



ORIGINAL
97286 COR2
- COG RLB -
City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 4, 1999

Bohannon Huston
Rick Beltramo, P.E.
7500 Jefferson NE
Albuquerque, N.M. 87109

RE: Gateway Center
Site Development Plan for Subdivision, J-15/D35
Submittal Date - May 3, 1999 (Stamped 4/27/99 by Rick Beltramo P.E.)

Dear Mr. Beltramo:

The referenced drainage Report is approved for Site Development Plan for Subdivision. Building permit approval will require the resolution of the attached letter by our contract engineer (Smith Engineering) dated 6/30/99.

If I can be of further assistance, please feel free to contact me at 924-3980.

Sincerely,

Fred J. Aguirre
City Hydrologist



June 30, 1999

Mr. Fred Aguirre, P.E. & Mr. John Murry P.E.
Hydrologist
City of Albuquerque
Public Works Department
P.O. Box 1293
Albuquerque, NM 87103

RE: Drainage Management Plan for the Gateway Center, April 1993 - Revised April 27, 1999.

Prepared by Bohannon-Huston, Inc. (stamped by Rick Beltramo, P.E. on 4-27-99)

Drainage File - J-15 / D 35
DRB - 97-466 EPC - Z-93-46

Approval Sought - Site Development for Subdivision Approval
Rough Grading Permit Approval
Work Order
Final Plat

Dear Mr. Aguirre & Mr. Murry,

Smith Engineering Company (SEC) is pleased to review the referenced submittal.
My review comments are as follows:

In general, the drainage plan adheres to the items discussed at the pre-design conference that took place March 11, 1993 (a copy is included as Appendix A of the report). The items from that conference are as follows:

1. "The target discharge for Phase 1 is 50% of the historic flow rate but in no case will the flow be greater than historic flow rate. The goal of this plan and future phases is to divert the maximum flows away from Martinez Town and into Lomas."
2. "This plan will need to address and resolve the potential for storm water flows entering Martinez Town through High St. from Lomas. This is warranted as a result of the increased flows to Lomas."

Comments with Regard to Reducing the developed condition flow rate to 50% of historic.

1. Table 2 (page 5) presents the historic discharges, post development discharges and the maximum allowable discharge ($=0.5(\text{historic discharge})$). The totals at the bottom indicate that



the post development discharge of 20.57 cfs is less than the total maximum allowable discharge of 25.61 cfs. Therefore, considering the totals, the drainage management plan complies. However, a few individual analysis points will have post development discharges slightly larger than the maximum allowable, although they remain lower than historic rates. I have noted these on Table 2 within the report and I will summarize those here:

<u>Analysis Point Number</u>	<u>Historic 100-yr. peak discharge</u>	<u>Post Development 100-yr. peak discharge</u>	<u>Maximum Allowable Developed Peak Discharge</u>	<u>Flowrate Reduction as compare to Historic</u>
	(cfs)	(cfs)	(cfs)	(cfs)
4	2.81	2.03	1.41	0.78
5	0.72	0.75	0.36	0.00
7, 8, 9	4.59	3.98	2.3	0.61
11	3.67	2.14	1.84	2.08
12	0.34	0.56	0.17	0.20

Summary of Total Q's from the Site.

Please see Table 3 in report. It appears that the master plan will reduce the total developed discharge from the entire site to less than the historic discharge.

Historic Peak Discharge	53.4 cfs
Developed Peak Discharge to Martinez Town	-20.57 cfs
= Allowable remaining	32.83 cfs

Total Discharge to Mountain Road	11.65 cfs
Total Discharge to Lomas Blvd.	16.55 cfs
Total Discharge to Both Roads	28.20 cfs

Therefore, 28.20 cfs is less than 32.83 cfs.

MINOR COMMENTS

1) Analysis Point #4 - It appears from the Grading Plan Sheets and the Grading and Drainage Plan Sheets that Basin D-4 should actually be included with Analysis Point #3 (Please see Table 2). However, the basin size and discharge is insignificant and will not affect the discharge constraints even if it is changed.

2) Table 2. A column or row that summed the post development Q's for the Analysis Points would be helpful. (Note that I have hand written the totals on Table 2 in the report)



3. Table 3 - As noted before with Table 2, Basin D-4 should actually be added as draining to Mountain Road. However, it is such a small basin it is nearly insignificant.
4. Page 10, last paragraph. The proposed water block on High Street is not shown or called out on the Grading Plan or the Drainage Plan Sheets. Please remember this must be included in the Construction Plans for the Site.
5. Appendix B - The drainage plan indicates buildings within basin I-4, however, the land treatment data presented does not reflect any Type D. Is this correct?
6. Appendix C - The hydraulics given for the drainage swales that are shown on the Grading/Drainage Plan indicate relatively steep slopes (5 to 10% slopes) and Manning's "n" values of 0.03. Most of the Q's are very small (0.3 to 1.7 cfs). However, Swale D-2 has a Q of 7.83 cfs. My concern is that due to the slopes, and success of the revegetation, these swales may have some erosion problems.

7. Exhibit 2 -

1. The discharge listed in the notes regarding the total discharge to Lomas Blvd and to Mountain Road do not match the discharges on Table 3.
2. The water block on High Street near Lomas Blvd. is not shown.

8. Exhibit 3 -

1. Due to the steep slopes and the importance of the swales on the western side of the development upstream of Martinez town, should the area and the limits of the proposed revegetation be indicated on the grading plan?
9. The location of the site with respect to a FEMA designated flood plain is not discussed, nor is an annotated FIRM map included.

CONCLUSION -

Other than the minor comments, the street hydraulics, storm drain hydraulics and general grading and drainage plan concepts appear to be reasonable.

Please call me if you need to discuss this further at telephone number 994-1902, or my FAX number is 994-1921.

Sincerely,

Pat Stovall, P.E.
Smith Engineering Company

O: \ 100 \ 198624b \ b39.doc

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GATEWAY CENTER ZONE ATLAS/DRNG. FILE # J-15/D35DRB #: 97-466 EPC #: Z-93-46 WORK ORDER #: N/A
*To Be Designated*LEGAL DESCRIPTION: TRACTS P, Q, & Y OF PLAT OF VARIOUS TRACTS OF LAND OF SOUTHWESTERN CONSTRUCTION CO.CITY ADDRESS: LOMAS & WOODWARDENGINEERING FIRM: BOHANNAN HUSTON, INC.ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109OWNER: SANDIA FOUNDATIONADDRESS: 2 WOODWARD CENTER

ARCHITECT: _____

ADDRESS: _____

SURVEYOR: BOHANNAN HUSTON, INC.

ADDRESS: _____

CONTRACTOR: _____

ADDRESS: _____

CONTACT: RICK BELTRAMOPHONE: (505) 823-1000CONTACT: RUSSEL D. HILLER, IIIPHONE: 242-2684

CONTACT: _____

PHONE: _____

CONTACT: DWAIN WEAVERPHONE: (505) 823-1000

CONTACT: _____

PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ FINAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEERS CERTIFICATION
☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

See Ltr 4/27/99
☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUBD. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☒ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ GRADING PERMIT APPROVAL (Rough)
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☒ OTHER REVISED PLAN APPROVAL

PRE-DESIGN MEETING:

☒ YES
☐ NO
☒ COPY PROVIDED

(SPECIFY) _____

RECEIVED
MAY 3 1999
HYDROLOGY SECTION

DATE SUBMITTED: April 26, 1999BY: RICK BELTRAMO

See Ltr 4/27/99
LTR

FINAL



January 24, 2000

Fred Aguirre, P.E.
Hydrology Division/PWD
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

fax 505.821.0892

Re: Gateway Development, Drainage Management Plan, April 1993 – Revised April 27, 1999
DRB# 97-466 EPC – Z-93-46 Drainage File: J-15 / D35

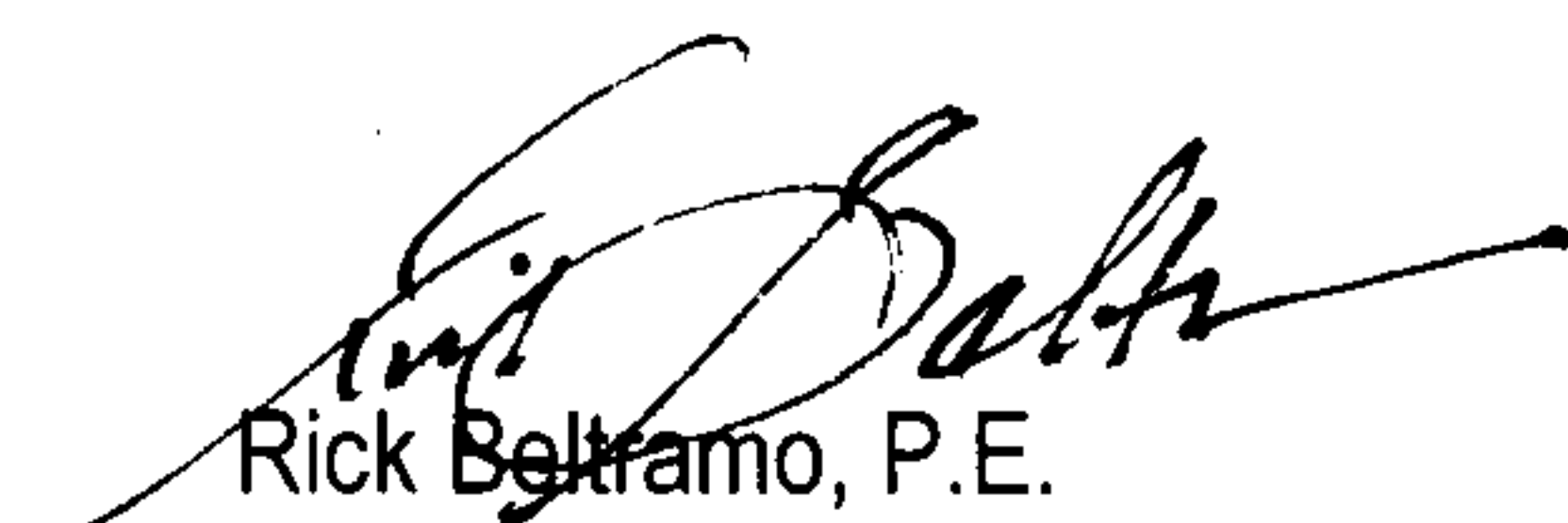
Dear Fred:

The Gateway Drainage Management Plan was reviewed by Smith Engineering on June 30, 1999. The report has now been revised to address the comments made in that review. This letter will discuss and clarify some of the revisions to the report.

- The review comments are included for your convenience.
- Comments 1, 2, and 3 requested that Table 2 be revised to include a column that sums the post development flows and includes Basin D-4 in analysis point 3. These modifications were made.
- Comment 5 asked whether the existing buildings in Basin I-4 should add impervious area to the analysis. The developed Basin I-4 is the same as the historic basin UD-10 and will remain unchanged when this site is developed. We reanalyzed this basin using 70% impervious area and modified both the historic and the proposed value. In the future, these buildings may be demolished and therefore the flow may decrease.
- Comment 6 expressed concern over the erosion of the slopes at the western boundary of the site. In order to prevent erosion of these slopes and as a part of the interim mass grading, we propose grading swales into the slope at 10' intervals. These swales will be designed to contain 1.7 times the 100-year flow. Therefore, the runoff will be captured before it can harm the slope. In addition, the slope will be reseeded with native grasses. A detail of this slope grading plan is included on the detail sheet.
- Comment 7 indicated that Table 3 did not match exhibit 2. Table 3 was modified to include Basin D-4 and to update the flows to match the rest of the report.
- Comment 8 requested that the limits of revegetation be included on the grading plan. See the Grading Plan.
- Finally, comment 9 requested the inclusion of a FIRM map. A FIRM map superimposed with the site plan is included on the Historic Drainage Plan for your review.

If we can provide additional information or answer any questions about the plan, please call me anytime.

Sincerely,
Bohannon Huston, Inc.


Rick Beltramo, P.E.
Community Development
and Planning Group



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sage Pointe Subdivison ZONE/ATLAS/DRNG, FILE#: M-9 021
DRB#: 99-21 EPC# WORK ORDER#:
LEGAL DESCRIPTION: Tracts 490 and 491, Town of Atrisco Grant, Unit 7
CITY ADDRESS:

ENGINEERING FIRM:	Mark Goodwin and Associates, PA	CONTACT:	Gregory J. Krenik, PE
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	(505) 828-2200
OWNER:	C & W Land Development	CONTACT:	Rex Wilson
ADDRESS:	P.O. Box 38, Espanola, NM 87532	PHONE:	(505) 450-2395
ARCHITECT:	N/A	CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	Aldrich Land Surveying	CONTACT:	Tim Aldrich
ADDRESS:	P.O. Box 30701, Albuquerque, NM 87190	PHONE:	(505) 884-1990
CONTACTOR:	N/A	CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT - *REVISED*
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL
☐ ENGINEER'S CERTIFICATION
☐ OTHER
☐ EASEMENT VACATION

PRE-DESIGN MEETING:

☐ YES
☒ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

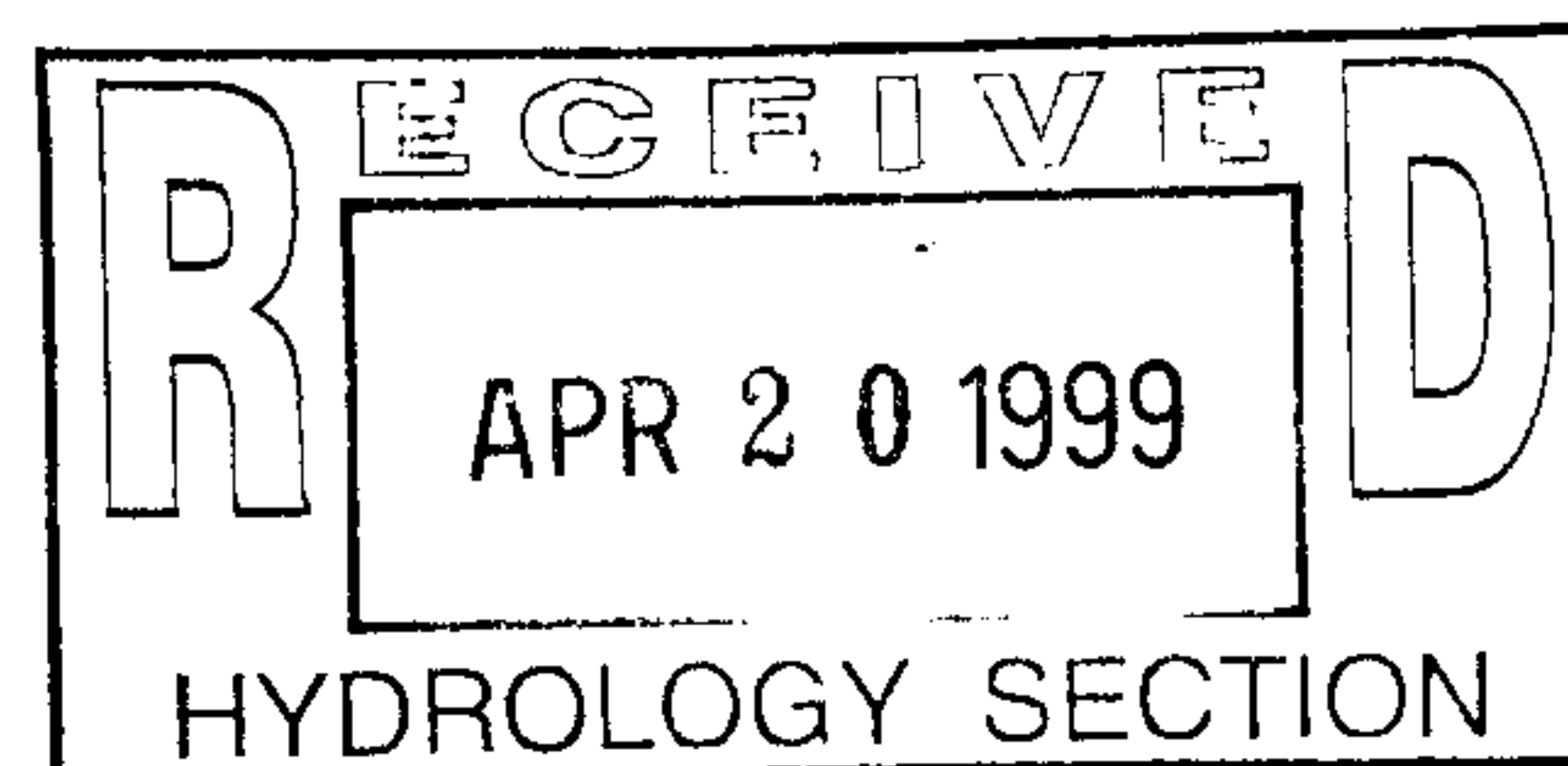
☐ SKETCH PLAT APPROVAL
☒ PRELIMINARY PLAT APPROVAL
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☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATION OF OCCUPANCY APPROVAL
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER
☐ RELEASE OF FINANCIAL GUARANTY

DATE SUBMITTED:

4-20-99

BY:

[Signature]
Gregory J. Krenik, PE





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 4, 1999

Bohannon Huston
Rick Beltramo, P.E.
7500 Jefferson NE
Albuquerque, N.M. 87109

RE: Gateway Center
Site Development Plan for Subdivision, J-15/D35
Submittal Date - May 3, 1999 (Stamped 4/27/99 by Rick Beltramo P.E.)

Dear Mr. Beltramo:

The referenced drainage Report is approved for Site Development Plan for Subdivision. Building permit approval will require the resolution of the attached letter by our contract engineer (Smith Engineering) dated 6/30/99.

If I can be of further assistance, please feel free to contact me at 924-3980.

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Fred J. Aguirre
City Hydrologist



June 30, 1999

Mr. Fred Aguirre, P.E. & Mr. John Murry P.E.
Hydrologist
City of Albuquerque
Public Works Department
P.O. Box 1293
Albuquerque, NM 87103

RE: Drainage Management Plan for the Gateway Center, April 1993 - Revised April 27, 1999.

Prepared by Bohannon-Huston, Inc. (stamped by Rick Beltramo, P.E. on 4-27-99)

**Drainage File - J-15 / D 35
DRB - 97-466 EPC - Z-93-46**

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 Work Order
 Final Plat**

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Please call me if you need to discuss this further at telephone number 994-1902, or my FAX number is 994-1921.

Sincerely,

Pat Stovall, P.E.

Smith Engineering Company

O: \ 100 \ 198624b \ b39.doc



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 9, 2000

Rick Beltramo, PE
Bohannon Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Gateway Center Drainage Management Plan
Engineer's Stamp dated 1-24-00, (J15/D35)

Dear Mr. Beltramo,

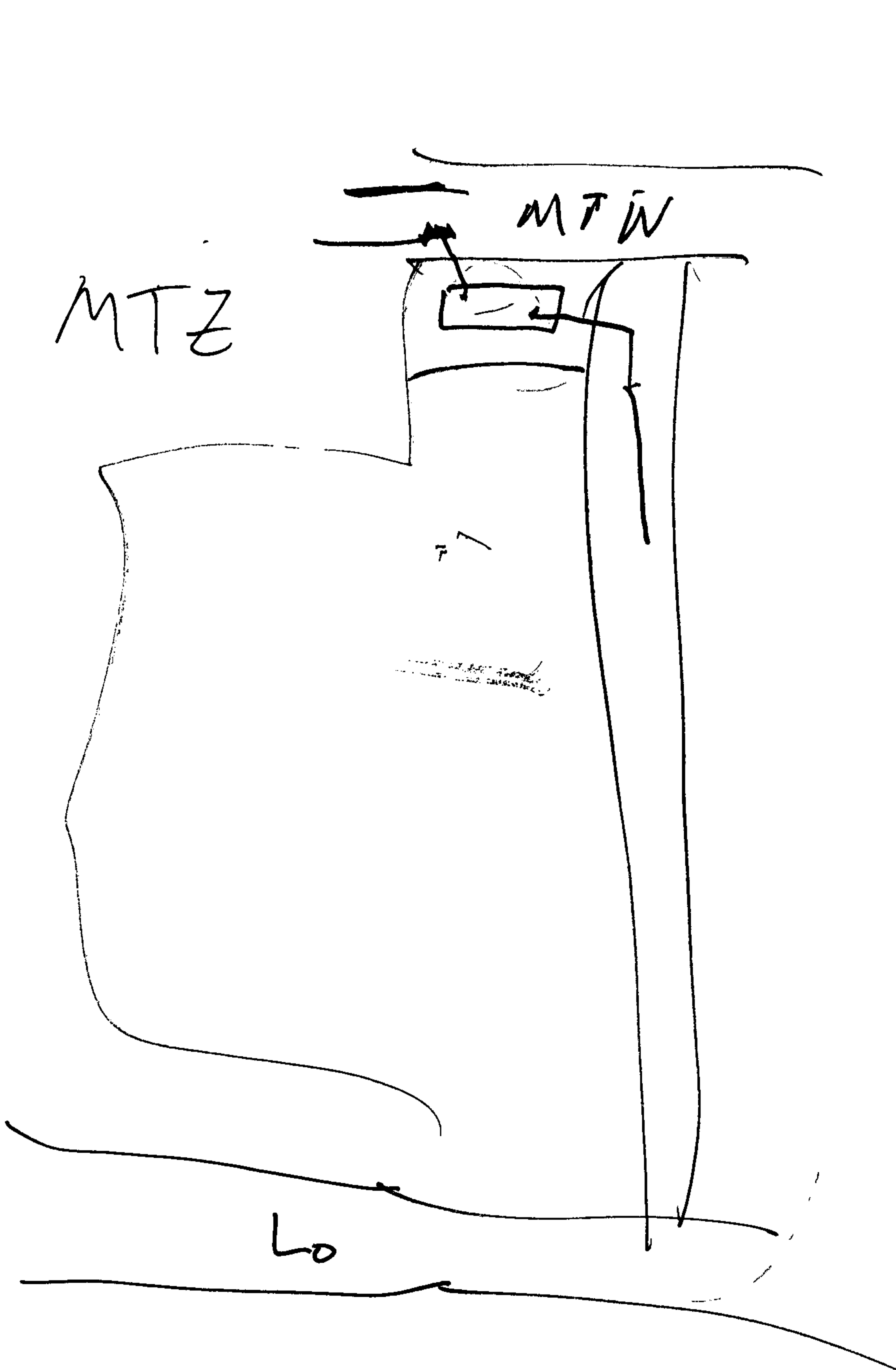
Based upon the information provided in your resubmittal dated 1-24-00, the above referenced Drainage Management Plan is approved. You are also approved for a Grading Permit. Please be aware that each lot will require a specific grading and drainage plan to obtain a building permit.

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

Sincerely,

Bradley L. Bingham
Bradley L. Bingham, PE
Hydrology Review Engineer

C: file





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 9, 2000

Rick Beltramo, PE
Bohannon Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Gateway Center Drainage Management Plan
Engineer's Stamp dated 1-24-00, (J15/D35)

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Sincerely,

Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

ALB. REPRO.

DEVELOPMENT & BUILDING SERVICE CENTER

ONE STOP

600 SECOND ST. N.W./2ND FLOOR

ATTENTION: BRAD

505-924-3900

Records Withdrawal Form

Project No. _____

Date: 07-12-02

Project Title: GATEWAY CENTER DMP (J15/D35)

a. File b. Mylars c. Redlines/Comments
d. Other RPT

Requested By: ISAACSON

Company

Phone No.: 268-8828

ARMAN, P.A. (ATTN: FRED ARMAN)

Comments: _____

1 - COPY (COMPLETE W/ PLATES)

Anticipated Return Date: _____

Receipt Acknowledged

I here by accept full responsibility for the security of the above noted records/plans until return receipt acknowledgement is completed. Records/plans will be returned to the Development & Building Services Center on or before the indicated anticipated return date.

