DRAINAGE REPORT
for
UNIVERSITY OF NEW MEXICO
NORTH CAMPUS PARKING LOT

MAY 1994

DRAINAGE INFORMATION SHEET

PROJECT TITLE: North Campus Parking Lot ZONE ATLAS/DRNG. FILE #: J15 /D38

DRB #: N/A EPC #: N/A WORK ORDER #: N/A

LEGAL DESCRIPTION: Unplatted Land - South of Indian School Road

CITY ADDRESS: North of Lomas Blvd. and East of University Blvd.

ENGINEERING FIRM: Andrews, Asbury & Robert, Inc. CONTACT: Mr. John Andrews, P.E.
ADDRESS: 149 Jackson Street, NE Albuquerque, NM 87108 PHONE: (505) 265-6631

OWNER: University of New Mexico CONTACT: Mr. Gil Berry
ADDRESS: 1841 Lomas NE Albuquerque, NM 87131 PHONE: (505) 277-2236

ARCHITECT: Consensus Planning CONTACT: Mr. Chris Green
ADDRESS: 718 Central, SW Albuquerque, NM 87102 PHONE: (505) 764-9801

SURVEYOR: Andrews, Asbury & Robert, Inc. CONTACT: Mr. Gayle Jewell
ADDRESS: 149 Jackson Street, NE Albuquerque, NM 87108 PHONE: (505) 265-6631

CONTRACTOR: Unknown at this time 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:

- X YES
- ___ NO
- X COPY PROVIDED- In Report as Appendix A

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
- X GRADING PERMIT APPROVAL
- X PAVING PERMIT APPROVAL
- ___ S.A.D. DRAINAGE REPORT
- ___ DRAINAGE REQUIREMENTS
- ___ OTHER ____ (SPECIFY)

RECE[IVED] MAY 27 1994 HYDROLOG[Y]

DATE SUBMITTED: May 25, 1994

BY: John A. Andrews

FIGURE 6

CITY OF ALBUQUERQUE
NOTICE OF D.R.C. MEETING

6-3-94 (DATE)

PROJECT NO: 4943.90
ZONE ATLAS: J-15

PROJECT NAME: U.N.M. North Campus Parking Lot (E. Side of University, N. of Lomas)

TYPE OF PROJECT: AHBA ✓ CIP ____ PWC ____ SAD ____ ALL PRIVATE ____

Contact Person: John Andrews Phone: 265-6631
Firm: Andrews, Asbury, Robert

X Scheduled with the D.R.C. on 6-8-94 at 1:30 in Conf. Room 302
____ No DRC Meeting Scheduled. Please return any comments by ____

The Project Is Scheduled For:

/ / Design Report Review / / Final Plan Review (Approved Infra. List)
/ / Pre-Design Meeting / / Signoff of Plans (Mylars Required)
/X/ Preliminary Plan Review / / ____

The Project Relates To:

/ / Water / / San. Sewer /X/ Paving /X/ Storm Drainage / / ____

The Attached Package Includes:

/D/ Drawings /S/ Spec's /E/ Estimate /R/ Report /M/ Memo Only

Indicated below are the Departments/Divisions that have received project documents and/or are invited to attend. On all CIP Projects, it will be the Project Managers responsiblity to notify consulting engineering firms of date and time of scheduled meetings.

D038

/D/ DRC Chairman	Project Review Section	All
/D/ Traffic Repres	Transportation Development	All
/D/ Water Repres.	Utility Design	All
/D/ ~~Hydro Repres.~~	Hydrology	All
/D/ Const. Repres.	Construction	All
/D/ Bill Coleman	Traffic Operations	All
/D/ Dick Salas	Street Maintenance	ALL SUBDIVISIONS
/ / Sergio Miranda	Water (Shutoff Plan)	ALL WATER SHUTOFF
/ / Diane Scena	Parks & Recreation	ALL LANDSCAPING
/D/ Joe Luehring	Utility Coordinator	ALL PWC & CIP
/ / Sheryl Germack	Transit Department	CIP/Memo
/ / Rick Roybal	Construction Coordinator	CIP/Memo
/ / Jim Fink	Line Maintenance	CIP-SAS/Memo
/ / Joe Dellalonga	City Architect	ARCHITECTURAL
/ / Lee Lunsford	SAD Engineer	SAD/Memo
/ / Brett Locke	Transportation Develop.	CIP/Memo
/ / Roger Green	Utility Design	CIP/WATER & SAS
/ / Mike Minturn	General Services Dept.	BUILDINGS
/ / Anita Boulton	PWD/Legal Assistant	DWGS & SPECS
/ / Richard Sertich	Planning Department	CIP/Memos
/ / CIP Manager	CIP	CIP/Memos
/ / ____	____	____
/ / ____	____	____

RG/tm (WP+123400) Rev. 11/05/91

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

149 Jackson NE, Albuquerque, New Mexico 87108
Tel: (505) 265-6631 • Fax: (505) 266-8112

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S. (1915-1984)
James E. Millington, P.E. - V.P.
Gayle D. Jewell, L.S. - V.P.

June 1, 1994

Mr. Billy Goolsby
DRC Chairman
Public Works Department
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87102

Subject: University of New Mexico
North Campus Parking Lot
Improvements Within Public Right-of-Way

Dear Mr. Goolsby:

Transmitted herewith are ten (10) sets of construction plans for subject project for DRC Review and Approval.

I discussed this project with you a few weeks ago. The University of New Mexico proposes to construct a parking lot on the east side of University Boulevard between Indian School Road and Lomas Boulevard. Included with the project are some improvements within Public Right-of-Way that consists of constructing a left turn holding lane on University Boulevard for access to the Parking Lot and also, the construction of a detention pond outlet pipe along the east side of University Boulevard and a connection to an existing drop inlet.

We request that these plans be distributed to DRC members and a review meeting be scheduled as soon as possible.

Should have any questions or need anything additional, please do not hesitate to contact me.

Very truly yours,

ANDREWS, ASBURY & ROBERT, INC.

John A. Andrews

John A. Andrews, P.E.

JA:df

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ALBUQUERQUE NEW MEXICO 1706

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 8, 1994

Mr. John Andrews
Andrews, Asbury & Robert, Inc.
149 Jackson Street NE
Albuquerque, NM 87108

RE: UNM NORTH CAMPUS PARKING LOT (J-15/D38) ENGINEER'S STAMP DATED 5/25/94

Dear Mr. Andrews:

Based upon your 5/27/94 submittal, the referenced project is approved for Grading and Paving Permit. Please keep in mind the following:

1. A Work Order Permit will be required for the work being done within City right-of-way.
2. Engineer's Certification will be required upon completion of the project.

If I can be of further assistance, feel free to contact me at 768-3622.

Cordially,

Scott Davis
PWD, Hydrology Division

(WP+8577)

c: Andrew Garcia
File

UNIVERSITY OF

NEW MEXICO

DRAINAGE REPORT
FOR THE
NORTH CAMPUS PARKING LOT

May 1994

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
No. 3969
JOHN A. ANDREWS

5-25-94

AAR

MAY 27 1994
HYDROLOGY DI...

Andrews, Asbury & Robert, Inc.
149 Jackson Street, NE
Albuquerque, New Mexico 87108

DRAINAGE REPORT
FOR THE
NORTH CAMPUS PARKING LOT

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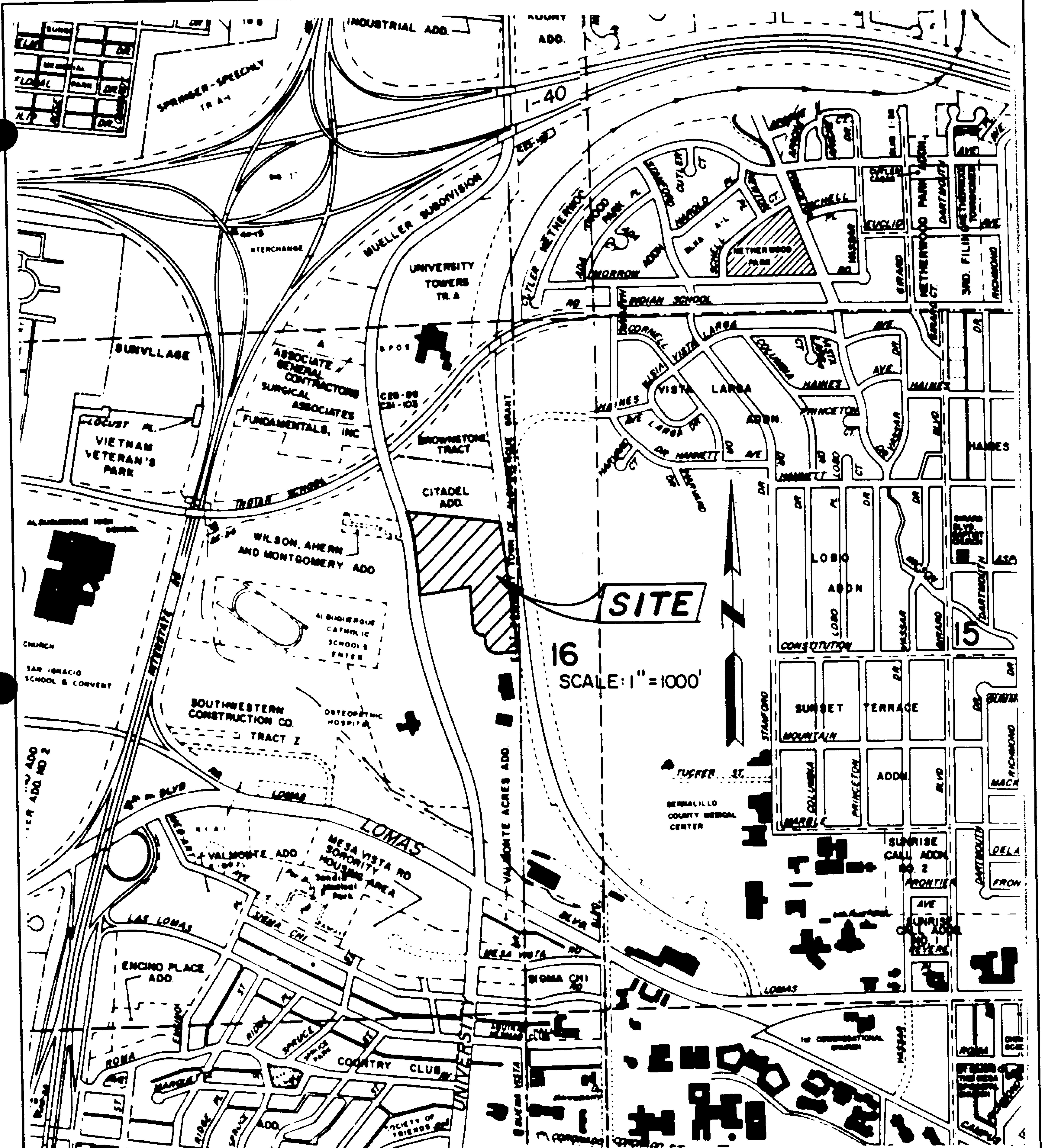
IN THE BACK POCKET OF REPORT

I.

INTRODUCTION

The University of New Mexico (UNM) proposes to regrade and pave an existing dirt parking lot located east of University Boulevard and about 350 feet south of Indian School Road. A vicinity map is shown as Figure 1. The parking lot covers an area of about 12.8 acres in size. A detention pond is included in the design to reduce peak flows and to control the rate of flow from the new paved parking lot. The total runoff from the project site is to be less than the prorated flow entering the existing storm drain in University Boulevard. This criteria is based on a pre-design conference held with the City of Albuquerque (see Appendix A). A proposed storm drain system in the parking lot will convey local onsite runoff to the detention pond. While the majority of the parking lot will drain to the new detention pond, a few small subbasins that cannot be diverted to the Detention Pond will still drain directly to University Boulevard.



UNIVERSITY OF NEW MEXICO

NORTH CAMPUS PARKING LOT

VICINITY MAP

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE — LAS CRUCES

FILE No.	DRAWN	CHECKED	DATE	
93-683	TL	SK	APRIL 1994	FIGURE 1

AAR

II.
SITE LOCATION AND DESCRIPTION

A. Existing Conditions - Offsite and Onsite

The existing gravel and dirt parking lot is sloped from southeast to northwest at an average grade of about 3%. The parking lot is bounded on the east by the North Diversion Channel and on the west by University Boulevard. On the north it is bounded by the Citadel Apartments and on the south by an unpaved parking area for the KNME radio station and the UNM Child Care Center.

Virtually all of the existing offsite flow drains away from the parking lot. An exception includes a 0.3 acre portion (Basin B-1) of the KNME parking lot that drains north onto the UNM parking lot as shown in Figure 2. Existing onsite runoff flows from the southeast to northwest. Runoff from the parking lot area now enters University Boulevard where it flows north to a Type "D" inlet or across the street to a multiple grate inlet served by an existing 36 inch storm drain. The existing storm drain flows about 300 feet north along University Boulevard and then turns west for another 1370 feet along Indian School Road. The storm drain discharges into the culvert crossing structure passing under Interstate-25. (see Figure 4)

The present 100 year flow in University Boulevard exceeds the existing storm drain capacity. The Albuquerque Master Drainage Study shows a 100 year floodplain stretching west along a swale from the northwest corner of the Citadel parking lot to Interstate-25. The direction of existing runoff and 100 year floodplain are shown in Figure 2.

B. Developed Conditions - Offsite and Onsite

Developed flows from the newly paved parking lot will flow by surface means from southeast to northwest to four newly constructed inlets in the parking lot. The new inlets are connected to new storm drain lines that will convey runoff to a detention pond located at the northwest corner of the UNM parking lot. Offsite flow will continue to flow away from the site. Offsite flow that presently enters the UNM parking lot from the KNME property (Basin B-1) will continue to flow north and west around the UNM Child Care Center. Runoff from the UNM Child Care Center will continue to flow west onto University Boulevard. The developed flow paths are shown on the Grading and Drainage Plan (Map No. 1 in the back pocket of the report).

