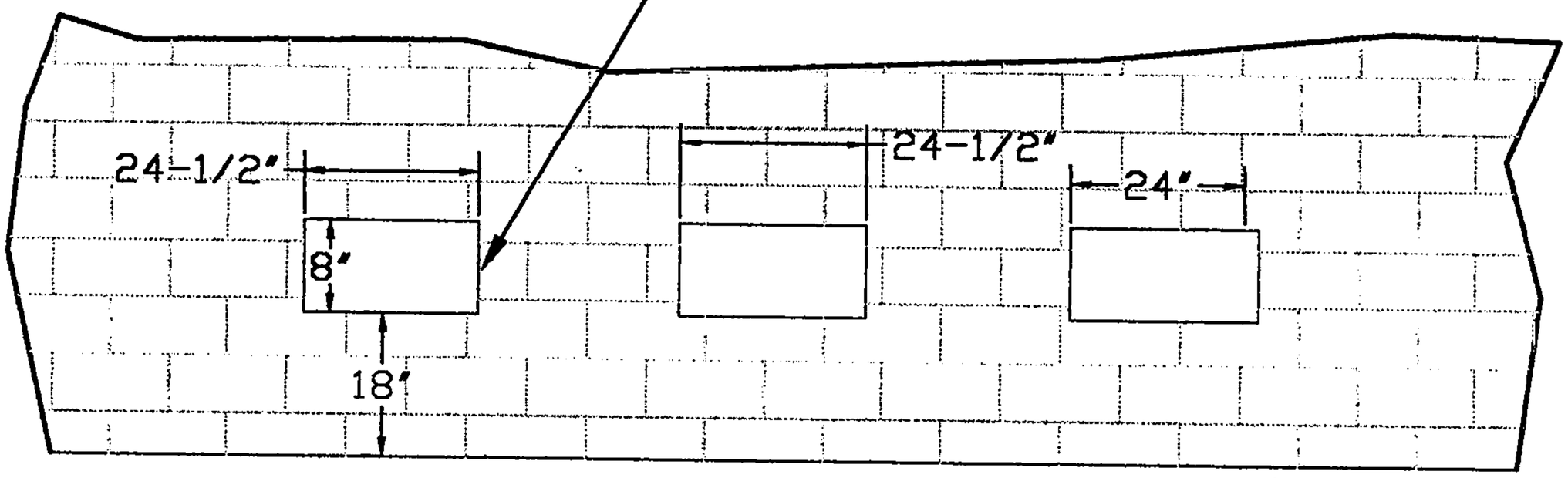
$A = 3.14 \times 0.75^2 = 1.77$

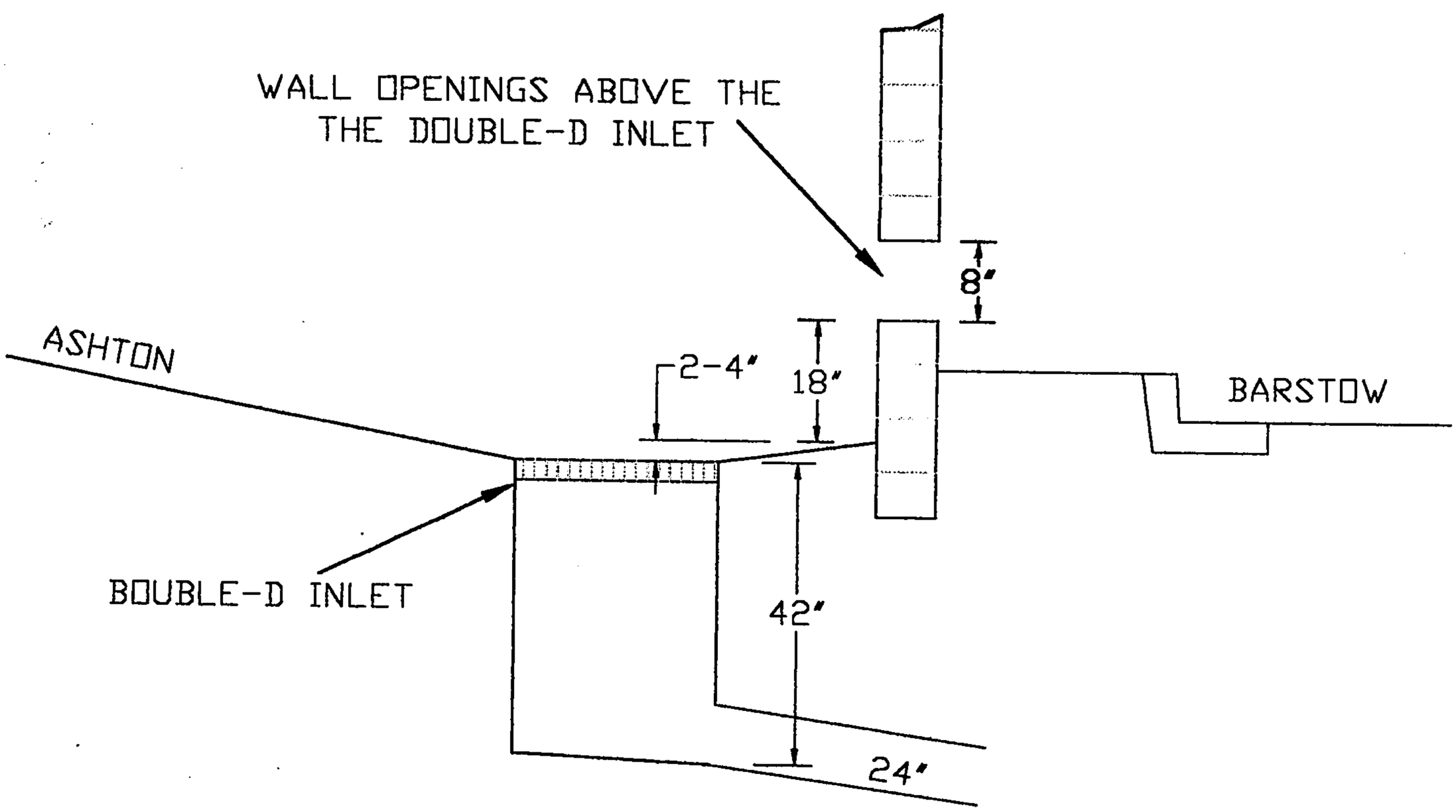
$h = 18" + 2" + 48" = 68" = 5.67'$

$Q = 0.6 \times 1.77\sqrt{2 \times 32.2 \times 5.67} = 20.29$ cfs

INLET AT THE WEST END OF ASHTON PL.

(CARRINGTON SUBDIVISION)





$Q = CA\sqrt{2gh}$

$C = 0.60$

$A = 3.14 \times 1^2 = 3.14$

$h = 18" + 2" + 42" = 62" = 5.17'$

$Q = 0.6 \times 3.14 \sqrt{2 \times 32.2 \times 5.17} = 34.38$ cfs

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 7, 2001

Shahab Biazar, P.E.
Advanced Engineering and Consulting, LLC
10205 Snowflake Court NW
Albuquerque, NM 87114

RE: QUAIL CREEK SUBDIVISION (C20-D33). GRADING AND DRAINAGE PLAN FOR PRELIMINARY PLAT APPROVAL, SITE DEVELOPMENT PLAN FOR SUBDIVISION AND BUILDING PERMIT APPROVALS. ENGINEER'S STAMP DATED NOVEMBER 30, 2001.

Dear Mr. Biazar:

Based on the information provided on your December 4, 2001 resubmittal, City Hydrology has the following comments:

a. Storm Drain will be installed by Work Order not an SO#19. Notice to Contractor Notes are those for SO#19 and are superfluous.
b. An infrastructure list is required. Show street names. Catch basins should be Type "A" not Type "C". Inch symbol instead of foot symbol used to indicate manhole diameter.
c. Easement must be assured before Preliminary Plat approval is given.
d. ***Plat and Site Development actions can be approved upon said assurance.***

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: Terri Martin
File

DRAINAGE INFORMATION SHEET

(REV. 11/01/2001)

PROJECT TITLE: Quail Creek Subdivision ZONE ATLAS/DRG. FILE #: C-20 / D33

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 29, 30, 31, & 32 Block 4, Tract 3, Unit 3, NAA

CITY ADDRESS: _____

ENGINEERING FIRM: Advanced Engineering and Consulting, LLC CONTACT: Shahab Biazar
ADDRESS: 10205 Snowflake Ct. NW PHONE: (505) 899-5570
CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87114

OWNER: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

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

SURVEYOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

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

CHECK TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- X DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ____ CLOMR / LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEER'S CERTIFICATION (TCL)
- ____ ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
- ____ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SIA / FINANCIAL GUARANTEE RELEASE
- X PRELIMINARY PLAT APPROVAL
- X S. DEV. PLAN FOR SUB'D. APPROVAL
- X S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- X FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY (PERM.)
- ____ CERTIFICATE OF OCCUPANCY (TEMP.)
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ____ OTHER (SPECIFY)

RECEIVED
DEC 04 2001
HYDROLOGY SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ____ YES
- X NO
- ____ COPY PROVIDED

DATE SUBMITTED: 11 / 30 / 01 BY: Shahab Biazar, P.E.

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittals may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5)
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or containing five (5) acres or

ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection

November 30, 2001

Mr. Carlos Montoya
City Floodplain Administrator
Plaza Del Sol-2nd Floor West
600 2nd Street NW
Albuquerque, NM 87102

RE: Revised Grading Plan For Quail Creek Subdivision (C20 / D33)

Dear Mr. Montoya:

This letter is in response to your comments received dated August 23, 2001.

1. We are in the process of preparing the private drainage Easement and maintenance agreement. We will forward all the necessary documents as soon as they are ready.

2. A cross section on the retaining wall and the road at Signal Avenue is added to the plans. See Section F-F.

3. The retaining walls are shown more clearly on the plans.

4. Section C-C is modified to show the property line as well as the elevations difference between the pads.

5. Lot 9 and 10 are shown as an example for the difference in the elevation of the pads. No retaining walls are required to maintain the grades between the pads for any of the lots.

6. We have addressed the elevation differences between the pads. See Section C-C and response number 5.

7. Inlets are added on Signal as requested.

Please contact me if there are any questions or concerns regarding this submittal.

Sincerely yours,

Shahab Biazar, P.E.