Delivery Picked Up By:

Name: Michelle Shelton
Print

Organization: Albug Reprographics

Signed: Michelle Shelton
Phone No. 884-0885

Date: 7/15/02

Office Use Only

Return Acknowledged

Received by: _____ Date: _____
Print

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GATEWAY CENTER ZONE ATLAS/DRNG. FILE # J-15/D35

DRB #: 97-466 EPC #: Z-93-46 WORK ORDER #: N/A

LEGAL DESCRIPTION: TRACTS P, Q, & Y OF PLAT OF VARIOUS TRACTS OF LAND OF SOUTHWESTERN CONSTRUCTION CO.

CITY ADDRESS: LOMAS & WOODWARD

ENGINEERING FIRM: BOHANNAN HUSTON, INC.

ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109

OWNER: SANDIA FOUNDATION

ADDRESS: 2 WOODWARD CENTER

ARCHITECT: _____

ADDRESS: _____

SURVEYOR: BOHANNAN HUSTON, INC.

ADDRESS: _____

CONTRACTOR: _____

ADDRESS: _____

CONTACT: RICK BELTRAMO

PHONE: (505) 823-1000

CONTACT: RUSSEL D. HILLER, III

PHONE: 242-2684

CONTACT: _____

PHONE: _____

CONTACT: DWAIN WEAVER

PHONE: (505) 823-1000

CONTACT: _____

PHONE: _____

TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ FINAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEERS CERTIFICATION
☐ OTHER

PRE-DESIGN MEETING:

- ☐ YES
☒ NO
☐ COPY PROVIDED

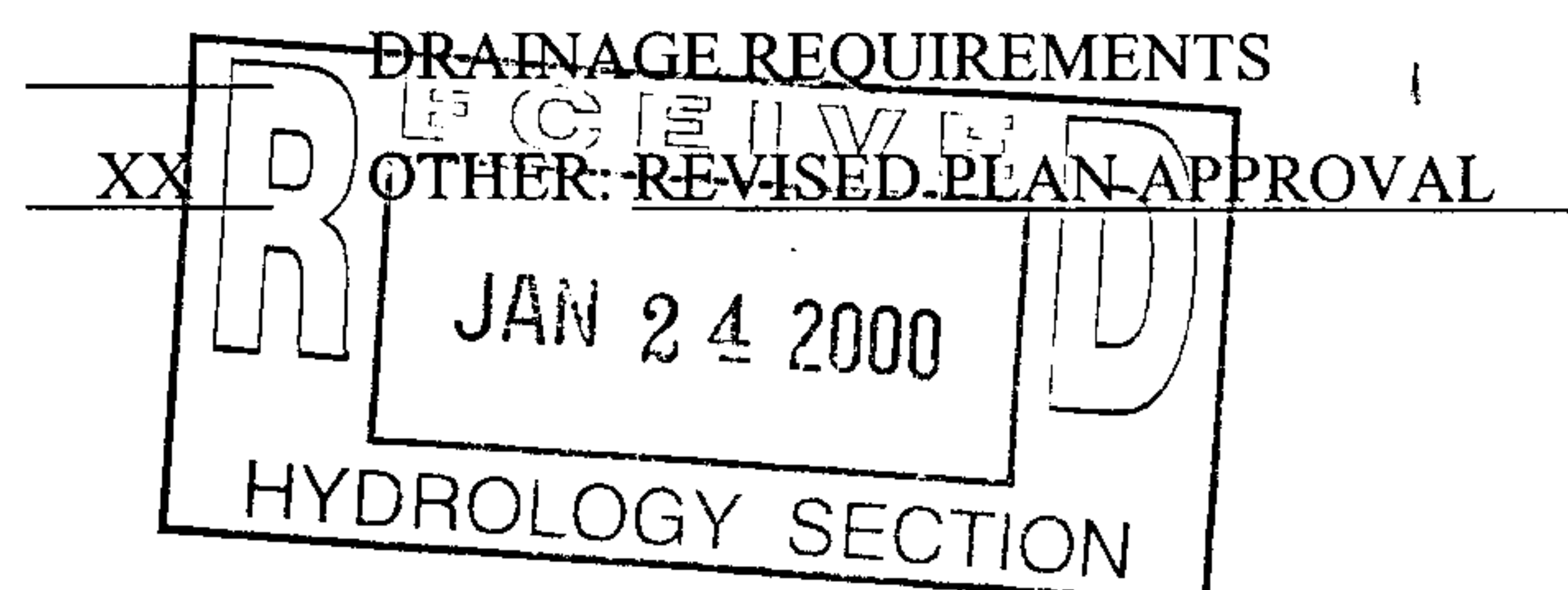
(SPECIFY)

DATE SUBMITTED: January 24, 2000

BY: RICK BELTRAMO

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUBD. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT





April 27, 1999

BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

fax 505.821.0892

Susan Calongne, P.E., City Hydrologist
Hydrology Division/PWD
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Gateway Development, Grading and Drainage Plan (Zone Atlas Map J-15-Z)

Dear Susan:

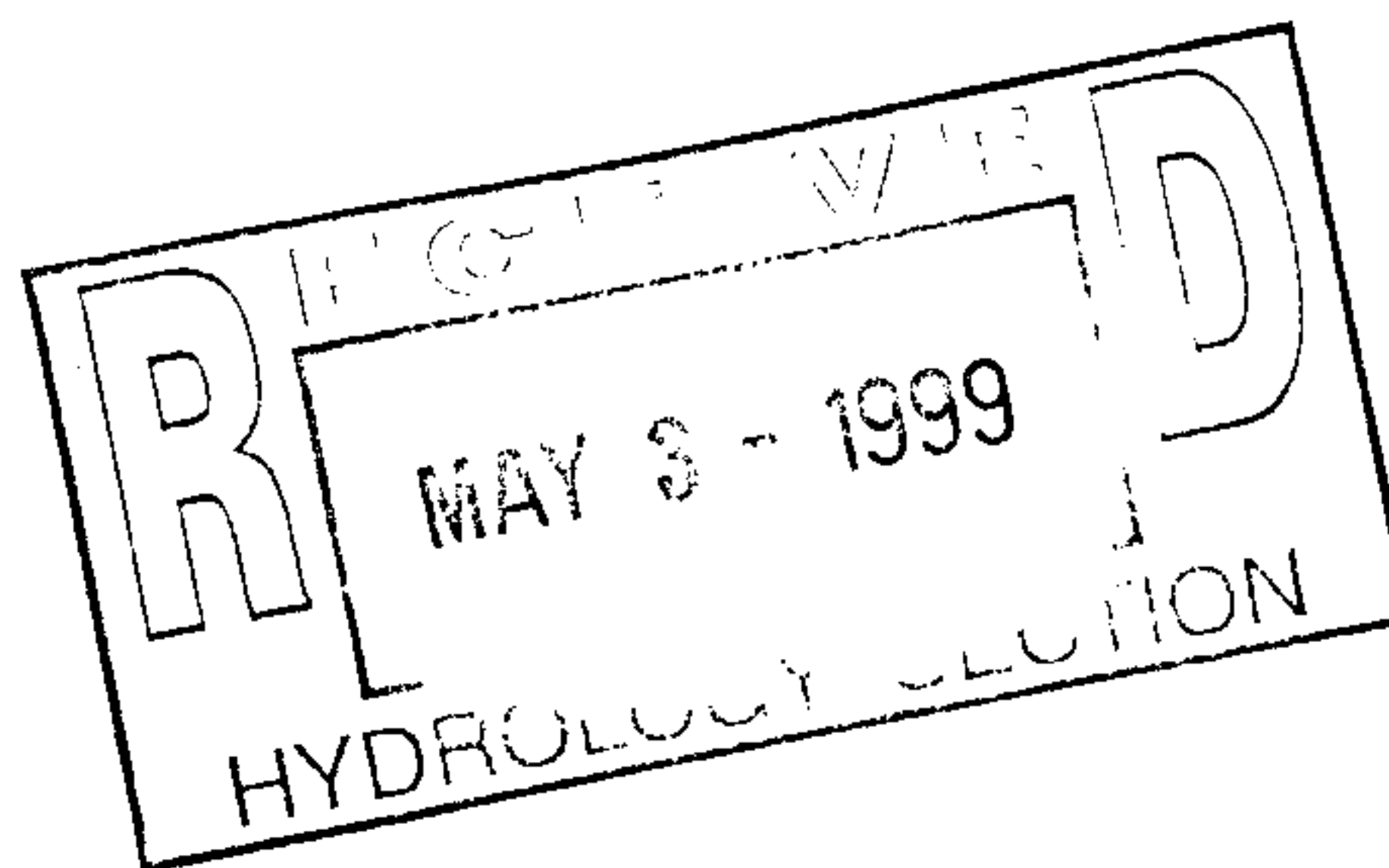
This letter transmits the Grading Plan and Drainage Report for the proposed Gateway Development. This plan is being submitted for rough grading permit and work order approval. Submitted with this report is the drainage information sheet.

If we can provide additional information or answer any questions about the plan, please call.

Sincerely,
Bohannon Huston, Inc.


Rick L. Beltramo, P.E.
Community Development
and Planning Group

RLB/am
Attachments





BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

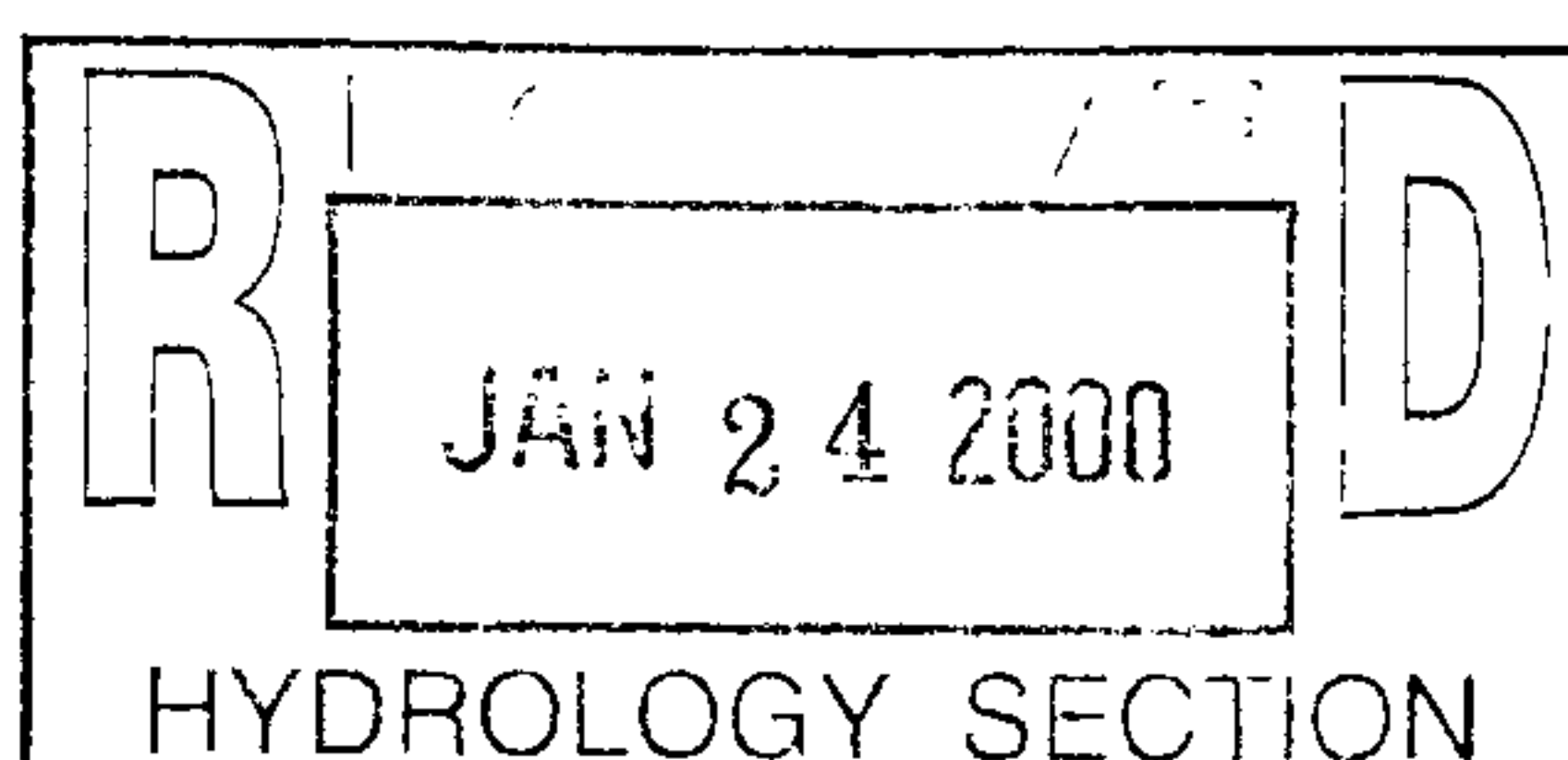
fax 505.821.0892

DRAINAGE MANAGEMENT PLAN FOR THE GATEWAY CENTER

REVISED JANUARY 24, 2000

PREPARED FOR:

**SANDIA FOUNDATION
TWO WOODWARD CENTER
700 LOMAS BLVD. NE, SUITE 204
ALBUQUERQUE, NM 87102**



**DRAINAGE MANAGEMENT PLAN
FOR THE
GATEWAY CENTER**

JANUARY 24, 2000

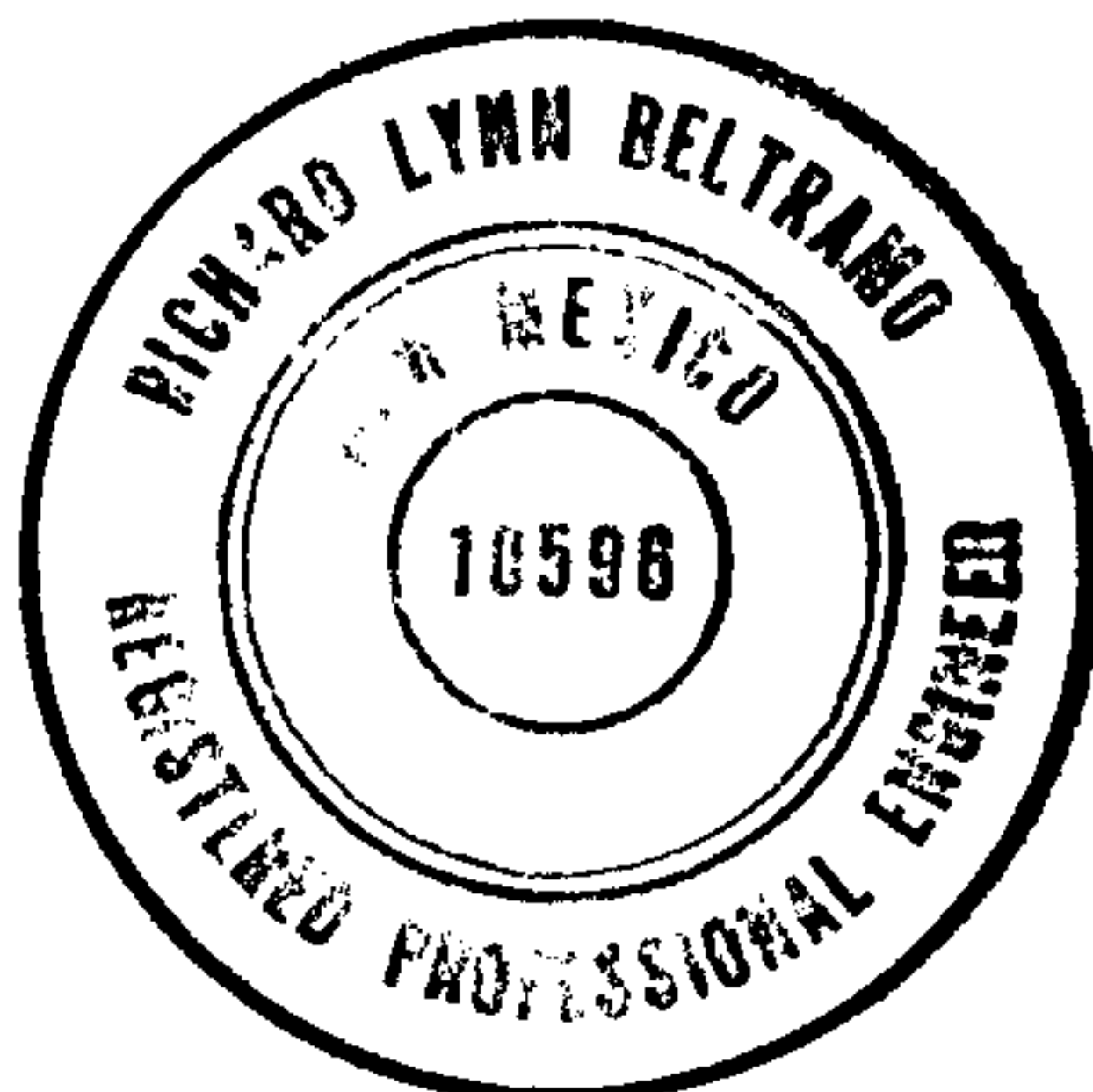
Prepared for:

**SANDIA FOUNDATION
TWO WOODWARD CENTER
SUITE 204
700 LOMAS BOULEVARD NE
ALBUQUERQUE, NEW MEXICO 87102**

Prepared by:

**BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87109**

I, Rick L. Beltramo, being a Registered Professional Engineer, registered in the State of New Mexico, hereby certify that this report was written by me or under my direct supervision, and that the information contained herein is true and accurate to the best of my knowledge and belief.




Rick L. Beltramo, P.E.
N.M.P.E. No. 10596

Date: 1/24/00

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I. PURPOSE

The purpose of this plan is to establish the management of storm water runoff from a 24.9± acre parcel of land. The parcel of land is being subdivided for site development by the owner, Sandia Foundation. The proposed development will be referred to as the "Gateway Center." This report presents the drainage management plan for development of the site.

This plan has been prepared in accordance with the prior reports approved by the City of Albuquerque, the pre-design meeting held with City Hydrology Division, and in accordance with the City of Albuquerque Development Process Manual (DPM), including the latest revisions dated July, 1997 (DPM update). Approval of this plan will allow rough grading to occur. Runoff calculations from individual developed sites will be necessary to control runoff amounts to those mandated by this plan.

II. PROJECT LOCATION AND DESCRIPTION

The project site is located at the northwest corner of the intersection of Interstate 25 (I-25) and Lomas Boulevard (see **Plan Sheet 1 of 2** for location map). The site is bounded by I-25 to the east, Lomas Boulevard to the south, Mountain Road to the north and Martineztown residential neighborhood to the west. The site generally slopes from east to west with 3:1 slopes adjacent to the interstate and Martineztown neighborhood. The north and south edges of the site slope steeply toward Mountain Road and Lomas Boulevard, respectively. Slopes vary greatly over the site ranging from near level to in excess of 1:1. In the central portion of the site is a large, relatively flat area that has been utilized in the past for gravel production. The west central portion of the site is traversed by a deep, bowled arroyo with its outlet at Maggie's Avenue (see **Plan Sheet 1**).

Soils on the site consist primarily of course to fine graded sands and gravel within the Bluepoint-Kokan Association (BKD). The SCS Soil Survey of Bernalillo County describes the Bluepoint-Kokan soils as soils which experience slow runoff and moderate or severe erosion. The

soil survey also identifies a portion of the site as Cut and Fill Land (CU), which is described as "sandy loam and very gravelly sand." Both soil types are within hydrologic soils Group A.

III. HISTORIC (UNDEVELOPED) DRAINAGE

The project site is located within a larger watershed which has a history of flooding problems. However, recent storm drain improvements both upstream and downstream of the site have significantly reduced the magnitude of flooding in the watershed. With the completion of the I-25 northbound storm sewer diversion to Odelia Pond, the flooding hazard that currently exists at the Broadway Boulevard Pump Station, which is the terminus of the watershed in which the project site resides, has been partially relieved. Similarly, drainage improvements in Lomas Boulevard from Broadway to Eighth Street have relieved downstream flooding.

Interstate 25, which forms the easterly watershed boundary of the site precludes the majority of upstream offsite runoff from reaching the site. However, a small amount of offsite runoff does enter the site from the I-25 ROW near Lomas. Both Mountain Road and Lomas Boulevard have curb and gutter, which serve as watershed divides.

The site was subdivided into eleven existing condition basins (see **Historic Drainage Plan**). Basins UD-1 and UD-2 drain directly to Mountain Road while Basin UD-7 drains directly to Lomas Boulevard. The remaining basins drain to the west to the Martineztown neighborhood. Runoff in Martineztown drains to Lomas Boulevard and Mountain Road, downstream of the project site. Hydrology calculation for the historic basins are shown on the **Historic Drainage Plan**. A summary of the 100-year historic peak discharge rates for each of these basins is shown in **Table 1**.

TABLE 1

HISTORIC 100-YEAR RUNOFF SUMMARY



<u>BASIN</u>	<u>PEAK DISCHARGE (CFS)</u>
TO LOMAS BOULEVARD	
UD-7	3.57
TO MOUNTAIN ROAD	
UD-1	13.31
UD-2	<u>2.47</u>
SUBTOTAL	15.78
TO MARTINEZTOWN NEIGHBORHOOD	
UD-3	2.81
UD-4	0.72
UD-5	18.39
UD-6	4.59
UD-8	3.67
UD-9	1.28
UD-10	0.83
UD-11	<u>2.21</u>
SUBTOTAL	34.50
TOTAL	53.85

IV. DRAINAGE MANAGEMENT PLAN

A. General

Currently, the larger watershed in which the site resides is experiencing flooding problems. Unlike most development which increases runoff, this plan maintains the overall site runoff to historic levels. This plan includes grading and storm water runoff detention provisions that will reduce the aggregate runoff to Martineztown from the developed areas to 50% of the historic runoff. **Table 2** shows a comparison between the historical peak discharge and the developed peak discharge. (See summary of analysis points following **Table 2**.) It is proposed that the street improvements will be allowed free discharge. However, even with some free discharge, the total runoff for this development will be approximately equal to historic runoff for the site (see Peak Discharge Summary, **Table 3**).

All of the proposed basins and the hydrologic analysis of the site and surrounding contributing areas for proposed conditions are shown on the **Grading/Drainage Plan**.

B. Land Use

For each basin, the developed conditions 10-year and 100-year peak discharge rates were based on the following land treatment assumptions found in **Appendix B**. These percentages were based upon typical development land treatment types. **The Historic Drainage Plan** shows the historic and developed 10-year and 100-year peak discharge rates for each proposed basin. Developed flow rates were based on the above land use percentages. Supporting hydrology calculations for the historic flow rates for the proposed basin configuration and maximum allowable peak discharge rates are shown in **Appendix B**. A significant reduction in the developed discharge rates occurs with the proposed detention scheme.

TABLE 2

PROPOSED 100-YEAR RUNOFF SUMMARY

Existing Basin	Analysis Point	Historic Peak Discharge (cfs)	Post Development Basin	Post Development Q ₁₀₀ Subtotals	Post Development Q ₁₀₀ Totals	* Maximum Allowable Developed Peak Discharge (cfs)	Flowrate Reduction (cfs)
UD-1	AP#1 & AP#2	13.31	A-3 A-5 A-4	0.46 0.98 3.77	5.21	6.66	8.10
UD-2	AP#3	2.47	D-2 D-3 D-4	0.35 0.21 0.24	0.8	1.24	1.67
UD-3	AP#4	2.81	E-1 E-2	1.45 0.34	1.79	1.41	1.02
UD-4	AP#5	0.72	G-1	0.75	0.75	0.36	0.00
UD-5	AP#6	18.39	F-1	3.07	3.07	9.20	15.32
UD-6	AP#7, AP#8, & AP#9	4.59	F-2 F-3 H-1	1.07 0.25 2.66	3.98	2.30	0.61
UD-7	AP#14	3.57	C-2 I-2	0.69 1.11	1.80	1.79	1.77
UD-8	AP#11	3.67	I-3	2.14	2.14	1.84	1.53
UD-9	AP#10	1.28	H-2	0.47	0.47	0.64	0.81
UD-10	AP#12	0.83	I-4	0.83	0.83	0.42	0.00
UD-11	AP#13	2.21	I-1	** 0	**0	1.11	2.21
TOTALS		51.64		20.84	20.84	25.86	

Maximum Allowable Developed Peak Discharge = (0.5) (Historic Peak Discharge)

** Post-Development Q is discharging into a proposed storm drain.

SUMMARY OF ANALYSIS POINTS

➤ **AP#1 & AP#2**

Existing Basin UD-1 discharges to AP#1 and AP#2 with a total historic peak discharge of 13.31 cfs directly into Mountain Road. The developed peak discharge to AP#1 is 1.44 cfs (from Basins A-3 and A-5), and 3.77 cfs to AP#2 (from Basin A-4). This post-development Q will be released via sheet flow, directly into Mountain Road, resulting in a reduction of 8.10 cfs from the pre-developed conditions

➤ **AP#3**

Existing Basin UD-2 discharges 2.47 cfs onto Mountain Road at AP#3. The post-development Basins D-2 and D-3 discharge 0.35 cfs and 0.21 cfs at AP#3. This results in a reduction of 1.67 cfs being discharged directly onto Mountain Road.