UNIVERSITY OF NEW MEXICO				
NORTH CAMPUS PARKING LOT				
EXISTING DRAINAGE				
ANDREWS, ASBURY & ROBERT, INC. — CONSULTING ENGINEERS — ALBUQUERQUE / LAS CRUCES				
FILE No. 93-683	DRAWN TL	CHECKED SK	DATE APRIL 1994	FIGURE 2

III.
HYDROLOGIC ANALYSIS

A. Pre-design Conference

The existing drainage conditions were discussed at a pre-design conference with the City of Albuquerque. It was determined that the capacity of the downstream storm drain and streets must be determined and runoff prorated based on the overall contributing basin area. By dividing the capacity of the existing streets and storm drain system by the total contributing drainage area, one can determine how much flow is permissible from each acre of land in the drainage area. This prorated value would determine the allowable discharge from the UNM parking lot. Assuming that every property restricted their runoff to this prorated value, then the existing storm drain system would be sufficient to drain the area. The pre-design conference form is included in Appendix A.

The analysis points for determining the capacity of the streets and storm drain system were chosen at existing inlets. The existing drainage basins, storm drain and street system is shown in Figures 3 and 4. The capacity of the storm drain and the streets was determined using Manning's equation. The storm drain was assumed to flow full. The streets were assumed to maintain one open driving lane in each direction for the 10 year event. For the 100 year event the depth was not allowed to exceed 0.2 feet above top of curb. The nomographs and calculations used to determine the capacity of the storm drains and the streets are shown in Appendix B. The prorated runoffs based on capacity of the storm drain and streets for the 10 year event and the 100 year event at analysis points 1, 2, and 3 are shown in Table 1. The combined capacity of the street and storm drain system is divided by the contributing drainage area at the applicable analysis point. The most conservative value of 0.74 cfs/ac occurred at analysis point AP-1 (capacity of streets and storm drain system is 50 cfs divided by the total contributing drainage area of 67.7 acres). This value governs both the 10 year and the 100 year events. Given the total project area of 12.8 acres, the allowable discharge from the UNM parking lot is approximately 9.5 cfs (0.74 cfs/ac x 12.8 ac = 9.5 cfs).

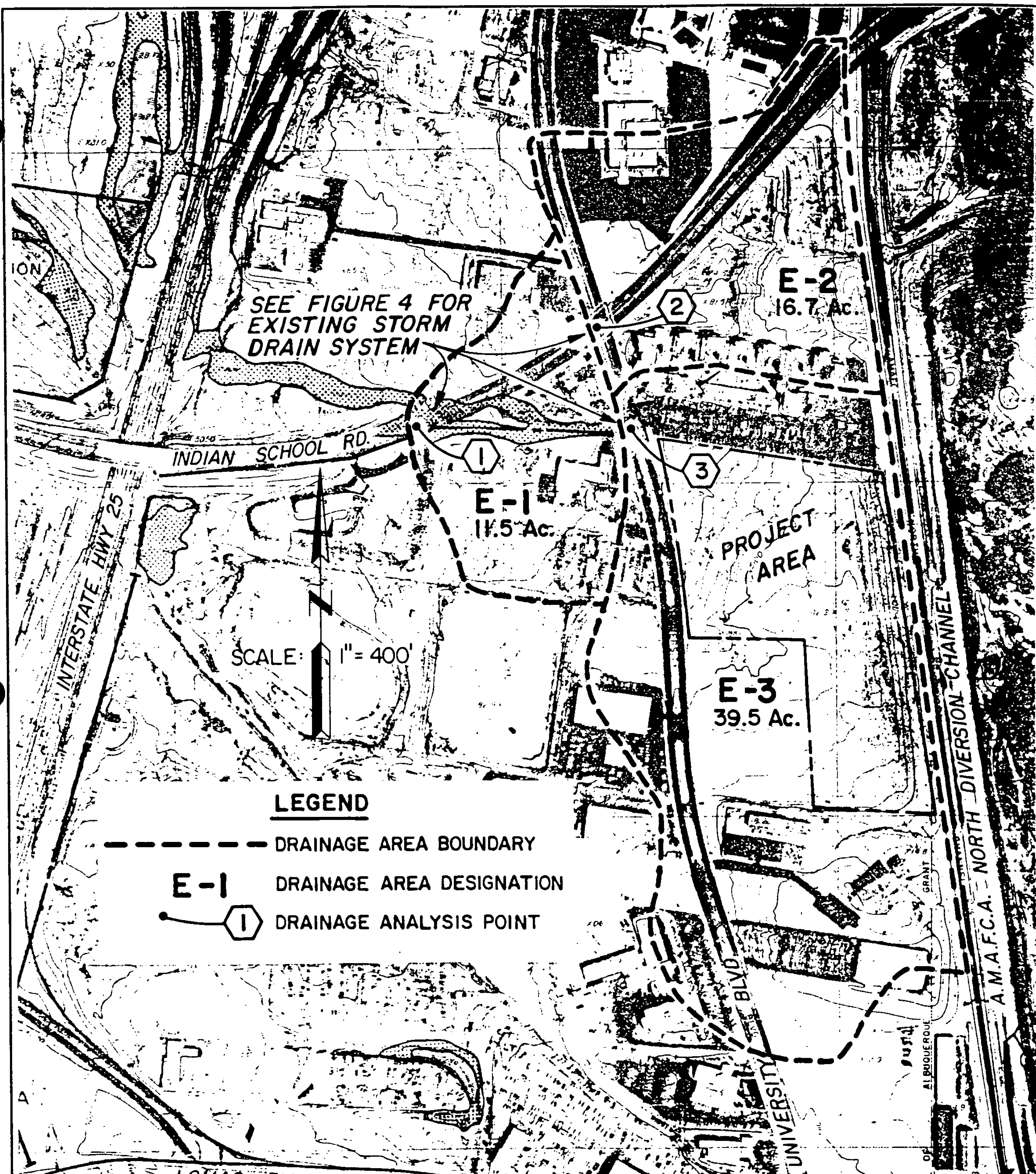
TABLE 1

CALCULATION OF PRORATED FLOW (RUNOFF) FOR UNM PARKING LOT BASED ON OVERALL DRAINAGE BASIN

Analysis Point	Return Period (years)	Capacity of Storm Drain (cfs)	Capacity of Street (cfs)	Total Capacity (cfs)	Contrib. Drain. Area ID	Contrib. Drain. Area (acres)	Prorated Runoff (cfs/ac)
AP-1	10	50	0**	50	E1,2,3	67.7	0.74
AP-2	10	50	46	96	E2,3	56.2	1.71
AP-3	10	50*	0**	50	E3	39.5	1.26
AP-1	100	50	0**	50	E1,2,3	67.7	0.74
AP-2	100	50	190	240	E2,3	56.2	4.27
AP-3	100	50*	0**	50	E3	39.5	1.26

* Capacity is 60 cfs but is limited to downstream capacity of 50 cfs.

** The street capacity is 0 cfs as the street reverses slope and is in the floodplain.



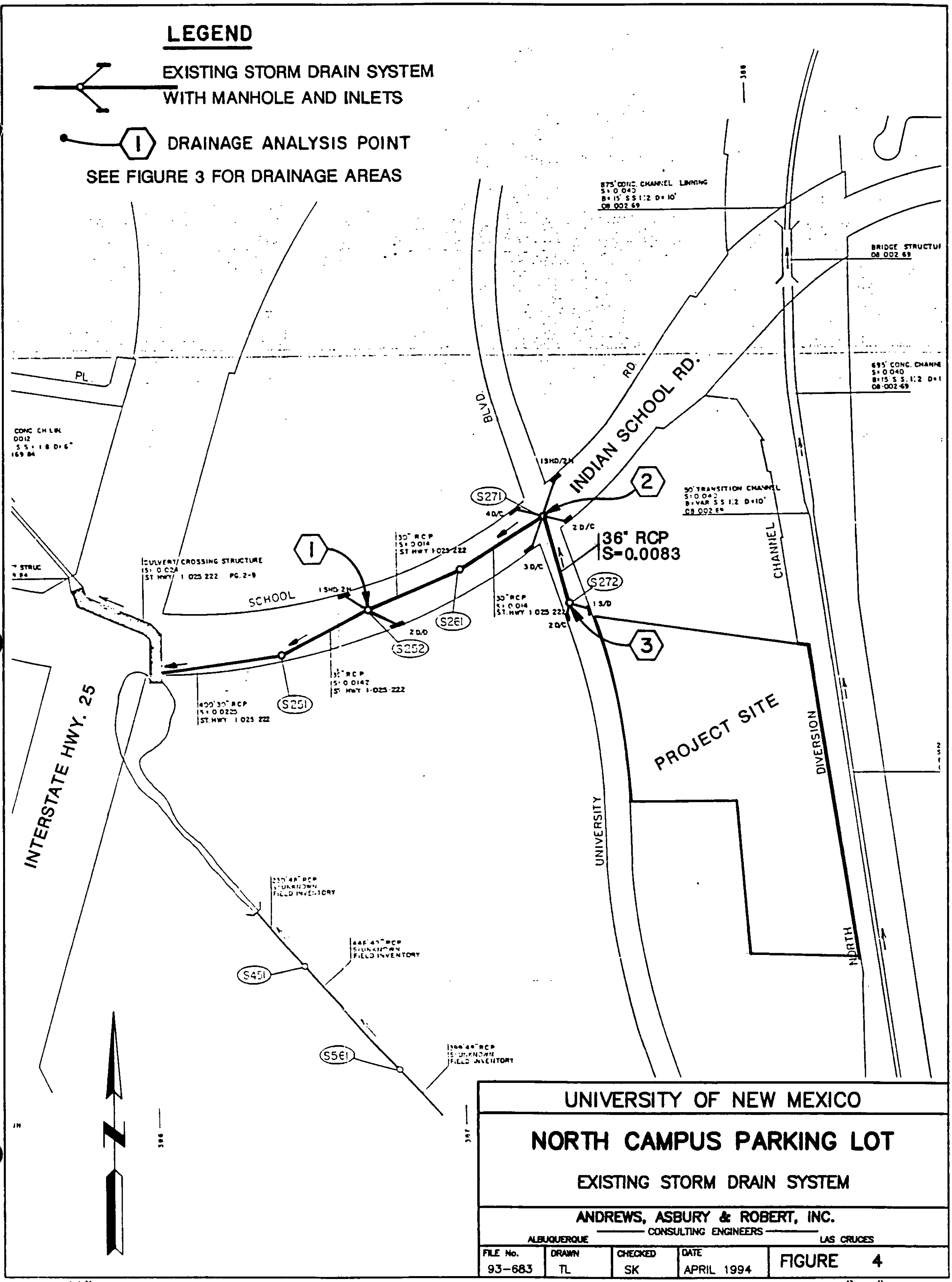
UNIVERSITY OF NEW MEXICO

NORTH CAMPUS PARKING LOT

DRAINAGE AREAS CONTRIBUTING TO EXISTING STORM DRAIN SYSTEM

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE LAS CRUCES

FILE No.	DRAWN	CHECKED	DATE	FIGURE 3
93-683	TL	SK	APRIL 1994	



LEGEND
EXISTING STORM DRAIN SYSTEM WITH MANHOLE AND INLETS
DRAINAGE ANALYSIS POINT
SEE FIGURE 3 FOR DRAINAGE AREAS
1
2
3
PL.
RD
BLVD.
INDIAN SCHOOL RD.
SCHOOL
S271
S272
S261
S252
S251
S451
S561
36" RCP
S=0.0083
CHANNEL
PROJECT SITE
UNIVERSITY
DIVERSION
NORTH
INTERSTATE HWY. 25
UNIVERSITY OF NEW MEXICO
NORTH CAMPUS PARKING LOT
EXISTING STORM DRAIN SYSTEM
ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
ALBUQUERQUE
LAS CRUCES
FILE No.
93-683
DRAWN
TL
CHECKED
SK
DATE
APRIL 1994
FIGURE 4

B. Results of Hydrologic Analysis

The City of Albuquerque's Development Process Manual Section 22.2 along with the AHYMO rainfall runoff model were used to compute the existing and developed flows for the 10 year and 100 year rainfall events. The soils in the project area are classified as "cut and fill" in the Soil Survey of Bernalillo County. The 6 hour 100 year rainstorm was used to design the new storm drains in the UNM parking lot. The 24 hour 100 year rainstorm was used to design the new detention pond. The basin parameters are shown in Table 2 and the resulting flows and runoff volumes are shown in Table 3. The time to peak was computed using the SCS Upland Method. The time to peak (tp) for the subbasins was found to be less than 0.133 hours so this minimum value was used. The AHYMO output for the 10 year and 100 year events are shown in Appendix C.

TABLE 2
SUMMARY OF BASIN PARAMETERS
EXISTING AND DEVELOPED CONDITIONS
NORTH CAMPUS PARKING LOT

Basin	Area (ac)	Len (ft)	dElev (ft)	Slope (ft/ft)	K	V (ft/s)	tc (hrs)	tp (hrs)	Surface Treatment (%)			
									A	B	C	D
Onsite - Developed												
A-1	0.7	225	8	.0356	2	3.77	0.02	0.133	0	0	100	0
A-2	3.7	760	20	0.026	2	3.24	0.07	0.133	0	0	19	81
A-3	0.6	360	11	0.031	2	3.50	0.03	0.133	0	1	49	50
A-4	7.2	1080	17	0.016	2	2.51	0.12	0.133	0	0	22	78
A-5	0.5	680	32	0.047	2	4.34	0.04	0.133	0	58	41	1
A-6	0.2	550	3	0.005	2	1.48	0.10	0.133	0	94	6	0
Total	12.8	1240	26	0.021	2	2.90	0.12	0.133	0	0	28	72
Onsite - Existing												
Total	12.8	1240	26	0.021	2	2.90	0.12	0.133	0	0	91	9
Offsite - Existing												
B-1	0.3	200	10	0.05	2	4.47	0.01	0.133	0	0	100	0

N/A = Not applicable

TABLE 3
SUMMARY OF PEAK FLOWS AND RUNOFF VOLUMES
NORTH CAMPUS PARKING LOT

Basin	Analysis Point	Existing Conditions			Developed Conditions		
		6 Hour 100 Year Peak Flow (cfs)	24 Hour 100 Year Volume (ac-ft)	6 Hour 10 Year Peak Flow (cfs)	6 Hour 100 Year Peak Flow (cfs)	24 Hour 100 Year Volume (ac-ft)	6 Hour 10 Year Peak Flow (cfs)
Onsite Draining to Pond							
A-1	4	N/A	N/A	N/A	2.2	0.07	1.2
A-2	5	N/A	N/A	N/A	16.1	0.69	10.4
A-4	7	N/A	N/A	N/A	31.3	1.32	20.1
Total	N/A	N/A	N/A	N/A	52.0	2.16	33.1
Onsite Draining Directly to University Blvd. and University Storm Drain							
Outflow from pond	N/A	N/A	N/A	N/A	2.8	N/A	2.3
A-3	6	N/A	N/A	N/A	2.4	0.09	1.4
A-5	8	N/A	N/A	N/A	1.4	0.04	0.7
A-6	9	N/A	N/A	N/A	0.4	0.01	0.2
Total	N/A	N/A	N/A	N/A	7.0	N/A	4.6
Onsite - Total							
Total	N/A	42.1	1.33	23.3	N/A	N/A	N/A
Offsite							
B-1	10	1.0	0.03	0.5	N/A	N/A	N/A

N/A = Not applicable

NOTE: See Map No. 1 in Back Pocket of Report for location of Drainage Basins and Analysis Points

C. Storm Drain System

A proposed system of storm drains will convey runoff from the parking lot to the detention pond. Two double grate/curb inlets will be constructed at AP-7. The pavement is only crowned about 3 inches between the grates so that as one grate fills it may overflow to the adjacent grate before overtopping the 6 inch curb. One 30 inch RCP storm drain will convey the flow at AP-7 to the detention pond. Two single grate/curb inlets will be constructed at AP-5. The pavement crown between these two grates will also be only 3 inches high. One 24 inch RCP storm drain will convey the flow from AP-5 to the detention pond. The storm drains are shown on the Grading and Drainage Plan (in back pocket). The inlet and storm drain calculations are shown in Appendix F.