10205 Snowflake Court N.W., Albuquerque, N.M. 87114 PH (505) 899-5570 FAX (505) 897-4996 EMAIL AECLLC@aol.com

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Quail Creek Subdivision **ZONE ATLAS/DRNG. FILE #:** C-20 / D33

DRB #: _____ **EPC #:** _____ **WORK ORDER #:** _____

LEGAL DESCRIPTION: LOTS 29, 30, 31, & 32, BLOCK 4, TRACT 3, UNIT 3, NAA

CITY ADDRESS: _____

ENGINEERING FIRM: Advanced Engineering and Consulting, LLC **CONTACT:** Shahab Biazar

ADDRESS: 10205 Snowflake Ct. NW Alb., NM 87114 **PHONE:** (505) 899-5570

OWNER: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

ARCHITECT: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

SURVEYOR: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

CONTRACTOR: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

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**

CHECK TYPE OF APPROVAL SOUGHT:

- _____ **SKETCH PLAN APPROVAL**
- X **PRELIMINARY PLAT APPROVAL**
- X **S. DEV. PLAN FOR SUB'D. APPROVAL**
- X **S. DEV. PLAN FOR BLDG. PERMIT APPROVAL**
- _____ **SECTOR PLAN APPROVAL**
- X **FINAL PLAT APPROVAL**
- _____ **FOUNDATION PERMIT APPROVAL**
- X **BUILDING PERMIT APPROVAL**
- _____ **CERTIFICATE OF OCCUPANCY APPROVAL**
- X **GRADING PERMIT APPROVAL**
- _____ **PAVING PERMIT APPROVAL**
- _____ **S. A. D. DRAINAGE REPORT**
- _____ **DRAINAGE REQUIREMENTS**
- _____ **OTHER**

RECEIVED
AUG 14 2001
PWD/DESIGN REVIEW

DATE SUBMITTED: 08 / 13 / 2001

BY: *SHAHAB BIAZAR*

DRAINAGE REPORT
FOR

QUAIL CREEK SUBDIVISION

Prepared by:

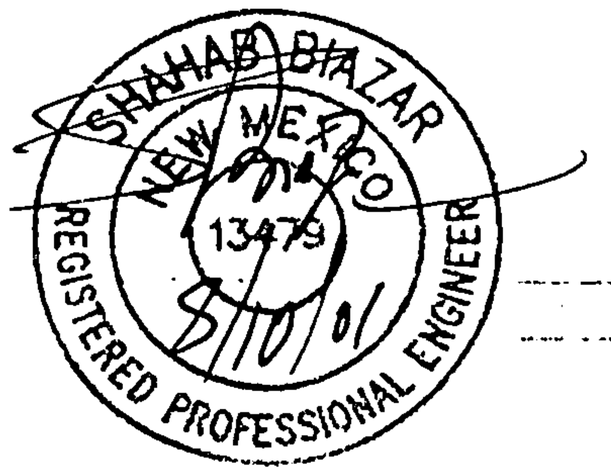
ADVANCED ENGINEERING and CONSULTING, LLC

10205 Snowflake Ct. NW
Albuquerque, New Mexico 871-14

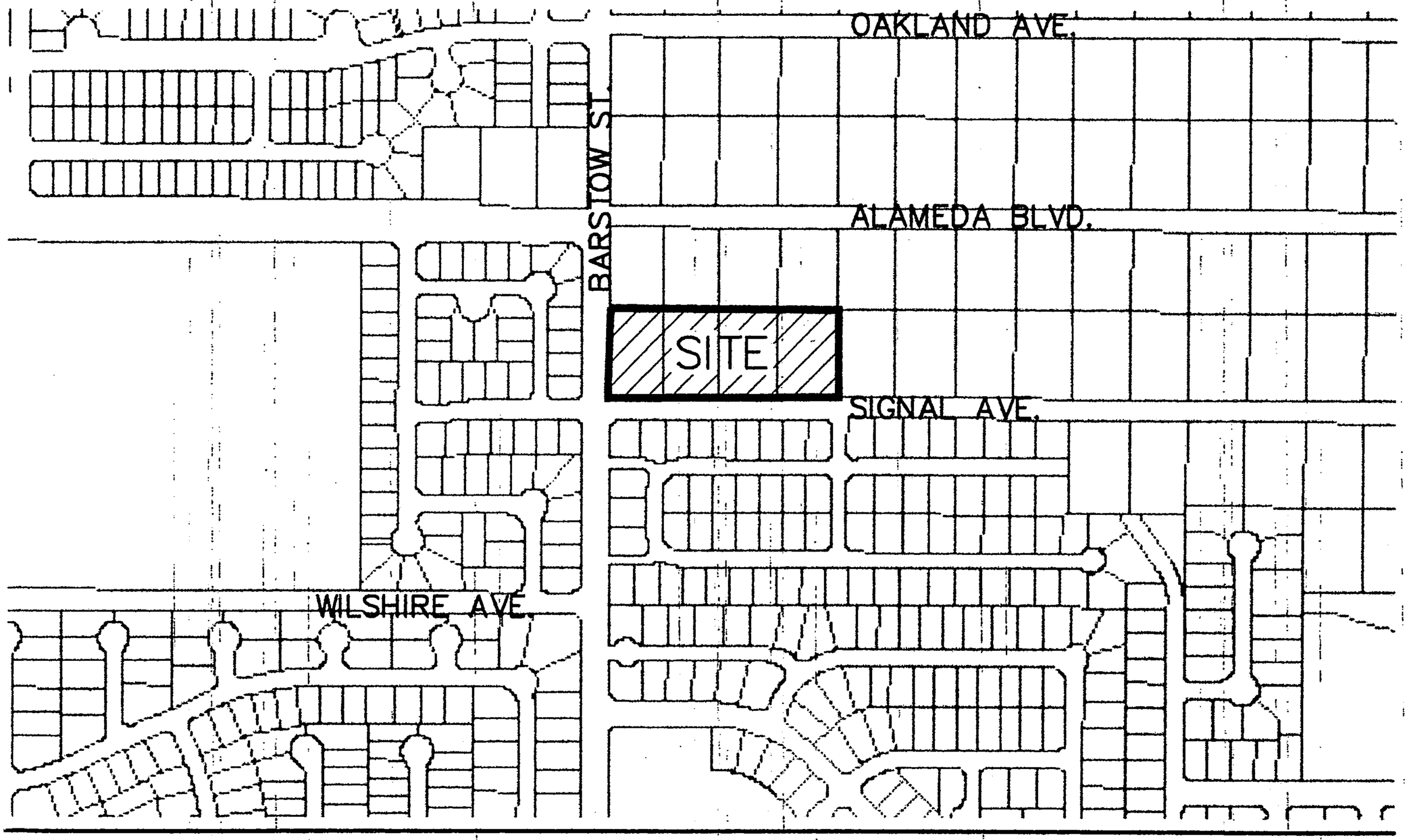
Prepared For:

Paul Newman
PO Box 91927
Albuquerque, NM 87199

August, 2001



Shahab Biazar
PE NO. 13479



VICINITY MAP:

C-20-Z

Location

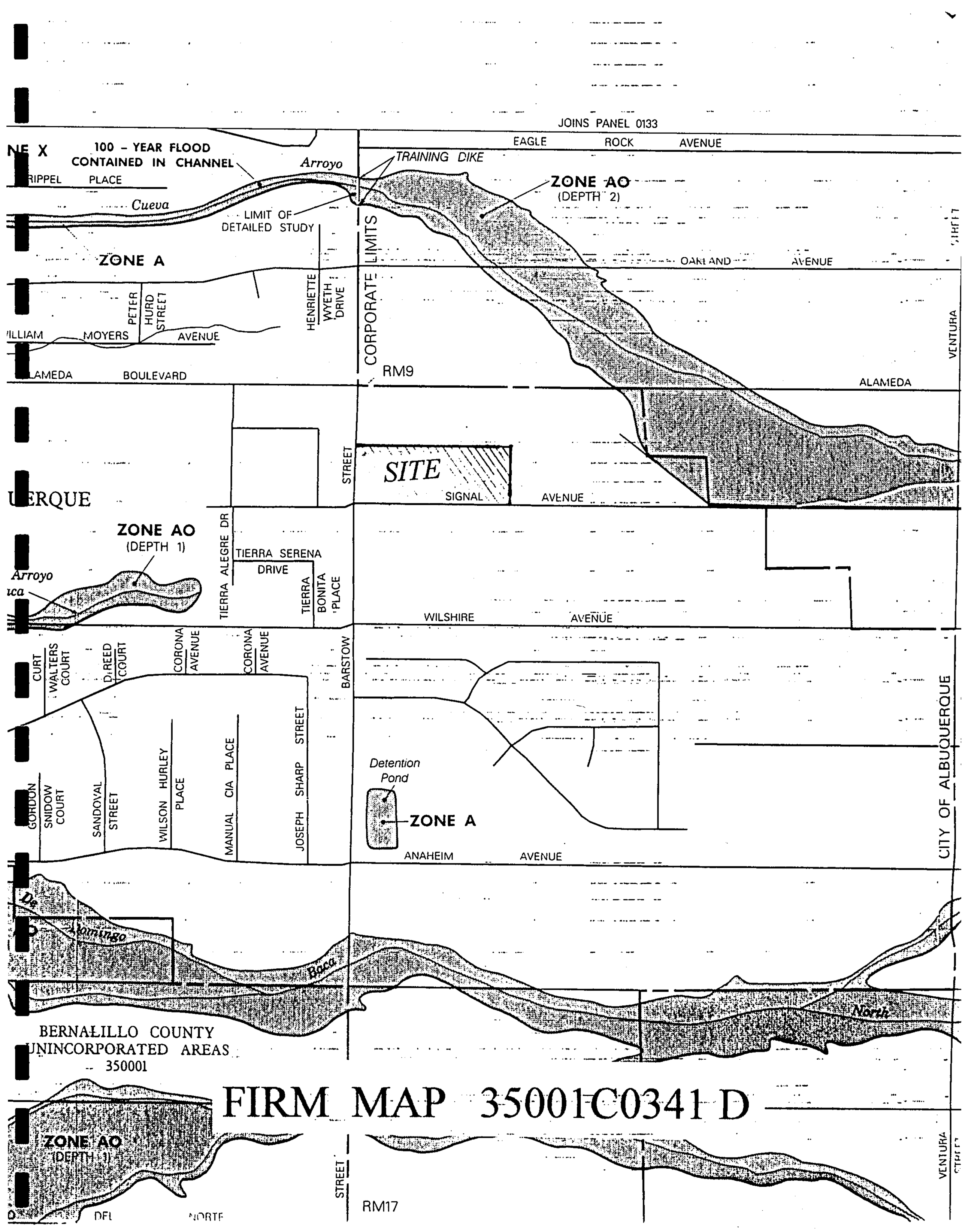
Quail Creek Subdivision consists of lots 29, 30, 31, and 32, Block 4, Tract 3, Unit 3 of North Albuquerque Acres, is located at the northeast corner of Signal Avenue and Barstow Street. The total area of the site is ±3.3843 acres. See attached Zone Atlas page number C-20 for exact location. The owners are proposing to subdivide these 4 lots into 24 lot subdivision.