➤ **AP#4**

Existing Basin UD-3 has a historic peak discharge of 2.81 cfs. This runoff is sheet flowing onto the lots adjacent to the site and to the east and south of High Street. The post-development basins, D-4, E-1 and E-2 will release a total of 2.03 cfs onto the same area. Basin D-4 is discharging 0.24 cfs (an increase of 0.02 cfs over the existing conditions) onto the lots east of High Street in the same drainage pattern as the existing conditions. Basin E-2 is discharging 0.34 cfs (the same as existing) onto the lot south of High Street, also with the same drainage pattern as existing conditions. Basin E-1 has a total developed peak discharge of 1.45 cfs. This runoff will be directed, via a swale, to run along the property line in a westerly direction in order to discharge directly into High Street rather than sheet flowing through the adjacent lots as it does under existing conditions.

➤ **AP#5**

Existing Basin UD-4 releases a total historic peak discharge of 0.72 cfs at Analysis Point #5. The post-development basin, G-1, will discharge an increase of 0.03 cfs at this point for a total of 0.75 cfs and remains mostly in the pre-developed condition with no change to the drainage patterns.



➤ **AP#6**

Existing Basin UD-5 directs 18.39 cfs, via a swale toward the property to the south of Maggie's Avenue. Basin F-1 discharges 3.07 cfs, greatly reducing the historic runoff. The basin will be graded to direct the majority of the runoff directly toward Maggie's Avenue rather than through the adjacent lots.

➤ **AP#7, AP#8 & AP#9**

Existing drainage Basin UD-6 discharges 4.59 cfs towards Analysis Points 7, 8 and 9, sheet flowing onto the lots adjacent to the site boundary line. Post-development Basins F-2, F-3 and H-1 release 1.07 cfs, 0.25 cfs and 2.66 cfs respectively, for a total runoff of 3.98 cfs (a reduction of 0.61 cfs from existing conditions). Basin F-2 will direct its 1.07 cfs at AP#7 toward an existing offsite swale which bypasses the adjacent homes. Basin F-3 will sheet flow onto the adjacent lots in the same manner as the existing drainage pattern, but with a total runoff of only 0.25 cfs. Basin H-1 will be graded to direct its discharge of 2.66 cfs toward Marble Avenue rather than sheet flowing through the lots as in the existing drainage patterns.

➤ **AP#10**

Existing Basin UD-9 discharges 1.28 cfs toward AP#10. The post-development Basin H-2 will discharge 0.47 cfs toward the same point, which is a reduction of 0.81 cfs. The drainage patterns remain the same since most of the basin remains in its natural state.

➤ **AP#11**

Existing Basin UD-8 discharges 3.67 cfs toward AP#11 at the easterly end of Page Avenue. Basin I-3 reduces the existing flow rate to 2.14 cfs and will be graded to direct the flow toward Page Avenue and away from the adjacent lot and home.

➤ **AP#12**

Existing Basin UD-10 has a total runoff of 0.83 cfs. The proposed basin I-4 is the same as the existing basin UD-10. No construction will occur in this basin and the flow will remain the same. In the future, the buildings within this basin will be demolished and the flow will decrease.



➤ **AP#13**

Existing Basin UD-11 discharges 2.21 cfs toward the east end of Slate Avenue. Basin I-1 generates 3.65 cfs of post-development runoff at AP#13. This discharge will be picked up by a proposed 12" storm drain connecting to the existing system in Lomas Boulevard, thus reducing the overland runoff to 0 cfs.

➤ **AP#14**

Existing Basin UD-7 drains toward AP#14, discharging a total of 3.57 cfs. The offsite post-development Basins C-2 and I-2 will discharge 0.69 cfs and 1.11 cfs, respectively, toward AP#14 for a total reduction in runoff of 1.77 cfs.

The runoff from post-development Basins A-1, A-2, B-1 and D-1 will enter a proposed underground storm drainage system that ultimately discharges into an existing system in Mountain Road. Basin B-2, B-3, C-1, C-3, C-4, C-5 and I-1 are also draining into proposed storm drainage pipes which will transport the runoff into the existing drainage system in Lomas Boulevard. See Table 2 for the maximum allowable developed peak discharge from these basins.

C. Grading/Drainage Plan

Under existing conditions, the proposed drainage basins to the east of proposed Woodward Place primarily drain directly to either Lomas Boulevard or Mountain Road. Under the proposed plan, the historic flow destinations for these basin will be honored. The proposed street will also drain to these locations as well as a portion of the site west of the proposed street (Basins C-5, D-1, D-2, D-3, I-1 and I-2). The grading plan will drain basins B-2, C-1, C-2, C-3, C-4, C-5, I-1 and I-2 to Lomas Boulevard, while basins A-1, A-2, A-3, A-4, A-5, D-1, D-2 and D-3 will drain to Mountain Road. Table 1 provides a summary of the 100-year historic peak discharge rates to both Lomas Boulevard and Mountain Road.

Table 3

PEAK DISCHARGE SUMMARY

• Total Historic Peak Discharge:	53.4 cfs		
• Total Developed Peak Discharge to Residential Area (see Table 2):	20.57 cfs		
• Total Allowable Discharge from Ponds and Street:			
	53.40 cfs - Historic Peak Discharge		
	- 20.57 cfs - Developed Peak Discharge to Residential		
	32.83 cfs - Allowable Remaining		
• Discharge to Mountain Road			
• Pond 3:			
Basin "A-1": $Q_{100}(\text{Hist}) =$	4.42 cfs	$Q_{100}(\text{Dev}) =$	10.20 cfs
Basin "A-2": $Q_{100}(\text{Hist}) =$	0.41 cfs	$Q_{100}(\text{Dev}) =$	0.41 cfs
Basin "D-1": $Q_{100}(\text{Hist}) =$	3.56 cfs	$Q_{100}(\text{Dev}) =$	7.94 cfs
	8.39 cfs		18.55 cfs
* Max. Release from Pond 3:			Actual Release = 2.48 cfs
	$8.39/2 = 4.20$ cfs		
• Underground Detention #4:			
Basin "B-1": $Q_{100}(\text{Hist}) =$	9.15 cfs	$Q_{100}(\text{Dev}) =$	20.77 cfs
Basin "B-3": $Q_{100}(\text{Hist}) =$	0.27 cfs	$Q_{100}(\text{Dev}) =$	0.27 cfs
	9.42 cfs		21.04 cfs
* Max. Release from Underground			Actual Release = 3.42 cfs
	$\text{Det \#4: } 9.38/2 = 4.69$ cfs		
• Basin "A-3":		$Q_{100}(\text{Dev}) =$	0.46 cfs
• Basin "A-4":		$Q_{100}(\text{Dev}) =$	3.77 cfs
• Basin "A-5":		$Q_{100}(\text{Dev}) =$	0.98 cfs
• Basin "D-2":		$Q_{100}(\text{Dev}) =$	0.35 cfs
• Basin "D-3":		$Q_{100}(\text{Dev}) =$	0.22 cfs
• Basin "D-4":		$Q_{100}(\text{Dev}) =$	0.21 cfs
	Sub-Total		Actual Release 5.99 cfs
	Sub-Total (To Mountain Road)		11.89 cfs
• Discharge to Lomas Boulevard			
• Pond 2:			
Basin "C-5": $Q_{100}(\text{Hist}) =$	8.33 cfs	$Q_{100}(\text{Dev}) =$	13.81 cfs
* Max. Release from Pond 2:			Actual Release = 1.45 cfs
	$8.36/2 = 4.18$ cfs		
• Underground Detention #4A:			
Basin "B-2": $Q_{100}(\text{Hist}) =$	4.18 cfs	$Q_{100}(\text{Dev}) =$	9.49 cfs
* Max. Release from Underground			Actual Release = 1.45 cfs
	$\text{Det \#4A: } 4.18/2 = 2.09$ cfs		
• Pond 5:			
Basin "C-1": $Q_{100}(\text{Hist}) =$	3.49 cfs	$Q_{100}(\text{Dev}) =$	7.59 cfs
* Max. Release from Pond 5:			Actual Release = 1.19 cfs
	$3.51/2 = 1.76$ cfs		
• Basin "C-2":		$Q_{100}(\text{Dev}) =$	0.69 cfs
• Basin "C-3":		$Q_{100}(\text{Dev}) =$	3.16 cfs
• Basin "C-4":		$Q_{100}(\text{Dev}) =$	4.00 cfs
• Basin "I-2":		$Q_{100}(\text{Dev}) =$	1.11 cfs
• Basin "I-1":		$Q_{100}(\text{Dev}) =$	3.66 cfs
	Sub-Total (To Lomas Boulevard)		16.71 cfs
	TOTAL		28.60 cfs

D. Runoff to Lomas Boulevard and Mountain Road



Based on the restriction of limiting the developed site (non-street) flow rates to 50% of historic levels, detention ponds have been provided to achieve discharge reductions for each graded site draining to Lomas Boulevard or Mountain Road. The pond volumes provided for each basin are shown in Table 4. Runoff will be discharged from these ponds directly into the existing storm drainage systems in Lomas Boulevard and Mountain Road. A proposed storm drain system will be designed to collect the proposed controlled discharge from the ponds, as well as runoff from portions of proposed Woodward Place. Storm drains will then convey the flow from the proposed inlets to existing storm drains in Lomas Boulevard and Mountain Road.

Until the site is developed, there will be significantly less runoff produced. Therefore, the underground ponds will not be built until development begins. The surface ponds are sufficient to carry the undeveloped flow from the site. The interim flow to mountain road will be 7.29 cfs. This flow is less than the 11.89 cfs released after development. The interim flow to Lomas Boulevard is 15.16 cfs. This is less than the 16.71 cfs released after development. The AHYMO run shows that the ponds have sufficient volume to carry the interim flow.

Also as a part of this plan, the north leg of the High Street/Lomas Boulevard intersection will be reconstructed to provide an 8" water block on High Street to prevent runoff on Lomas Boulevard from entering High Street.

TABLE 4
POND VOLUMES SUMMARY

<u>POND</u>	<u>VOLUME (AC. FT.)</u>	<u>PEAK RELEASE (CFS)</u>
2	0.500	1.45
3	0.971	5.90
4	0.759	3.42
4A	0.367	1.45
5	0.366	1.19

V. EROSION CONTROL PLAN

The contractor shall ensure that no soil erodes from the site into public right-of-way or adjacent property. The western boundary of this site slopes down at 3:1. In order to prevent erosion, the slope will be graded to include swales every 10' down the slope. These swales will contain 1.7 times the 100-year flow for each portion of the slope. Therefore, the water will be stopped before it can erode the slope. In addition, the slope shall be seeded with native grasses to control cutting of the swales. See the Grading plan for the temporary erosion control detail and the rough grading of the slope.

VI. CONCLUSION

This plan presents a grading/drainage plan for the "Gateway Center." For each developed site, excluding the street, the flow rate will be reduced to 50% of the historic site runoff and the proposed street will be allowed free discharge. Overall runoff from the site will be the same as historic as a result of on-site detention storage provided.

The developed sites draining toward the neighboring residential area, west of the site will have a total discharge of less than 50% of the 100-year storm historic runoff and the proposed street will have free discharge. By controlling the discharge from the developed sites, the overall runoff will be slightly less than historic.

APPENDIX A

PRE-DESIGN CONFERENCE NOTES

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

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: J15-D35 DATE: 3/11/93
EPC NO.: _____ DRB NO.: _____ ZONE: _____
SUBJECT: SADIA FOUNDATION / FEDERAL COURTHOUSE SITE
STREET ADDRESS: INTERSECTION OF LOMAS AND I-25 (N.W. CORNER)
LEGAL DESCRIPTION: UNDISTURBED

APPROVAL REQUESTED: ☒ PRELIMINARY PLAT ☒ FINAL PLAT (4 LOT SUBDIVISION)
☐ SITE DEVELOPMENT PLAN ☐ BUILDING PERMIT
☐ GRADING/PAVING PERMIT ☒ OTHER
SITE PLAN FOR SUBDIVISION

	WHO	REPRESENTING
ATTENDANCE:	<u>Mike Emery</u>	<u>Bokhannan</u>
	<u>James Topmiller</u>	<u>Bokhannan</u>
	<u>Dan Moran</u>	<u>CITY</u>
	<u>Fred J. Aguirre</u>	<u>CITY</u>

FINDINGS:

PHASE 1 DEVELOPMENT: AN APPROVED CONCEPTUAL
GRADING & DRAINAGE PLAN IS REQUIRED FOR SITE
PLAN FOR SUBDIVISION APPROVAL.

THE TARGET DISCHARGE FOR PHASE 1 IS 50% OF
THE HISTORIC FLOW RATE BUT IN NO CASE ~~WILL THE FLOW~~
~~BE~~ GREATER THAN HISTORIC FLOW RATE. THE
GOAL OF THIS PLAN ~~IS~~ AND FUTURE PHASES IS
TO DIVERT THE MAXIMUM FLOWS AWAY FROM
MARTINEZ TOWN AND INTO LOMAS.

THIS PLAN WILL NEED TO ADDRESS THE ~~PROB~~ AND RESOLVE THE
POTENTIAL FOR STORM WATER FLOWS ENTERING MART
TOWN FROM HIGH ST FROM LOMAS. THIS IS WARRANTED AS
A RESULT OF THE INCREASED ~~WATER~~ FLOWS TO LOMAS.

NOTE: PHASE 1 DEVELOPMENT IS ^{AT} ABOUT WOODWARD PL.

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: <u>[Signature]</u>	SIGNED: <u>[Signature]</u>
TITLE: <u>[Title]</u>	TITLE: <u>SADIA FOUNDATION</u>
DATE: <u>[Date]</u>	DATE: <u>3/11/93</u>

NOTE PLEASE PROVIDE A COPY OF THIS PRE-DESIGN FORM WITH THE DRAINAGE SUBMITTAL. A 11

APPENDIX B

AHYMO INPUT & OUTPUT FILES FOR EXISTING AND PROPOSED CONDITIONS

2 x 100 year analysis

*DETERMINATION OF POND:

*****ROUTE BASIN C-5 THROUGH DETENTION POND

ROUTE RESERVOIR ID=20 HYD=POND2 INFLOW ID=18 CODE=10
OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
0 0 5020
5.348089868 0.308286217 5022
7.563341224 0.784311677 5024

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5020.00	.000	.00
.50	.00	5020.00	.000	.00
1.00	.00	5020.00	.000	.00
1.50	27.74	5021.73	.267	4.63
2.00	6.13	5023.04	.555	6.49
2.50	.83	5022.39	.401	5.78
3.00	.28	5021.40	.215	3.74
3.50	.16	5020.72	.111	1.93
4.00	.14	5020.38	.058	1.01
4.50	.13	5020.21	.032	.56
5.00	.13	5020.13	.020	.34
5.50	.15	5020.09	.014	.24
6.00	.16	5020.07	.011	.19
6.50	.01	5020.04	.007	.12
7.00	.00	5020.02	.003	.06
7.50	.00	5020.01	.002	.03
8.00	.00	5020.01	.001	.01
8.50	.00	5020.00	.000	.01
9.00	.00	5020.00	.000	.00

PEAK DISCHARGE = 6.495 CFS - PEAK OCCURS AT HOUR 1.95

MAXIMUM WATER SURFACE ELEVATION = 5023.036

MAXIMUM STORAGE = .5548 AC-FT INCREMENTAL TIME= .050000HRS

Pond2 can handle 2x100 year flow
if a 12" orifice is used.
Therefore, a standpipe will be used that
has a 12" PVC pipe with the end open
for storms over the 100-year or in the
event of plugged orifice.

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
 INPUT FILE =

RUN DATE (MON/DAY/YR) =11/29/1999
 USER NO.= BOHN_HNM.STE

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	PAGE = 1 NOTATION
*S Developed Gateway										
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.350
COMPUTE NM HYD	B2	-	1	.00358	6.17	.179	.93603	1.500	2.692	PER IMP= .00
COMPUTE NM HYD	C3	-	2	.00112	1.94	.056	.93603	1.500	2.700	PER IMP= .00
COMPUTE NM HYD	C5	-	3	.00530	9.13	.265	.93603	1.500	2.691	PER IMP= .00
COMPUTE NM HYD	C4	-	4	.00137	2.37	.068	.93603	1.500	2.697	PER IMP= .00
COMPUTE NM HYD	C1	-	5	.00286	4.93	.143	.93603	1.500	2.693	PER IMP= .00
COMPUTE NM HYD	I1	-	6	.00137	2.37	.068	.93603	1.500	2.697	PER IMP= .00
COMPUTE NM HYD	B1	-	7	.00783	13.48	.391	.93603	1.500	2.690	PER IMP= .00
COMPUTE NM HYD	A4	-	8	.00130	3.13	.111	1.60172	1.500	3.762	PER IMP= 60.00
COMPUTE NM HYD	A1	-	9	.00384	7.30	.217	1.05837	1.500	2.969	PER IMP= .00
COMPUTE NM HYD	D1	-	10	.00305	5.26	.152	.93603	1.500	2.692	PER IMP= .00
COMPUTE NM HYD	B3	-	11	.00016	.28	.008	.93603	1.500	2.777	PER IMP= .00
COMPUTE NM HYD	A2	-	12	.00020	.35	.010	.93603	1.500	2.754	PER IMP= .00
COMPUTE NM HYD	A3	-	13	.00042	.73	.021	.93603	1.500	2.721	PER IMP= .00
COMPUTE NM HYD	A5	-	14	.00044	.76	.022	.93603	1.500	2.716	PER IMP= .00
COMPUTE NM HYD	D3	-	15	.00009	.16	.004	.93603	1.500	2.846	PER IMP= .00
COMPUTE NM HYD	D2	-	16	.00017	.30	.008	.93603	1.500	2.765	PER IMP= .00
COMPUTE NM HYD	D4	-	17	.00013	.22	.006	.93603	1.500	2.790	PER IMP= .00
COMPUTE NM HYD	I2	-	31	.00044	.76	.022	.93603	1.500	2.716	PER IMP= .00
COMPUTE NM HYD	C2	-	30	.00056	.98	.028	.93603	1.500	2.713	PER IMP= .00
*S*****										
*S DISCHARGE TO MOUNTAIN ROAD										
ADD HYD	B13	7&11	18	.00799	13.76	.399	.93600	1.500	2.692	
ADD HYD	B134	18& 8	19	.00929	16.89	.510	1.02913	1.500	2.841	
ADD HYD	B134D1	19&10	20	.01234	22.15	.662	1.00611	1.500	2.805	
ADD HYD	A12	9&12	21	.00404	7.65	.227	1.05225	1.500	2.958	
ADD HYD	NORTH	20&21	22	.01638	29.80	.889	1.01749	1.500	2.842	
ROUTE RESERVOIR	POND3	22	33	.01638	6.43	.889	1.01749	1.850	.613	AC-FT= .539
ADD HYD	A35	13&14	40	.00086	1.50	.043	.93575	1.500	2.719	
ADD HYD	A35D3	40&15	42	.00095	1.66	.047	.93564	1.500	2.731	
ADD HYD	D24	16&17	44	.00030	.52	.015	.93523	1.500	2.776	
ADD HYD	A35D234	42&44	46	.00125	2.18	.062	.93554	1.500	2.741	
*S TOTAL DISCHARGE TO MOUNTAIN ROAD										
ADD HYD	MTN	46&33	48	.01763	7.29	.951	1.01165	1.600	.646	
*S*****										
*S DISCHARGE TO LOMAS BLVD										
ROUTE RESERVOIR	POND2	3	20	.00530	.90	.265	.93597	2.000	.266	AC-FT= .207
ADD HYD	C45	20& 4	21	.00667	2.68	.333	.93534	1.500	.627	
ADD HYD	B2C3	1& 2	23	.00470	8.10	.235	.93598	1.500	2.694	
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4										
ADD HYD	B23C45	23&21	24	.01137	10.78	.567	.93561	1.500	1.481	
ROUTE RESERVOIR	POND5	5	25	.00286	.76	.143	.93599	1.900	.413	AC-FT= .102
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1										
ADD HYD	26.00	24&25	26	.01423	11.06	.710	.93550	1.500	1.215	
ADD HYD	I12	6&31	27	.00181	3.13	.090	.93590	1.500	2.702	
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4+C1+C2										
ADD HYD	28.00	30&26	28	.01479	12.04	.738	.93551	1.500	1.272	
*S TOTAL LOMAS DISCHARGE										
ADD HYD	LOMAS	27&28	29	.01660	15.16	.828	.93556	1.500	1.427	
FINISH										

```

*S Developed Gateway
START          RAINFALL BEGINS AT 0.00 HOURS
*              100 YEAR RETURN PERIOD
*****
*              :
*              :              MISC. DATA              :
*              :              RAINFALL RETURN PERIOD_____ 100-YEAR      :
*              :              RAINFALL DURATION_____ 6-HOUR           :
*              :              ZONE 2                      :
*              :              RAINFALL DEPTHS: 1 HOUR (P60)_____ 2.01 INCHES :
*              :              (UNADJUSTED)      6 HOUR (P360)_____ 2.35 INCHES :
*              :              24 HOUR (P1440)_____ 2.75 INCHES           :
*              :              RAINFALL DATA TAKEN FROM NOAA.              :
*              :              HYDROGRAPH METHODOLOGY              :
*              :              CITY OF ALBQ. DPM VOL. 2, SECTION 22.2 July, 1997 :
*              :              INITIAL ABSTRACTION - INFILTRATION METHOD      :
*              :              Tc CALCULATIONS PER C.O.A. DPM 22.2-B.4       :
*              :              AMAFCA AHYMO VERSION MARCH 20,1992           :
*              :              BEGIN ANALYSIS              :
*****
RAINFALL      TYPE=1 RAIN QUARTER=0.0 RAIN ONE=2.01
              RAIN SIX=2.35 RAIN DAY=2.75 DT=0.05
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B2 ****
COMPUTE NM HYD      ID=1 HYD=B2 AREA=0.00358 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=1 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C3 ****
COMPUTE NM HYD      ID=2 HYD=C3 AREA=0.00112 PER A=0.0 PER B=0.0
                    PER C=20.0 PER D=80.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=2 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C5 ****
COMPUTE NM HYD      ID=3 HYD=C5 AREA=0.00530 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=3 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C4 ****
COMPUTE NM HYD      ID=4 HYD=C4 AREA=0.00137 PER A=0.0 PER B=0.0
                    PER C=10.0 PER D=90.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=4 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C1 ****
COMPUTE NM HYD      ID=5 HYD=C1 AREA=0.00286 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=5 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN I1 ****
COMPUTE NM HYD      ID=6 HYD=I1 AREA=0.00137 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=6 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B1 ****
COMPUTE NM HYD      ID=7 HYD=B1 AREA=0.00783 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=7 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A4 ****
COMPUTE NM HYD      ID=8 HYD=A4 AREA=0.00130 PER A=0.0 PER B=0.0
                    PER C=10.0 PER D=90.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=8 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A1 ****
COMPUTE NM HYD      ID=9 HYD=A1 AREA=0.00384 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=9 CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D1 ****
COMPUTE NM HYD      ID=10 HYD=D1 AREA=0.00305 PER A=0.0 PER B=10.0
                    PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1
PRINT HYD          ID=10 CODE=1