D. Detention Pond

The proposed detention pond is located at the northwest corner of the parking lot property adjacent to the Citadel Apartments parking lot and University Boulevard as shown on the Grading and Drainage Plan (in the back pocket of this report).

Storm drains will convey runoff from the parking lot into the pond. (see previous paragraph).

To determine the pond volume and to drain the pond in 24 hours as well as comply with the allowable discharge from the parking lot property, the 100 year, 24 hour runoff was routed through the detention pond using AHYMO. Initial trial runs were made to determine general parameters required. The final AHYMO output is included hereinafter in Appendix C.

The outlet of the pond consists of an Orifice with a 5 3/8 inch square opening (equivalent to a 6" dia. opening) that flows into a 12 inch RCP pipe. A stage/storage/outflow curve for the pond is shown in Table 4. The outflow versus stage relationship was determined using orifice and weir equations. These calculations are shown in Appendix D.

The pond will hold a total volume of 1.56 acre feet at elevation 5,085.25. The invert of the pond is at elevation 5,078.80 feet. The minimum top of the berm varies in elevation from 5,086.50 to 5,086.74.

The peak stage in the pond is 5,085.2 feet and the peak outflow from the pond is 2.8 cfs.

The routing reduced the peak volume in the pond from the total inflow of 2.16 ac-ft to a peak storage in the pond of 1.53 ac-ft. The pond has an emergency spillway designed to pass the 100 year discharge of 52 cfs. The spillway is 15 feet wide at an elevation of 5085.25 ft, NGVD. The spillway was not designed for any larger flood events due to the fact that the total storm drain capacity flowing into the pond is only 52 cfs. Therefore, larger storm events cannot produce larger rates of inflow into the pond than the 100 year discharge.

The Albuquerque Metropolitan Arroyo Flood Control Authority developed a report entitled, "Sediment and Erosion Design Guide". This report estimated the annual sediment yield to the North Diversion Channel at about 0.7 tons/acre. Assuming a bulked specific weight for the sediment of 100 lb/cuft, the annual sediment yield for northeast Albuquerque was estimated to be about 14 cuft/ac. It is assumed that only landuse "C" from the UNM parking lot will contribute significant amounts of sediment to the detention pond. The total amount of landuse "C" in the project area is about 3.5 acres. Therefore, the annual sediment yield to the pond is about 49 cu.ft. The available sediment storage is about 870 cu.ft. As a result the sediment storage in the detention pond will fill on the average every 18 years. The pond will be maintained to remove sediment periodically and to clean the outlet structure.

TABLE 4

STAGE/STORAGE/OUTFLOW DATA FOR UNM DETENTION POND

Water Surface Elevation (ft., NGVD)	Cumulative Volume (ac-ft)	Pond Outflow (cfs)
5078.8	0	0
5079.5	0.06	0.92
5080.0	0.14	1.21
5082.0	0.57	1.97
5084.0	1.14	2.51
5085.25	1.56	2.80

E. Pond Outlet

A 12 inch outlet pipe will convey the pond outflow to the eastern inlet of the storm drain system in University Boulevard (near AP-3 of Figure No. 4). University Boulevard has two grated inlets at this location. One is on the eastern side of the street and the other is located on the western side of the street. The eastern inlet is a single grate Type "D" inlet at the base of the driveway from Citadel Apartments. University Boulevard is superelevated in this location by about 1.3 feet (sloped to the west). Existing flows to this inlet come from the Citadel Apartments while the flow along University Boulevard will flow to the multiple grated inlet on the western side of the street. The capacity of the eastern inlet is 13 cfs. A 15 inch RCP connects the eastern inlet to the 36 inch storm drain in University Boulevard. The capacity of the 15 inch storm drain is 18 cfs. The pond's peak outflow of 2.8 cfs may be discharged directly to the 15 inch RCP connector pipe and not exceed the pipe's capacity (inlet capacity of 13 cfs + pond outflow of 2.8 cfs = 15.8 cfs is less than connector pipe capacity of 18 cfs). Appendix E shows the calculations for the capacity of the eastern inlet and the 15 inch RCP connector pipe.

IV.
CONCLUSIONS

UNM plans to regrade and pave an existing gravel and dirt parking lot located east of University Boulevard and about 350 feet south of Indian School Road. The developed parking lot will produce a 6 hour 100 year discharge of 52.0 cfs. This discharge exceeds the prorated capacity of the downstream storm drain located in University Boulevard. A proposed detention pond with a capacity of 1.56 ac-ft will attenuate the runoff from the parking lot. The 100 year runoff (developed conditions) from the north campus parking lot includes the outflow from the detention pond (2.8 cfs) and the runoff from basins A-3, A-5, and A-6 (2.4 cfs, 1.4 cfs and 0.4 cfs respectively) which drain directly to University Boulevard. This combined flow of 7.0 cfs is well within the allowable prorated capacity of the University Boulevard storm drain (9.5 cfs allowable from UNM parking lot) as determined by the criteria established at the pre-design conference. This total peak flow of 7.0 cfs is also significantly smaller than the total existing 6 hour 100 year peak flow of 42.1 cfs that currently flows to University Blvd. from the existing parking lot. The peak stage in the detention pond for the 24 hour 100 year event will be 5085.2 ft., NGVD. This allows about 18 years of sediment storage and 1.5 feet of freeboard in the pond.

V.
REFERENCES

Albuquerque Metropolitan Arroyo Flood Control Authority, January 1994, "AHYMO Computer Program User's Manual".

Albuquerque Metropolitan Arroyo Flood Control Authority, March 1994, "Sediment and Erosion Design Guide".

Bohannon-Huston, January 1981, "Albuquerque Master Drainage Study".

City of Albuquerque, January 1993, "Development Process Manual, Section 22.2, Hydrology".

Soil Conservation Service, June 1977, "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico".

APPENDIX A -

PRE-DESIGN CONFERENCE FORM

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
UTILITY DEVELOPMENT DIVISION/HYDROLOGY SECTION

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: J15 DATE: 12/9/93

EPC NO.: DRB NO.: ZONE:

SUBJECT: UNM North Campus Parking

STREET ADDRESS:

LEGAL DESCRIPTION: UNPLATTED - South of Indian Sch - North of Lomas And East of University (≈ 12 acres)

APPROVAL REQUESTED:

___	PRELIMINARY PLAT	___	FINAL PLAT
___	SITE DEVELOPMENT PLAN	___	BUILDING PERMIT
___	GRADING/PAVING PERMIT	X	OTHER
			PAVING PERMIT

	WHO	REPRESENTING
ATTENDANCE:	John Andrews	
	FRED J AGUIRRE	

FINDINGS:

AN APPROVED DRAINAGE PLAN IS REQUIRED FOR AN APPROVED PAVING PERMIT

Downstream capacity of the existing storm drain and streets must be determined and prorated for the contributing basin to determine the allowable discharge from this development. See Attached Facility map J15N for system.

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Fred J Aguirre SIGNED: John Andrews

TITLE: TITLE: AA&E

DATE: 12/9/93 DATE: 12-9-93

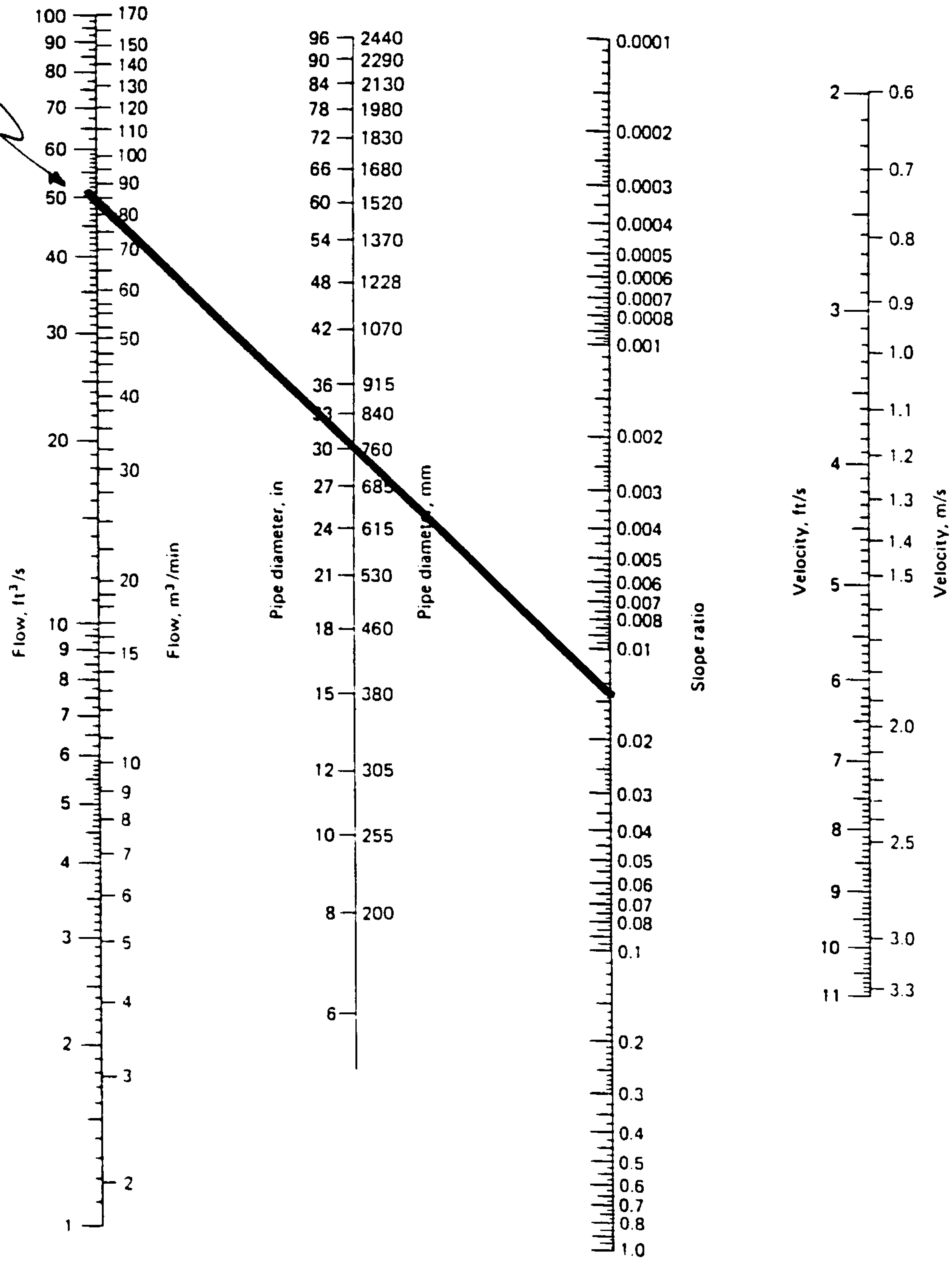
NOTE PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL.