Purpose

The purpose of this drainage report is to present a grading and drainage solution for the proposed sites. We are requesting rough grading approval, site development plan for subdivision purposes, site development plan for building permit, final plat approval and building permit.

Existing Drainage Conditions

The site falls within the Basin 924.4 of North Albuquerque Acres Master Drainage Plan prepared for City of Albuquerque by Resource Technology, Inc. which drains to North Domingo Baca Arroyo ultimately. The site at the current conditions drains west to Barstow Street and then from there south, where the runoff will be intercepted by a series of inlets. The inlets will drain to a detention pond and then drain to North Domingo Baca Arroyo. The site does not fall within a 100-year flood plain. See the following sheet, FIRM Map (35001C0341 D), for the location of the site.


JOINS PANEL 0133
NE X
100 – YEAR FLOOD
CONTAINED IN CHANNEL
Arroyo
TRAINING DIKE
EAGLE ROCK AVENUE
RIPPEL PLACE
Cueva
ZONE AO
(DEPTH 2)
LIMIT OF
DETAILED STUDY
ZONE A
CORPORATE LIMITS
OAKLAND AVENUE
HENRIETTE
WYETH DRIVE
PETER
HURD
STREET
ILLIAM MOYERS AVENUE
LAMEDA BOULEVARD
RM9
ALAMEDA
VENTURA
STREET
SITE
SIGNAL AVENUE
UERQUE
ZONE AO
(DEPTH 1)
Arroyo
ica
TIERRA ALEGRE DR
TIERRA SERENA
DRIVE
TIERRA BONITA PLACE
WILSHIRE AVENUE
CURT
WALTERS
COURT
D.REED
COURT
CORONA
AVENUE
CORONA
AVENUE
BARSTOW
GORDON
SNIDOW
COURT
SANDOVAL
STREET
WILSON HURLEY
PLACE
MANUAL CIA PLACE
JOSEPH SHARP STREET
Detention
Pond
ZONE A
ANAHEIM AVENUE
CITY OF ALBUQUERQUE
Domingo
Baca
North
BERNALILLO COUNTY
UNINCORPORATED AREAS
-- 350001
FIRM MAP 35001C0341 D
ZONE AO
(DEPTH 1)
STREET
RM17
DEL NORTE
VENTURA
STREET

There is an offsite basin (±3.5425 acres), with a runoff of 6.64 cfs, which drains to this site and then to Signal Avenue. See the following sheet for the location of the offsite flow.

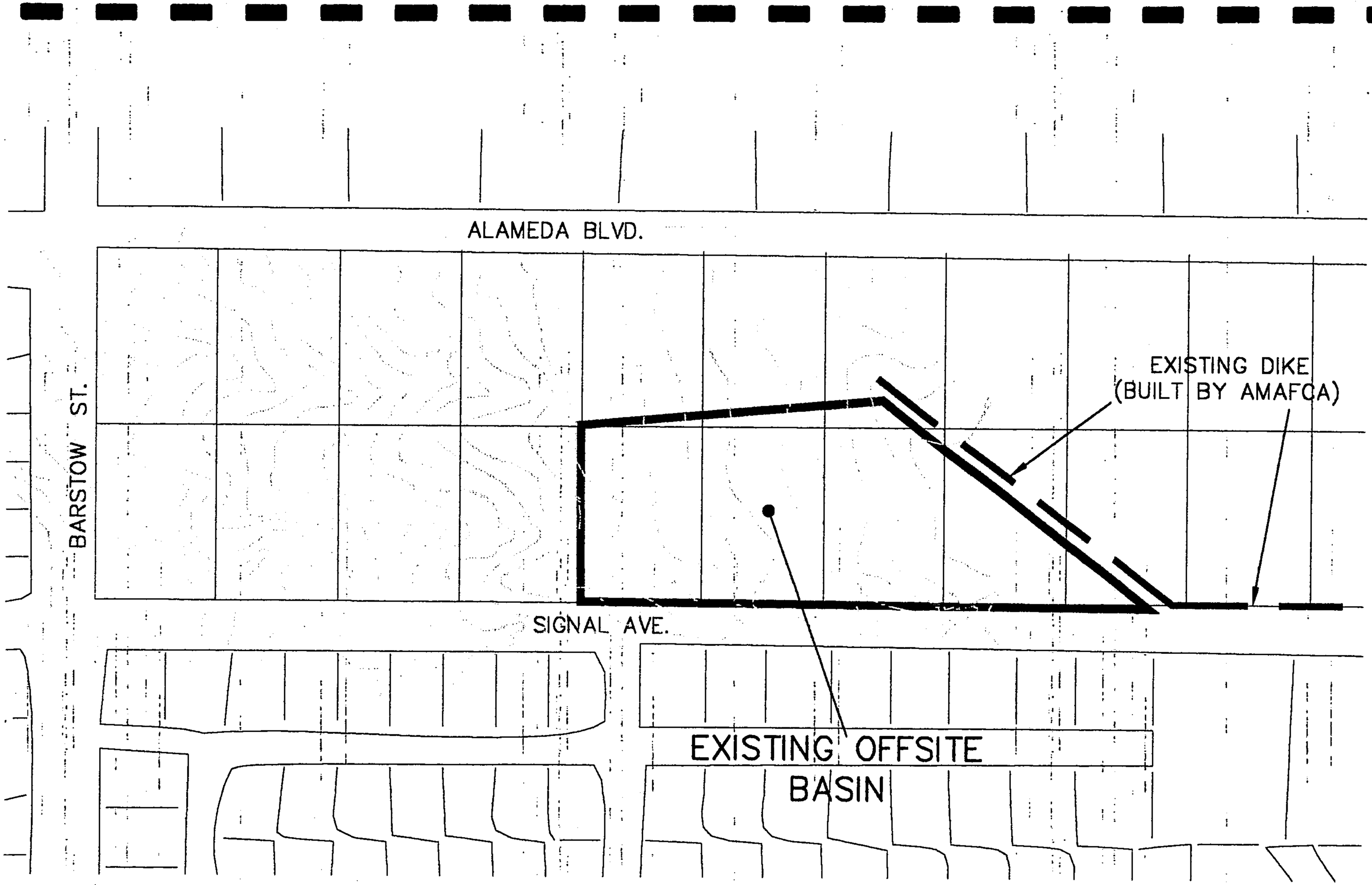
Proposed Conditions and On-Site Drainage Management Plan

Under the proposed conditions the drainage patterns will remain as the existing conditions. The runoff from the site will drain to Signal and then from there to Barstow and then to North Domingo Baca Arroyo. The offsite runoff to the east will drain to a temporary desilting pond and then will discharge to Signal Ave. The desilting pond is not designed to any specific size or volume and is merely for desilting purposes.

Under the proposed conditions Basin 924.4 of North Albuquerque Acres Master Drainage Plan prepared for City of Albuquerque by Resource Technology, Inc. shows a total developed discharge rate of 43.28 cfs. Therefore, the discharge rate under the developed conditions is 3.93 cfs/acre which is a total discharge rate of 13.30 cfs for our site. We have calculated a developed flow rate of 14.55 cfs. The difference in Resource Technology's calculations and our calculation is only 1.25 cfs and will not have any adverse impact on the capacity of the existing storm sewer structure or the street flow capacity.

Existing 24" Storm Drain Pipe in Barstow

Under the City Drainage Number C-20/D3B (Carrington Subdivision) it was calculated that the inlets located at west end of the Ashton Place and Hampton Avenue only intercept 9 cfs per street. Since the inlet at the end of these two street are built differently from the original



OFFSITE BASIN MAP

intended design they intercept more runoff. See this report for inlet capacity calculations. Inlet located at the west end of Hampton Avenue is capable of intercepting ±20.29 cfs and inlet located at the west end of Ashton Place is capable of intercepting ±34.38 cfs. The total flow which can get discharged into the existing 24" pipe in Barstow Avenue is 54.67 cfs. We also have analyzed the 24" storm sewer pipe on Barstow Avenue and it has a flow capacity of 40.20 cfs. Therefore, flow discharge rate will be controlled by the 24" in Barstow Avenue.

Street Flow Capacity

Since under the drainage report for Carrington Subdivision it was intended to intercept only 18 cfs via storm sewer pipe (rather than 40.20 cfs) and discharge more runoff via surface flow to Barstow at the west end of Hampton Avenue and Ashton Place, Barstow has more flow capacity (±22.20 cfs more). It was also mentioned in the report for Carrington subdivision that Barstow has only a runoff capacity of 70 cfs and we have calculated that it has full flow capacity of 99.40 cfs. We have analyzed Signal Avenue to have a runoff capacity of 47.05 cfs where under the developed conditions, based on the Basin 924.4 of North Albuquerque Acres Master Drainage Plan, the total runoff is 43.28 cfs. Quail Creek Place was analyzed for runoff capacity. The total runoff capacity for Quail Creek Place is 21.86 cfs and the total runoff for the site is only 14.55 cfs.

Calculations

City of Albuquerque, Development Process Manuel, Section 22.2, Hydrology Section, revised January, 1993, was used for runoff calculations.

RUNOFF DRAINAGE DATA

The site is @ Zone 3

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 2.14 inches

P_{360} = 2.60 inches

P_{1440} = 3.10 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 2.14 x 0.667
= 1.43 inches

P_{360} = 1.73

P_{1440} = 2.07

See the summary output from AHYMO calculations.

Also see the following summary tables.

RUNOFF CALCULATION RESULTS

EXISTING

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
ON-SITE	147,420.11	3.3843	0.005288
OFFSITE	154,310.45	3.5425	0.005535

15 cfs

EXISTING

BASIN	Q-100 CFS	Q-10 CFS
ON-SITE	6.34	1.90
OFFSITE	6.64	1.99

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS
ON-SITE	14.55	9.08
OFFSITE	6.64	1.99

Developed?