```

```

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B3 *****
COMPUTE NM HYD      ID=11 HYD=B3  AREA=0.00016 PER A=0.0 PER B=50.0
                    PER C=50.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=11  CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A2 *****
COMPUTE NM HYD      ID=12 HYD=A2  AREA=0.00020 PER A=0.0 PER B=0.0
                    PER C=100.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=12  CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A3 *****
COMPUTE NM HYD      ID=13 HYD=A3  AREA=0.00042 PER A=90.0 PER B=0.0
                    PER C=10.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=13  CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A5 *****
COMPUTE NM HYD      ID=14 HYD=A5  AREA=0.00044 PER A=0.0 PER B=50.0
                    PER C=0.0 PER D=50.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=14  CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D3 *****
COMPUTE NM HYD      ID=15 HYD=D3  AREA=0.00009 PER A=0.0 PER B=50.0
                    PER C=0.0 PER D=50.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=15  CODE=1
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D2 *****
COMPUTE NM HYD      ID=16 HYD=D2  AREA=0.00017 PER A=0.0 PER B=0.0
                    PER C=100.0 PER D=0.0  TP=.133  RAINFALL=-1
PRINT HYD           ID=16  CODE=1

```

*DETERMINATION OF POND:

*****ROUTE BASIN C-5 THROUGH DETENTION POND

```

ROUTE RESERVOIR      ID=20 HYD=POND2 INFLOW ID=3  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0                0          5020
                        1.34            0.308286    5022
                        1.64            0.499562    5023

```

```

PRINT HYD           ID=20      CODE=1

```

**** COMBINE HYDROGRAPHS FOR BASINS C5 AND C4*****

*S COMBINE HYDROGRAPHS FOR BASINS C5 AND C4

```

ADD HYD              ID=21 HYD=21 ID I=20 ID II=4

```

```

PRINT HYD           ID=21      CODE=1

```

*DETERMINATION OF POND:

*****ROUTE BASIN B-2 THROUGH UNDERGROUND DETENTION POND

```

ROUTE RESERVOIR      ID=22 HYD=POND4A INFLOW ID=1  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                        0                0          5028
                        1.82            0.293846    5030
                        2.03            0.367308    5030.5

```

```

PRINT HYD           ID=22      CODE=1

```

**** COMBINE HYDROGRAPHS FOR BASINS B2 AND C3*****

*S COMBINE HYDROGRAPHS FOR BASINS B2 AND C3

```

ADD HYD              ID=23 HYD=23 ID I=22 ID II=2

```

```

PRINT HYD           ID=23      CODE=1

```

**** COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4 *****

*S COMBINE HYDROGRAPHS FOR BASINS B2+C3 AND C5+C4

```

ADD HYD              ID=24 HYD=24 ID I=23 ID II=21

```

```

PRINT HYD           ID=24      CODE=1

```

*DETERMINATION OF POND:

*****ROUTE BASIN C-1 THROUGH DETENTION POND

```

ROUTE RESERVOIR      ID=25 HYD=POND5 INFLOW ID=5  CODE=10
                    OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)

```

```

                                pondin.txt
                                0          0          5020
                                1.12        0.150931    5022
                                1.59        0.36632     5024
*
PRINT HYD          ID=25      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1*****
*S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1
ADD HYD          ID=26 HYD=26 ID I=24 ID II=25
*
PRINT HYD          ID=26      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B3 AND B1*****
*S COMBINE HYDROGRAPHS FOR BASINS B3 AND B1
ADD HYD          ID=28 HYD=28 ID I=11 ID II=7
*
PRINT HYD          ID=28      CODE=1
*
*****
*DETERMINATION OF POND:
*****ROUTE BASIN B1+B3 THROUGH DETENTION POND
ROUTE RESERVOIR    ID=29 HYD=POND4 INFLOW ID=28 CODE=10
                   OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                   0          0          5022
                   4.09        0.607206    5024
                   4.58        0.759008    5024.5
*
PRINT HYD          ID=29      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A2 AND A1*****
*S COMBINE HYDROGRAPHS FOR BASINS A2 AND A1
ADD HYD          ID=30 HYD=30 ID I=12 ID II=9
*
PRINT HYD          ID=30      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2 *****
*S COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2+D1
ADD HYD          ID=31 HYD=31 ID I=30 ID II=29
ADD HYD          ID=32 HYD=32 ID I=31 ID II=10
*
PRINT HYD          ID=32      CODE=1
*
*****
*DETERMINATION OF POND:
*****ROUTE NORTH BASINS THROUGH DETENTION POND
ROUTE RESERVOIR    ID=33 HYD=POND3 INFLOW ID=32 CODE=10
                   OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
                   0          0          5008
                   4.53        0.214141    5010
                   6.40        0.531449    5012
                   7.84        0.964482    5014
*
PRINT HYD          ID=33      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 *****
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2
ADD HYD          ID=34 HYD=34 ID I=13 ID II=14
ADD HYD          ID=35 HYD=35 ID I=15 ID II=16
ADD HYD          ID=36 HYD=36 ID I=34 ID II=35
*
PRINT HYD          ID=36      CODE=1
*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS*****
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS
ADD HYD          ID=37 HYD=37 ID I=33 ID II=36
*
PRINT HYD          ID=37      CODE=1
FINISH

```

Out

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 08/12/1998
START TIME (HR:MIN:SEC) = 13:19:47 USER NO.= BOHN_HNM.STE
INPUT FILE = PONDIN.TXT

```
*
*S Developed Gateway
START RAINFALL BEGINS AT 0.00 HOURS
* 100 YEAR RETURN PERIOD
*****
*
* : MISC. DATA :
* : RAINFALL RETURN PERIOD 100-YEAR :
* : RAINFALL DURATION 6-HOUR :
* : ZONE 2 :
*
* : RAINFALL DEPTHS: 1 HOUR (P60) 2.01 INCHES :
* : (UNADJUSTED) 6 HOUR (P360) 2.35 INCHES :
* : 24 HOUR (P1440) 2.75 INCHES :
* :
* : RAINFALL DATA TAKEN FROM NOAA. :
* :
* : HYDROGRAPH METHODOLOGY :
* :
* : CITY OF ALBQ. DPM VOL. 2, SECTION 22.2 July, 1997 :
* : INITIAL ABSTRACTION - INFILTRATION METHOD :
* : Tc CALCULATIONS PER C.O.A. DPM 22.2-B.4 :
* : AMAFCA AHYMO VERSION MARCH 20,1992 :
* :
* : BEGIN ANALYSIS :
*****
*
RAINFALL TYPE=1 RAIN QUARTER=0.0 RAIN ONE=2.01
RAIN SIX=2.35 RAIN DAY=2.75 DT=0.05
```

```
COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
DT = .050000 HOURS END TIME = 6.000000 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
```

```
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B2 ****
COMPUTE NM HYD ID=1 HYD=B2 AREA=0.00358 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 9.9161 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 2.0100
AREA = .002506 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 2.9190 CFS UNIT VOLUME = .9972 B = 361.48 P60 = 2.0100
AREA = .001074 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1
```

HYDROGRAPH FROM AREA B2

Out

RUNOFF VOLUME = 1.78077 INCHES = .3400 ACRE-FEET
PEAK DISCHARGE RATE = 9.37 CFS AT 1.500 HOURS BASIN AREA = .0036 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C3 ****

COMPUTE NM HYD ID=2 HYD=C3 AREA=0.00112 PER A=0.0 PER B=0.0
PER C=20.0 PER D=80.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.5454 CFS UNIT VOLUME = .9960 B = 526.28 P60 = 2.0100
AREA = .000896 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 = .64597 CFS UNIT VOLUME = .9814 B = 383.55 P60 = 2.0100
AREA = .000224 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

HYDROGRAPH FROM AREA C3

RUNOFF VOLUME = 1.91924 INCHES = .1146 ACRE-FEET
PEAK DISCHARGE RATE = 3.12 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C5 ****

COMPUTE NM HYD ID=3 HYD=C5 AREA=0.00530 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 14.680 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 2.0100
AREA = .003710 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 4.3214 CFS UNIT VOLUME = .9987 B = 361.48 P60 = 2.0100
AREA = .001590 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=3 CODE=1

HYDROGRAPH FROM AREA C5

RUNOFF VOLUME = 1.78077 INCHES = .5034 ACRE-FEET
PEAK DISCHARGE RATE = 13.87 CFS AT 1.500 HOURS BASIN AREA = .0053 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C4 ****

COMPUTE NM HYD ID=4 HYD=C4 AREA=0.00137 PER A=0.0 PER B=0.0
PER C=10.0 PER D=90.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 4.8789 CFS UNIT VOLUME = .9971 B = 526.28 P60 = 2.0100
AREA = .001233 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 = .39508 CFS UNIT VOLUME = .9693 B = 383.55 P60 = 2.0100
AREA = .000137 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=4 CODE=1

HYDROGRAPH FROM AREA C4

RUNOFF VOLUME = 2.01838 INCHES = .1475 ACRE-FEET

PEAK DISCHARGE RATE = 3.94 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN C1 ****

COMPUTE NM HYD ID=5 HYD=C1 AREA=0.00286 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 7.9218 CFS UNIT VOLUME = .9979 B = 526.28 P60 = 2.0100
AREA = .002002 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 2.3319 CFS UNIT VOLUME = .9965 B = 361.48 P60 = 2.0100
AREA = .000858 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=5 CODE=1

HYDROGRAPH FROM AREA C1

RUNOFF VOLUME = 1.78077 INCHES = .2716 ACRE-Feet
PEAK DISCHARGE RATE = 7.49 CFS AT 1.500 HOURS BASIN AREA = .0029 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN I1 ****

COMPUTE NM HYD ID=6 HYD=I1 AREA=0.00137 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.7947 CFS UNIT VOLUME = .9966 B = 526.28 P60 = 2.0100
AREA = .000959 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 1.1170 CFS UNIT VOLUME = .9910 B = 361.48 P60 = 2.0100
AREA = .000411 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA I1

RUNOFF VOLUME = 1.78077 INCHES = .1301 ACRE-Feet
PEAK DISCHARGE RATE = 3.60 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B1 ****

COMPUTE NM HYD ID=7 HYD=B1 AREA=0.00783 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 21.688 CFS UNIT VOLUME = .9986 B = 526.28 P60 = 2.0100
AREA = .005481 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 6.3843 CFS UNIT VOLUME = .9998 B = 361.48 P60 = 2.0100
AREA = .002349 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA B1

RUNOFF VOLUME = 1.78077 INCHES = .7436 ACRE-Feet
PEAK DISCHARGE RATE = 20.49 CFS AT 1.500 HOURS BASIN AREA = .0078 SQ. MI.

Out

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A4 ****
COMPUTE NM HYD ID=8 HYD=A4 AREA=0.00130 PER A=0.0 PER B=0.0
PER C=10.0 PER D=90.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 4.6296 CFS UNIT VOLUME = .9966 B = 526.28 P60 = 2.0100
AREA = .001170 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 = .37490 CFS UNIT VOLUME = .9693 B = 383.55 P60 = 2.0100
AREA = .000130 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=8 CODE=1

HYDROGRAPH FROM AREA A4

RUNOFF VOLUME = 2.01838 INCHES = .1399 ACRE-FEET
PEAK DISCHARGE RATE = 3.74 CFS AT 1.500 HOURS BASIN AREA = .0013 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A1 ****
COMPUTE NM HYD ID=9 HYD=A1 AREA=0.00384 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 10.636 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 2.0100
AREA = .002688 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 3.1310 CFS UNIT VOLUME = .9978 B = 361.48 P60 = 2.0100
AREA = .001152 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=9 CODE=1

HYDROGRAPH FROM AREA A1

RUNOFF VOLUME = 1.78077 INCHES = .3647 ACRE-FEET
PEAK DISCHARGE RATE = 10.05 CFS AT 1.500 HOURS BASIN AREA = .0038 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D1 ****
COMPUTE NM HYD ID=10 HYD=D1 AREA=0.00305 PER A=0.0 PER B=10.0
PER C=20.0 PER D=70.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 8.4481 CFS UNIT VOLUME = .9979 B = 526.28 P60 = 2.0100
AREA = .002135 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115400HR TP = .133000HR K/TP RATIO = .867666 SHAPE CONSTANT, N = 4.095337
UNIT PEAK = 2.4868 CFS UNIT VOLUME = .9965 B = 361.48 P60 = 2.0100
AREA = .000915 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=10 CODE=1

HYDROGRAPH FROM AREA D1

RUNOFF VOLUME = 1.78077 INCHES = .2897 ACRE-FEET
PEAK DISCHARGE RATE = 7.99 CFS AT 1.500 HOURS BASIN AREA = .0031 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN B3 ****
COMPUTE NM HYD ID=11 HYD=B3 AREA=0.00016 PER A=0.0 PER B=50.0

Out
PER C=50.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947
UNIT PEAK = .42284 CFS UNIT VOLUME = .9692 B = 351.48 P60 = 2.0100
AREA = .000160 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=11 CODE=1

HYDROGRAPH FROM AREA B3

RUNOFF VOLUME = .93603 INCHES = .0080 ACRE-FEET
PEAK DISCHARGE RATE = .28 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A2 *****
COMPUTE NM HYD ID=12 HYD=A2 AREA=0.00020 PER A=0.0 PER B=0.0
PER C=100.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .107204HR TP = .133000HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = .57676 CFS UNIT VOLUME = .9814 B = 383.55 P60 = 2.0100
AREA = .000200 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=12 CODE=1

HYDROGRAPH FROM AREA A2

RUNOFF VOLUME = 1.12613 INCHES = .0120 ACRE-FEET
PEAK DISCHARGE RATE = .41 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A3 *****
COMPUTE NM HYD ID=13 HYD=A3 AREA=0.00042 PER A=90.0 PER B=0.0
PER C=10.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .154535HR TP = .133000HR K/TP RATIO = 1.161917 SHAPE CONSTANT, N = 3.050921
UNIT PEAK = .90299 CFS UNIT VOLUME = .9836 B = 285.95 P60 = 2.0100
AREA = .000420 SQ MI IA = .62000 INCHES INF = 1.58600 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=13 CODE=1

HYDROGRAPH FROM AREA A3

RUNOFF VOLUME = .57192 INCHES = .0128 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN A5 *****
COMPUTE NM HYD ID=14 HYD=A5 AREA=0.00044 PER A=0.0 PER B=50.0
PER C=0.0 PER D=50.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .87053 CFS UNIT VOLUME = .9866 B = 526.28 P60 = 2.0100
AREA = .000220 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .131790HR TP = .133000HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .53744 CFS UNIT VOLUME = .9767 B = 324.91 P60 = 2.0100
AREA = .000220 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=14 CODE=1

HYDROGRAPH FROM AREA A5

RUNOFF VOLUME = 1.44763 INCHES = .0340 ACRE-FEET
PEAK DISCHARGE RATE = .99 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

Out

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D3 ****

COMPUTE NM HYD ID=15 HYD=D3 AREA=0.00009 PER A=0.0 PER B=50.0
PER C=0.0 PER D=50.0 TP=.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .17806 CFS UNIT VOLUME = .9364 B = 526.28 P60 = 2.0100
AREA = .000045 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .131790HR TP = .133000HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .10993 CFS UNIT VOLUME = .8748 B = 324.91 P60 = 2.0100
AREA = .000045 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=15 CODE=1

HYDROGRAPH FROM AREA D3

RUNOFF VOLUME = 1.44763 INCHES = .0069 ACRE-FEET
PEAK DISCHARGE RATE = .22 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

**** COMPUTE AND PRINT NM HYD DATA FOR BASIN D2 ****

COMPUTE NM HYD ID=16 HYD=D2 AREA=0.00017 PER A=0.0 PER B=0.0
PER C=100.0 PER D=0.0 TP=.133 RAINFALL=-1

K = .107204HR TP = .133000HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = .49025 CFS UNIT VOLUME = .9780 B = 383.55 P60 = 2.0100
AREA = .000170 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=16 CODE=1

HYDROGRAPH FROM AREA D2

RUNOFF VOLUME = 1.12613 INCHES = .0102 ACRE-FEET
PEAK DISCHARGE RATE = .35 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

*

*DETERMINATION OF POND:

*****ROUTE BASIN C-5 THROUGH DETENTION POND

ROUTE RESERVOIR ID=20 HYD=POND2 INFLOW ID=3 CODE=10
OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
0 0 5020
1.34 0.308286 5022
1.64 0.499562 5023

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5020.00	.000	.00
.50	.00	5020.00	.000	.00
1.00	.00	5020.00	.000	.00
1.50	13.87	5020.95	.146	.64
2.00	3.07	5022.30	.366	1.43
2.50	.41	5022.26	.359	1.42
3.00	.14	5022.02	.311	1.34
3.50	.08	5021.71	.264	1.15
4.00	.07	5021.45	.223	.97
4.50	.06	5021.23	.189	.82
5.00	.07	5021.04	.160	.70
5.50	.07	5020.89	.137	.59
6.00	.08	5020.76	.117	.51
6.50	.00	5020.64	.099	.43
7.00	.00	5020.54	.083	.36
7.50	.00	5020.45	.069	.30
8.00	.00	5020.37	.058	.25

				Out
8.50	.00	5020.31	.048	.21
9.00	.00	5020.26	.040	.18
9.50	.00	5020.22	.034	.15
10.00	.00	5020.18	.028	.12
10.50	.00	5020.15	.024	.10
11.00	.00	5020.13	.020	.09
11.50	.00	5020.11	.016	.07
12.00	.00	5020.09	.014	.06
12.50	.00	5020.07	.011	.05
13.00	.00	5020.06	.010	.04
13.50	.00	5020.05	.008	.03
14.00	.00	5020.04	.007	.03
14.50	.00	5020.04	.006	.02
15.00	.00	5020.03	.005	.02
15.50	.00	5020.03	.004	.02
16.00	.00	5020.02	.003	.01
16.50	.00	5020.02	.003	.01
17.00	.00	5020.01	.002	.01
17.50	.00	5020.01	.002	.01
18.00	.00	5020.01	.002	.01
18.50	.00	5020.01	.001	.01
19.00	.00	5020.01	.001	.00

PEAK DISCHARGE = 1.449 CFS - PEAK OCCURS AT HOUR 2.15
 MAXIMUM WATER SURFACE ELEVATION = 5022.364
 MAXIMUM STORAGE = .3780 AC-FT INCREMENTAL TIME= .050000HRS

*
 PRINT HYD ID=20 CODE=1

HYDROGRAPH FROM AREA POND2

RUNOFF VOLUME = 1.78064 INCHES = .5033 ACRE-Feet
 PEAK DISCHARGE RATE = 1.45 CFS AT 2.150 HOURS BASIN AREA = .0053 SQ. MI.

*
 ***** COMBINE HYDROGRAPHS FOR BASINS C5 AND C4*****
 *S COMBINE HYDROGRAPHS FOR BASINS C5 AND C4.
 ADD HYD ID=21 HYD=21 ID I=20 ID II=4
 *
 PRINT HYD ID=21 CODE=1

OUTFLOW HYDROGRAPH REACH 21.00

RUNOFF VOLUME = 1.82883 INCHES = .6506 ACRE-Feet
 PEAK DISCHARGE RATE = 4.58 CFS AT 1.500 HOURS BASIN AREA = .0067 SQ. MI.

*

 *DETERMINATION OF POND:
 *****ROUTE BASIN B-2 THROUGH UNDERGROUND DETENTION POND
 ROUTE RESERVOIR ID=22 HYD=POND4A INFLOW ID=1 CODE=10
 OUTFLOW (CFS) STORAGE (AC FT) ELEV. (FT)
 0 0 5028
 1.82 0.293846 5030
 2.03 0.367308 5030.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5028.00	.000	.00
.50	.00	5028.00	.000	.00
1.00	.00	5028.00	.000	.00
1.50	9.37	5028.66	.098	.60
2.00	2.07	5029.58	.232	1.44
2.50	.28	5029.42	.209	1.29
3.00	.09	5029.14	.167	1.04
3.50	.05	5028.90	.132	.82
4.00	.05	5028.71	.104	.64
4.50	.04	5028.56	.082	.51
5.00	.05	5028.44	.065	.40

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				Out
.00	.00	5020.00	.000	.00
.50	.00	5020.00	.000	.00
1.00	.00	5020.00	.000	.00
1.50	7.49	5021.02	.077	.57
2.00	1.66	5022.27	.180	1.18
2.50	.22	5022.08	.160	1.14
3.00	.07	5021.62	.122	.91
3.50	.04	5021.21	.092	.68
4.00	.04	5020.91	.069	.51
4.50	.03	5020.69	.052	.39
5.00	.04	5020.52	.039	.29
5.50	.04	5020.40	.030	.23
6.00	.04	5020.32	.024	.18
6.50	.00	5020.24	.018	.13
7.00	.00	5020.18	.013	.10
7.50	.00	5020.13	.010	.07
8.00	.00	5020.10	.007	.05
8.50	.00	5020.07	.005	.04
9.00	.00	5020.05	.004	.03
9.50	.00	5020.04	.003	.02
10.00	.00	5020.03	.002	.02
10.50	.00	5020.02	.002	.01
11.00	.00	5020.02	.001	.01
11.50	.00	5020.01	.001	.01
12.00	.00	5020.01	.001	.00

PEAK DISCHARGE = 1.188 CFS - PEAK OCCURS AT HOUR 2.10
 MAXIMUM WATER SURFACE ELEVATION = 5022.290
 MAXIMUM STORAGE = .1822 AC-FT INCREMENTAL TIME= .050000HRS

*
 PRINT HYD ID=25 CODE=1

HYDROGRAPH FROM AREA POND5

RUNOFF VOLUME = 1.78068 INCHES = .2716 ACRE-FEET
 PEAK DISCHARGE RATE = 1.19 CFS AT 2.100 HOURS BASIN AREA = .0029 SQ. MI.

*
 ***** COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1*****
 *S COMBINE HYDROGRAPHS FOR BASINS B2+C3+C5+C4 AND C1
 ADD HYD ID=26 HYD=26 ID I=24 ID II=25
 *
 PRINT HYD ID=26 CODE=1

OUTFLOW HYDROGRAPH REACH 26.00

RUNOFF VOLUME = 1.81375 INCHES = 1.3765 ACRE-FEET
 PEAK DISCHARGE RATE = 8.87 CFS AT 1.500 HOURS BASIN AREA = .0142 SQ. MI.

*
 ***** COMBINE HYDROGRAPHS FOR BASINS B3 AND B1*****
 *S COMBINE HYDROGRAPHS FOR BASINS B3 AND B1
 ADD HYD ID=28 HYD=28 ID I=11 ID II=7
 *
 PRINT HYD ID=28 CODE=1

OUTFLOW HYDROGRAPH REACH 28.00

RUNOFF VOLUME = 1.76381 INCHES = .7516 ACRE-FEET
 PEAK DISCHARGE RATE = 20.77 CFS AT 1.500 HOURS BASIN AREA = .0080 SQ. MI.

*

 *DETERMINATION OF POND:
 *****ROUTE BASIN B1+B3 THROUGH DETENTION POND
 ROUTE RESERVOIR ID=29 HYD=POND4 INFLOW ID=28 CODE=10
 OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
 0 0 5022
 4.09 0.607206 5024

4.58 0.759008 5024.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5022.00	.000	.00
.50	.00	5022.00	.000	.00
1.00	.00	5022.00	.000	.00
1.50	20.77	5022.71	.215	1.45
2.00	4.56	5023.66	.503	3.39
2.50	.61	5023.47	.445	3.00
3.00	.21	5023.15	.349	2.35
3.50	.12	5022.89	.270	1.82
4.00	.10	5022.69	.208	1.40
4.50	.09	5022.53	.161	1.09
5.00	.10	5022.41	.126	.85
5.50	.11	5022.33	.099	.66
6.00	.12	5022.26	.079	.53
6.50	.01	5022.20	.061	.41
7.00	.00	5022.15	.046	.31
7.50	.00	5022.12	.035	.24
8.00	.00	5022.09	.027	.18
8.50	.00	5022.07	.020	.14
9.00	.00	5022.05	.015	.10
9.50	.00	5022.04	.012	.08
10.00	.00	5022.03	.009	.06
10.50	.00	5022.02	.007	.04
11.00	.00	5022.02	.005	.03
11.50	.00	5022.01	.004	.03
12.00	.00	5022.01	.003	.02
12.50	.00	5022.01	.002	.01
13.00	.00	5022.01	.002	.01
13.50	.00	5022.00	.001	.01
14.00	.00	5022.00	.001	.01
14.50	.00	5022.00	.001	.00

PEAK DISCHARGE = 3.422 CFS - PEAK OCCURS AT HOUR 2.10
 MAXIMUM WATER SURFACE ELEVATION = 5023.673
 MAXIMUM STORAGE = .5080 AC-FT INCREMENTAL TIME= .050000HRS

PRINT HYD ID=29 CODE=1

HYDROGRAPH FROM AREA POND4

RUNOFF VOLUME = 1.76380 INCHES = .7516 ACRE-FEET
 PEAK DISCHARGE RATE = 3.42 CFS AT 2.100 HOURS BASIN AREA = .0080 SQ. MI.