APPENDIX B -

EXISTING STORM DRAIN AND STREET CAPACITY CALCULATIONS
ON UNIVERSITY BOULEVARD

APPENDIX B - CAPACITY OF STORM DRAIN @ AP-1 AND AP-2

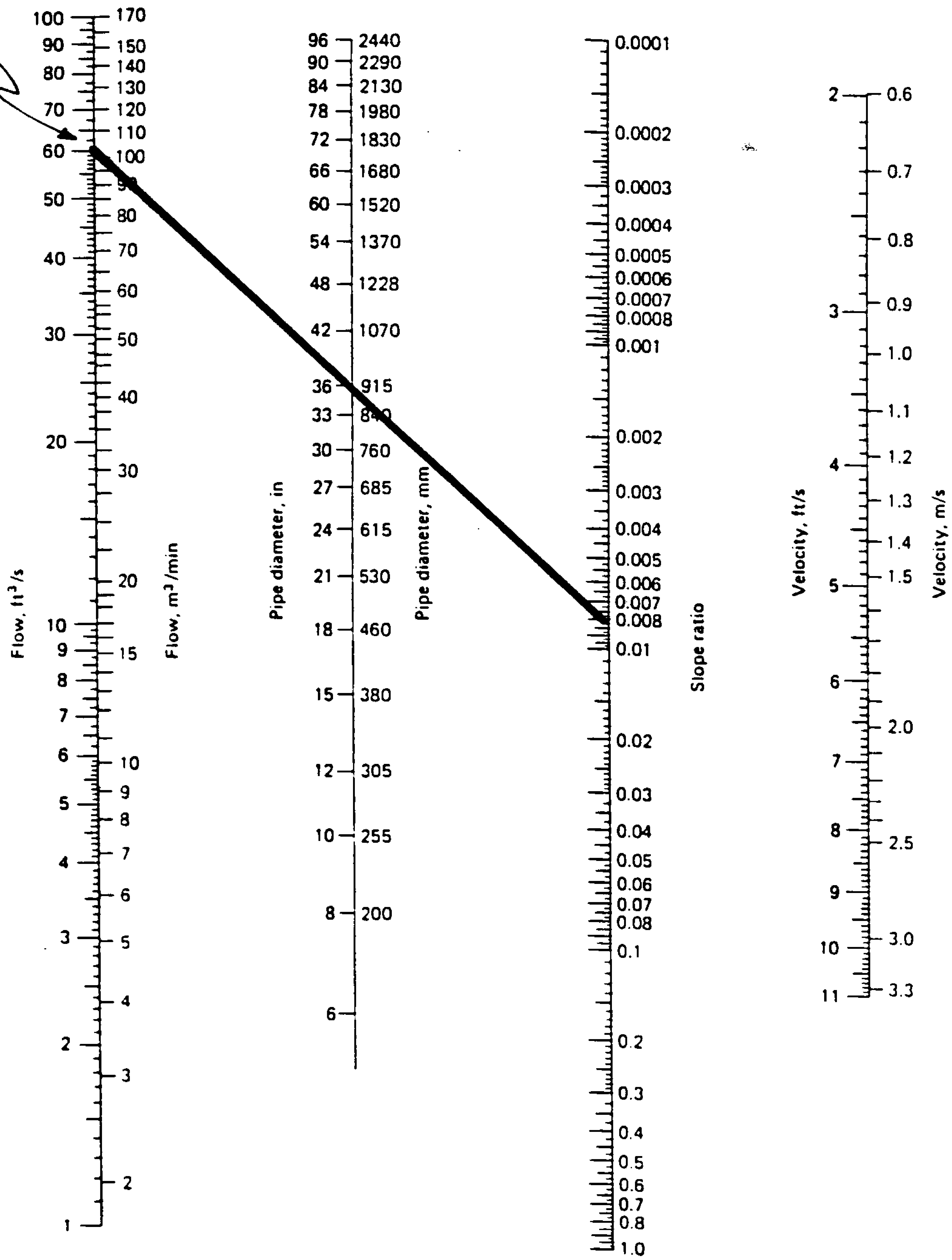
CAPACITY = 50 CFS



Nomogram for solution of Manning's equation for circular pipes flowing full (n = 0.013).

APPENDIX 3 - CAPACITY OF STORM DRAIN @ AP-3

CAPACITY = 60CFS



Nomogram for solution of Manning's equation for circular pipes flowing full (n = 0.013).