AHYMO INPUT FILE

```
*
* QUAIL CREEK SUBDIVISION
*
**********************************************************************
*         100-YEAR,  6-HR STORM (UNDER EXISTING CONDITIONS)          *
**********************************************************************
*
START
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=2.14 IN RAIN SIX=2.60 IN
                        RAIN DELAY=3.10 IN DT=0.03333 HR
* ON-SITE
COMPUTE NM HYD          ID=1 HYD NO=100.0 AREA=0.005288 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
* OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=101.0 AREA=0.005535 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
**********************************************************************
*          10-YEAR,  6-HR STORM (UNDER EXISTING CONDITIONS)          *
**********************************************************************
*
START                   TIME=0.0
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.43 IN RAIN SIX=1.73 IN
                        RAIN DAY=2.07 IN DT=0.03333 HR
* ON-SITE
COMPUTE NM HYD          ID=1 HYD NO=110.0 AREA=0.005288 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
* OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=111.0 AREA=0.005535 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
**********************************************************************
*         100-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
**********************************************************************
*
START
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=2.14 IN RAIN SIX=2.60 IN
                        RAIN DELAY=3.10 IN DT=0.03333 HR
* ON-SITE
COMPUTE NM HYD          ID=1 HYD NO=100.1 AREA=0.005288 SQ MI
                        PER A=0.00 PER B=20.00 PER C=15.00 PER D=65.00
                        TP=0.1333 HR MASS RAINFALL=-1
* OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=101.1 AREA=0.005535 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
```

```
**********************************************************************
*          10-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
**********************************************************************
*
START                   TIME=0.0
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.43 IN RAIN SIX=1.73 IN
                        RAIN DAY=2.07 IN DT=0.03333 HR
* ON-SITE
COMPUTE NM HYD          ID=1 HYD NO=110.1 AREA=0.005288 SQ MI
                        PER A=0.00 PER B=20.00 PER C=15.00 PER D=65.00
                        TP=0.1333 HR MASS RAINFALL=-1
* OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=111.1 AREA=0.005535 SQ MI