***** COMBINE HYDROGRAPHS FOR BASINS A2 AND A1*****
 *S COMBINE HYDROGRAPHS FOR BASINS A2 AND A1
 ADD HYD ID=30 HYD=30 ID I=12 ID II=9

PRINT HYD ID=30 CODE=1

OUTFLOW HYDROGRAPH REACH 30.00

RUNOFF VOLUME = 1.74826 INCHES = .3767 ACRE-FEET
 PEAK DISCHARGE RATE = 10.46 CFS AT 1.500 HOURS BASIN AREA = .0040 SQ. MI.

***** COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2 *****
 *S COMBINE HYDROGRAPHS FOR BASINS B1+B3 AND A1+A2+D1
 ADD HYD ID=31 HYD=31 ID I=30 ID II=29
 ADD HYD ID=32 HYD=32 ID I=31 ID II=10

PRINT HYD ID=32 CODE=1

OUTFLOW HYDROGRAPH REACH 32.00

Out
RUNOFF VOLUME = 1.76287 INCHES = 1.4178 ACRE-FEET
PEAK DISCHARGE RATE = 19.90 CFS AT 1.500 HOURS BASIN AREA = .0151 SQ. MI.

*

*DETERMINATION OF POND:

*****ROUTE NORTH BASINS THROUGH DETENTION POND

ROUTE RESERVOIR ID=33 HYD=POND3 INFLOW ID=32 CODE=10
OUTFLOW (CFS) STORAGE (AC FT) ELEV (FT)
0 0 5008
4.53 0.214141 5010
6.40 0.531449 5012
7.84 0.964482 5014

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5008.00	.000	.00
.50	.00	5008.00	.000	.00
1.00	.00	5008.00	.000	.00
1.50	19.90	5009.70	.182	3.85
2.00	7.44	5011.41	.437	5.85
2.50	3.54	5011.17	.401	5.63
3.00	2.53	5010.56	.303	5.05
3.50	1.92	5009.86	.199	4.20
4.00	1.49	5009.20	.129	2.72
4.50	1.17	5008.84	.089	1.89
5.00	.93	5008.61	.066	1.39
5.50	.76	5008.47	.050	1.06
6.00	.63	5008.37	.040	.84
6.50	.42	5008.28	.030	.64
7.00	.31	5008.21	.022	.47
7.50	.24	5008.16	.017	.35
8.00	.18	5008.12	.013	.26
8.50	.14	5008.09	.009	.20
9.00	.10	5008.07	.007	.15
9.50	.08	5008.05	.005	.11
10.00	.06	5008.04	.004	.09
10.50	.04	5008.03	.003	.07
11.00	.03	5008.02	.002	.05
11.50	.03	5008.02	.002	.04
12.00	.02	5008.01	.001	.03
12.50	.01	5008.01	.001	.02
13.00	.01	5008.01	.001	.02
13.50	.01	5008.01	.001	.01
14.00	.01	5008.00	.000	.01
14.50	.00	5008.00	.000	.01
15.00	.00	5008.00	.000	.01
15.50	.00	5008.00	.000	.00

PEAK DISCHARGE = 5.896 CFS - PEAK OCCURS AT HOUR 2.10
MAXIMUM WATER SURFACE ELEVATION = 5011.461
MAXIMUM STORAGE = .4460 AC-FT INCREMENTAL TIME= .050000HRS

*
PRINT HYD ID=33 CODE=1

HYDROGRAPH FROM AREA POND3

RUNOFF VOLUME = 1.76287 INCHES = 1.4178 ACRE-FEET
PEAK DISCHARGE RATE = 5.90 CFS AT 2.100 HOURS BASIN AREA = .0151 SQ. MI.

*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 *****

*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2

ADD HYD ID=34 HYD=34 ID I=13 ID II=14

ADD HYD ID=35 HYD=35 ID I=15 ID II=16

ADD HYD ID=36 HYD=36 ID I=34 ID II=35

*
PRINT HYD ID=36 CODE=1

OUTFLOW HYDROGRAPH REACH 36.00

Out

RUNOFF VOLUME = 1.06682 INCHES = .0637 ACRE-FEET
PEAK DISCHARGE RATE = 2.01 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

*
**** COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS*****
*S COMBINE HYDROGRAPHS FOR BASINS A3+A5 AND D3+D2 AND NORTH BASINS
ADD HYD ID=37 HYD=37 ID I=33 ID II=36
*
PRINT HYD ID=37 CODE=1

OUTFLOW HYDROGRAPH REACH 37.00

RUNOFF VOLUME = 1.71469 INCHES = 1.4815 ACRE-FEET
PEAK DISCHARGE RATE = 6.53 CFS AT 1.550 HOURS BASIN AREA = .0162 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:19:49

BASIN	TOTAL AREA (ac)	PROPOSED LAND TREATMENT AREAS				PEAK DISCHARGE RATE								PROPOSED PEAK DISCHARGE		EXISTING PEAK DISCHARGE	
		A (ac)	B (ac)	C (ac)	D (ac)	A (cfs/ac)	B (cfs/ac)	C (cfs/ac)	D (cfs/ac)	10 YR (cfs)	100 YR (cfs)	10 YR (cfs)	100 YR (cfs)				
PHASE I																	
OFFSITE BASINS																	
A-2	0.13	0.00	0.00	0.13	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.22	0.41	0.00	0.41
A-5	0.28	0.00	0.14	0.00	0.13	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.57	0.98	0.13	0.76
B-3	0.1	0.00	0.05	0.05	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.13	0.27	0.05	0.27
C-2	0.36	0.18	0.18	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.24	0.69	0.24	0.69
D-3	0.06	0.00	0.03	0.00	0.03	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.12	0.21	0.02	0.09
I-2	0.28	0.00	0.08	0.00	0.18	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.70	1.11	0.11	0.44
	1.21													1.99	3.67	0.55	2.66
ON-SITE BASINS																	
A-1	2.46	0.00	0.25	0.49	1.72	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	6.48	10.20	1.43	4.42
A-3	0.27	0.24	0.00	0.03	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.14	0.46	0.14	0.46
A-4	0.83	0.00	0.00	0.08	0.76	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.49	3.77	0.84	1.92
B-1	5.01	0.00	0.50	1.00	3.48	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	13.20	20.77	3.00	9.15
B-2	2.29	0.00	0.23	0.46	1.60	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	6.03	9.49	1.37	4.18
C-1	1.83	0.00	0.18	0.37	1.29	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	4.82	7.59	1.22	3.49
C-3	0.72	0.00	0.00	0.16	0.65	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.05	3.16	0.43	1.31
C-4	0.88	0.00	0.00	0.08	0.69	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.64	4.00	0.70	1.82
C-5	3.39	0.34	0.00	0.68	2.38	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	8.74	13.81	3.83	8.33
D-1	1.95	0.19	0.00	0.39	1.36	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	5.03	7.94	1.17	3.56
D-2	0.11	0.00	0.00	0.11	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.19	0.35	0.04	0.17
D-4	0.08	0.00	0.01	0.07	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.13	0.24	0.11	0.22
E-1	0.48	0.00	0.07	0.41	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.77	1.45	0.29	0.88
E-2	0.12	0.00	0.05	0.07	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.17	0.34	0.16	0.33
F-1	1.02	0.00	0.14	0.82	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.63	3.07	1.21	2.58
F-2	0.34	0.00	0.00	0.34	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.58	1.07	0.53	1.01
F-3	0.08	0.00	0.00	0.08	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.14	0.25	0.08	0.19
G-1	0.26	0.00	0.08	0.18	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.39	0.75	0.35	0.70
H-1	0.87	0.00	0.08	0.71	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.42	2.66	1.18	2.38
H-2	0.15	0.00	0.00	0.28	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.26	0.47	0.24	0.45
I-1	0.88	0.00	0.12	0.22	0.78	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.32	3.65	1.05	2.23
I-3	0.7	0.00	0.06	0.52	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.14	2.14	0.86	1.81
I-4	0.19	0.00	0.02	0.09	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.30	0.56	0.30	0.56
	24.91													61.05	98.18	20.53	52.15
Total	26.12													63.04	101.85	21.08	54.81

10-YR STORM DISCHARGE (cfs/acre)**CURRENT CONDITIONS**

BASIN	AREA (ACRES)	% LAND TREATMENT*				10-YR DISCHARGE - (CFS/ACRE)**				Q(10-YR) UNDEVELOPED (CFS)
		A	B	C	D	0.38	0.95	1.71	3.14	
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.22
A-6	0.28	0.00	50.00	50.00	0.00	0.38	0.95	1.71	3.14	0.37
B-3	0.10	0.00	50.00	50.00	0.00	0.38	0.95	1.71	3.14	0.13
C-2	0.38	50.00	50.00	0.00	0.00	0.38	0.95	1.71	3.14	0.24
D-3	0.06	100.00	0.00	0.00	0.00	0.38	0.95	1.71	3.14	0.02
I-2	0.28	100.00	0.00	0.00	0.00	0.38	0.95	1.71	3.14	0.11
ON SITE										
A-1	2.46	85.00	0.00	15.00	0.00	0.38	0.95	1.71	3.14	1.43
A-3	0.27	90.00	0.00	10.00	0.00	0.38	0.95	1.71	3.14	0.14
A-4	0.83	34.00	33.00	33.00	0.00	0.38	0.95	1.71	3.14	0.84
B-1	5.01	75.00	15.00	10.00	0.00	0.38	0.95	1.71	3.14	3.00
B-2	2.29	75.00	15.00	10.00	0.00	0.38	0.95	1.71	3.14	1.37
C-1	1.83	70.00	15.00	15.00	0.00	0.38	0.95	1.71	3.14	1.22
C-3	0.72	75.00	15.00	10.00	0.00	0.38	0.95	1.71	3.14	0.43
C-4	0.88	60.00	15.00	25.00	0.00	0.38	0.95	1.71	3.14	0.70
C-5	3.39	35.00	15.00	50.00	0.00	0.38	0.95	1.71	3.14	3.83
D-1	1.95	75.00	15.00	10.00	0.00	0.38	0.95	1.71	3.14	1.17
D-2	0.11	100.00	0.00	0.00	0.00	0.38	0.95	1.71	3.14	0.04
D-4	0.08	0.00	50.00	50.00	0.00	0.38	0.95	1.71	3.14	0.11
E-1	0.48	75.00	15.00	10.00	0.00	0.38	0.95	1.71	3.14	0.29
E-2	0.12	0.00	50.00	50.00	0.00	0.38	0.95	1.71	3.14	0.16
F-1	1.02	25.00	25.00	50.00	0.00	0.38	0.95	1.71	3.14	1.21
F-2	0.34	0.00	20.00	80.00	0.00	0.38	0.95	1.71	3.14	0.53
F-3	0.08	34.00	33.00	33.00	0.00	0.38	0.95	1.71	3.14	0.08
G-1	0.26	20.00	15.00	65.00	0.00	0.38	0.95	1.71	3.14	0.35
H-1	0.87	15.00	20.00	65.00	0.00	0.38	0.95	1.71	3.14	1.18
H-2	0.15	0.00	15.00	85.00	0.00	0.38	0.95	1.71	3.14	0.24
I-1	0.88	25.00	25.00	50.00	0.00	0.38	0.95	1.71	3.14	1.06
I-3	0.70	30.00	10.00	60.00	0.00	0.38	0.95	1.71	3.14	0.86
I-4	0.19	0.00	20.00	80.00	0.00	0.38	0.95	1.71	3.14	0.30
										21.80

DEVELOPED

BASIN	AREA (ACRES)	% LAND TREATMENT*				10-YR DISCHARGE - (CFS/ACRE)**				Q(10-YR) DEVELOPED
		A	B	C	D	0.38	0.95	1.71	3.14	(CFS)
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.22
A-5	0.28	0.00	50.00	0.00	50.00	0.38	0.95	1.71	3.14	0.57
B-3	0.10	0.00	50.00	50.00	0.00	0.38	0.95	1.71	3.14	0.13
C-2	0.38	50.00	50.00	0.00	0.00	0.38	0.95	1.71	3.14	0.24
D-3	0.06	0.00	50.00	0.00	50.00	0.38	0.95	1.71	3.14	0.12
I-2	0.28	0.00	30.00	0.00	70.00	0.38	0.95	1.71	3.14	0.70
ON SITE										
A-1	2.46	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	6.48
A-3	0.27	90.00	0.00	10.00	0.00	0.38	0.95	1.71	3.14	0.14
A-4	0.83	0.00	0.00	10.00	90.00	0.38	0.95	1.71	3.14	2.49
B-1	5.01	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	13.20
B-2	2.29	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	6.03
C-1	1.83	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	4.82
C-3	0.72	0.00	0.00	20.00	80.00	0.38	0.95	1.71	3.14	2.06
C-4	0.88	0.00	0.00	10.00	90.00	0.38	0.95	1.71	3.14	2.64
C-5	3.39	10.00	0.00	20.00	70.00	0.38	0.95	1.71	3.14	8.74
D-1	1.95	10.00	0.00	20.00	70.00	0.38	0.95	1.71	3.14	5.03
D-2	0.11	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.19
D-4	0.08	0.00	10.00	90.00	0.00	0.38	0.95	1.71	3.14	0.13
E-1	0.48	0.00	15.00	85.00	0.00	0.38	0.95	1.71	3.14	0.77
E-2	0.12	0.00	40.00	60.00	0.00	0.38	0.95	1.71	3.14	0.17
F-1	1.02	0.00	15.00	85.00	0.00	0.38	0.95	1.71	3.14	1.63
F-2	0.34	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.58
F-3	0.08	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.14
G-1	0.26	0.00	30.00	70.00	0.00	0.38	0.95	1.71	3.14	0.39
H-1	0.87	0.00	10.00	90.00	0.00	0.38	0.95	1.71	3.14	1.42
H-2	0.15	0.00	0.00	100.00	0.00	0.38	0.95	1.71	3.14	0.26
I-1	0.88	0.00	10.00	20.00	70.00	0.38	0.95	1.71	3.14	2.32
I-3	0.70	0.00	10.00	90.00	0.00	0.38	0.95	1.71	3.14	1.14
I-4	0.19	0.00	20.00	80.00	0.00	0.38	0.95	1.71	3.14	0.30
										63.03

TOTAL 10-YEAR STORM DISCHARGE (DEVELOPED)**63.03**

PEAK DISCHARGE (cfs/acre)

CURRENT CONDITIONS

BASIN	AREA (ACRES)	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)**				Q(100-YR) UNDEVELOPED
		A	B	C	D	1.56	2.28	3.14	4.7	(CFS)
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	0.41
A-5	0.28	0.00	50.00	50.00	0.00	1.56	2.28	3.14	4.7	0.76
B-3	0.10	0.00	50.00	50.00	0.00	1.56	2.28	3.14	4.7	0.27
C-2	0.36	50.00	50.00	0.00	0.00	1.56	2.28	3.14	4.7	0.69
D-3	0.06	100.00	0.00	0.00	0.00	1.56	2.28	3.14	4.7	0.09
I-2	0.28	100.00	0.00	0.00	0.00	1.56	2.28	3.14	4.7	0.44
ON SITE										
A-1	2.46	85.00	0.00	15.00	0.00	1.56	2.28	3.14	4.7	4.42
A-3	0.27	90.00	0.00	10.00	0.00	1.56	2.28	3.14	4.7	0.46
A-4	0.83	34.00	33.00	33.00	0.00	1.56	2.28	3.14	4.7	1.92
B-1	5.01	75.00	15.00	10.00	0.00	1.56	2.28	3.14	4.7	9.15
B-2	2.29	75.00	15.00	10.00	0.00	1.56	2.28	3.14	4.7	4.18
C-1	1.83	70.00	15.00	15.00	0.00	1.56	2.28	3.14	4.7	3.49
C-3	0.72	75.00	15.00	10.00	0.00	1.56	2.28	3.14	4.7	1.31
C-4	0.88	60.00	15.00	25.00	0.00	1.56	2.28	3.14	4.7	1.82
C-5	3.39	35.00	15.00	50.00	0.00	1.56	2.28	3.14	4.7	8.33
D-1	1.95	75.00	15.00	10.00	0.00	1.56	2.28	3.14	4.7	3.56
D-2	0.11	100.00	0.00	0.00	0.00	1.56	2.28	3.14	4.7	0.17
D-4	0.08	0.00	50.00	50.00	0.00	1.56	2.28	3.14	4.7	0.22
E-1	0.48	75.00	15.00	10.00	0.00	1.56	2.28	3.14	4.7	0.88
E-2	0.12	0.00	50.00	50.00	0.00	1.56	2.28	3.14	4.7	0.33
F-1	1.02	25.00	25.00	50.00	0.00	1.56	2.28	3.14	4.7	2.58
F-2	0.34	0.00	20.00	80.00	0.00	1.56	2.28	3.14	4.7	1.01
F-3	0.08	34.00	33.00	33.00	0.00	1.56	2.28	3.14	4.7	0.19
G-1	0.26	20.00	15.00	65.00	0.00	1.56	2.28	3.14	4.7	0.70
H-1	0.87	15.00	20.00	65.00	0.00	1.56	2.28	3.14	4.7	2.38
H-2	0.15	0.00	15.00	85.00	0.00	1.56	2.28	3.14	4.7	0.45
I-1	0.88	25.00	25.00	50.00	0.00	1.56	2.28	3.14	4.7	2.23
I-3	0.70	30.00	10.00	60.00	0.00	1.56	2.28	3.14	4.7	1.81
I-4	0.19	0.00	20.00	80.00	0.00	1.56	2.28	3.14	4.7	0.56
										54.80

DEVELOPED

BASIN	AREA (ACRES)	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)**				Q(100-YR) DEVELOPED
		A	B	C	D	1.56	2.28	3.14	4.7	(CFS)
OFF SITE										
A-2	0.13	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	0.41
A-5	0.28	0.00	50.00	0.00	50.00	1.56	2.28	3.14	4.7	0.98
B-3	0.10	0.00	50.00	50.00	0.00	1.56	2.28	3.14	4.7	0.27
C-2	0.36	50.00	50.00	0.00	0.00	1.56	2.28	3.14	4.7	0.69
D-3	0.06	0.00	50.00	0.00	50.00	1.56	2.28	3.14	4.7	0.21
I-2	0.28	0.00	30.00	0.00	70.00	1.56	2.28	3.14	4.7	1.11
ON SITE										
A-1	2.46	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4.7	10.20
A-3	0.27	90.00	0.00	10.00	0.00	1.56	2.28	3.14	4.7	0.46
A-4	0.83	0.00	0.00	10.00	90.00	1.56	2.28	3.14	4.7	3.77
B-1	5.01	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4.7	20.77
B-2	2.29	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4.7	9.49
C-1	1.83	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4.7	7.59
C-3	0.72	0.00	0.00	20.00	80.00	1.56	2.28	3.14	4.7	3.16
C-4	0.88	0.00	0.00	10.00	90.00	1.56	2.28	3.14	4.7	4.00
C-5	3.39	10.00	0.00	20.00	70.00	1.56	2.28	3.14	4.7	13.81
D-1	1.95	10.00	0.00	20.00	70.00	1.56	2.28	3.14	4.7	7.94
D-2	0.11	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	0.35
D-4	0.08	0.00	10.00	90.00	0.00	1.56	2.28	3.14	4.7	0.24
E-1	0.48	0.00	15.00	85.00	0.00	1.56	2.28	3.14	4.7	1.45
E-2	0.12	0.00	40.00	60.00	0.00	1.56	2.28	3.14	4.7	0.34
F-1	1.02	0.00	15.00	85.00	0.00	1.56	2.28	3.14	4.7	3.07
F-2	0.34	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	1.07
F-3	0.08	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	0.25
G-1	0.26	0.00	30.00	70.00	0.00	1.56	2.28	3.14	4.7	0.75
H-1	0.87	0.00	10.00	90.00	0.00	1.56	2.28	3.14	4.7	2.66
H-2	0.15	0.00	0.00	100.00	0.00	1.56	2.28	3.14	4.7	0.47
I-1	0.88	0.00	10.00	20.00	70.00	1.56	2.28	3.14	4.7	3.65
I-3	0.70	0.00	10.00	90.00	0.00	1.56	2.28	3.14	4.7	2.14
I-4	0.19	0.00	20.00	80.00	0.00	1.56	2.28	3.14	4.7	0.56
										101.86

TOTAL 100-YEAR STORM DISCHARGE (DEVELOPED)

101.86

Pond 2	(Max. allow. rel.=1.75)		100 Yr. WSE=5022.36						
Elevation	Area	Avg Area	Increment Vol	Cum Vol	Cum Vol	H	Q	d (ft)=	0.5
	ft^2	ft^2	ft^3	ft^3	ac-ft	ft	cfs		
5020	5663		0	0	0	0	0		
5022	7766	6714.5	13429	13429	0.308286217	2	1.34		
5023	8898	8332	8332	21761	0.49956187	3	1.64		
Pond 3	(Max. allow. rel.=4.20 and 4.69-Pond 4)		100 Yr. WSE=5011.46						
Elevation	Area	Avg Area	Increment Vol	Cum Vol	Cum Vol	H	Q	d (ft)=	0.92
	ft^2	ft^2	ft^3	ft^3	ac-ft	ft	cfs		
5880	3614		0	0	0	0	0		
5010	5714	4664	9328	9328	0.214140578	2	4.53		
5012	8108	6911	13822	23150	0.531448798	4	6.40		
5014	10755	9431.5	18863	42013	0.964482003	6	7.84		
Pond 5	(Max. allow. rel.=1.76)		100 Yr. WSE=5022.29						
Elevation	Area	Avg Area	Increment Vol	Cum Vol	Cum Vol	H	Q	d (ft)=	0.458
	ft^2	ft^2	ft^3	ft^3	ac-ft	ft	cfs		
5020	2643.5		0	0	0	0	0		
5022	3931.1	3287.3	6574.6	6574.6	0.150931459	2	1.12		
5024	5451.25	4691.175	9382.35	15956.95	0.366319737	4	1.59		
Pond 4	(Max. allow. rel.=4.68)		100 Yr. WSE=5023.67						
Elevation	Area	Avg Area	Increment Vol	Cum Vol	Cum Vol	H	Q	d (ft)=	0.875
	ft^2	ft^2	ft^3	ft^3	ac-ft	ft	cfs		
5022	13225		0	0	0	0	0		
5024	13225	13225	26450	26450	0.607206078	2	4.09		
5024.5	13225	13225	6612.5	33062.5	0.759007598	2.5	4.58		
Pond 4A	(Max. allow. rel.=2.09)		100 Yr. WSE=5029.60						
Elevation	Area	Avg Area	Increment Vol	Cum Vol	Cum Vol	H	Q	d (ft)=	0.583
	ft^2	ft^2	ft^3	ft^3	ac-ft	ft	cfs		
5028	6400		0	0	0	0	0		
5030	6400	6400	12800	12800	0.29384642	2	1.82		
5030.5	6400	6400	3200	16000	0.367308025	2.5	2.03		