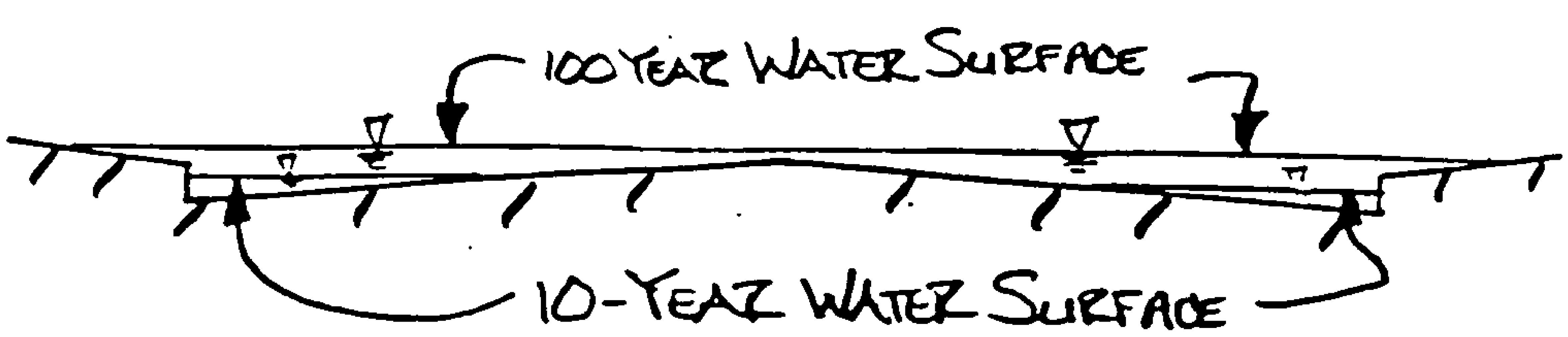
APPENDIX B - EXISTING STREET CAPACITY - INDIAN SCHOOL ROAD AT AP-2

AHYMO MODEL USED TO COMPUTE RATING CURVE FOR STREETS

```
*************** Rating Curve for Street Section ******************
*
* STREET RATING CURVE AT INDIAN SCHOOL RD AP-2
* SLOPE = .017
* 1/2 ROAD WIDTH = 35.0 FT  (MEASURED COA FLINE OF CURB TO FLINE OF CURB)
* NOTE: ASSUMED STREET HAS ONLY 4 FT SIDEWALKS (ARTERIALS MAY HAVE
* SIX FOOT SIDEWALKS, YET DIFFERENCE SHOULD BE INSIGNIFICANT)
*
COMPUTE RATING CURVE ID=1  VS NO=1  NO SEGS=3
              EL MIN=0   EL MAX=1.0000
              CH SLP=.017  FP SLP=.017
              N=.013 DIST=6.625 N=-0.017 DIST=72.625
              N=.013 DIST=79.25
              DIST     ELEV
              0        0.7467
              4        0.667
              4.46     0.667
              4.625    0
              6.625    0.125
              39.625   0.785
              72.625   0.125
              74.625   0
              74.792   0.667
              75.25    0.667
              79.25    0.7467
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	
.00	.0	.0	
.05	.0	.1	
.11	.2	.4	
.16	.4	1.2	
.21	1.0	2.9	
.26	1.8	5.7	
.32	2.9	10.0	
.37	4.2	16.0	
.42	5.9	23.9	
.47	7.8	34.0	
.53	10.0	46.4	<- 10 year capacity - one driving lane open
.58	12.5	61.5	
.63	15.2	79.2	
.68	18.3	94.9	
.74	21.9	114.7	
.79	25.9	145.0	
.84	30.1	186.0	<- 100 year capacity
.89	34.3	231.1	
.95	38.4	280.0	
1.00	42.6	332.6	



APPENDIX C -

AHYMO OUTPUT

APPENDIX C - SAMPLE OUTPUT FOR 24 HOUR 100 YEAR EVENT - DEVELOPED CONDITIONS

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 05/10/1994
     START TIME (HR:MIN:SEC) = 13:31:57      USER NO.= ANASRONM.I01
     INPUT FILE = UNM10024.IN

*    THIS IS THE INPUT FILE FOR THE UNM NORTH CAMPUS PARKING
*    DEVELOPED CONDITIONS
*    INPUT FILE NAME:  UNM10024.IN
*    100 YEAR 24 HOUR STORM.
*    BASINS A-1, A-2, A-3, A-4, A-5, A-6, and B-1
*    BASINS A-1, A-2, A-3, and A-4 are routed through the pond
*    6 INCH DIAM. ORIFICE FOR POND OUTLET
*    POND INVERT AT 5078.8
*    SPILLWAY AT 5082.25
*
**************************** Set time to start *****************
*
START                TIME = 0.0
*
**************************** Comput Rainfall hydrograph *****************
*
RAINFALL             TYPE=2
                     RAIN QUARTER=0.0        RAIN ONE = 2.01 IN
                     RAIN SIX=2.35 IN       RAIN DAY = 2.75 IN
                     DT=0.05

               COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
               DT =    .050000 HOURS          END TIME =    24.000000 HOURS
                   .0000   .0024   .0049   .0075   .0102   .0130   .0158
                   .0188   .0219   .0252   .0286   .0321   .0358   .0397
                   .0439   .0482   .0529   .0578   .0631   .0689   .0751
                   .0836   .0930   .1201   .1842   .2944   .4649   .7103
                  1.0460  1.3107  1.4303  1.5302  1.6176  1.6959  1.7667
                  1.8313  1.8906  1.9452  1.9955  2.0421  2.0851  2.0946
                  2.1034  2.1115  2.1191  2.1262  2.1330  2.1394  2.1455
                  2.1513  2.1569  2.1622  2.1673  2.1723  2.1771  2.1817
                  2.1862  2.1905  2.1948  2.1989  2.2028  2.2067  2.2105
                  2.2142  2.2178  2.2213  2.2248  2.2282  2.2315  2.2347
                  2.2379  2.2410  2.2440  2.2470  2.2500  2.2529  2.2557
                  2.2585  2.2613  2.2640  2.2666  2.2693  2.2719  2.2744
                  2.2769  2.2794  2.2818  2.2842  2.2866  2.2889  2.2913
                  2.2935  2.2958  2.2980  2.3002  2.3024  2.3046  2.3067
                  2.3088  2.3109  2.3129  2.3150  2.3170  2.3190  2.3209
                  2.3229  2.3248  2.3267  2.3286  2.3305  2.3323  2.3342
                  2.3360  2.3378  2.3396  2.3414  2.3431  2.3449  2.3466
                  2.3483  2.3500  2.3517  2.3534  2.3551  2.3569  2.3586
                  2.3602  2.3619  2.3636  2.3653  2.3669  2.3686  2.3703
                  2.3719  2.3736  2.3752  2.3768  2.3785  2.3801  2.3817
                  2.3833  2.3849  2.3865  2.3881  2.3897  2.3913  2.3929
                  2.3944  2.3960  2.3976  2.3991  2.4007  2.4022  2.4038
                  2.4053  2.4068  2.4084  2.4099  2.4114  2.4129  2.4144
                  2.4159  2.4174  2.4189  2.4204  2.4219  2.4234  2.4248
                  2.4263  2.4278  2.4292  2.4307  2.4322  2.4336  2.4350
                  2.4365  2.4379  2.4394  2.4408  2.4422  2.4436  2.4450
                  2.4464  2.4478  2.4493  2.4506  2.4520  2.4534  2.4548
                  2.4562  2.4576  2.4589  2.4603  2.4617  2.4630  2.4644
                  2.4658  2.4671  2.4685  2.4698  2.4711  2.4725  2.4738
                  2.4751  2.4765  2.4778  2.4791  2.4804  2.4817  2.4830
                  2.4843  2.4856  2.4869  2.4882  2.4895  2.4908  2.4921
                  2.4934  2.4946  2.4959  2.4972  2.4984  2.4997  2.5010
                  2.5022  2.5035  2.5047  2.5060  2.5072  2.5085  2.5097
                  2.5109  2.5122  2.5134  2.5146  2.5158  2.5170  2.5183
                  2.5195  2.5207  2.5219  2.5231  2.5243  2.5255  2.5267
                  2.5279  2.5291  2.5303  2.5314  2.5326  2.5338  2.5350
                  2.5361  2.5373  2.5385  2.5396  2.5408  2.5420  2.5431
                  2.5443  2.5454  2.5466  2.5477  2.5488  2.5500  2.5511
                  2.5523  2.5534  2.5545  2.5556  2.5568  2.5579  2.5590
                  2.5601  2.5612  2.5623  2.5635  2.5646  2.5657  2.5668
                  2.5679  2.5690  2.5701  2.5711  2.5722  2.5733  2.5744
                  2.5755  2.5766  2.5776  2.5787  2.5798  2.5809  2.5819
                  2.5830  2.5841  2.5851  2.5862  2.5872  2.5883  2.5893
                  2.5904  2.5914  2.5925  2.5935  2.5946  2.5956  2.5966
                  2.5977  2.5987  2.5997  2.6008  2.6018  2.6028  2.6038
                  2.6049  2.6059  2.6069  2.6079  2.6089  2.6099  2.6109
                  2.6119  2.6129  2.6139  2.6149  2.6159  2.6169  2.6179
                  2.6189  2.6199  2.6209  2.6219  2.6229  2.6238  2.6248
                  2.6258  2.6268  2.6278  2.6287  2.6297  2.6307  2.6316
                  2.6326  2.6336  2.6345  2.6355  2.6364  2.6374  2.6384
                  2.6393  2.6403  2.6412  2.6421  2.6431  2.6440  2.6450
                  2.6459  2.6469  2.6478  2.6487  2.6497  2.6506  2.6515
                  2.6524  2.6534  2.6543  2.6552  2.6561  2.6571  2.6580
                  2.6589  2.6598  2.6607  2.6616  2.6625  2.6634  2.6644
                  2.6653  2.6662  2.6671  2.6680  2.6689  2.6698  2.6707
                  2.6715  2.6724  2.6733  2.6742  2.6751  2.6760  2.6769
                  2.6778  2.6786  2.6795  2.6804  2.6813  2.6821  2.6830
                  2.6839  2.6848  2.6856  2.6865  2.6874  2.6882  2.6891
                  2.6900  2.6908  2.6917  2.6925  2.6934  2.6942  2.6951
                  2.6959  2.6968  2.6976  2.6985  2.6993  2.7002  2.7010
                  2.7019  2.7027  2.7035  2.7044  2.7052  2.7061  2.7069
                  2.7077  2.7085  2.7094  2.7102  2.7110  2.7119  2.7127
                  2.7135  2.7143  2.7151  2.7160  2.7168  2.7176  2.7184
                  2.7192  2.7200  2.7209  2.7217  2.7225  2.7233  2.7241
                  2.7249  2.7257  2.7265  2.7273  2.7281  2.7289  2.7297
                  2.7305  2.7313  2.7321  2.7329  2.7337  2.7344  2.7352
                  2.7360  2.7368  2.7376  2.7384  2.7392  2.7399  2.7407
                  2.7415  2.7423  2.7431  2.7438  2.7446  2.7454  2.7462
                  2.7469  2.7477  2.7485  2.7492  2.7500

*
*********** BASIN A-1
*
*S BASIN A-1
```

```
*
COMPUTE NM HYD        ID=1  HYD NO=1 DRAINAGE AREA=.0010844 SQ MI
                      PERCENT A=0 PERCENT B=0 PERCENT C=100 D=0
                      TP=.133 HRS
                      MASSRAINFALL=-1

    K =   .107204HR     TP =   .133000HR     K/TP RATIO =    .806046      SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   3.1272     CFS    UNIT VOLUME =      .9981          B =    383.55          P60 = 2.0100
    AREA =        .001084 SQ MI      IA =      .35000 INCHES       INF =     .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

*
*
PRINT HYD             ID=1  CODE=1

                                        OUTFLOW HYDROGRAPH REACH      1.00

    RUNOFF VOLUME =      1.12613 INCHES       =          .0651 ACRE-FEET
    PEAK DISCHARGE RATE =         2.17 CFS   AT    1.500 HOURS    BASIN AREA =    .0011 SQ. MI.


*
************ BASIN A-2
*
*S BASIN A-2
*
COMPUTE NM HYD        ID=2  HYD NO=2 DRAINAGE AREA=.005706 SQ MI
                      PERCENT A=0 PERCENT B=0 PERCENT C=19 D=81
                      TP=.133 HRS
                      MASSRAINFALL=-1

    K =   .072485HR     TP =   .133000HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.289     CFS    UNIT VOLUME =      .9985          B =    526.28          P60 = 2.0100
    AREA =        .004622 SQ MI      IA =      .10000 INCHES       INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000


    K =   .107204HR     TP =   .133000HR     K/TP RATIO =    .806046      SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   3.1265     CFS    UNIT VOLUME =      .9981          B =    383.55          P60 = 2.0100
    AREA =        .001084 SQ MI      IA =      .35000 INCHES       INF =     .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

*
*
PRINT HYD             ID=2  CODE=1

                                        OUTFLOW HYDROGRAPH REACH      2.00

    RUNOFF VOLUME =      2.25286 INCHES       =          .6856 ACRE-FEET
    PEAK DISCHARGE RATE =        15.86 CFS   AT    1.500 HOURS    BASIN AREA =    .0057 SQ. MI.


*
*************************** Add Hydrographs **************************
*
*S ADD A-1 AND A-2
*
*    COMBINE BASIN A-1 AND BASIN A-2
*
ADD HYD               ID=3  HYD NO=3  ID I=1  ID II=2
*
*
PRINT HYD             ID=3  CODE=1

                                        OUTFLOW HYDROGRAPH REACH      3.00

    RUNOFF VOLUME =      2.07286 INCHES       =          .7507 ACRE-FEET
    PEAK DISCHARGE RATE =        18.03 CFS   AT    1.500 HOURS    BASIN AREA =    .0068 SQ. MI.


*
************ BASIN A-3
*
*S BASIN A-3
*
COMPUTE NM HYD        ID=4  HYD NO=4 DRAINAGE AREA=.000934 SQ MI
                      PERCENT A=0 PERCENT B=1 PERCENT C=49 D=50
                      TP=.133 HRS
                      MASSRAINFALL=-1

    K =   .072485HR     TP =   .133000HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.8479     CFS    UNIT VOLUME =      .9928          B =    526.28          P60 = 2.0100
    AREA =        .000467 SQ MI      IA =      .10000 INCHES       INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000


    K =   .107696HR     TP =   .133000HR     K/TP RATIO =    .809743      SHAPE CONSTANT, N =  4.417819
    UNIT PEAK =   1.3418     CFS    UNIT VOLUME =      .9923          B =    382.13          P60 = 2.0100
    AREA =        .000467 SQ MI      IA =      .35300 INCHES       INF =     .83840 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

*
*
PRINT HYD             ID=4  CODE=1

                                        OUTFLOW HYDROGRAPH REACH      4.00

    RUNOFF VOLUME =      1.81743 INCHES       =          .0905 ACRE-FEET
    PEAK DISCHARGE RATE =         2.33 CFS   AT    1.500 HOURS    BASIN AREA =    .0009 SQ. MI.
```

```
*
*************************** Add Hydrographs *************************
*
*S ADD A-1, A-2 and A-3
*
*   COMBINE BASIN A-1, A-2 and BASIN A-3
*
ADD HYD             ID=5  HYD NO=5  ID I=3  ID II=4
*
*
PRINT HYD           ID=5  CODE=1

                                   OUTFLOW HYDROGRAPH REACH     5.00


    RUNOFF VOLUME =     2.04195 INCHES      =        .8412 ACRE-FEET
    PEAK DISCHARGE RATE =      20.35 CFS  AT   1.500 HOURS   BASIN AREA =   .0077 SQ. MI.


*
************ BASIN A-4
*
*S BASIN A-4
*
COMPUTE NM HYD      ID=6  HYD NO=6 DRAINAGE AREA=.011213 SQ MI
                    PERCENT A=0 PERCENT B=0 PERCENT C=22 D=78
                    TP=.133 HRS
                    MASSRAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   34.608    CFS   UNIT VOLUME =    .9988        B =   526.28       P60 = 2.0100
    AREA =      .008746 SQ MI    IA =     .10000 INCHES      INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .107204HR    TP =   .133000HR    K/TP RATIO =   .806046     SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   7.1140    CFS   UNIT VOLUME =    1.000        B =   383.55       P60 = 2.0100
    AREA =      .002467 SQ MI    IA =     .35000 INCHES      INF =    .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

*
*
PRINT HYD           ID=6  CODE=1

                                   OUTFLOW HYDROGRAPH REACH     6.00


    RUNOFF VOLUME =     2.21113 INCHES      =       1.3223 ACRE-FEET
    PEAK DISCHARGE RATE =      30.82 CFS  AT   1.500 HOURS   BASIN AREA =   .0112 SQ. MI.


*
*************************** Add Hydrographs *************************
*
*S ADD A-1, A-2, A-3, and A-4
*
*   COMBINE A-1, A-2, A-3, and A-4
*
ADD HYD             ID=7   HYD NO=7  ID I=5  ID II=6
*
*
PRINT HYD           ID=7   CODE=1

                                   OUTFLOW HYDROGRAPH REACH     7.00


    RUNOFF VOLUME =     2.14211 INCHES      =       2.1635 ACRE-FEET
    PEAK DISCHARGE RATE =      51.17 CFS  AT   1.500 HOURS   BASIN AREA =   .0189 SQ. MI.


*
*********************** Route Flow Through Detention Pond *************
*
ROUTE RESERVOIR     ID=8    HYD NO=8    INFLOW ID=7    CODE=1
                    OUTFLOW (CFS)   STORAGE (AC-FT)     ELEVATION (FT)
                       0.0            0.000               5078.8
                       0.92           0.056               5079.5
                       1.210          0.141               5080.0
                       1.970          0.567               5082.0
                       2.510          1.137               5084.0
                       2.800          1.560               5085.25
  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5078.80	.000	.00
.05	.00	5078.80	.000	.00
.10	.00	5078.80	.000	.00
.15	.00	5078.80	.000	.00
.20	.00	5078.80	.000	.00
.25	.00	5078.80	.000	.00
.30	.00	5078.80	.000	.00
.35	.00	5078.80	.000	.00
.40	.00	5078.80	.000	.00
.45	.00	5078.80	.000	.00
.50	.00	5078.80	.000	.00
.55	.00	5078.80	.000	.00
.60	.00	5078.80	.000	.00
.65	.00	5078.80	.000	.00