                        PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                        TP=0.1333 HR MASS RAINFALL=-1
FINISH
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SUMMARY OUTPUT FILE

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.600
COMPUTE NM HYD	100.00	-	1	.00529	6.34	.185	.65514	1.533	1.874	PER IMP=	.00
COMPUTE NM HYD	101.00	-	1	.00554	6.64	.193	.65514	1.533	1.874	PER IMP=	.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.730
COMPUTE NM HYD	110.00	-	1	.00529	1.90	.053	.18834	1.533	.561	PER IMP=	.00
COMPUTE NM HYD	111.00	-	1	.00554	1.99	.056	.18834	1.533	.561	PER IMP=	.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.600
COMPUTE NM HYD	100.10	-	1	.00529	14.55	.537	1.90345	1.500	4.300	PER IMP=	65.00
COMPUTE NM HYD	101.10	-	1	.00554	6.64	.193	.65514	1.533	1.874	PER IMP=	.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.730
COMPUTE NM HYD	110.10	-	1	.00529	9.08	.318	1.12915	1.500	2.683	PER IMP=	65.00
COMPUTE NM HYD	111.10	-	1	.00554	1.99	.056	.18834	1.533	.561	PER IMP=	.00
FINISH											

From Resource Technology Inc. Report

TABLE A-6

NORTH DOMINGO BACA EXISTING CONDITION

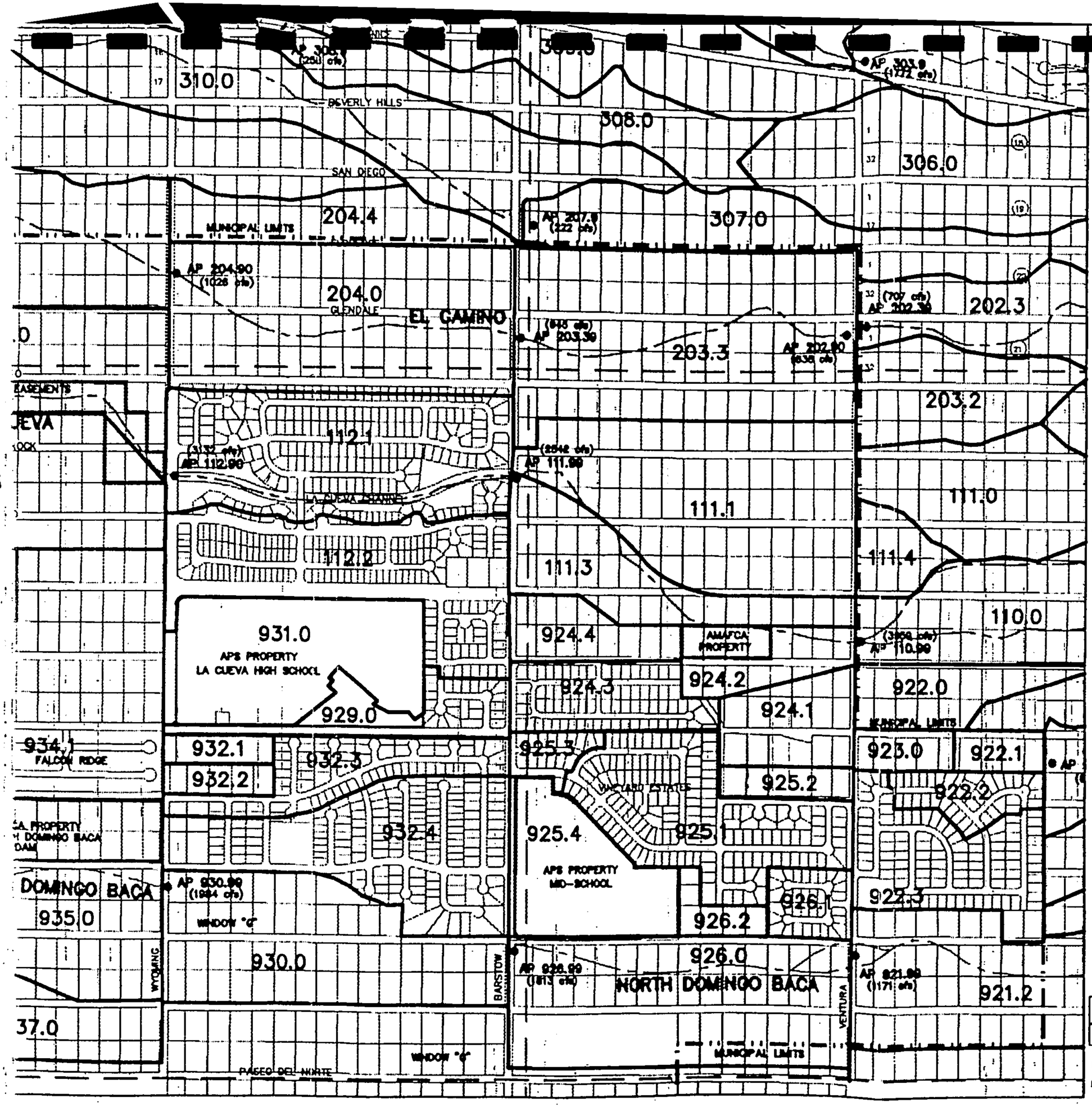
Sub-basin	Area (acres)	100-yr Vol (ac-ft)	100-yr Qp (cfs)	100-yr Vol (ac-ft)	100-yr Qp (cfs)
922	.0210	1.398	32.59		
922.1	.0070	.394	11.18		
922.2	.0148	1.396	35.69		
922.3	.0415	3.913	100.3		
923.0	.0070	.370	11.32		
924.1	.0190	.733	24.11		
924.2	.0070	.335	10.16		
924.3	.0270	2.753	68.50		
924.4	.0172	.862	26.21 ✓		
925.1	.0640	6.547	162.20		
925.2	.0140	.536	17.65		
925.3	.0105	1.063	26.43		
925.4	.0370	3.887	96.45		
926.0	.0375	2.624	72.25		
926.1	.0120	.836	24.21		
929.0	.0240	2.752	65.77		
930.0	.0850	8.468	211.88		
931.0	.0605	6.185	104.39		
932.1	.0073	.766	19.08		
932.2	.0073	.766	18.89		
932.3	.0313	3.284	80.93		
932.4	.0574	6.135	150.03		
934.1	.0468	4.148	107.84		

From Resource Technology Inc., Reports

TABLE A-7

NORTH DOMINGO BACA FUTURE CONDITION

Sub-basin	Area (sq. mi.)	10-yr Vol (ac-ft)	10-yr Qp (cfs)	100-yr Vol (ac-ft)	100-yr Qp (cfs)
922.0	.0210	.713	17.26	1.462	33.77
922.1	.0070	.412	10.43	1.443	41.55
922.2	.0148	.784	21.04	1.396	35.69
922.3	.0415	2.199	58.97	3.913	100.03
923.0	.0070	.515	12.15	.844	19.32
19.32924.1	.0250	1.487	38.43		
924.4	.0190	1.130	29.21		
924.3	.0270	1.593	41.20	2.753	68.50
924.4	.0172	1.006	25.91	1.741	43.28
925.3	.0105	.6140	15.82	1.063	26.43
925.4	.0370	2.255	58.52		
926.0	.0578	3.381	87.05	5.850	145.40
926.1	.0120	.709	18.12	1.228	30.38
929.0	.0240	1.658	41.00	2.752	65.77
930.0	.0850	4.874	125.30	8.468	211.88
931.0	.0605	3.878	66.31	6.529	109.47