APPENDIX C

STREET FLOW, INLET, STORM DRAIN AND CHANNEL CALCULATIONS

CATCH BASIN CALCULATION SHEET

ShL of_____

PROJECT GATEWAY

CALCULATED BY CAB

DESIGN FREQUENCY 100 YEAR

DATE 7-6-98

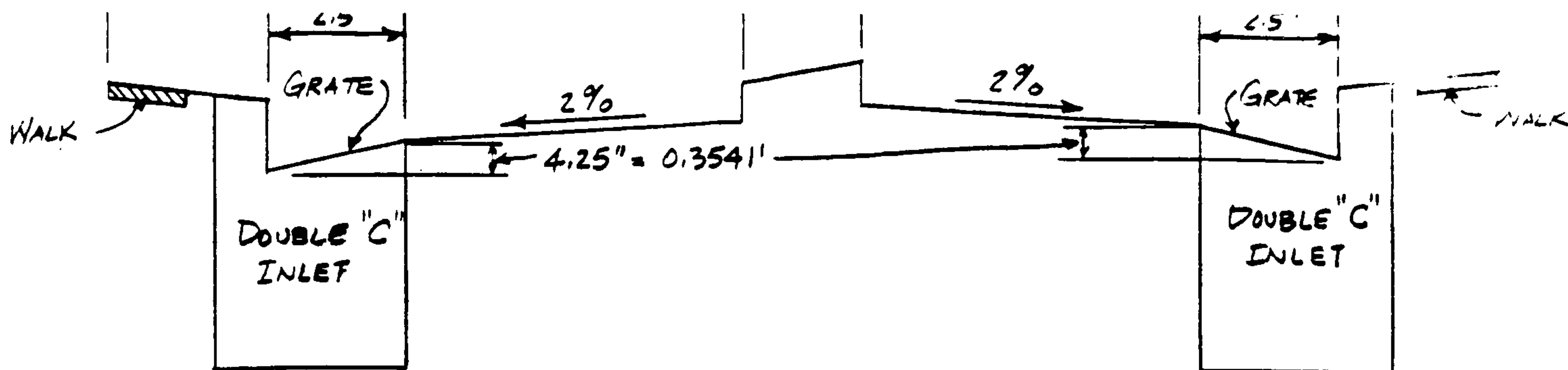
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Shl of _____

PROJECT GATEWAY
DESIGN FREQUENCY 10

CALCULATED BY CAB
DATE 7-6-98

DESIGN FREQUENCY	FLOW DIAGRAM (Indicate street slopes)	Sym.	Drain. Area	Q		Cap. of Street	Gutter "d"	C.B.		Connector Pipe		V Depth
				Total	Inter.			No.	Size	Head	L	
		3		0.88	0.88		.19	DBL "C"		202.8'	18"	3.8'
		2A		2.4	2.4		.36	DBL "C"		7.1'	18"	3.8'
		1B		2.3	2.3		.38	DBL "C"		74.7'	18"	2.99'
		1A		2.1	2.1		.36	DBL "C"		26.1'	18"	3.0'



STRUCTURE 3

$$Q_{TOTAL} = 0.88 \text{ CFS}$$

$$d = 0.19'$$

$$V = 2.4 \text{ fps}$$

$$S = 0.0269$$

$$SPREAD = < 2.5'$$

$$Q_{CAP} = 1.5 \text{ CFS}$$

STRUCTURE 2A

$$Q_{TOTAL} = 2.4 \text{ CFS}$$

$$d = 0.36'$$

$$V = 1.3 \text{ fps}$$

$$S = 0.0269$$

$$SPREAD = 2.8'$$

$$Q_{CAP} = 5.1 \text{ CFS}$$

STRUCTURE 1B

$$Q_{TOTAL} = 2.3 \text{ CFS}$$

$$d = 0.38'$$

$$V = 1.1 \text{ fps}$$

$$S = 0.0156$$

$$SPREAD = 3.8'$$

$$Q_{CAP} = 4.6 \text{ CFS}$$

STRUCTURE 1A

$$Q_{TOTAL} = 2.1 \text{ CFS}$$

$$d = 0.36'$$

$$V = 1.10 \text{ fps}$$

$$S = 0.0156$$

$$SPREAD = 2.8'$$

$$Q_{CAP} = 4.0 \text{ CFS}$$

STRUCTURE 1I

$$Q_{TOTAL} = 4.6 \text{ CFS}$$

$$d = 0.39'$$

$$V = 1.9 \text{ fps}$$

$$S = 0.058$$

$$SPREAD = 4.3'$$

$$Q_{CAP} = 8.0 \text{ CFS}$$

STRUCTURE 10A

$$Q_{TOTAL} = 2.4 \text{ CFS}$$

$$d = 0.32'$$

$$V = 1.7 \text{ fps}$$

$$S = 0.058$$

$$SPREAD = < 2.5'$$

$$Q_{CAP} = 5.6 \text{ CFS}$$

STRUCTURE 8

$$Q_{TOTAL} = 1.3 \text{ CFS}$$

$$d = 0.27'$$

$$V = 1.5 \text{ fps}$$

$$S = 0.058$$

$$SPREAD = < 2.5'$$

$$Q_{CAP} = 3.8 \text{ CFS}$$

Bohannon & Huston



PROJECT NAME

GATEWAY

PROJECT NO

97286

SUBJECT

SHEET

BY

CH'D

CAB

OF

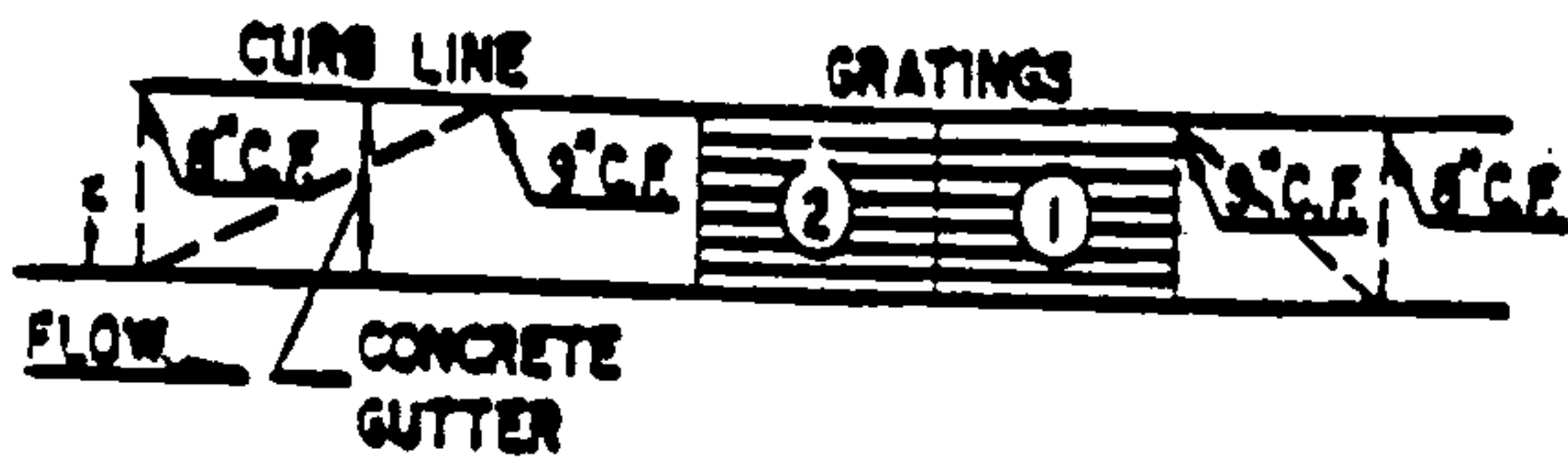
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DATE

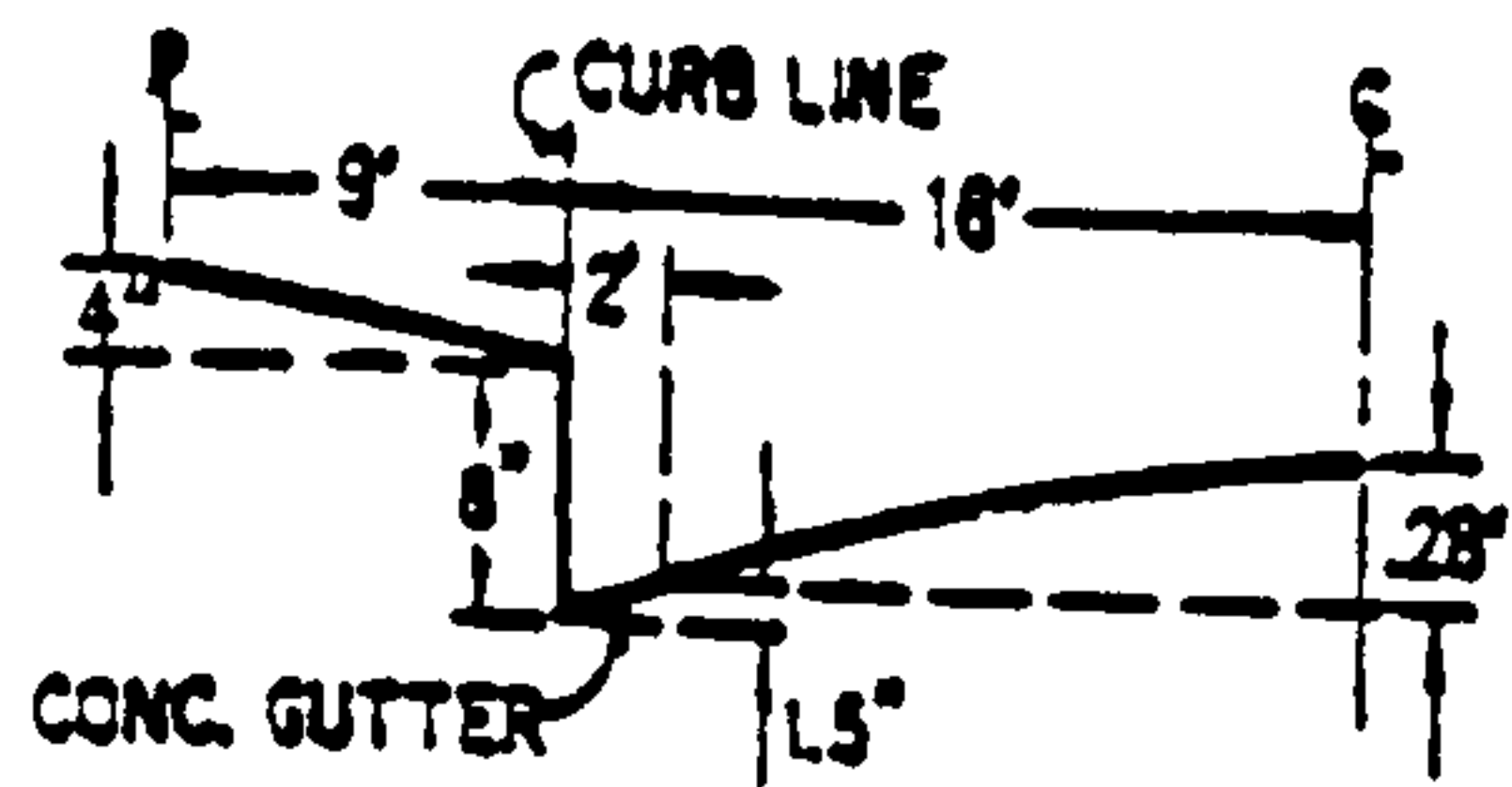
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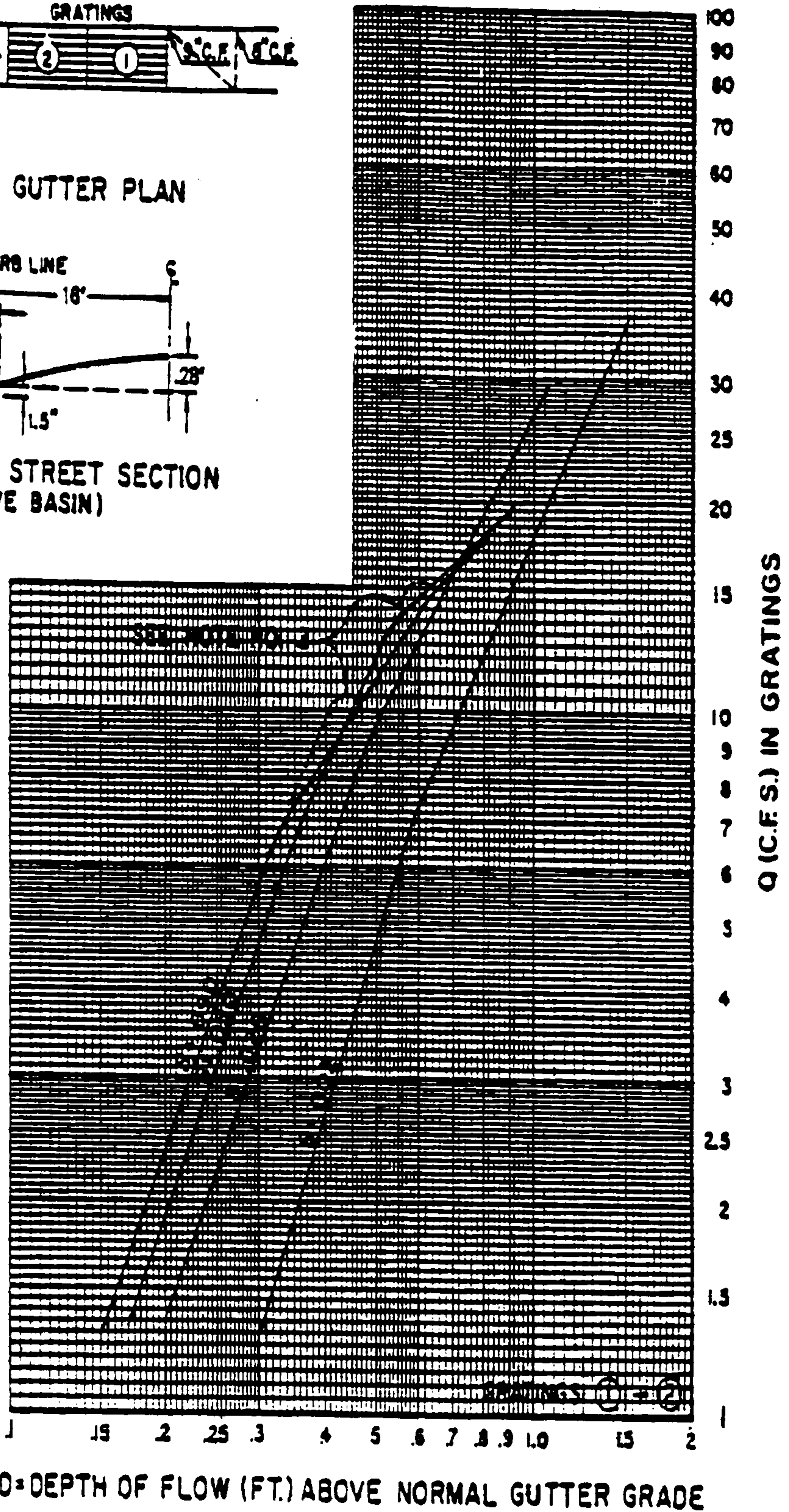
GRATING CAPACITIES FOR TYPE DOUBLE 'C,' AND 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION (ABOVE BASIN)



STREET CAPACITY

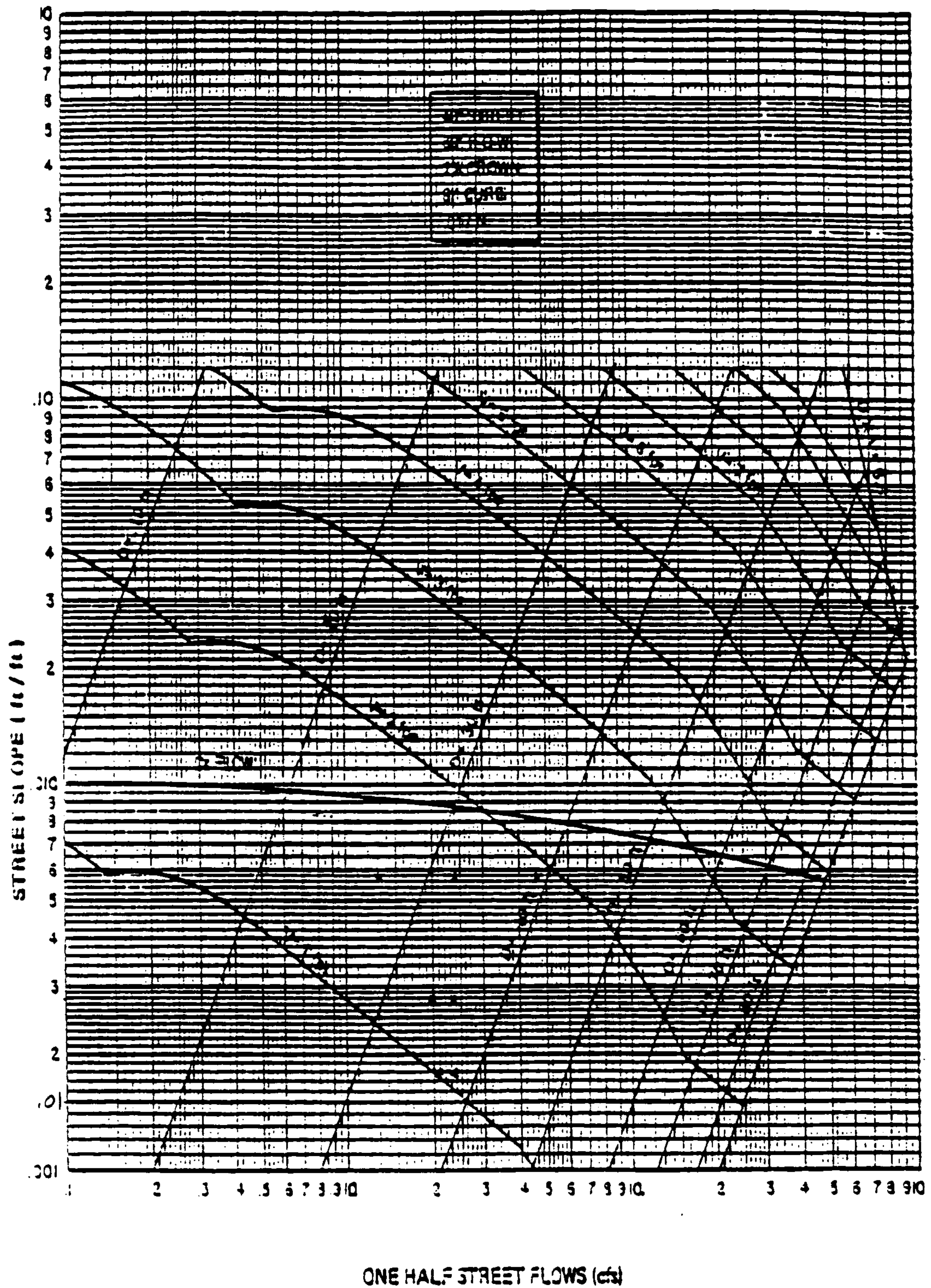


PLATE 22.3 D-3

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	2.000 cfs
Slope	0.0317 ft/ft
Manning's n	0.0110

Computed Results:

Depth	4.23 in
Area	0.79 ft2
Wetted Area	0.25 ft2
Wetted Perimeter	15.26 in
Perimeter	37.70 in
Velocity	8.08 fps
Hydraulic Radius	2.34 in
Percent Full	35.27 %
Full flow Flowrate	7.497 cfs
Full flow velocity	9.55 fps

Critical Information

Critical depth	7.24 in
Critical slope	0.0049 ft/ft
Critical velocity	4.04 fps
Critical area	0.50 ft2
Critical perimeter	21.35 in
Critical hydraulic radius	3.34 in
Critical top width	11.74 in
Specific energy	1.37 ft
Minimum energy	0.91 ft
Froude number	2.80
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.880 cfs
Slope	0.0386 ft/ft
Manning's n	0.0130

Computed Results:

Depth	4.54 in
Area	1.77 ft2
Wetted Area	0.35 ft2
Wetted Perimeter	18.95 in
Perimeter	56.55 in
Velocity	8.23 fps
Hydraulic Radius	2.66 in
Percent Full	25.24 %
Full flow Flowrate	20.638 cfs
Full flow velocity	11.68 fps

Critical Information

Critical depth	7.74 in
Critical slope	0.0051 ft/ft
Critical velocity	3.97 fps
Critical area	0.73 ft2
Critical perimeter	25.74 in
Critical hydraulic radius	4.06 in
Critical top width	17.82 in
Specific energy	1.43 ft
Minimum energy	0.97 ft
Froude number	2.80
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.880 cfs
Slope	0.0220 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.37 in
Area	1.77 ft2
Wetted Area	0.81 ft2
Wetted Perimeter	27.02 in
Perimeter	56.55 in
Velocity	8.54 fps
Hydraulic Radius	4.29 in
Percent Full	46.52 %
Full flow Flowrate	15.580 cfs
Full flow velocity	8.82 fps

Critical Information

Critical depth	12.18 in
Critical slope	0.0067 ft/ft
Critical velocity	5.40 fps
Critical area	1.27 ft2
Critical perimeter	34.79 in
Critical hydraulic radius	5.27 in
Critical top width	16.84 in
Specific energy	1.83 ft
Minimum energy	1.52 ft
Froude number	2.05
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	12.860 cfs
Slope	0.1127 ft/ft
Manning's n	0.0130

Computed Results:

Depth	7.52 in
Area	1.77 ft2
Wetted Area	0.70 ft2
Wetted Perimeter	25.30 in
Perimeter	56.55 in
Velocity	18.39 fps
Hydraulic Radius	3.98 in
Percent Full	41.78 %
Full flow Flowrate	35.264 cfs
Full flow velocity	19.96 fps

Critical Information

Critical depth	16.16 in
Critical slope	0.0132 ft/ft
Critical velocity	7.69 fps
Critical area	1.67 ft2
Critical perimeter	44.83 in
Critical hydraulic radius	5.37 in
Critical top width	10.91 in
Specific energy	5.88 ft
Minimum energy	2.02 ft
Froude number	4.72
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	1.600 cfs
Slope	0.0052 ft/ft
Manning's n	0.0110

Computed Results:

Depth	6.19 in
Area	0.79 ft2
Wetted Area	0.41 ft2
Wetted Perimeter	19.23 in
Perimeter	37.70 in
Velocity	3.92 fps
Hydraulic Radius	3.06 in
Percent Full	51.58 %
Full flow Flowrate	3.036 cfs
Full flow velocity	3.87 fps

Critical Information

Critical depth	6.44 in
Critical slope	0.0045 ft/ft
Critical velocity	3.72 fps
Critical area	0.43 ft2
Critical perimeter	19.74 in
Critical hydraulic radius	3.13 in
Critical top width	11.97 in
Specific energy	0.75 ft
Minimum energy	0.81 ft
Froude number	1.08
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	4.000 cfs
Slope	0.0070 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.52 in
Area	1.77 ft2
Wetted Area	0.82 ft2
Wetted Perimeter	27.31 in
Perimeter	56.55 in
Velocity	4.86 fps
Hydraulic Radius	4.34 in
Percent Full	47.34 %
Full flow Flowrate	8.789 cfs
Full flow velocity	4.97 fps

Critical Information

Critical depth	9.19 in
Critical slope	0.0054 ft/ft
Critical velocity	4.41 fps
Critical area	0.91 ft2
Critical perimeter	28.65 in
Critical hydraulic radius	4.56 in
Critical top width	18.00 in
Specific energy	1.08 ft
Minimum energy	1.15 ft
Froude number	1.15
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.100 cfs
Slope	0.0031 ft/ft
Manning's n	0.0130

Computed Results:

Depth	7.46 in
Area	1.77 ft2
Wetted Area	0.69 ft2
Wetted Perimeter	25.17 in
Perimeter	56.55 in
Velocity	3.04 fps
Hydraulic Radius	3.96 in
Percent Full	41.42 %
Full flow Flowrate	5.849 cfs
Full flow velocity	3.31 fps