.70	.00	5078.80	.000	.00
.75	.00	5078.80	.000	.00
.80	.00	5078.80	.000	.00
.85	.00	5078.80	.000	.00

.90	.00	5078.80	.000	.00
.95	.00	5078.80	.000	.00
1.00	.00	5078.80	.000	.00
1.05	.00	5078.80	.000	.00
1.10	.00	5078.80	.000	.00
1.15	.12	5078.80	.000	.00
1.20	1.21	5078.84	.003	.05
1.25	4.37	5078.97	.014	.23
1.30	9.99	5079.32	.042	.68
1.35	18.78	5079.74	.097	1.06
1.40	31.17	5080.26	.196	1.31
1.45	45.04	5080.97	.347	1.58
1.50	51.17	5081.87	.539	1.92
1.55	44.92	5082.57	.729	2.12
1.60	34.96	5083.12	.885	2.27
1.65	27.63	5083.54	1.005	2.38
1.70	22.95	5083.87	1.099	2.47
1.75	19.90	5084.12	1.177	2.54
1.80	17.68	5084.32	1.244	2.58
1.85	15.86	5084.49	1.303	2.62
1.90	14.29	5084.64	1.354	2.66
1.95	12.89	5084.78	1.399	2.69
2.00	11.63	5084.89	1.439	2.72
2.05	10.31	5084.99	1.473	2.74
2.10	7.99	5085.07	1.499	2.76
2.15	5.63	5085.12	1.516	2.77
2.20	4.15	5085.15	1.525	2.78
2.25	3.28	5085.16	1.529	2.78
2.30	2.73	5085.16	1.530	2.78
2.35	2.33	5085.16	1.529	2.78
2.40	2.01	5085.15	1.526	2.78
2.45	1.74	5085.14	1.522	2.77
2.50	1.52	5085.13	1.518	2.77
2.55	1.33	5085.11	1.512	2.77
2.60	1.17	5085.09	1.506	2.76
2.65	1.03	5085.07	1.499	2.76
2.70	.92	5085.05	1.492	2.75
2.75	.83	5085.02	1.484	2.75

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
2.80	.75	5085.00	1.476	2.74
2.85	.67	5084.98	1.467	2.74
2.90	.61	5084.95	1.459	2.73
2.95	.55	5084.92	1.450	2.72
3.00	.51	5084.90	1.441	2.72
3.05	.46	5084.87	1.432	2.71
3.10	.43	5084.84	1.422	2.71
3.15	.41	5084.81	1.413	2.70
3.20	.38	5084.79	1.403	2.69
3.25	.36	5084.76	1.394	2.69
3.30	.35	5084.73	1.384	2.68
3.35	.33	5084.70	1.374	2.67
3.40	.32	5084.67	1.365	2.67
3.45	.31	5084.64	1.355	2.66
3.50	.30	5084.62	1.345	2.65
3.55	.29	5084.59	1.336	2.65
3.60	.29	5084.56	1.326	2.64
3.65	.28	5084.53	1.316	2.63
3.70	.27	5084.50	1.306	2.63
3.75	.27	5084.47	1.297	2.62
3.80	.27	5084.44	1.287	2.61
3.85	.26	5084.42	1.277	2.61
3.90	.26	5084.39	1.268	2.60
3.95	.26	5084.36	1.258	2.59
4.00	.25	5084.33	1.248	2.59
4.05	.25	5084.30	1.239	2.58
4.10	.25	5084.27	1.229	2.57
4.15	.25	5084.24	1.220	2.57
4.20	.24	5084.22	1.210	2.56
4.25	.24	5084.19	1.200	2.55
4.30	.24	5084.16	1.191	2.55
4.35	.24	5084.13	1.181	2.54
4.40	.24	5084.10	1.172	2.53
4.45	.24	5084.07	1.162	2.53
4.50	.24	5084.05	1.153	2.52
4.55	.24	5084.02	1.144	2.51
4.60	.24	5083.99	1.134	2.51
4.65	.24	5083.96	1.125	2.50
4.70	.24	5083.92	1.115	2.49
4.75	.24	5083.89	1.106	2.48
4.80	.24	5083.86	1.097	2.47
4.85	.25	5083.83	1.088	2.46
4.90	.25	5083.80	1.079	2.45
4.95	.25	5083.76	1.070	2.45
5.00	.25	5083.73	1.060	2.44
5.05	.25	5083.70	1.051	2.43
5.10	.25	5083.67	1.042	2.42
5.15	.26	5083.64	1.034	2.41
5.20	.26	5083.61	1.025	2.40
5.25	.26	5083.57	1.016	2.40
5.30	.26	5083.54	1.007	2.39
5.35	.26	5083.51	.998	2.38
5.40	.26	5083.48	.990	2.37
5.45	.27	5083.45	.981	2.36
5.50	.27	5083.42	.972	2.35
5.55	.27	5083.39	.964	2.35

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
5.60	.28	5083.36	.955	2.34
5.65	.28	5083.33	.947	2.33
5.70	.28	5083.30	.938	2.32
5.75	.28	5083.27	.930	2.31
5.80	.29	5083.24	.921	2.31
5.85	.29	5083.21	.913	2.30

5.90	.29	5083.19	.905	2.29
5.95	.30	5083.16	.897	2.28
6.00	.30	5083.13	.888	2.27
6.05	.30	5083.10	.880	2.27
6.10	.30	5083.07	.872	2.26
6.15	.30	5083.04	.864	2.25
6.20	.30	5083.01	.856	2.24
6.25	.31	5082.99	.848	2.24
6.30	.31	5082.96	.840	2.23
6.35	.30	5082.93	.832	2.22
6.40	.30	5082.90	.824	2.21
6.45	.30	5082.87	.816	2.21
6.50	.30	5082.85	.808	2.20
6.55	.30	5082.82	.801	2.19
6.60	.30	5082.79	.793	2.18
6.65	.30	5082.76	.785	2.18
6.70	.30	5082.74	.777	2.17
6.75	.30	5082.71	.770	2.16
6.80	.29	5082.68	.762	2.15
6.85	.29	5082.66	.754	2.15
6.90	.29	5082.63	.746	2.14
6.95	.29	5082.60	.739	2.13
7.00	.29	5082.58	.731	2.13
7.05	.29	5082.55	.724	2.12
7.10	.29	5082.52	.716	2.11
7.15	.29	5082.50	.709	2.10
7.20	.29	5082.47	.701	2.10
7.25	.29	5082.44	.694	2.09
7.30	.29	5082.42	.686	2.08
7.35	.29	5082.39	.679	2.08
7.40	.28	5082.37	.671	2.07
7.45	.28	5082.34	.664	2.06
7.50	.28	5082.31	.657	2.05
7.55	.28	5082.29	.649	2.05
7.60	.28	5082.26	.642	2.04
7.65	.28	5082.24	.635	2.03
7.70	.28	5082.21	.628	2.03
7.75	.28	5082.19	.620	2.02
7.80	.27	5082.16	.613	2.01
7.85	.28	5082.14	.606	2.01
7.90	.28	5082.11	.599	2.00
7.95	.27	5082.09	.592	1.99
8.00	.27	5082.06	.585	1.99
8.05	.27	5082.04	.578	1.98
8.10	.27	5082.01	.570	1.97
8.15	.27	5081.98	.563	1.96
8.20	.27	5081.95	.556	1.95
8.25	.27	5081.92	.550	1.94
8.30	.27	5081.89	.543	1.93
8.35	.27	5081.85	.536	1.91

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
8.40	.26	5081.82	.529	1.90
8.45	.26	5081.79	.522	1.89
8.50	.26	5081.76	.516	1.88
8.55	.26	5081.73	.509	1.87
8.60	.26	5081.70	.502	1.85
8.65	.26	5081.67	.496	1.84
8.70	.26	5081.64	.489	1.83
8.75	.26	5081.60	.483	1.82
8.80	.26	5081.57	.476	1.81
8.85	.26	5081.54	.470	1.80
8.90	.26	5081.51	.464	1.79
8.95	.26	5081.49	.457	1.77
9.00	.25	5081.46	.451	1.76
9.05	.25	5081.43	.445	1.75
9.10	.25	5081.40	.439	1.74
9.15	.25	5081.37	.433	1.73
9.20	.25	5081.34	.427	1.72
9.25	.25	5081.31	.420	1.71
9.30	.25	5081.28	.414	1.70
9.35	.25	5081.26	.409	1.69
9.40	.25	5081.23	.403	1.68
9.45	.25	5081.20	.397	1.67
9.50	.25	5081.17	.391	1.66
9.55	.25	5081.15	.385	1.65
9.60	.25	5081.12	.379	1.64
9.65	.24	5081.09	.374	1.63
9.70	.25	5081.07	.368	1.61
9.75	.24	5081.04	.362	1.60
9.80	.24	5081.01	.357	1.59
9.85	.25	5080.99	.351	1.58
9.90	.24	5080.96	.346	1.58
9.95	.24	5080.94	.340	1.57
10.00	.24	5080.91	.335	1.56
10.05	.24	5080.88	.329	1.55
10.10	.24	5080.86	.324	1.54
10.15	.24	5080.83	.319	1.53
10.20	.24	5080.81	.313	1.52
10.25	.24	5080.78	.308	1.51
10.30	.24	5080.76	.303	1.50
10.35	.24	5080.73	.298	1.49
10.40	.23	5080.71	.292	1.48
10.45	.23	5080.69	.287	1.47
10.50	.23	5080.66	.282	1.46
10.55	.23	5080.64	.277	1.45
10.60	.23	5080.62	.272	1.44
10.65	.23	5080.59	.267	1.43
10.70	.23	5080.57	.262	1.43
10.75	.23	5080.55	.257	1.42
10.80	.23	5080.52	.252	1.41
10.85	.23	5080.50	.248	1.40
10.90	.23	5080.48	.243	1.39
10.95	.23	5080.46	.238	1.38
11.00	.23	5080.43	.233	1.37
11.05	.23	5080.41	.228	1.37

11.10	.23	5080.39	.224	1.36
11.15	.23	5080.37	.219	1.35

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
11.20	.23	5080.35	.214	1.34
11.25	.23	5080.32	.210	1.33
11.30	.23	5080.30	.205	1.32
11.35	.22	5080.28	.201	1.32
11.40	.22	5080.26	.196	1.31
11.45	.22	5080.24	.192	1.30
11.50	.22	5080.22	.187	1.29
11.55	.22	5080.20	.183	1.28
11.60	.22	5080.18	.179	1.28
11.65	.22	5080.16	.174	1.27
11.70	.22	5080.14	.170	1.26
11.75	.22	5080.12	.166	1.25
11.80	.22	5080.10	.161	1.25
11.85	.22	5080.08	.157	1.24
11.90	.22	5080.06	.153	1.23
11.95	.22	5080.04	.149	1.22
12.00	.22	5080.02	.145	1.22
12.05	.22	5080.00	.141	1.21
12.10	.22	5079.97	.136	1.19
12.15	.21	5079.95	.132	1.18
12.20	.21	5079.93	.128	1.17
12.25	.21	5079.90	.125	1.15
12.30	.21	5079.88	.121	1.14
12.35	.21	5079.86	.117	1.13
12.40	.21	5079.84	.113	1.12
12.45	.21	5079.81	.109	1.10
12.50	.21	5079.79	.106	1.09
12.55	.21	5079.77	.102	1.08
12.60	.21	5079.75	.099	1.07
12.65	.21	5079.73	.095	1.05
12.70	.21	5079.71	.092	1.04
12.75	.21	5079.69	.088	1.03
12.80	.21	5079.67	.085	1.02
12.85	.21	5079.65	.082	1.01
12.90	.21	5079.63	.078	1.00
12.95	.21	5079.61	.075	.98
13.00	.21	5079.59	.072	.97
13.05	.21	5079.57	.069	.96
13.10	.21	5079.56	.066	.95
13.15	.20	5079.54	.063	.94
13.20	.20	5079.52	.059	.93
13.25	.20	5079.50	.057	.92
13.30	.20	5079.47	.054	.88
13.35	.21	5079.44	.051	.84
13.40	.20	5079.40	.048	.80
13.45	.20	5079.38	.046	.76
13.50	.20	5079.35	.044	.72
13.55	.20	5079.32	.042	.69
13.60	.20	5079.30	.040	.65
13.65	.20	5079.27	.038	.62
13.70	.20	5079.25	.036	.60
13.75	.20	5079.23	.035	.57
13.80	.20	5079.22	.033	.55
13.85	.20	5079.20	.032	.52
13.90	.20	5079.18	.031	.50
13.95	.20	5079.17	.029	.48

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
14.00	.20	5079.15	.028	.46
14.05	.20	5079.14	.027	.45
14.10	.20	5079.13	.026	.43
14.15	.20	5079.12	.025	.41
14.20	.19	5079.10	.024	.40
14.25	.19	5079.09	.024	.39
14.30	.19	5079.08	.023	.37
14.35	.19	5079.08	.022	.36
14.40	.20	5079.07	.021	.35
14.45	.20	5079.06	.021	.34
14.50	.19	5079.05	.020	.33
14.55	.19	5079.04	.020	.32
14.60	.19	5079.04	.019	.31
14.65	.19	5079.03	.019	.31
14.70	.19	5079.03	.018	.30
14.75	.19	5079.02	.018	.29
14.80	.19	5079.02	.017	.28
14.85	.19	5079.01	.017	.28
14.90	.19	5079.01	.017	.27
14.95	.19	5079.00	.016	.27
15.00	.19	5079.00	.016	.26
15.05	.19	5079.00	.016	.26
15.10	.19	5078.99	.015	.25
15.15	.19	5078.99	.015	.25
15.20	.19	5078.99	.015	.24
15.25	.19	5078.98	.015	.24
15.30	.19	5078.98	.014	.24
15.35	.19	5078.98	.014	.23
15.40	.18	5078.98	.014	.23
15.45	.19	5078.97	.014	.23
15.50	.19	5078.97	.014	.22
15.55	.18	5078.97	.014	.22
15.60	.19	5078.97	.013	.22
15.65	.19	5078.97	.013	.22
15.70	.18	5078.96	.013	.22
15.75	.18	5078.96	.013	.21
15.80	.18	5078.96	.013	.21
15.85	.18	5078.96	.013	.21
15.90	.18	5078.96	.013	.21
15.95	.18	5078.96	.013	.21
16.00	.18	5078.96	.012	.20
16.05	.18	5078.95	.012	.20

16.10	.18	5078.95	.012	.20
16.15	.18	5078.95	.012	.20
16.20	.18	5078.95	.012	.20
16.25	.18	5078.95	.012	.20
16.30	.18	5078.95	.012	.20
16.35	.18	5078.95	.012	.19
16.40	.18	5078.95	.012	.19
16.45	.18	5078.95	.012	.19
16.50	.18	5078.95	.012	.19
16.55	.18	5078.94	.012	.19
16.60	.18	5078.94	.012	.19
16.65	.18	5078.94	.012	.19
16.70	.18	5078.94	.011	.19
16.75	.17	5078.94	.011	.19

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
16.80	.17	5078.94	.011	.19
16.85	.18	5078.94	.011	.19
16.90	.18	5078.94	.011	.19
16.95	.18	5078.94	.011	.18
17.00	.17	5078.94	.011	.18
17.05	.17	5078.94	.011	.18
17.10	.17	5078.94	.011	.18
17.15	.17	5078.94	.011	.18
17.20	.17	5078.94	.011	.18
17.25	.17	5078.94	.011	.18
17.30	.17	5078.94	.011	.18
17.35	.17	5078.94	.011	.18
17.40	.17	5078.94	.011	.18
17.45	.17	5078.94	.011	.18
17.50	.17	5078.94	.011	.18
17.55	.17	5078.94	.011	.18
17.60	.17	5078.94	.011	.18
17.65	.17	5078.93	.011	.18
17.70	.17	5078.93	.011	.18
17.75	.17	5078.93	.011	.18
17.80	.17	5078.93	.011	.18
17.85	.17	5078.93	.011	.17
17.90	.17	5078.93	.011	.17
17.95	.17	5078.93	.011	.17
18.00	.17	5078.93	.011	.17
18.05	.17	5078.93	.011	.17
18.10	.17	5078.93	.011	.17
18.15	.17	5078.93	.011	.17
18.20	.16	5078.93	.010	.17
18.25	.16	5078.93	.010	.17
18.30	.17	5078.93	.010	.17
18.35	.17	5078.93	.010	.17
18.40	.16	5078.93	.010	.17
18.45	.16	5078.93	.010	.17
18.50	.17	5078.93	.010	.17
18.55	.17	5078.93	.010	.17
18.60	.16	5078.93	.010	.17
18.65	.16	5078.93	.010	.17
18.70	.16	5078.93	.010	.17
18.75	.16	5078.93	.010	.17
18.80	.16	5078.93	.010	.17
18.85	.16	5078.93	.010	.17
18.90	.17	5078.93	.010	.17
18.95	.17	5078.93	.010	.17
19.00	.16	5078.93	.010	.17
19.05	.16	5078.93	.010	.17
19.10	.16	5078.93	.010	.17
19.15	.16	5078.93	.010	.17
19.20	.16	5078.93	.010	.17
19.25	.16	5078.93	.010	.17
19.30	.16	5078.93	.010	.16
19.35	.16	5078.92	.010	.16
19.40	.16	5078.92	.010	.16
19.45	.16	5078.92	.010	.16
19.50	.16	5078.92	.010	.16
19.55	.16	5078.92	.010	.16

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
19.60	.16	5078.92	.010	.16
19.65	.16	5078.92	.010	.16
19.70	.16	5078.92	.010	.16
19.75	.16	5078.92	.010	.16
19.80	.16	5078.92	.010	.16
19.85	.16	5078.92	.010	.16
19.90	.16	5078.92	.010	.16
19.95	.15	5078.92	.010	.16
20.00	.16	5078.92	.010	.16
20.05	.16	5078.92	.010	.16
20.10	.16	5078.92	.010	.16
20.15	.15	5078.92	.010	.16
20.20	.16	5078.92	.010	.16
20.25	.15	5078.92	.010	.16
20.30	.15	5078.92	.010	.16
20.35	.16	5078.92	.010	.16
20.40	.15	5078.92	.010	.16
20.45	.15	5078.92	.010	.16
20.50	.15	5078.92	.010	.16
20.55	.15	5078.92	.010	.16
20.60	.15	5078.92	.010	.16
20.65	.15	5078.92	.010	.16
20.70	.15	5078.92	.010	.16
20.75	.15	5078.92	.009	.16
20.80	.15	5078.92	.009	.16
20.85	.15	5078.92	.009	.16
20.90	.15	5078.92	.009	.16
20.95	.15	5078.92	.009	.15
21.00	.15	5078.92	.009	.15
21.05	.15	5078.92	.009	.15

21.10	.15	5078.92	.009	.15
21.15	.15	5078.92	.009	.15
21.20	.15	5078.92	.009	.15
21.25	.15	5078.92	.009	.15
21.30	.15	5078.92	.009	.15
21.35	.15	5078.92	.009	.15
21.40	.15	5078.92	.009	.15
21.45	.15	5078.92	.009	.15
21.50	.15	5078.92	.009	.15
21.55	.15	5078.92	.009	.15
21.60	.15	5078.92	.009	.15
21.65	.15	5078.92	.009	.15
21.70	.15	5078.92	.009	.15
21.75	.15	5078.91	.009	.15
21.80	.14	5078.91	.009	.15
21.85	.14	5078.91	.009	.15
21.90	.15	5078.91	.009	.15
21.95	.15	5078.91	.009	.15
22.00	.15	5078.91	.009	.15
22.05	.14	5078.91	.009	.15
22.10	.14	5078.91	.009	.15
22.15	.14	5078.91	.009	.15
22.20	.15	5078.91	.009	.15
22.25	.15	5078.91	.009	.15
22.30	.15	5078.91	.009	.15
22.35	.14	5078.91	.009	.15

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
22.40	.14	5078.91	.009	.15
22.45	.14	5078.91	.009	.15
22.50	.14	5078.91	.009	.15
22.55	.14	5078.91	.009	.15
22.60	.14	5078.91	.009	.15
22.65	.14	5078.91	.009	.15
22.70	.14	5078.91	.009	.15
22.75	.14	5078.91	.009	.15
22.80	.14	5078.91	.009	.15
22.85	.14	5078.91	.009	.15
22.90	.14	5078.91	.009	.15
22.95	.14	5078.91	.009	.15
23.00	.14	5078.91	.009	.15
23.05	.14	5078.91	.009	.14
23.10	.14	5078.91	.009	.14
23.15	.14	5078.91	.009	.14
23.20	.14	5078.91	.009	.14
23.25	.14	5078.91	.009	.14
23.30	.14	5078.91	.009	.14
23.35	.14	5078.91	.009	.14
23.40	.14	5078.91	.009	.14
23.45	.14	5078.91	.009	.14
23.50	.14	5078.91	.009	.14
23.55	.14	5078.91	.009	.14
23.60	.14	5078.91	.009	.14
23.65	.14	5078.91	.009	.14
23.70	.14	5078.91	.009	.14
23.75	.14	5078.91	.009	.14
23.80	.14	5078.91	.009	.14
23.85	.14	5078.91	.009	.14
23.90	.14	5078.91	.009	.14
23.95	.14	5078.91	.009	.14
24.00	.14	5078.91	.009	.14
24.05	.13	5078.91	.009	.14
24.10	.10	5078.91	.008	.14
24.15	.06	5078.90	.008	.13
24.20	.04	5078.90	.008	.13
24.25	.02	5078.89	.007	.12
24.30	.02	5078.89	.007	.12
24.35	.01	5078.88	.007	.11
24.40	.01	5078.88	.006	.10
24.45	.01	5078.87	.006	.10
24.50	.01	5078.87	.006	.09
24.55	.01	5078.86	.005	.08
24.60	.00	5078.86	.005	.08
24.65	.00	5078.86	.005	.07
24.70	.00	5078.85	.004	.07
24.75	.00	5078.85	.004	.07
24.80	.00	5078.85	.004	.06
24.85	.00	5078.84	.003	.06
24.90	.00	5078.84	.003	.05
24.95	.00	5078.84	.003	.05
25.00	.00	5078.84	.003	.05
25.05	.00	5078.83	.003	.04
25.10	.00	5078.83	.002	.04
25.15	.00	5078.83	.002	.04

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
25.20	.00	5078.83	.002	.04
25.25	.00	5078.83	.002	.03
25.30	.00	5078.82	.002	.03
25.35	.00	5078.82	.002	.03
25.40	.00	5078.82	.002	.03
25.45	.00	5078.82	.002	.03
25.50	.00	5078.82	.001	.02
25.55	.00	5078.82	.001	.02
25.60	.00	5078.82	.001	.02
25.65	.00	5078.81	.001	.02
25.70	.00	5078.81	.001	.02
25.75	.00	5078.81	.001	.02
25.80	.00	5078.81	.001	.02
25.85	.00	5078.81	.001	.01
25.90	.00	5078.81	.001	.01
25.95	.00	5078.81	.001	.01
26.00	.00	5078.81	.001	.01
26.05	.00	5078.81	.001	.01