932.1	.0073	.450	11.58	.766	19.08
932.2	.0073	.450	11.46	.766	18.89
932.3	.0313	1.928	49.09	3.284	80.93
932.4	.0574	3.605	91.59	6.135	150.03
934.1	.1031	5.911	151.58	10.243	257.43
935.0	.1100	5.401	143.08	9.731	254.57
937.0	.0452	2.592	66.86	4.491	112.45



LEGEND

- 107.1 SUBBASIN DESIGNATION
- SUBBASIN BOUNDARY
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- AP 107.20 (2754 cfs) ANALYSIS POINT AND FUTURE CONDITION FLOW RATE
- * FLOW RATE NOT BULKED FOR SEDIMENT
- # 2 POTENTIAL AVULSION LOCATION
- MUNICIPAL LIMITS

NORTH ALBUQUERQUE ACRES
MASTER DRAINAGE PLAN

FUTURE CONDITION

FIGURE 4A

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

CITY OF Albuquerque

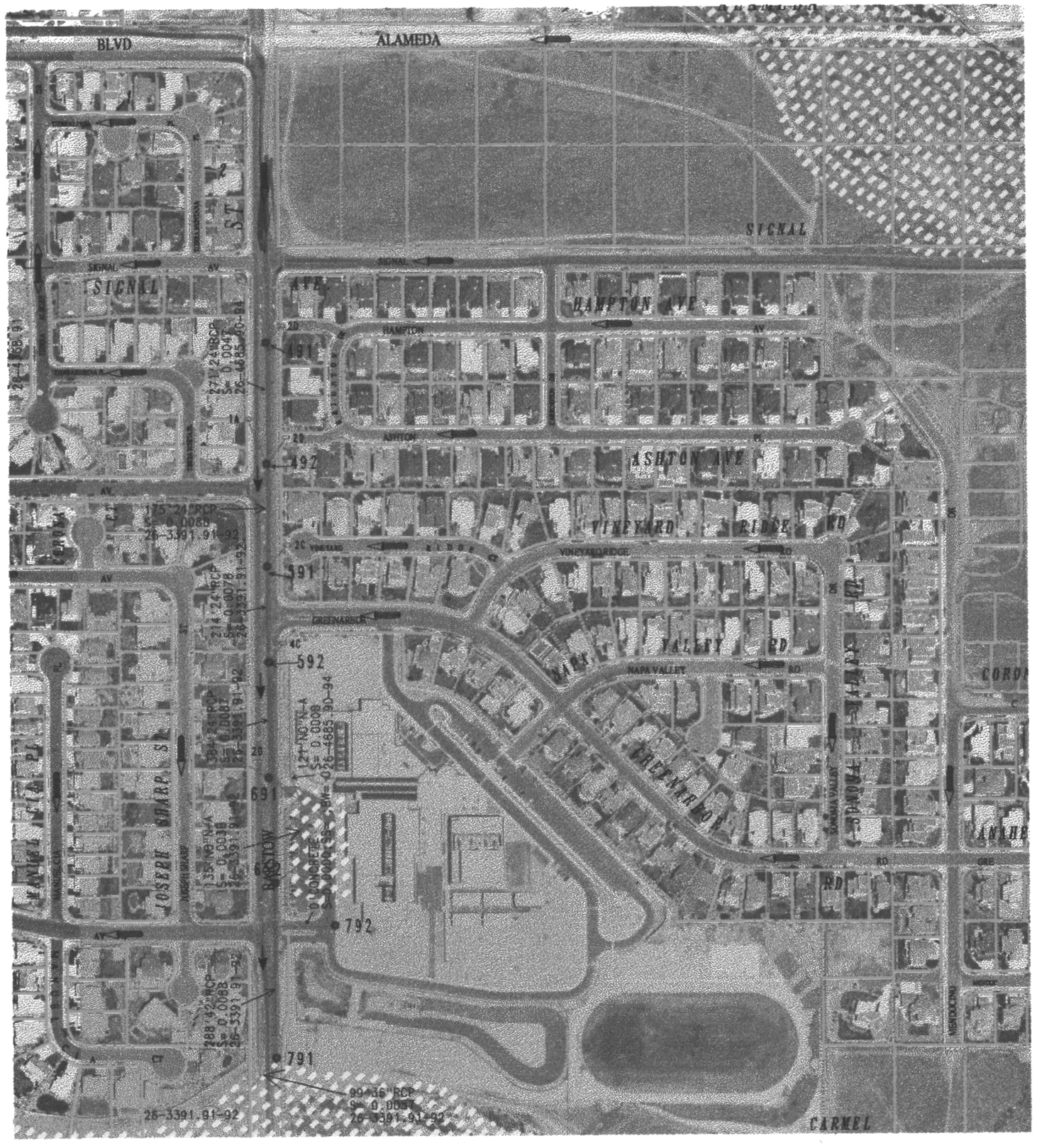
Resource Technology, Inc.
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@rtinc.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400

N

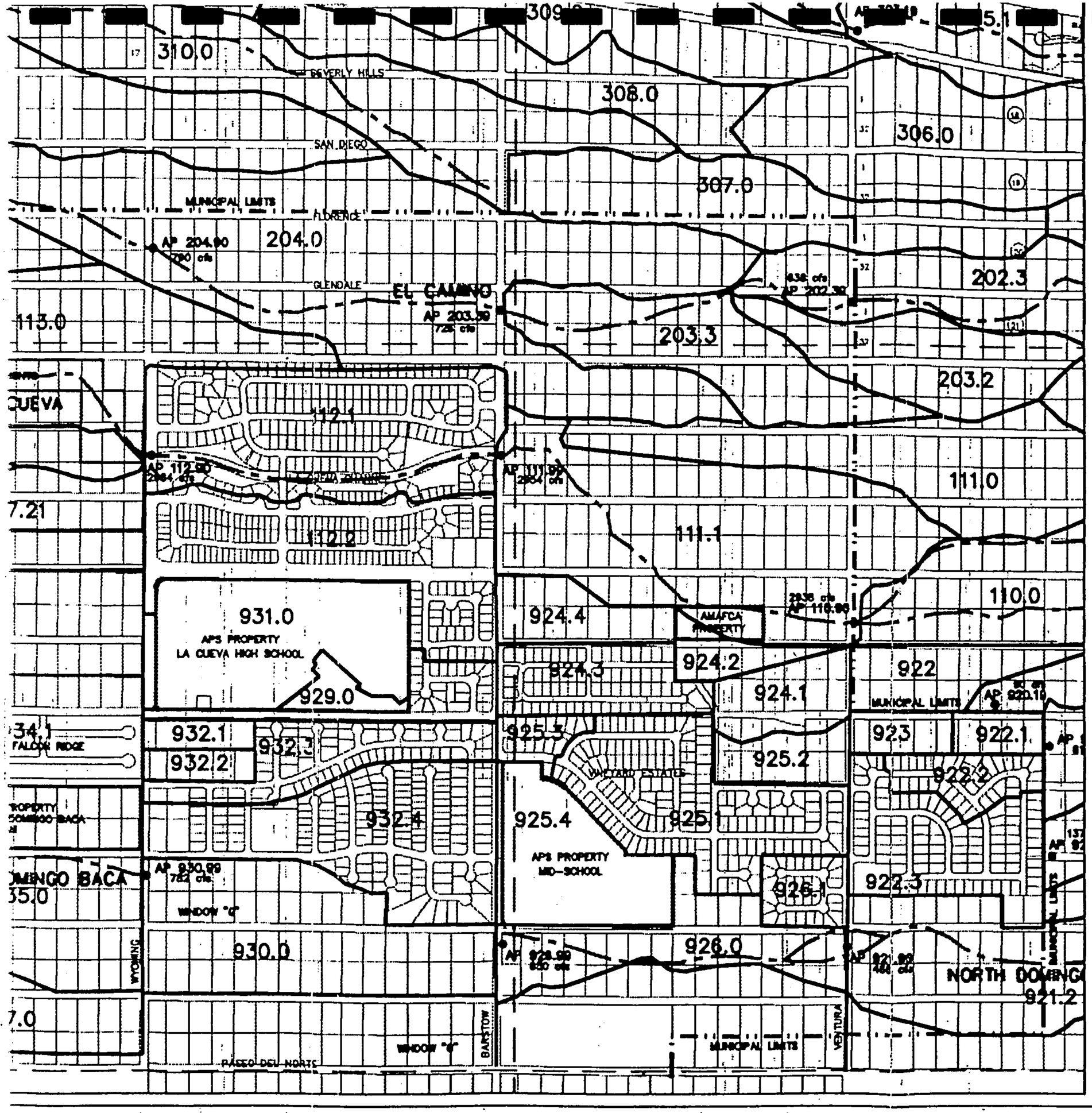
W E

S

1"=500'



GIS PRODUCT REFERENCE: TILE C-20 OPTIONS 08 22 01 PWPRV PWDCAM #QQ.GRA



LEGEND

- 107.1 SUBBASIN DESIGNATION
- SUBBASIN BOUNDARY
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- AP 107.20 2784 cfs — ANALYSIS POINT AND EXISTING CONDITION FLOW RATE
- * FLOW RATE NOT BULKED FOR SEDIMENT
- 2 POTENTIAL AVULSION LOCATION
- MUNICIPAL LIMITS

NORTH ALBUQUERQUE ACRES MASTER DRAINAGE PLAN

EXISTING CONDITION

FIGURE 3A

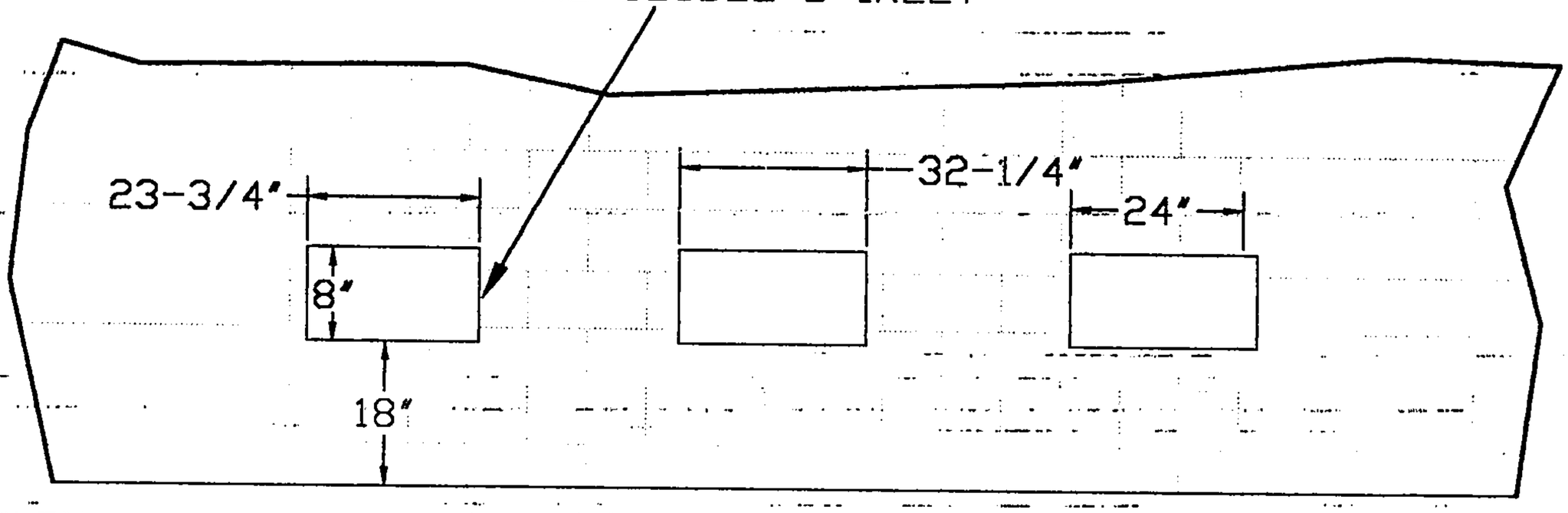
CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

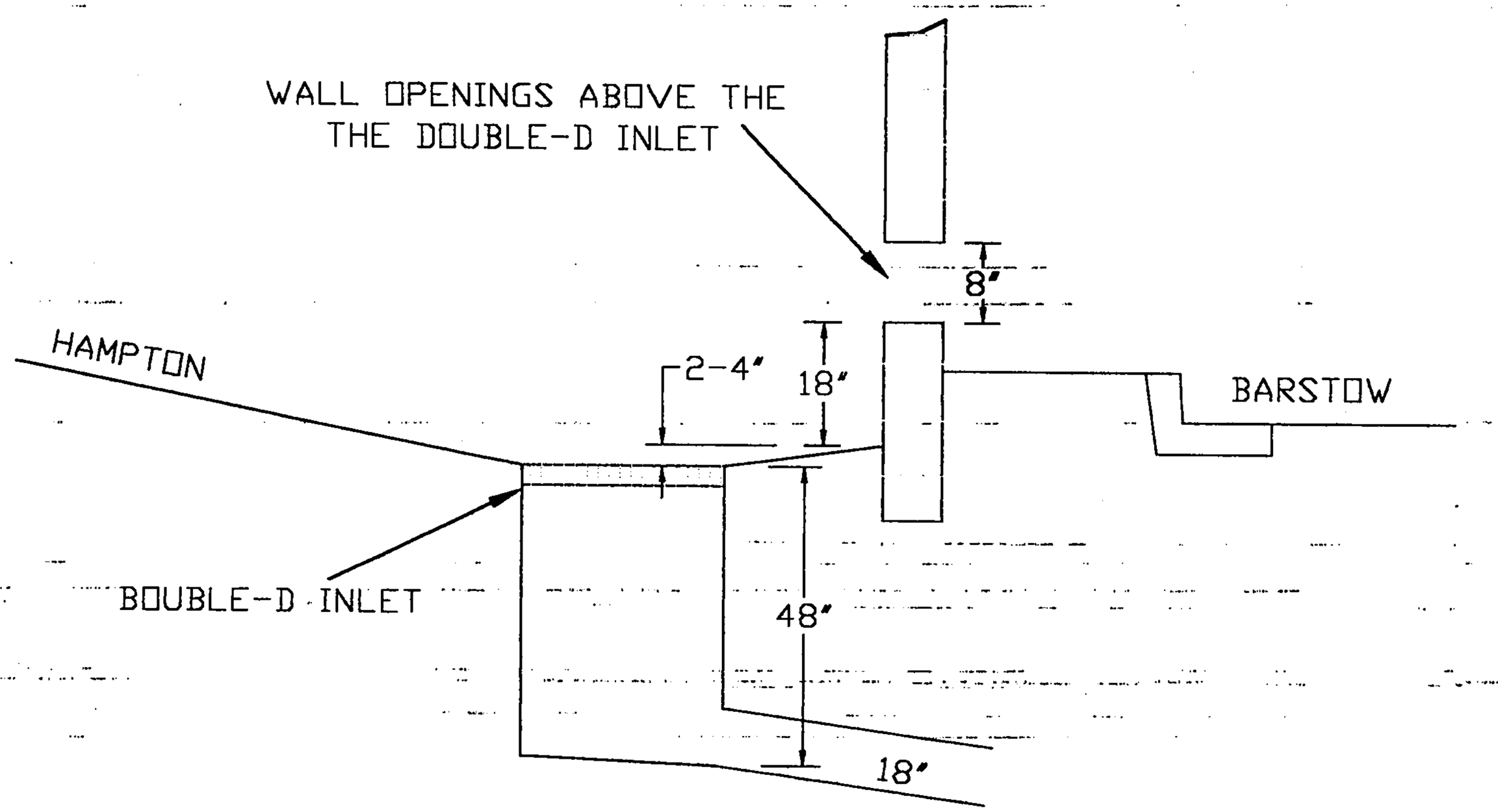
CITY OF Albuquerque

Resource Technology, Inc.
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@rtinm.com
Telephone: (505) 243-7200
Facsimile: (505) 243-7400

INLET AT THE WEST END OF HAMPTON AVE.

(CARRINGTON SUBDIVISION)





$Q = CA\sqrt{2gh}$

$C = 0.60$

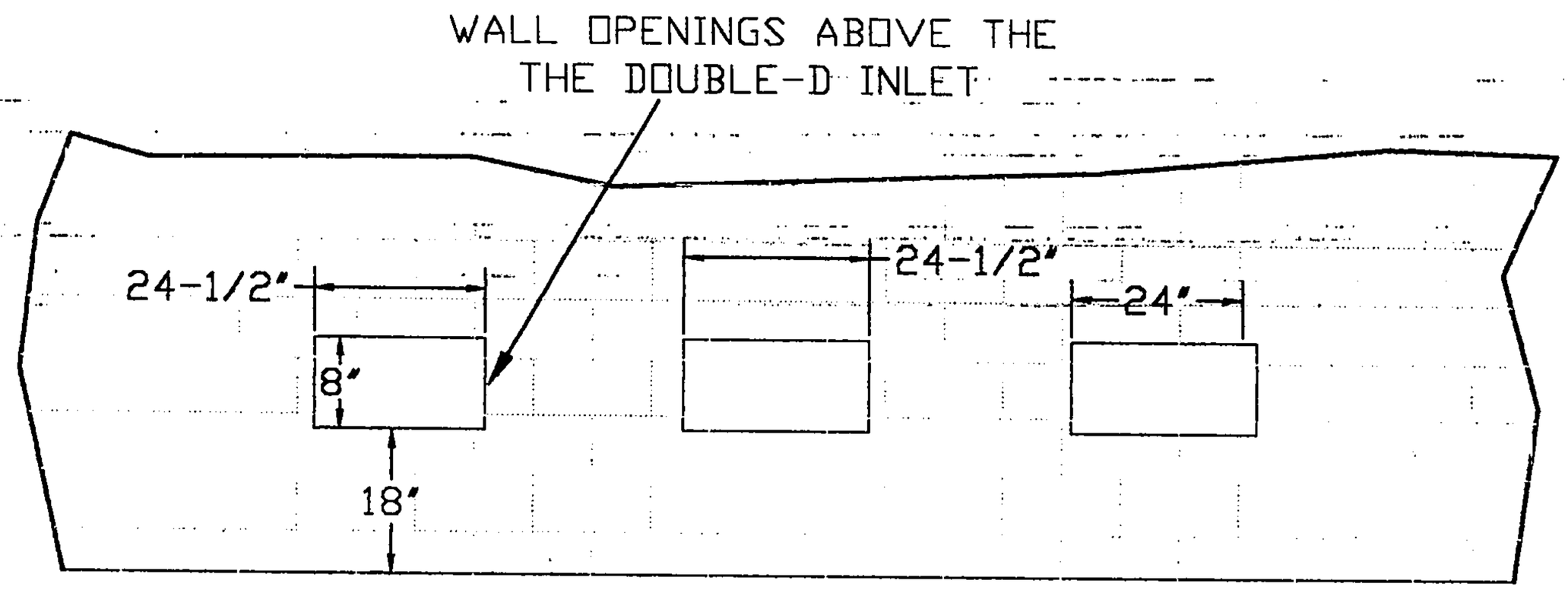
$A = 3.14 \times 0.75^2 = 1.77$

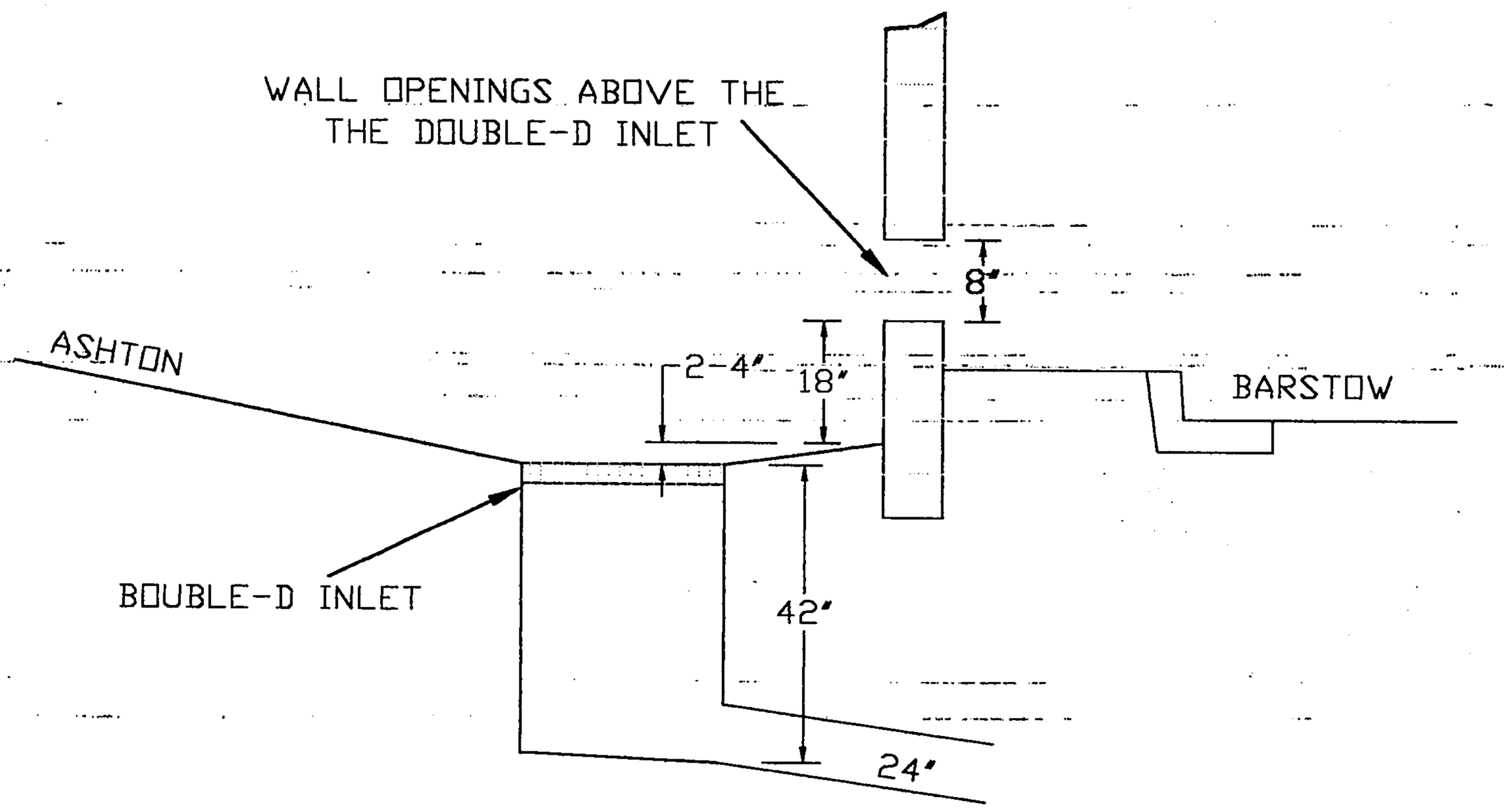
$h = 18" + 2" + 48" = 68" = 5.67'$

$Q = 0.6 \times 1.77\sqrt{2 \times 32.2 \times 5.67} = 20.29$ cfs

INLET AT THE WEST END OF ASHTON PL.

(CARRINGTON SUBDIVISION)





$$Q = CA\sqrt{2gh}$$

$C = 0.60$

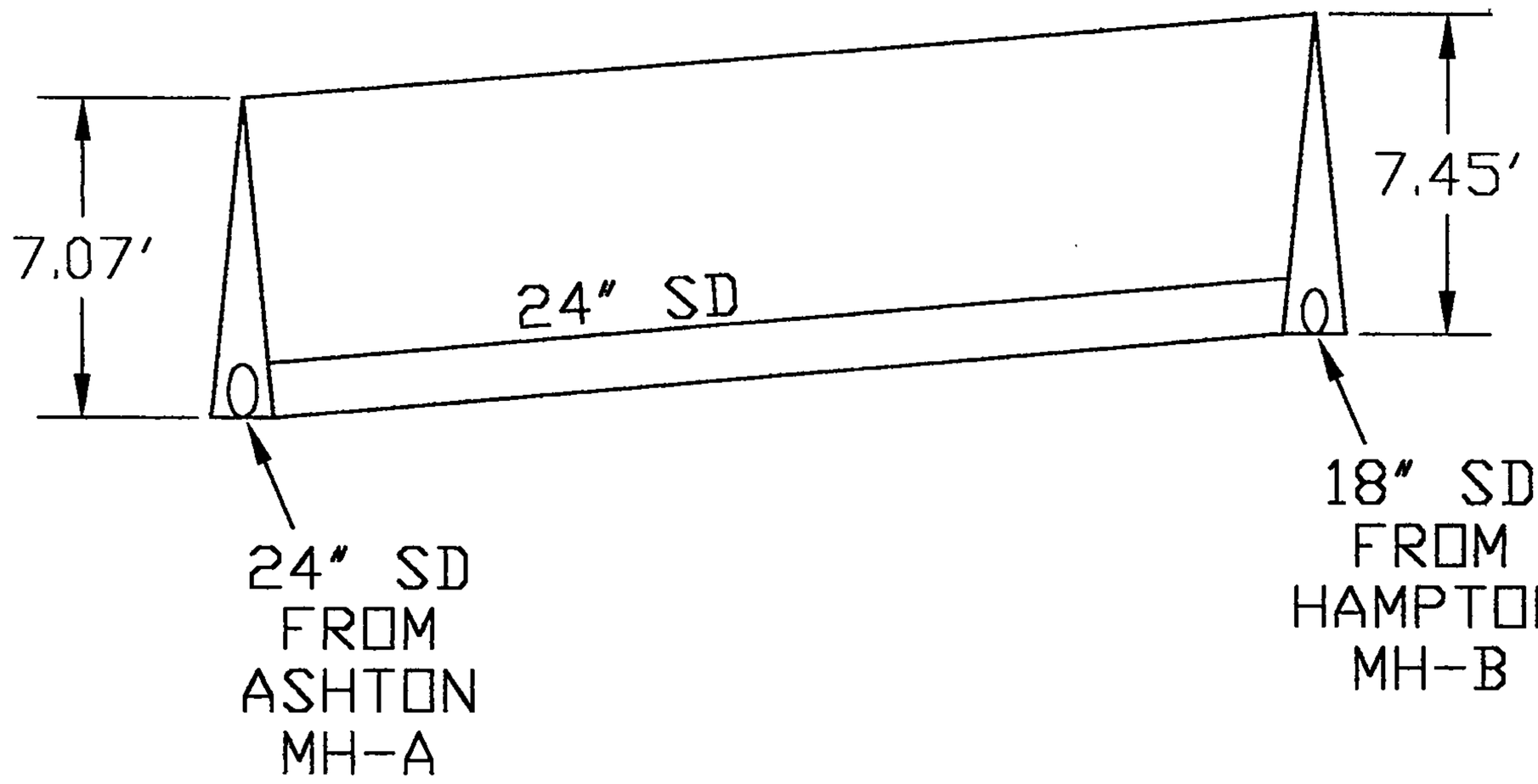
$A = 3.14 \times 1^2 = 3.14$

$h = 18" + 2" + 42" = 62" = 5.17'$

$$Q = 0.6 \times 3.14\sqrt{2 \times 32.2 \times 5.17} = 34.38 \text{ cfs}$$

PIPE FLOW CAPACITY

(EXISTING 24" SD PIPE FLOW CAPACITY
IN BARSTOW USING ORIFICE EQUATION)



$$Q = CA\sqrt{2gh}$$

$$C = 0.60$$

$$A = 3.14 \times 1.00^{2} = 3.14$$

$$h_{MH-A} = 7.07'$$

$$Q_{MH-A} = 0.6 \times 3.14 \sqrt{2 \times 32.2 \times 7.07} = 40.20 \text{ cfs}$$

$$h_{MH-B} = 7.45'$$

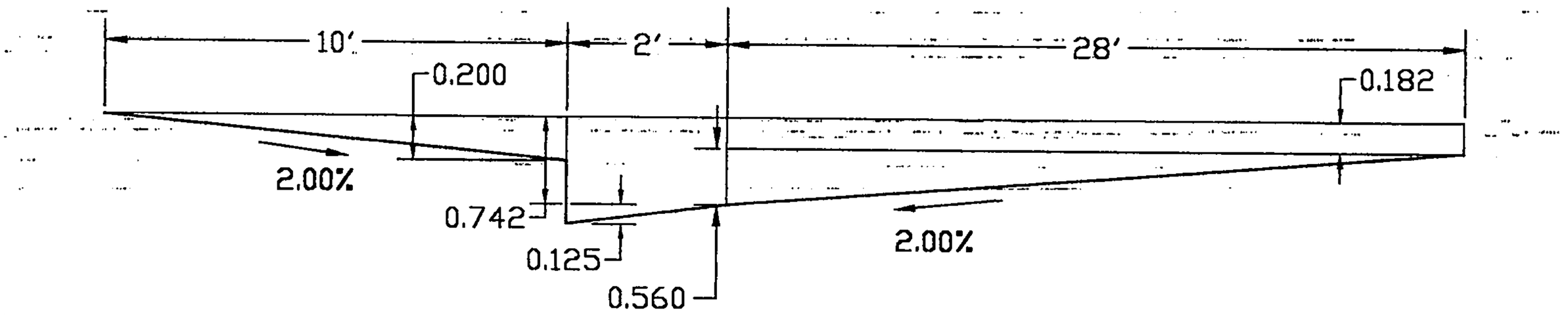