Critical Information

Critical depth	6.56 in
Critical slope	0.0050 ft/ft
Critical velocity	3.60 fps
Critical area	0.58 ft2
Critical perimeter	23.34 in
Critical hydraulic radius	3.60 in
Critical top width	17.33 in
Specific energy	0.76 ft
Minimum energy	0.82 ft
Froude number	0.78
Flow condition	Subcritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	1.600 cfs
Slope	0.0953 ft/ft
Manning's n	0.0110

Computed Results:

Depth	2.84 in
Area	0.79 ft ²
Wetted Area	0.14 ft ²
Wetted Perimeter	12.20 in
Perimeter	37.70 in
Velocity	11.24 fps
Hydraulic Radius	1.68 in
Percent Full	23.69 %
Full flow Flowrate	12.998 cfs
Full flow velocity	16.55 fps

Critical Information

Critical depth	6.44 in
Critical slope	0.0045 ft/ft
Critical velocity	3.72 fps
Critical area	0.43 ft ²
Critical perimeter	19.74 in
Critical hydraulic radius	3.13 in
Critical top width	11.97 in
Specific energy	2.20 ft
Minimum energy	0.81 ft
Froude number	4.85
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	3.880 cfs
Slope	0.0074 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.24 in
Area	1.77 ft ²
Wetted Area	0.79 ft ²
Wetted Perimeter	26.75 in
Perimeter	56.55 in
Velocity	4.92 fps
Hydraulic Radius	4.25 in
Percent Full	45.78 %
Full flow Flowrate	9.036 cfs
Full flow velocity	5.11 fps

Critical Information

Critical depth	9.04 in
Critical slope	0.0054 ft/ft
Critical velocity	4.37 fps
Critical area	0.89 ft ²
Critical perimeter	28.36 in
Critical hydraulic radius	4.51 in
Critical top width	18.00 in
Specific energy	1.06 ft
Minimum energy	1.13 ft
Froude number	1.19
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.300 cfs
Slope	0.0050 ft/ft
Manning's n	0.0130

Computed Results:

Depth	12.73 in
Area	1.77 ft ²
Wetted Area	1.34 ft ²
Wetted Perimeter	35.96 in
Perimeter	56.55 in
Velocity	4.72 fps
Hydraulic Radius	5.35 in
Percent Full	70.70 %
Full flow Flowrate	7.428 cfs
Full flow velocity	4.20 fps

Critical Information

Critical depth	11.64 in
Critical slope	0.0064 ft/ft
Critical velocity	5.21 fps
Critical area	1.21 ft ²
Critical perimeter	33.64 in
Critical hydraulic radius	5.18 in
Critical top width	17.21 in
Specific energy	1.41 ft
Minimum energy	1.46 ft
Froude number	0.84
Flow condition	Subcritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	3.650 cfs
Slope	0.0150 ft/ft
Manning's n	0.0110

Computed Results:

Depth	7.45 in
Area	0.79 ft ²
Wetted Area	0.51 ft ²
Wetted Perimeter	21.78 in
Perimeter	37.70 in
Velocity	7.12 fps
Hydraulic Radius	3.39 in
Percent Full	62.11 %
Full flow Flowrate	5.157 cfs
Full flow velocity	6.57 fps

Critical Information

Critical depth	9.78 in
Critical slope	0.0076 ft/ft
Critical velocity	5.33 fps
Critical area	0.69 ft ²
Critical perimeter	27.02 in
Critical hydraulic radius	3.65 in
Critical top width	9.32 in
Specific energy	1.41 ft
Minimum energy	1.22 ft
Froude number	1.73
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	12.00 in
Flowrate	4.600 cfs
Slope	0.0311 ft/ft
Manning's n	0.0110

Computed Results:

Depth	6.83 in
Area	0.79 ft2
Wetted Area	0.46 ft2
Wetted Perimeter	20.52 in
Perimeter	37.70 in
Velocity	9.96 fps
Hydraulic Radius	3.24 in
Percent Full	56.96 %
Full flow Flowrate	7.425 cfs
Full flow velocity	9.45 fps

Critical Information

Critical depth	10.72 in
Critical slope	0.0106 ft/ft
Critical velocity	6.21 fps
Critical area	0.74 ft2
Critical perimeter	29.71 in
Critical hydraulic radius	3.59 in
Critical top width	7.41 in
Specific energy	2.11 ft
Minimum energy	1.34 ft
Froude number	2.57
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	6.400 cfs
Slope	0.0424 ft/ft
Manning's n	0.0130

Computed Results:

Depth	6.71 in
Area	1.77 ft2
Wetted Area	0.60 ft2
Wetted Perimeter	23.64 in
Perimeter	56.55 in
Velocity	10.66 fps
Hydraulic Radius	3.66 in
Percent Full	37.28 %
Full flow Flowrate	21.630 cfs
Full flow velocity	12.24 fps

Critical Information

Critical depth	11.74 in
Critical slope	0.0064 ft/ft
Critical velocity	5.24 fps
Critical area	1.22 ft2
Critical perimeter	33.84 in
Critical hydraulic radius	5.19 in
Critical top width	17.15 in
Specific energy	2.32 ft
Minimum energy	1.47 ft
Froude number	2.92
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	8.800 cfs
Slope	0.0301 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.82 in
Area	1.77 ft2
Wetted Area	0.86 ft2
Wetted Perimeter	27.91 in
Perimeter	56.55 in
Velocity	10.22 fps
Hydraulic Radius	4.44 in
Percent Full	48.99 %
Full flow Flowrate	18.224 cfs
Full flow velocity	10.31 fps

Critical Information

Critical depth	13.78 in
Critical slope	0.0081 ft/ft
Critical velocity	6.06 fps
Critical area	1.45 ft2
Critical perimeter	38.35 in
Critical hydraulic radius	5.45 in
Critical top width	15.25 in
Specific energy	2.36 ft
Minimum energy	1.72 ft
Froude number	2.38
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	19.000 cfs
Slope	0.0452 ft/ft
Manning's n	0.0130

Computed Results:

Depth	12.76 in
Area	1.77 ft ²
Wetted Area	1.34 ft ²
Wetted Perimeter	36.03 in
Perimeter	56.55 in
Velocity	14.19 fps
Hydraulic Radius	5.35 in
Percent Full	70.87 %
Full flow Flowrate	22.333 cfs
Full flow velocity	12.64 fps

Critical Information

Critical depth	17.52 in
Critical slope	0.0290 ft/ft
Critical velocity	10.83 fps
Critical area	1.75 ft ²
Critical perimeter	50.67 in
Critical hydraulic radius	4.99 in
Critical top width	5.77 in
Specific energy	4.19 ft
Minimum energy	2.19 ft
Froude number	2.52
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	24.00 in
Flowrate	20.300 cfs
Slope	0.0090 ft/ft
Manning's n	0.0130

Computed Results:

Depth	18.60 in
Area	3.14 ft2
Wetted Area	2.61 ft2
Wetted Perimeter	51.67 in
Perimeter	75.40 in
Velocity	7.77 fps
Hydraulic Radius	7.28 in
Percent Full	77.49 %
Full flow Flowrate	21.461 cfs
Full flow velocity	6.83 fps

Critical Information

Critical depth	19.41 in
Critical slope	0.0083 ft/ft
Critical velocity	7.46 fps
Critical area	2.72 ft2
Critical perimeter	53.66 in
Critical hydraulic radius	7.30 in
Critical top width	18.88 in
Specific energy	2.49 ft
Minimum energy	2.43 ft
Froude number	1.10
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	2.400 cfs
Slope	0.0410 ft/ft
Manning's n	0.0130

Computed Results:

Depth	4.08 in
Area	1.77 ft2
Wetted Area	0.30 ft2
Wetted Perimeter	17.87 in
Perimeter	56.55 in
Velocity	7.97 fps
Hydraulic Radius	2.43 in
Percent Full	22.68 %
Full flow Flowrate	21.270 cfs
Full flow velocity	12.04 fps

Critical Information

Critical depth	7.04 in
Critical slope	0.0050 ft/ft
Critical velocity	3.75 fps
Critical area	0.64 ft2
Critical perimeter	24.31 in
Critical hydraulic radius	3.79 in
Critical top width	17.57 in
Specific energy	1.33 ft
Minimum energy	0.88 ft
Froude number	2.87
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	10.200 cfs
Slope	0.0500 ft/ft
Manning's n	0.0130

Computed Results:

Depth	8.29 in
Area	1.77 ft2
Wetted Area	0.80 ft2
Wetted Perimeter	26.86 in
Perimeter	56.55 in
Velocity	12.82 fps
Hydraulic Radius	4.26 in
Percent Full	46.08 %
Full flow Flowrate	23.488 cfs
Full flow velocity	13.29 fps

Critical Information

Critical depth	14.76 in
Critical slope	0.0094 ft/ft
Critical velocity	6.58 fps
Critical area	1.55 ft2
Critical perimeter	40.77 in
Critical hydraulic radius	5.48 in
Critical top width	13.84 in
Specific energy	3.25 ft
Minimum energy	1.84 ft
Froude number	3.10
Flow condition	Supercritical

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	18.00 in
Flowrate	7.800 cfs
Slope	0.1016 ft/ft
Manning's n	0.0130

Computed Results:

Depth	5.91 in
Area	1.77 ft2
Wetted Area	0.51 ft2
Wetted Perimeter	21.97 in
Perimeter	56.55 in
Velocity	15.44 fps
Hydraulic Radius	3.31 in
Percent Full	32.84 %
Full flow Flowrate	33.482 cfs
Full flow velocity	18.95 fps

Critical Information

Critical depth	12.99 in
Critical slope	0.0073 ft/ft
Critical velocity	5.71 fps
Critical area	1.36 ft2
Critical perimeter	36.53 in
Critical hydraulic radius	5.38 in
Critical top width	16.14 in
Specific energy	4.20 ft
Minimum energy	1.62 ft
Froude number	4.55
Flow condition	Supercritical

Channel D-2

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	7.8300 cfs
Slope	0.0514 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	48.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	4.3805 in
Velocity	5.2040 fps
Flow area	1.5046 ft ²
Flow perimeter	57.2350 in
Hydraulic radius	3.7855 in
Top width	50.9204 in
Area	4.3333 ft ²
Perimeter	73.2982 in
Percent full	36.5046 %

Critical Information

Critical depth	5.8236 in
Critical slope	0.0206 ft/ft
Critical velocity	3.8768 fps
Critical area	2.0197 ft ²
Critical perimeter	60.2772 in
Critical hydraulic radius	4.8250 in
Critical top width	51.8824 in
Specific energy	0.7859 ft
Minimum energy	0.7279 ft
Froude number	1.5407
Flow condition	Supercritical

Channel E-1

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.8600 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	3.4770 in
Velocity	3.4146 fps
Flow area	0.2519 ft2
Flow perimeter	21.9902 in
Hydraulic radius	1.6493 in
Top width	20.8617 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	28.9746 %

Critical Information

Critical depth	4.1767 in
Critical slope	0.0252 ft/ft
Critical velocity	2.3663 fps
Critical area	0.3634 ft2
Critical perimeter	26.4160 in
Critical hydraulic radius	1.9812 in
Critical top width	25.0604 in
Specific energy	0.4709 ft
Minimum energy	0.5221 ft
Froude number	1.5816
Flow condition	Supercritical

Channel F-1

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	1.3300 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	4.0946 in
Velocity	3.8078 fps
Flow area	0.3493 ft2
Flow perimeter	25.8962 in
Hydraulic radius	1.9422 in
Top width	24.5673 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	34.1213 %

Critical Information

Critical depth	4.9725 in
Critical slope	0.0238 ft/ft
Critical velocity	2.5819 fps
Critical area	0.5151 ft2
Critical perimeter	31.4491 in
Critical hydraulic radius	2.3587 in
Critical top width	29.8352 in
Specific energy	0.5665 ft
Minimum energy	0.6216 ft
Froude number	1.6253
Flow condition	Supercritical

Channel F-2

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.3300 cfs
Slope	0.0800 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.3484 in
Velocity	2.8723 fps
Flow area	0.1149 ft ²
Flow perimeter	14.8523 in
Hydraulic radius	1.1139 in
Top width	14.0902 in
Area	3.0000 ft ²
Perimeter	75.8947 in
Percent full	19.5697 %

Critical Information

Critical depth	2.8474 in
Critical slope	0.0286 ft/ft
Critical velocity	1.9537 fps
Critical area	0.1689 ft ²
Critical perimeter	18.0083 in
Critical hydraulic radius	1.3506 in
Critical top width	17.0842 in
Specific energy	0.3239 ft
Minimum energy	0.3559 ft
Froude number	1.6188
Flow condition	Supercritical

Channel H-1-A

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	1.7300 cfs
Slope	0.0570 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	4.6579 in
Velocity	3.8274 fps
Flow area	0.4520 ft ²
Flow perimeter	29.4593 in
Hydraulic radius	2.2094 in
Top width	27.9475 in
Area	3.0000 ft ²
Perimeter	75.8947 in
Percent full	38.8160 %

Critical Information

Critical depth	5.5240 in
Critical slope	0.0230 ft/ft
Critical velocity	2.7213 fps
Critical area	0.6357 ft ²
Critical perimeter	34.9370 in
Critical hydraulic radius	2.6203 in
Critical top width	33.1442 in
Specific energy	0.6158 ft
Minimum energy	0.6905 ft
Froude number	1.5317
Flow condition	Supercritical

Channel H-1-B

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.6800 cfs
Slope	0.1000 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.9535 in
Velocity	3.7417 fps
Flow area	0.1817 ft ²
Flow perimeter	18.6798 in
Hydraulic radius	1.4010 in
Top width	17.7212 in
Area	3.0000 ft ²
Perimeter	75.8947 in
Percent full	24.6128 %

Critical Information

Critical depth	3.8023 in
Critical slope	0.0260 ft/ft
Critical velocity	2.2577 fps
Critical area	0.3012 ft ²
Critical perimeter	24.0476 in
Critical hydraulic radius	1.8036 in
Critical top width	22.8135 in
Specific energy	0.4637 ft
Minimum energy	0.4753 ft
Froude number	1.8804
Flow condition	Supercritical

Channel I-3-A

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.5700 cfs
Slope	0.0570 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	3.0717 in
Velocity	2.8997 fps
Flow area	0.1966 ft ²
Flow perimeter	19.4271 in
Hydraulic radius	1.4570 in
Top width	18.4302 in
Area	3.0000 ft ²
Perimeter	75.8947 in
Percent full	25.5974 %

Critical Information

Critical depth	3.5431 in
Critical slope	0.0266 ft/ft
Critical velocity	2.1794 fps
Critical area	0.2615 ft ²
Critical perimeter	22.4088 in
Critical hydraulic radius	1.6807 in
Critical top width	21.2588 in
Specific energy	0.3866 ft
Minimum energy	0.4429 ft
Froude number	1.4290
Flow condition	Supercritical

Channel I-3-B

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.2800 cfs
Slope	0.0700 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	2.2640 in
Velocity	2.6220 fps
Flow area	0.1068 ft2
Flow perimeter	14.3189 in
Hydraulic radius	1.0739 in
Top width	13.5841 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	18.8668 %

Critical Information

Critical depth	2.6663 in
Critical slope	0.0293 ft/ft
Critical velocity	1.8906 fps
Critical area	0.1481 ft2
Critical perimeter	16.8628 in
Critical hydraulic radius	1.2647 in
Critical top width	15.9975 in
Specific energy	0.2955 ft
Minimum energy	0.3333 ft
Froude number	1.5051
Flow condition	Supercritical

Channel I-4

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	0.1600 cfs
Slope	0.0670 ft/ft
Manning's n	0.0300
Height	12.0000 in
Bottom width	0.0000 in
Left slope	3.0000 ft/ft
Right slope	3.0000 ft/ft

Computed Results:

Depth	1.8506 in
Velocity	2.2426 fps
Flow area	0.0713 ft2
Flow perimeter	11.7041 in
Hydraulic radius	0.8778 in
Top width	11.1035 in
Area	3.0000 ft2
Perimeter	75.8947 in
Percent full	15.4215 %

Critical Information

Critical depth	2.1315 in
Critical slope	0.0315 ft/ft
Critical velocity	1.6904 fps
Critical area	0.0947 ft2
Critical perimeter	13.4808 in
Critical hydraulic radius	1.0111 in
Critical top width	12.7890 in
Specific energy	0.2324 ft
Minimum energy	0.2664 ft
Froude number	1.4238
Flow condition	Supercritical

Weir Calculator

Given Input Data:

Weir Type	Rectangular
Equation	Suppressed
Solving for	Depth of Flow
Flowrate	7.8300 cfs
Coefficient	2.6400
Height	6.0000 in

Computed Results:

Depth of Flow	3.2146 in
Full Flow	19.9662 cfs
Velocity	7.3073 fps
Width	48.0000 in
Area	2.0000 ft2
Perimeter	60.0000 in
Wet Perimeter	54.4292 in
Wet Area	1.0715 ft2
Percent Full	53.5769 %

EXHIBIT 1

HISTORIC DRAINAGE

EXHIBIT 2

PROPOSED CONDITION BASIN MAP

EXHIBIT 3

GRADING PLAN



BOHANNAN HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

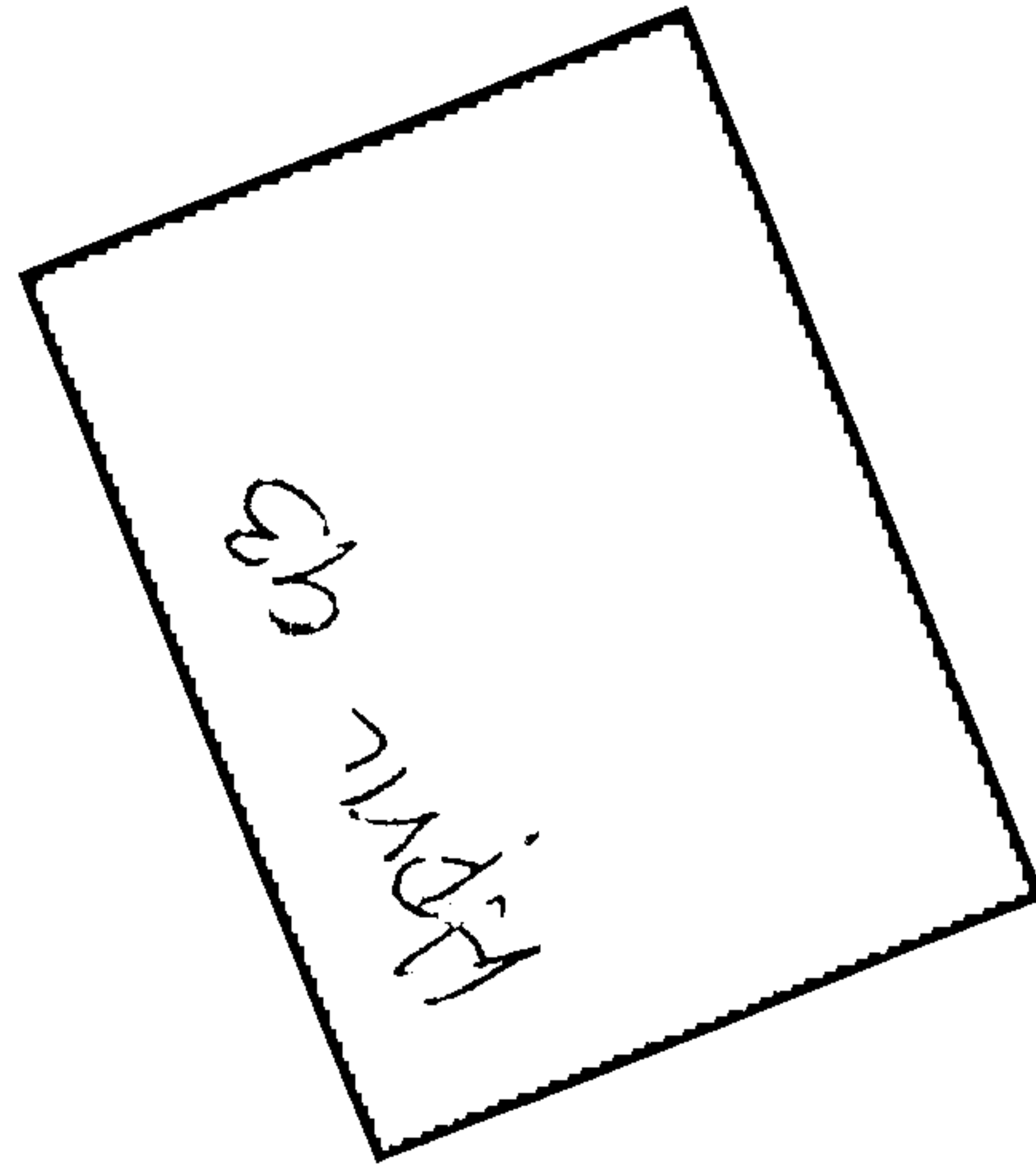
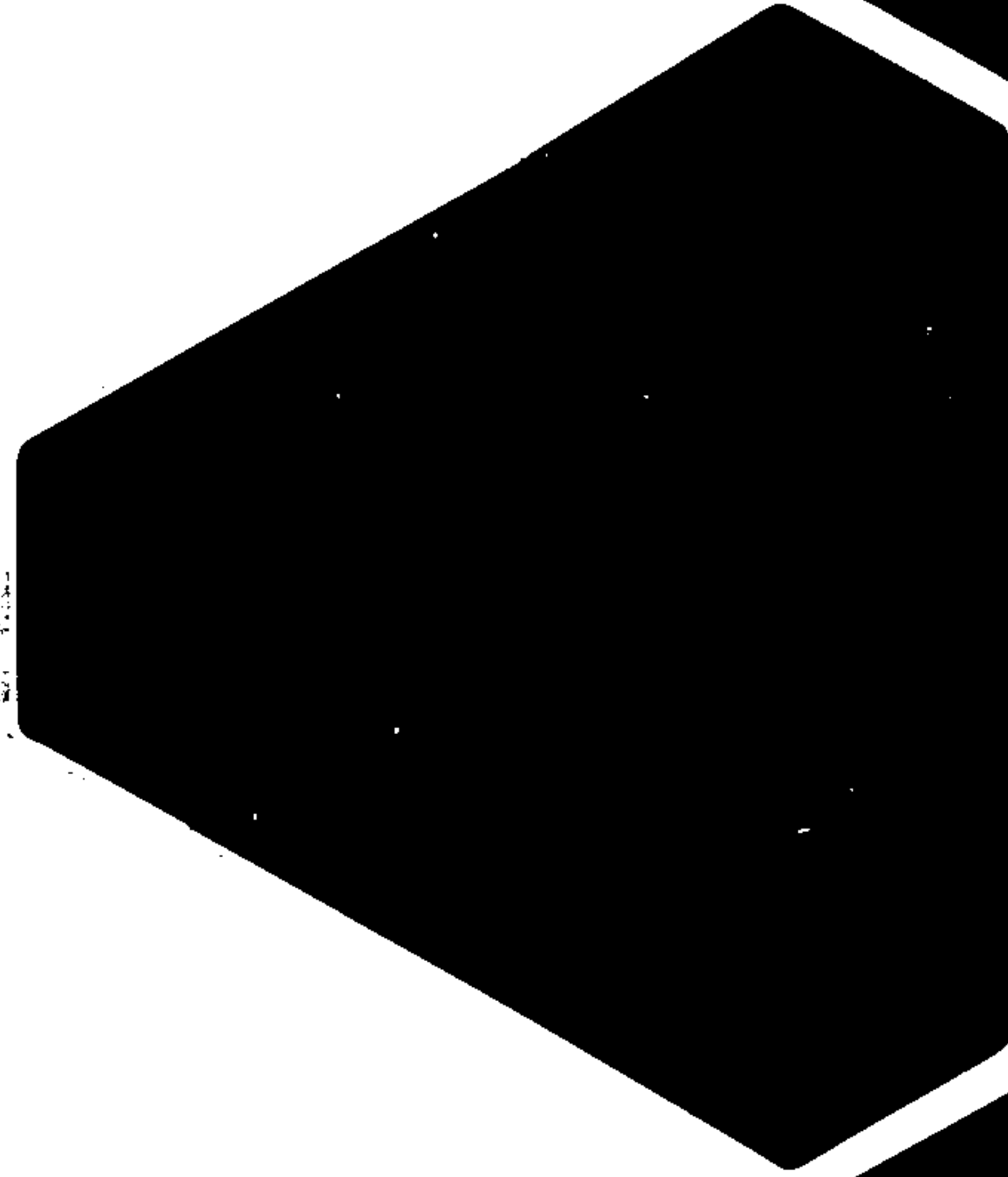
NM 87109-4335

voice 505.823.1000

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BOHANNAN - HUSTON

INC.