```
    26.10        .00   5078.81       .001        .01
    26.15        .00   5078.81       .001        .01
    26.20        .00   5078.81       .001        .01
    26.25        .00   5078.81       .001        .01
    26.30        .00   5078.81       .000        .01
    26.35        .00   5078.81       .000        .01
    26.40        .00   5078.81       .000        .01
    26.45        .00   5078.80       .000        .01
    26.50        .00   5078.80       .000        .01
    26.55        .00   5078.80       .000        .01
    26.60        .00   5078.80       .000        .01
    26.65        .00   5078.80       .000        .00
 PEAK DISCHARGE =         2.779 CFS - PEAK OCCURS AT HOUR    2.30
 MAXIMUM WATER SURFACE ELEVATION =     5085.160
 MAXIMUM STORAGE =        1.5296 AC-FT       INCREMENTAL TIME=     .050000HRS

*
PRINT HYD            ID=8      CODE=1

                                     OUTFLOW HYDROGRAPH REACH     8.00

    RUNOFF VOLUME =      2.14210 INCHES      =        2.1635 ACRE-FEET
    PEAK DISCHARGE RATE =        2.78 CFS   AT    2.300 HOURS   BASIN AREA =   .0189 SQ. MI.


*
************ BASIN A-5
*
*S BASIN A-5
*
COMPUTE NM HYD       ID=9  HYD NO=9 DRAINAGE AREA=.0008256 SQ MI
                     PERCENT A=0 PERCENT B=58 PERCENT C=41 D=1
                     TP=.133 HRS
                     MASSRAINFALL=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .32669E-01CFS   UNIT VOLUME =     .8998        B =    526.28        P60 = 2.0100
    AREA =      .000008 SQ MI     IA =     .10000 INCHES     INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

    K =   .121608HR    TP =   .133000HR    K/TP RATIO =   .914347     SHAPE CONSTANT, N =  3.872436
    UNIT PEAK =   2.1298     CFS   UNIT VOLUME =     .9948        B =    346.57        P60 = 2.0100
    AREA =      .000817 SQ MI     IA =     .43788 INCHES     INF =   1.07606 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000
*
*
PRINT HYD            ID=9  CODE=1

                                     OUTFLOW HYDROGRAPH REACH     9.00

    RUNOFF VOLUME =       .92306 INCHES      =         .0406 ACRE-FEET
    PEAK DISCHARGE RATE =        1.41 CFS   AT    1.500 HOURS   BASIN AREA =   .0008 SQ. MI.


*
************ BASIN A-6
*
*S BASIN A-6
*
COMPUTE NM HYD       ID=10 HYD NO=10 DRAINAGE AREA=.0002375 SQ MI
                     PERCENT A=0 PERCENT B=94 PERCENT C=6 D=0
                     TP=.133 HRS
                     MASSRAINFALL=-1

    K =   .130315HR    TP =   .133000HR    K/TP RATIO =   .979813     SHAPE CONSTANT, N =  3.604196
    UNIT PEAK =   .58546     CFS   UNIT VOLUME =     .9776        B =    327.86        P60 = 2.0100
    AREA =      .000238 SQ MI     IA =     .49100 INCHES     INF =   1.22480 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000
*
*
PRINT HYD            ID=10 CODE=1

                                     OUTFLOW HYDROGRAPH REACH    10.00

    RUNOFF VOLUME =       .79565 INCHES      =         .0101 ACRE-FEET
    PEAK DISCHARGE RATE =         .36 CFS   AT    1.500 HOURS   BASIN AREA =   .0002 SQ. MI.


*
************ BASIN B-1
*
*S BASIN B-1
*
COMPUTE NM HYD       ID=11 HYD NO=11 DRAINAGE AREA=.0004688 SQ MI
                     PERCENT A=0 PERCENT B=0 PERCENT C=100 PERCENT D=0
                     TP=.133 HRS
                     MASSRAINFALL=-1

    K =   .107204HR    TP =   .133000HR    K/TP RATIO =   .806046     SHAPE CONSTANT, N =  4.440701
    UNIT PEAK =   1.3519     CFS   UNIT VOLUME =     .9924        B =    383.55        P60 = 2.0100
    AREA =      .000469 SQ MI     IA =     .35000 INCHES     INF =    .83000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000
*
*
PRINT HYD            ID=11 CODE=1

                                     OUTFLOW HYDROGRAPH REACH    11.00
```

```
    RUNOFF VOLUME =      1.12613 INCHES      =         .0282 ACRE-FEET
    PEAK DISCHARGE RATE =        .94 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