$$Q_{MH-B} = 0.6 \times 3.14 \sqrt{2 \times 32.2 \times 7.45} = 41.27 \text{ cfs}$$

FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½
n = 0.017
SLOPE = 0.00470

80' ROW / 60 F-F
BARSTOW AVENUE

HALF STREET DETAIL



HALF STREET CALCULATION

FULL STREET FLOW

@Y ≤ 0.125
A1 = ½ Y (Y / 0.0625) = 8 Y²
P1 = SQRT[Y² + (Y / 0.0625)²] + Y = SQRT(257 Y²) + Y

Y (FT)	A	P	(A/P)^2/3	Q	2Q	V	Fr	D*V	D2
0.0250	0.0050	0.4258	0.0517	0.00	0.00	0.31	0.35	0.0077	0.00
0.0500	0.0200	0.8516	0.0820	0.01	0.02	0.49	0.39	0.0246	0.01
0.1250	0.1250	2.1289	0.1511	0.11	0.23	0.91	0.05	0.1132	--

@ 0.1250 < Y ≤ 0.6667 & Y2 = Y - 0.1250
A2 = A1 + ½ Y1(Y1 / 0.02) + 2 Y1 = A1 + 25 Y1² + 2 Y1
P2 = P1 + SQRT[Y1² + (Y1 / 0.01)²] + Y1 = P1 + SQRT(2501 Y1²) + Y1

0.2000	0.4156	6.0797	0.1672	0.42	0.83	1.00	0.39	0.2004	0.05
0.2500	0.7656	8.6302	0.1989	0.91	1.83	1.19	0.42	0.2980	0.07
0.3500	1.8406	13.7312	0.2619	2.89	5.78	1.57	0.47	0.5494	0.12
0.4500	3.4156	18.8322	0.3204	6.56	13.12	1.92	0.50	0.8641	0.17
0.5500	5.4906	23.9332	0.3748	12.33	24.66	2.25	0.53	1.2352	0.22
0.6667	8.5444	29.8860	0.4340	22.22	44.44	2.60	0.56	1.7339	0.29

@ 0.6667 < Y ≤ 0.8667 & Y2 = Y - 0.6667
A3 = A2 + 30 Y2 + ½ (Y2) (Y2 / 0.02) = A2 + 30 Y2 + 25 Y2²
P3 = P2 + SQRT(Y2² + (Y2 / 0.02)²) = P2 + SQRT(2501 Y2²)

0.7000	9.5711	31.5514	0.4515	25.89	51.79	2.71	0.57	1.8939	0.31
0.7500	11.2168	34.0519	0.4770	32.06	64.12	2.86	0.58	2.1437	0.35
0.8000	12.9876	36.5524	0.5017	39.04	78.09	3.01	0.59	2.4050	0.38
0.8667	15.5444	39.8880	0.5335	49.70	99.40	3.20	0.61	2.7710	0.43

Full Street Capacity

FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½

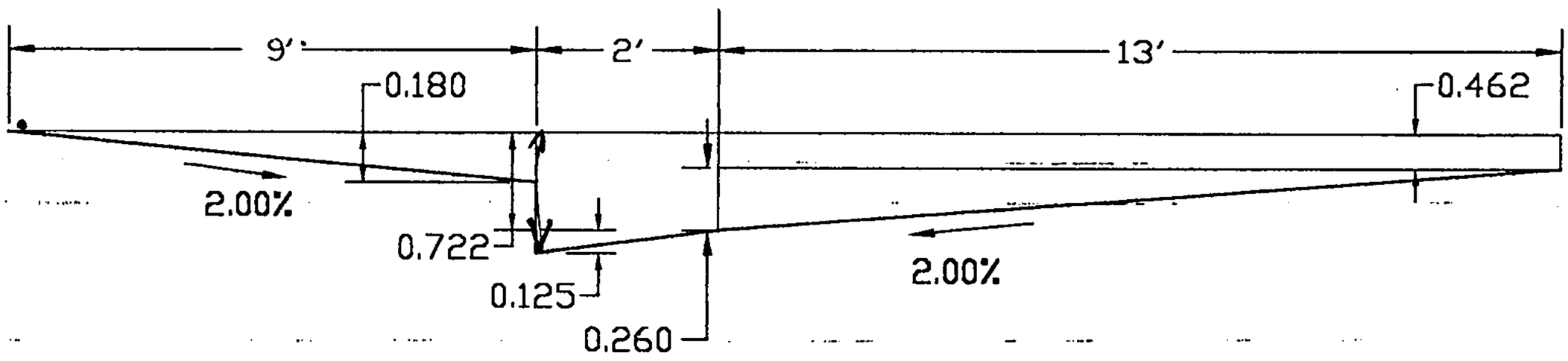
n = 0.017

SLOPE = 0.0320

48′ ROW / 30 F-F

Singnal Avenue

HALF STREET DETAIL



HALF STREET CALCULATION

FULL STREET FLOW

@Y⩽0.125

A1 = ½ Y (Y / 0.0625) = 8 Y²

P1 = SQRT[Y² + (Y / 0.0625)²] + Y = SQRT(257 Y²) + Y

Y (FT)	A	P	(A/P)^2/3	Q	2Q	V	Fr	D*V	D2
0.0250	0.0050	0.4258	0.0517	0.00	0.01	0.81	0.90	0.0202	0.02
0.0500	0.0200	0.8516	0.0820	0.03	0.05	1.28	1.01	0.0641	0.05
0.1250	0.1250	2.1289	0.1511	0.30	0.59	2.36	0.03	0.2954	—

@ 0.125 < Y⩽0.385 & Y1 = Y - 0.125

A2 = A1 + ½ Y1(Y1 / 0.02) + 2 Y1 = A1 + 25 Y1² + 2 Y1

P2 = P1 + SQRT[Y1² + (Y1 / 0.01)²] + Y1 = P1 + SQRT(2501 Y1²) + Y1

0.2000	0.4156	6.0797	0.1672	1.09	2.17	2.62	1.03	0.5230	0.21
0.2500	0.7656	8.6302	0.1989	2.38	4.76	3.11	1.10	0.7778	0.28
0.3500	1.8406	13.7312	0.2619	7.54	15.08	4.10	1.22	1.4339	0.45
0.3850	2.3350	15.5165	0.2829	10.33	20.67	4.43	1.26	1.7037	0.52

@ 0.425 < Y⩽0.6667 & Y2 = Y - 0.385

A3 = A2 + 15 Y2

P3 = P2 + Y2

Full Street Capacity

0.4000	2.5600	15.5315	0.3006	12.04	24.08	4.70	1.31	1.8809	0.57