*
*************************** End Program Run ***************************
*
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 13:32:14
```

APPENDIX D -

CALCULATIONS FOR ORIFICE AND WEIR FLOW FROM DETENTION POND

APPENDIX D
CALCULATIONS FOR ORIFICE AND WEIR FLOW FROM THE DETENTION POND

Stage in Pond (ft, NGVD)	Pond Invert (ft, NGVD)	Orifice/Weir Head (ft)	Orifice/Weir Coefficient	Area of 5 3/8" Square Opening (sq.ft.)	Outflow from Detention Pond* (cfs)
5078.8	5078.8	0.00	0.7	0.2	0.0
5079.5	5078.8	0.70	0.7	0.2	0.9
5080.0	5078.8	1.20	0.7	0.2	1.2
5082.0	5078.8	3.20	0.7	0.2	2.0
5084.0	5078.8	5.20	0.7	0.2	2.5
5085.25	5078.8	6.45	0.7	0.2	2.8
5086.5	5078.8	7.70/1.25	0.7/3.0	0.2	65.9

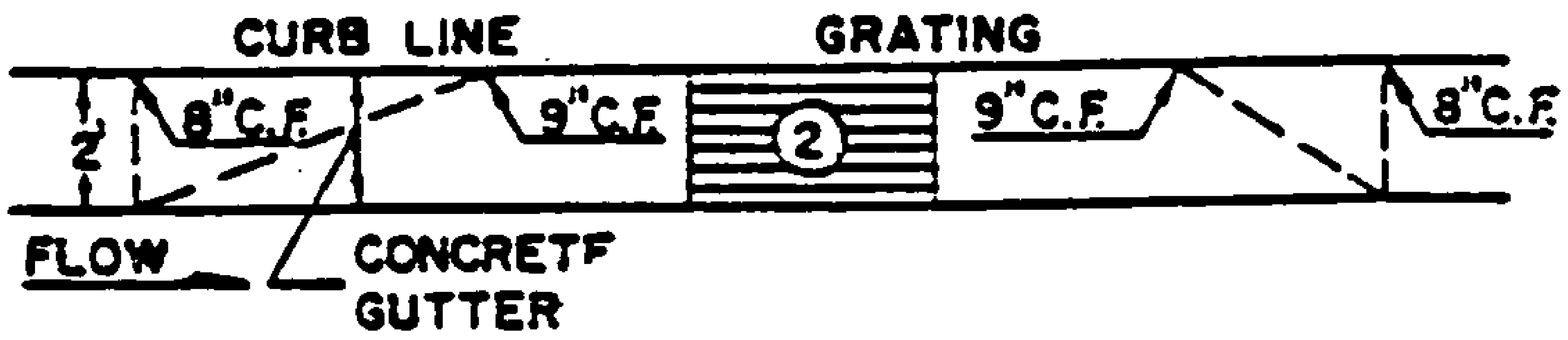
* Includes orifice and weir flow. The orifice flow from the detention pond is calculated using the orifice equation $Q=CA(2*g*H)^{0.5}$. The weir flow from the detention pond is calculated using the weir equation $Q=CL(H)^{1.5}$.

APPENDIX E -

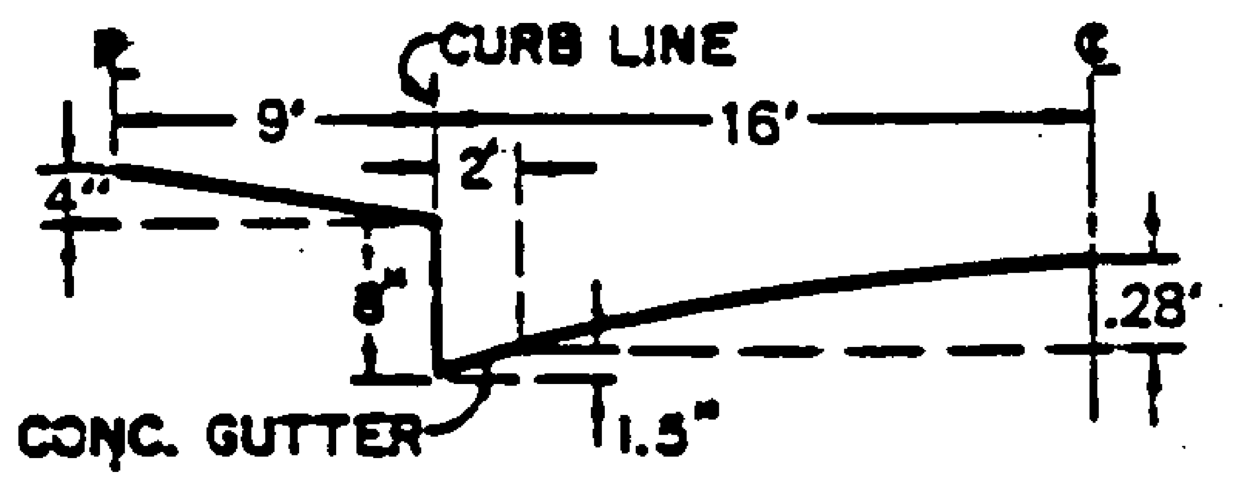
CALCULATIONS FOR EASTERN INLET AND CONNECTOR PIPE

- Appendix E – Capacity of Eastern Inlet in University Blvd.

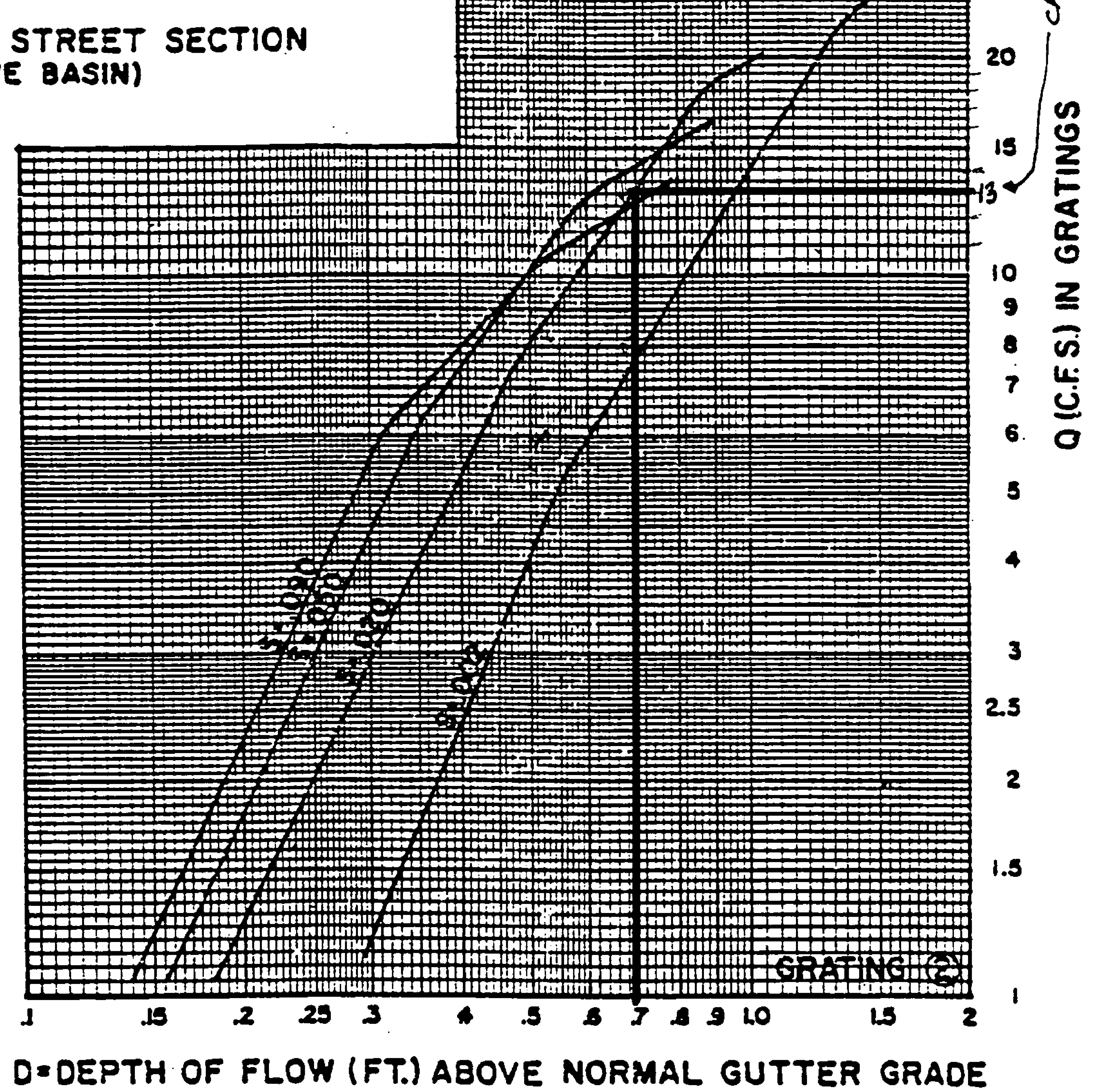
GRATING CAPACITIES FOR TYPE "A" , "C" and "D"



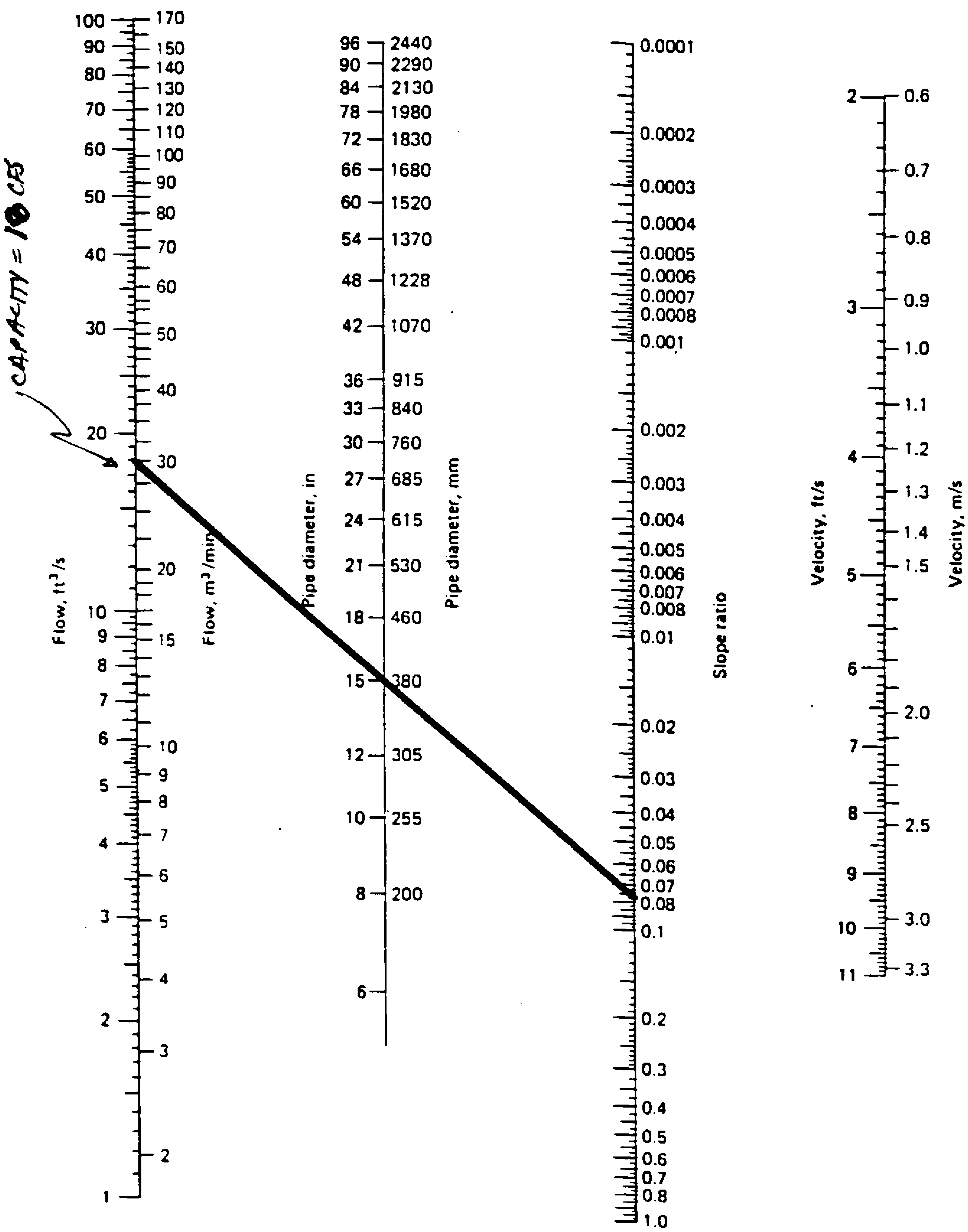
GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



APPENDIX E – CAPACITY OF 15" CONNECTOR PIPE TO EASTERN INLET



Nomogram for solution of Manning's equation for circular pipes flowing full (n = 0.013).

APPENDIX F -

PROPOSED PARKING LOT INLET AND STORM DRAIN CALCULATIONS

APPENDIX F

ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS 401 San Pedro, NE., Albuquerque, N.M. 87108 Telephone (505) 265-6631	Project UNM NORTH CAMPUS Sheet 1 of 5 DROP INLET CALCS. / STORM DR. CAP. Job No. By SPK Chk'd Date 5/24/94

DROP INLET CALCULATIONS

- 100 YEAR 6 HOUR STORM CONTROLS
- CURB AND GRATE INLET CAPACITIES BASED ON ORIFICE EQ.
- SEE "DRAINAGE AND SITE DETAILS" FOR INLET DETAILS
- TOTAL INLET CAPACITY MULTIPLIED BY REDUCTION FACTOR OF 0.5 TO SIMULATE CLOGGING

5 = ANALYSIS POINT #5 AS SHOWN ON "GRADING AND DRAINAGE PLAN"

STORM DRAIN CAPACITY

- 100 YEAR 6 HOUR STORM CONTROLS
- WORSE CASE WHEN POND @ 100 YEAR LEVEL
- USE BERNOULLI EQ. TO SOLVE CAPACITY OF PROPOSED STORM DRAINS.

ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS 401 San Pedro, NE., Albuquerque, N.M. 87108 Telephone (505) 265-6631	Project UNM NORTH CAMPUS DROP INLET CALCS. Sheet 2 of 5 Job No. 683 By SPK Chk'd Date 5/24/94

(5) Q_{100} = 16.1 CFS (BASIN A-2)

CURB & GRATE CAPACITIES BASED ON ORIFICE EQ.

DEPTH OF PONDING = 0.83 FEET @ BOTTOM CURB OPENING

AREA OF CURB INLET = (0.42 FT)(2.95 FT.) = 1.24 SQ FT.

CURB INLET CAPACITY $= CA\sqrt{2gH} = (0.6)(1.24)\sqrt{(2)(32.2)(0.625')}$

$= 4.7$ CFS

AREA OF GRATE = TOTAL AREA − AREA OF STEEL

= 6.14 SQFT − 2.05 SQFT

= 4.09 SQ.FT.

GRATE INLET CAPACITY $= CA\sqrt{2gH} = (0.6)(4.09\text{ SQ.FT.})\sqrt{(2)(32.2)(0.65')}$

$= 15.8$ CFS

TOTAL CAPACITY OF INLET = (4.7 + 15.8)(0.5) = 10.3 CFS

REMAINING FLOW = (2)(10.3 CFS) − 16.1 CFS = 0 CFS

THEREFORE, TWO SINGLE CURB/GRATE INLETS CAN HANDLE Q_{100} = 16.1 CFS.

ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS 401 San Pedro, NE., Albuquerque, N.M. 87108 Telephone (505) 265-6631	Project UNM NORTH CAMPUS Sheet 3 of 5 DROP INLET CALCS. Job No. 683 By SPK Chk'd ______ Date 5/24/94

(7) $Q_{100} = 31.3$ CFS (BASIN A-4)

CURB & GRATE CAPACITIES BASED ON ORIFICE EQUATION

DEPTH OF PONDING = 0.83 FT. @ BOTTOM CURB OPENING

AREA OF CURB INLET = (0.42 FT)(2.95 FT) = 1.24 FT.SQ.

CURB INLET CAPACITY = $CA\sqrt{2gH} = (0.6)(1.24)\sqrt{(2)(32.2)(0.625)}$

$= 4.1$ CFS

AREA OF GRATE = TOTAL AREA − AREA STEEL

= 6.14 − 2.05 SQFT

= 4.09 SQFT

GRATE INLET CAPACITY = $CA\sqrt{2gH} = (0.6)(4.09)\sqrt{(2)(32.2)(0.65)}$

$= 15.8$ CFS

TOTAL CAPACITY OF INLET = $(4.1 + 15.8)(0.5) = 10.3$ CFS

REMAINING FLOW = (4)(10.3 CFS) − 31.3 CFS = 0 CFS

THEREFORE, TWO DOUBLE CURB/GRATE INLETS CAN HANDLE $Q_{100} = 31.3$ CFS.

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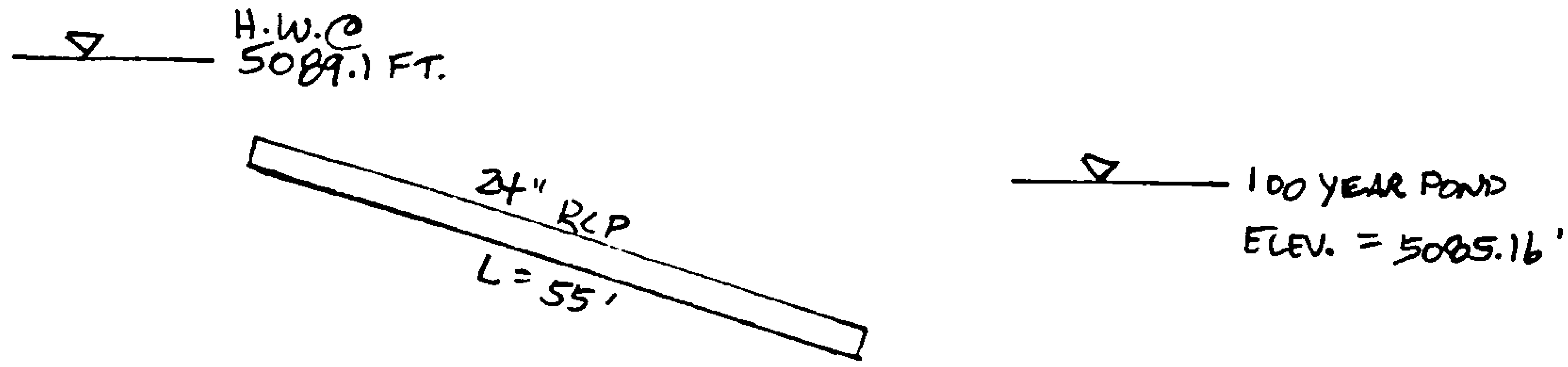
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project UNM NORTH CAMPUS — STORM DRAIN CAPACITY
Sheet 4 of 5
Job No. 683
By SPK Chk'd
Date 5/24/94

(5) TOP CURB



CAPACITY OF PROPOSED STORM DRAIN COMPUTED WITH BERNOULLI'S EQ.

$$\cancel{\frac{P_1}{\gamma}}^{0} + z_1 + \cancel{\frac{V_1^2}{2g}}^{0} = \cancel{\frac{P_2}{\gamma}}^{0} + z_2 + \cancel{\frac{V_2^2}{2g}}^{0} + \frac{V^2}{2g}\left(K_e + \frac{fL}{D} + K_E\right)$$

$$5089.1' = 5085.16' + \frac{V^2}{2g}\left(0.5 + \frac{(0.017)(55)}{(2')} + 1\right)$$

$$V^2 = 129$$

$$V = 11.4 \text{ FPS}$$

$$Q = VA = 35.7 \text{ CFS}$$

THEREFORE, NEW 24" RCP STORM DRAIN @ AP-5 CAN CONVEY $Q_{100} = 16.1$ CFS WHEN POND FULL (WORSE CASE).

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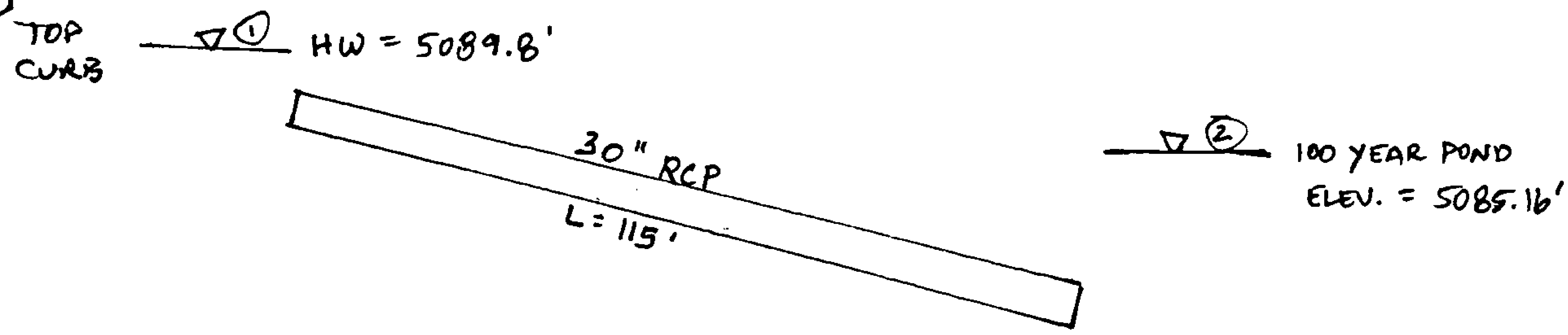
7



CAPACITY OF PROPOSED STORM DRAIN COMPUTED WITH BERNOULLI'S EQ.

$$\cancelto{0}{\frac{P_1}{\gamma}} + z_1 + \cancelto{0}{\frac{V_1^2}{2g}} = \cancelto{0}{\frac{P_2}{\gamma}} + z_2 + \cancelto{0}{\frac{V_2^2}{2g}} + \frac{V^2}{2g}\left(K_e + \frac{fL}{D} + K_E\right)$$

$$5089.8' = 5085.16' + \frac{V^2}{2g}\left(0.5 + \frac{0.016(115')}{(2.5')} + 1\right)$$

$$V^2 = 133.64$$

$$V = 11.6 \text{ FT/SEC}$$

$$Q = VA = (11.6 \text{ FPS})(4.91 \text{ SQ FT.}) = \underline{56.9 \text{ CFS}}$$

THEREFORE, NEW STORM DRAIN @ AP-7 CAN CONVEY Q_{100} = 31.3 CFS WHEN POND FULL (WORSE CASE).