0.4300	3.0100	15.5615	0.3345	15.75	31.49	5.23	1.41	2.2495	0.67
0.4500	3.3100	15.5815	0.3560	18.43	36.87	5.57	1.46	2.5059	0.73
0.4850	3.8350	15.6165	0.3922	23.52	47.05	6.13	1.55	2.9749	0.85
0.5000	4.0600	15.6315	0.4071	25.85	51.70	6.37	1.59	3.1837	0.90
0.5500	4.8100	15.6815	0.4548	34.22	68.44	7.11	1.69	3.9127	1.07
0.6000	5.5600	15.7315	0.4999	43.47	86.95	7.82	1.78	4.6914	1.24
0.6667	6.5601	15.7982	0.5566	57.11	114.22	8.71	1.88	5.8040	1.47

.42
.43

@ 0.6667 < Y⩽0.8467 & Y3 = Y - 0.6667

A4 = A3 + 15 Y3 + ½ (Y3) (Y3 / 0.02) = A3 + 15 Y3 + 25 Y3²

P4 = P3 + SQRT(Y3² + (Y3 / 0.02)²) = P3 + SQRT(2501 Y3²)

0.7000	7.1211	17.4650	0.5499	61.25	122.49	8.60	1.81	6.0205	1.48
0.7500	8.0669	19.9655	0.5465	68.96	137.92	8.55	1.74	6.4115	1.51
0.8000	9.1378	22.4660	0.5490	78.46	156.93	8.59	1.69	6.8693	1.56
0.8467	10.2508	24.8015	0.5549	88.97	177.93	8.68	1.66	7.3485	1.61

FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½

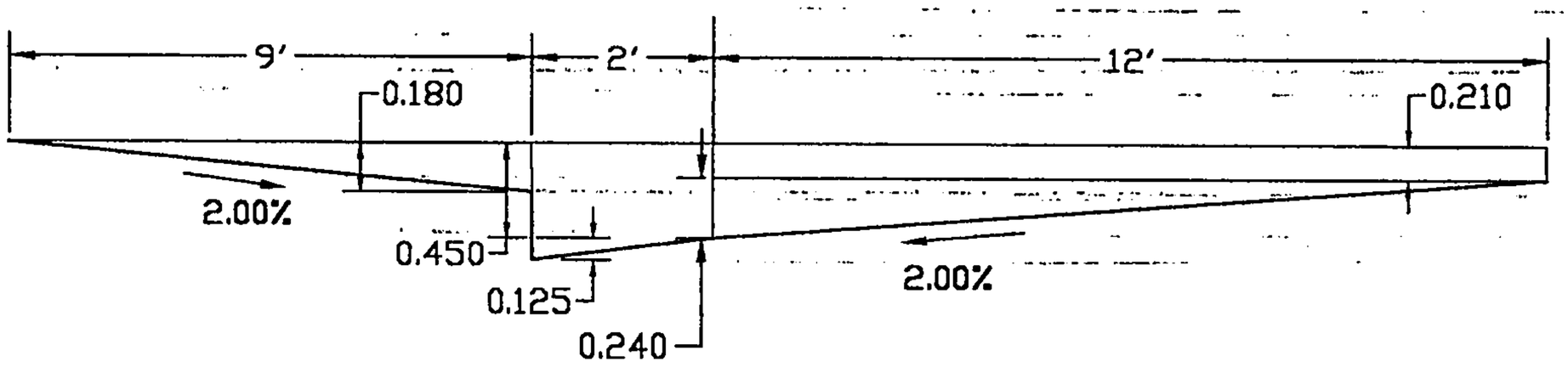
n = 0.017

SLOPE = 0.03387

46' ROW / 28 F-F

Quail Creek Place

HALF STREET DETAIL



HALF STREET CALCULATIONS

FULL STREET FLOW

@Y > 0.0625

$A1 = ½ Y (Y/0.03125) = 16Y^2$

$P1 = SQRT[Y^2 + (Y/0.03125)^2] + Y = SQRT(1025 Y^2) + Y$

Y (FT)	A	P	(A/P)^2/3	Q	2Q	V	Fr	D*V	D2
0.0250	0.0100	0.8254	0.0528	0.01	0.02	0.85	0.95	0.02122	0.02
0.0500	0.0400	1.6508	0.0837	0.05	0.11	1.35	1.06	0.06735	0.05
0.0625	0.0625	2.0635	0.0972	0.10	0.20	1.56	0.02	0.0977	0.00

@ 0.0625 < Y < 0.333 & Y1 = Y - 0.0625

$A2 = A1 + ½Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1^2 + 2Y1$

$P2 = P1 + SQRT[Y1^2 + (Y1/0.02)^2] + Y1 = P1 + SQRT(2501 Y^2) + Y1$

0.1000	0.1727	3.9764	0.1235	0.34	0.69	1.99	1.11	0.1987	0.11
0.1500	0.4289	6.5269	0.1628	1.12	2.25	2.62	1.19	0.3930	0.19
0.2500	1.3164	11.6279	0.2340	4.96	9.91	3.76	1.33	0.9412	0.36
0.3300	2.3864	15.7087	0.2847	10.93	21.86	4.58	1.41	1.5115	0.51
0.3330	2.4328	15.8617	0.2865	11.21	22.43	4.61	1.41	1.5349	0.52

Full Street Capacity

@ 0.333 < Y < 0.513 & Y2 = Y - 0.333

$A3 = A2 + 14Y2 + ½Y2[Y2/(0.02)] = A2 + 14 Y2 + 25 Y2^2$

$P3 = P2 + SQRT(Y2^2 + [Y2/(0.02)]^2) = P2 + SQRT(2501 Y2^2)$

0.4000	3.4830	19.2124	0.3203	17.95	35.90	5.15	1.44	2.0612	0.64
0.4500	4.4130	21.7129	0.3457	24.54	49.08	5.56	1.46	2.5025	0.73
0.5000	5.4680	24.2134	0.3708	32.62	65.24	5.97	1.49	2.9828	0.83
0.5130	5.7628	24.8635	0.3773	34.98	69.96	6.07	1.49	3.1139	0.86

WIER OVERFLOW CALCULATION

(DESILTING POND ON THE EAST SIDE OF PROJECT)

$$Q = CLH^{3/2}$$

$C = 2.95$

$H = 0.50'$

$Q = 6.64$ CFS (OFFSITE RUNOFF)

$$L = \frac{Q}{CH^{3/2}}$$

$$L = \frac{6.64}{2.95 \times 0.50^{3/2}}$$

$L = 6.37'$, USE $L = 7.00'$