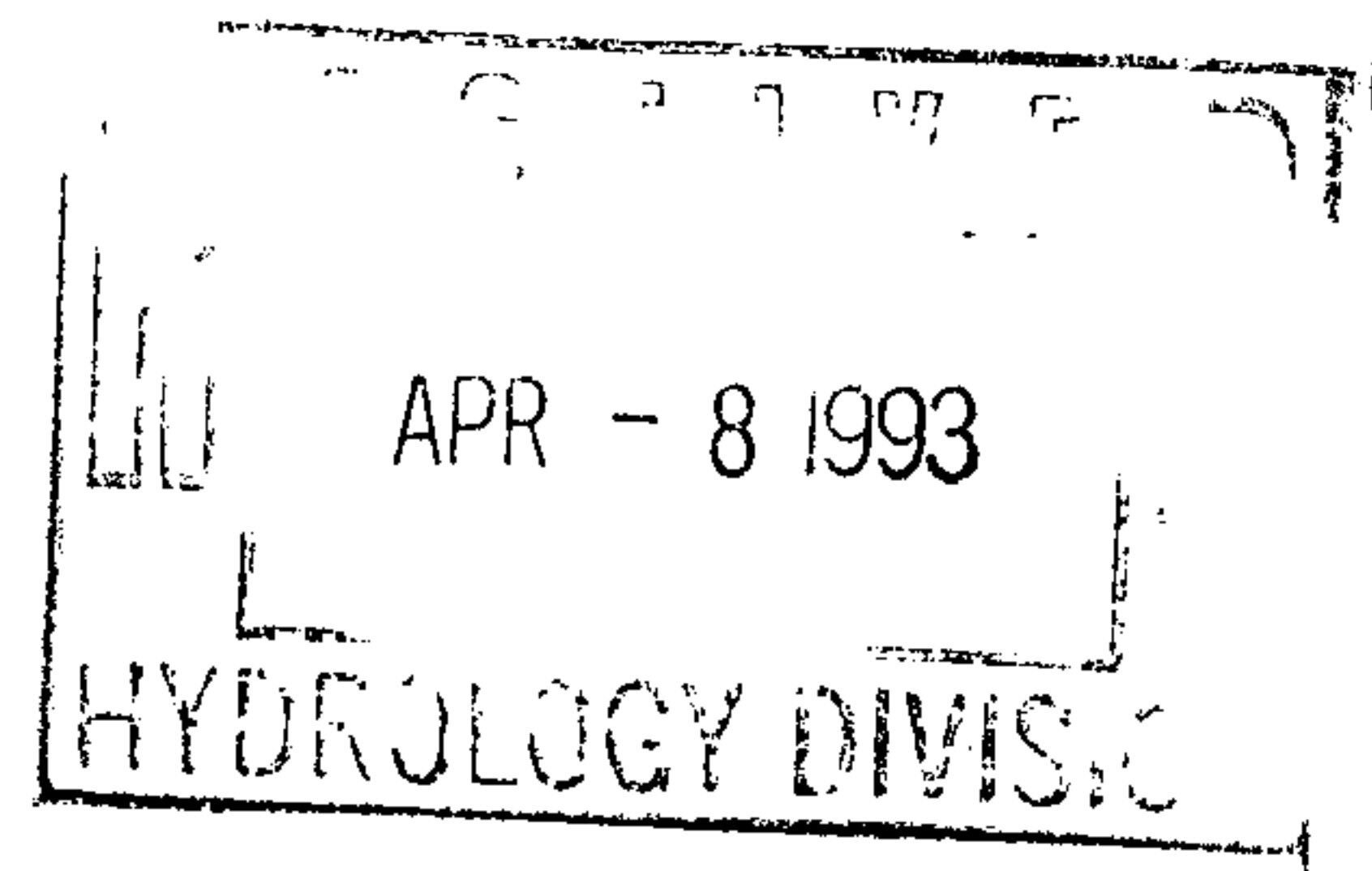




CONCEPTUAL DRAINAGE MANAGEMENT PLAN FOR THE GATEWAY CENTER

Prepared for:

The Sandia Foundation
700 Lomas Blvd., NE
Albuquerque, NM 87102



Prepared by:



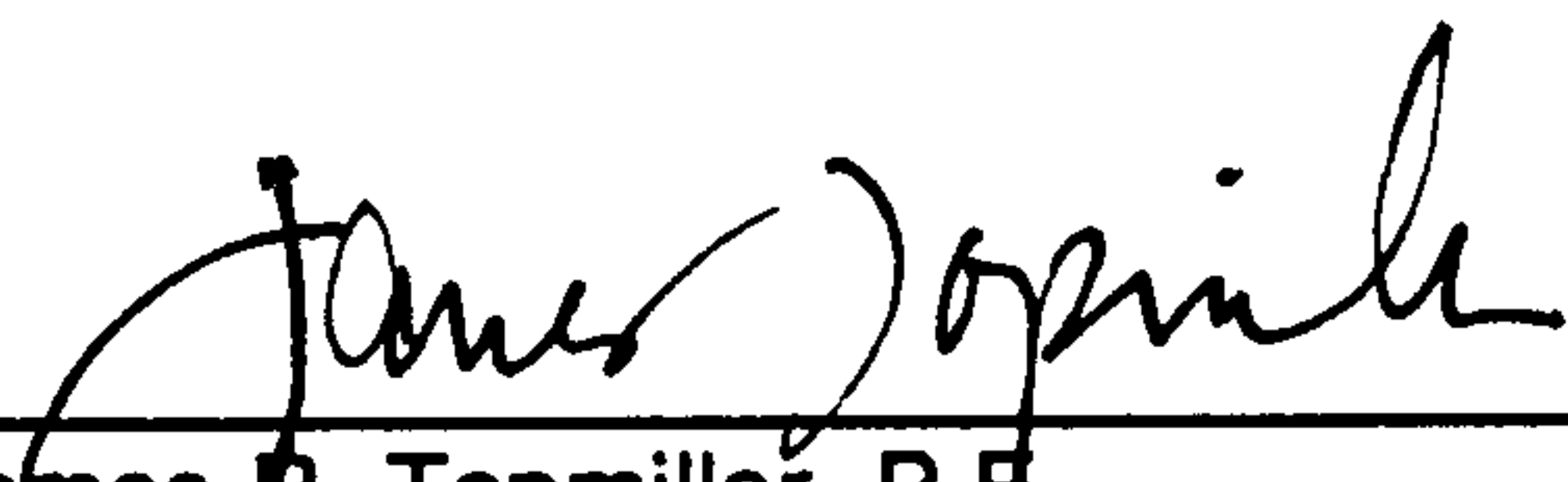
BOHANNAN-HUSTON INC.
ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS

COURTYARD I, 7500 JEFFERSON NE ALBUQUERQUE, NM 87109 TEL (505) 823-1000 FAX (505) 821-0892

**CONCEPTUAL DRAINAGE
MANAGEMENT PLAN FOR THE
GATEWAY CENTER**

APRIL 1993

I, James R. Topmiller, being a Registered Professional Engineer, registered in the State of New Mexico, hereby certify that this report was written by me or under my direct supervision, and that the information contained herein is true and accurate to the best of my knowledge and belief.



James R. Topmiller, P.E.
N.M.P.E. No. 9354

Date: _____ 4.2.93

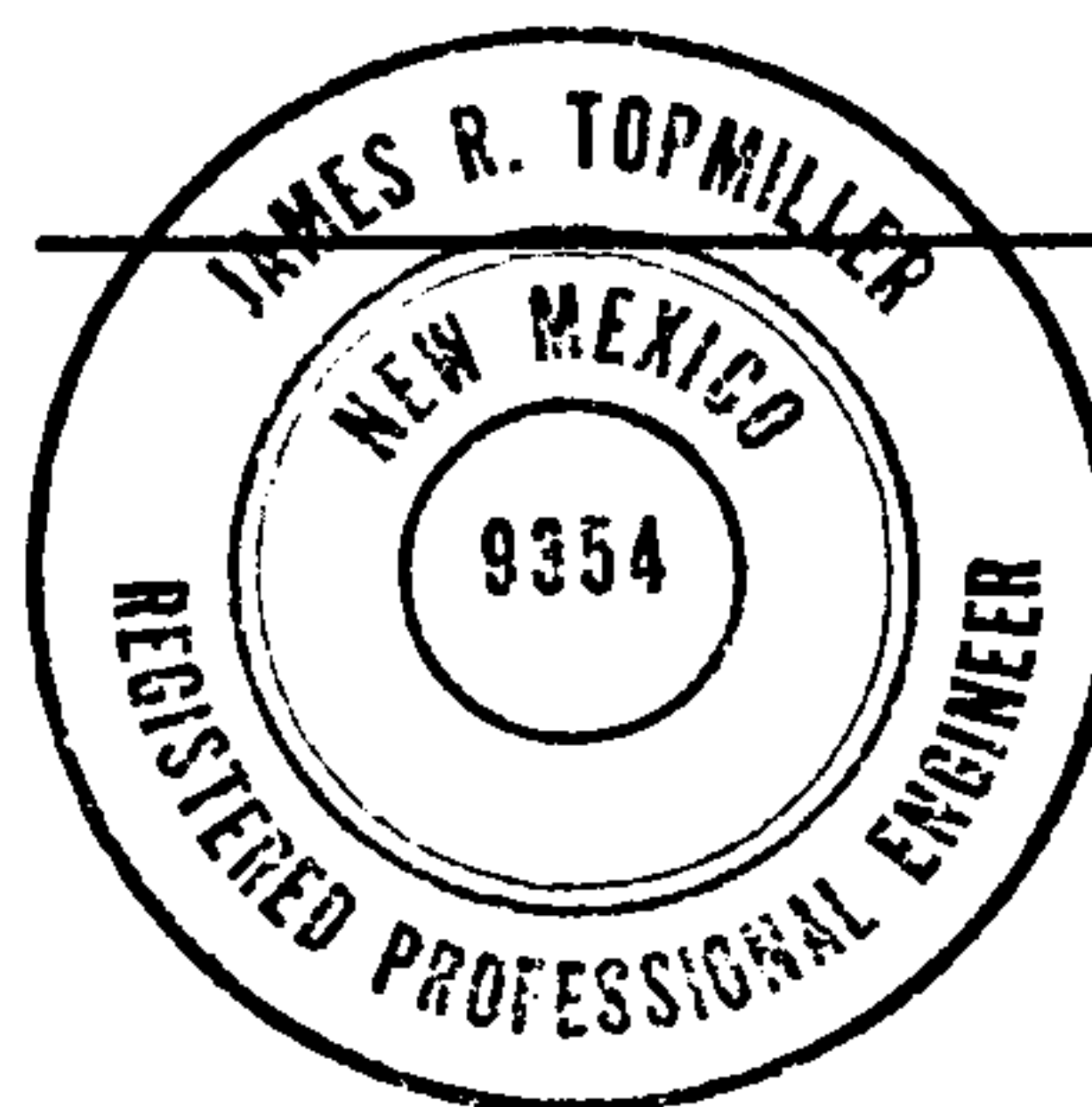


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TABLES

- TABLE 1 - HISTORIC 100-YEAR RUNOFF SUMMARY
- TABLE 2 - PROPOSED 100-YEAR RUNOFF SUMMARY

APPENDICES

- PRE-DESIGN CONFERENCE NOTES
- EXISTING CONDITIONS HYDROLOGY FOR PROPOSED BASINS

POCKETS

- HISTORIC DRAINAGE
- CONCEPTUAL GRADING/DRAINAGE PLAN

CONCEPTUAL DRAINAGE MANAGEMENT PLAN

PURPOSE

The purpose of this plan is to outline the concepts envisioned for the management of storm water runoff from a 24.9 ± acre parcel of land. The parcel of land is being subdivided for site development by the owner of the property, the Sandia Foundation. The proposed development is referred to as the "Gateway Center". This report presents the drainage management plan for development of the site. ~~The developed sites will have controlled discharge at 50 percent of the 100-year storm historic runoff and the proposed street will have free discharge.~~ By controlling the discharge from the developed sites, the overall runoff will be slightly less than historic. Additionally, this plan greatly reduces the amount of runoff historically directed at the neighboring residential area west of the site through positive grading.

This plan has been prepared in accordance with the prior reports approved by the City of Albuquerque, the pre-design meeting held with City Hydrology Division, and in accordance with the City of Albuquerque Development Process Manual (DPM), including the latest revisions dated August 1991 (DPM update).

PROJECT LOCATION AND DESCRIPTION

The project site is located at the northwest corner of the intersection of Interstate 25 (I-25) and Lomas Boulevard, see plan sheet 1 of 2 for location map. The site is bounded by I-25 to the east, Lomas Boulevard to the south, Mountain Road to the north and Martineztown neighborhood to the west. The site generally slopes from east to west with very steep slopes adjacent to the interstate and Martineztown Neighborhood. The north and south edges of the site slope steeply toward Mountain Road and Lomas Boulevard respectively. Slopes vary greatly over the site ranging

from near level to in excess of 1:1. In the central portion of the site is a large relatively flat area that has been utilized in the past for gravel production. The west central portion of the site is traversed by a deep bowled arroyo with its outlet at Maggie's Avenue.

~~Soils on the site consist primarily of coarse to fine graded sands and gravel within the Bluepoint-Kokan Association (BKD).~~ The SCS Soil Survey of Bernalillo County describes the Bluepoint-Kokan soils as soils which experience slow runoff and moderate or severe erosion. The soil survey also identifies a portion of the site as Cut and Fill Land (Cu), which is described as "sandy loam and very gravelly sand. Both soils are within hydrologic soils group A.

HISTORIC (UNDEVELOPED) DRAINAGE

The project site is located within a larger watershed which has a history of flooding problems. However, recent storm drain improvements both upstream and downstream of the site have significantly reduced the magnitude of flooding in the watershed. With the completion of the I-25 northbound storm sewer diversion to Odelia Pond the flooding hazard that currently exists at the Broadway Boulevard Pump Station, which is the terminus of the watershed in which the project site resides, has been partially relieved. Similarly, drainage improvements in Lomas Boulevard from Broadway to Eighth Street have relieved downstream flooding.

Interstate 25, which forms the easterly watershed boundary for the site precludes the majority of upstream offsite runoff from reaching the site. However, runoff from the strip of land located between the Lomas off ramp and the east property boundary does enter the site. Similarly, the strips of land between the property and Mountain Road and Lomas Boulevard combine with site runoff. ~~Both Mountain Road and Lomas Boulevard have curb and gutter, which serve as watershed divides.~~

The site was subdivided into eight undeveloped, existing condition basins, see plan sheet 1 of 2. Basins UD-1 and UD-2 drain directly to Mountain Road while Basins UD-7 drain directly to Lomas Boulevard. The remaining basins drain to the west to the Martineztown neighborhood. Runoff in Martineztown drains to Lomas Boulevard and Mountain Road, downstream of the project site. Hydrology calculation for the historic basins are shown on plan sheet 1 of 2. A summary of the 100-year historic peak discharge rates for each of these basins is shown in Table 1.

DRAINAGE MANAGEMENT PLAN

General

The site and surrounding contributing areas were divided into two phases. All of the conceptual grading and drainage issues for the first phase, Phase I, and an easterly portion of the second phase, Phase II, are addressed by this plan. The drainage area for Phase I was divided into five on site basins and four offsite basins. Similarly, for the Phase II drainage area, eight on site basins and two offsite basins were identified. Plan sheet 2 of 2 shows all of the proposed basins and the hydrologic analysis of the site and surrounding contributing areas for proposed conditions. Also included in this analysis for comparison are historic undeveloped peak discharge rates at the outfall for each proposed basin for both the 10-year and 100-year storms.

Currently, the larger watershed in which the site resides is experiencing flooding problems. Unlike most development which increases runoff, this plan reduces the overall site runoff below historic levels. This plan includes storm water runoff detention provisions that will reduce the aggregate runoff from the developed (non-street) areas for the 100-year storm to 50% of the historic runoff. It is proposed that the street improvements will be allowed free discharge. However, as can be seen in Table 2, even with free discharge for the street, the total runoff for this development due to onsite detention storage will be less than the total historic runoff for the site.

TABLE 1

**HISTORIC 100-YEAR
RUNOFF SUMMARY**

<u>BASIN</u>	<u>PEAK DISCHARGE (CFS)</u>
To Lomas Boulevard	
UD-7	5.99
To Mountain Road	
UD-1	15.20
UD-2	<u>2.70</u>
Subtotal	17.90
To the Martineztown Neighborhood	
UD-3	2.32
UD-4	0.85
UD-5	20.29
UD-6	4.33
UD-8	<u>2.83</u>
Subtotal	30.62
TOTAL	54.51

Land Use

Under this plan, grading will occur only within the following basins: A-1, A-4, B-1, C-1, C-3, C-4, C-5, and I-1. For each of these basins, the developed conditions 10-year and 100-year peak discharge rates were based on the following land treatment assumptions:

Land Treatment Type	Percentage of Total Area
A	0
B	7.5
C	21
D	71.5

These percentages were based upon typical development land treatment types. Plan sheet 2 of 2 shows the historic and developed 10-year and 100-year peak discharge rates for each proposed basin. Developed flowrates were based on the above land use percentages. Supporting hydrology calculations for the historic flow rates for the proposed basin configuration and maximum allowable peak discharge rates are shown in the appendix. It is anticipated that actual future development of this site will not match the shown developed flowrates exactly. However, for review and comparison purposes, these rates represent a reasonable approximation of the expected future rates. A significant reduction in the developed discharge rates occurs with the proposed detention scheme.

Grading/Drainage Plan

Under existing conditions, Basins A-1, B-1 and C-1 primarily drain directly to either Lomas Boulevard or Mountain Road. Under the proposed plan, the historic flow destinations for these basins will not change. The proposed street will also drain to these locations as well as a portion of the site west of the proposed street (Basins C-4 and C-5).

TABLE 2**PROPOSED 100-YEAR
RUNOFF SUMMARY**

BASIN	HISTORIC PEAK DISCHARGE (CFS)	(1)DEVELOPED PEAK DISCHARGE (CFS)	(2)MAXIMUM ALLOWABLE DEVELOPED PEAK DISCHARGE* (CFS)	TOTAL FLOWRATE REDUCTION (CFS)
TO LOMAS BOULEVARD:				
B-1	8.82	20.94	4.41	16.53
C-1	5.99	14.66	2.99	11.67
C-4	9.30	14.08	4.65	9.43
C-3 (Street)	4.73	10.42	10.42	0.00
I-1	<u>5.46</u>	<u>10.78</u>	<u>2.73</u>	<u>8.05</u>
Subtotal	34.30	70.88	25.20	45.68
TO MOUNTAIN ROAD:				
A-1	5.80	14.66	2.90	11.76
C-5	1.44	3.18	0.72	2.46
A-4 (Street)	<u>1.36</u>	<u>3.42</u>	<u>3.42</u>	<u>0.00</u>
Subtotal	7.16	21.26	7.04	14.22
TO THE MARTINEZTOWN NEIGHBORHOOD				
D-1	1.12	1.19	1.19	0.00
E-1	1.00	1.41	1.41	0.00
F-1	5.00	5.50	5.50	0.00
G-1	0.85	0.85	0.85	0.00
H-1	<u>1.65</u>	<u>1.88</u>	<u>1.88</u>	<u>0.00</u>
Subtotal	9.62	10.83	10.83	0.00
TOTAL	51.08	102.97	43.07	59.90

(1) Flow rates are based upon assumed land development.

(2) Based on reducing the developed peak discharge for developed sites to 50% of historic levels.

Note: Total proposed controlled site discharge is 43.07 cfs compared to 51.08 cfs for historic conditions.

neighborhood. The conceptual grading plan will drain basins B-1, C-1, C-3, C-4 and I-2 to Lomas Boulevard, while basins A-1, A-4 and C-5 will drain to Mountain Road. Table 1 provides a summary of the 100-year historic peak discharge rates to both Lomas Boulevard and Mountain Road. This table also shows for each basin the maximum allowable developed discharge rates permitted in order to reduce the developed (non-street) site runoff to 50 percent of the historic runoff.

No hardened improvements will be constructed within Phase II (west of the proposed street) as a part of this plan. Except for tie slopes required to tie the site to the existing ground near the west site boundary, grading within Phase II area will be limited to grading schemes that carry drainage to the proposed street. Construction of temporary detention ponds will be required to reduce the runoff to the maximum allowable discharge rates as shown in Table 1 and on plan sheet 2 of 2. The ultimate limits of Phase II grading will depend upon future development plans, however, the 100-year peak discharge shall not exceed 4.65 cfs for basin C-4 and 0.72 cfs for basin C-5 either during or after construction of Phase I or upon future development of Phase II.

No platting or further subdivision of the Phase II area is to occur with the Phase I plat. The initial Phase I plat will identify only the proposed street (Area 4) and three parcels on the east side of the Street (Areas 1, 2, and 3).

Runoff to Lomas Boulevard and Mountain Road

Based upon the restriction of limiting the developed site (non-street) flowrates to 50 % of historic levels, detention ponds will be required to achieve discharge reductions for each graded site draining to Lomas Boulevard or Mountain Road. The pond volumes required for each basin will be determined at the final drainage report stage. Runoff will be discharged from these ponds directly to the proposed street or Lomas Boulevard in the case of Basin I-1. A portion of the street flow will then be

collected by a series of inlets along the proposed street at both Lomas Boulevard and Mountain Road. The proposed storm drain system will be designed to collect the proposed controlled discharge from Phase I and Basins C-4 and C-5. Storm drains will then convey the flow from the inlets to existing storm drains in Lomas Boulevard and Mountain Road.

Also as part of this plan, the north leg of the High Street/Lomas Boulevard intersection will be reconstructed to provide a water block on High Street to prevent runoff on Lomas Boulevard from entering High Street.

EROSION CONTROL PLAN

The contractor shall insure that no soil erodes from the site into public right-of-way or adjacent property. Plan sheet 2 of 2 provides a temporary erosion control detail and temporary detention ponds for erosion control purposes.

CONCLUSION

This plan presents the conceptual grading/drainage plan for the "Gateway Center". For each developed site, excluding the street, the flowrate will be reduced to 50 percent of the historic site runoff and the proposed street will be allowed free discharge. Overall runoff from the site will be less than historic as a result of on site detention storage provided.

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APPENDIX

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

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: J15-D35 DATE: 3/11/93
EPC NO.: _____ DRB NO.: _____ ZONE: _____
SUBJECT: SADIA FOUNDATION / FEDERAL COURTHOUSE SITE
STREET ADDRESS: INTERSECTION OF LOMAS AND I-25 (N.W. CORNER)
LEGAL DESCRIPTION: UNPLATTED

APPROVAL REQUESTED: ☒ PRELIMINARY PLAT ☒ FINAL PLAT (4 LOT SUBDIVISION)
☐ SITE DEVELOPMENT PLAN ☐ BUILDING PERMIT
☐ GRADING/PAVING PERMIT ☒ OTHER
SITE PLAN FOR SUBDIVISION

	WHO	REPRESENTING
ATTENDANCE:	<u>Mike Emery</u>	<u>Bohannon</u>
	<u>JAMES TOPMILLER</u>	<u>Bohannon</u>
	<u>DAN HOBAN</u>	<u>CITY</u>
	<u>FRED J. AGUIRRE</u>	<u>CITY</u>

FINDINGS:

PHASE 1 DEVELOPMENT: AN APPROVED CONCEPTUAL
GRADING & DRAINAGE PLAN IS REQUIRED FOR SITE
PLAN FOR SUBDIVISION APPROVAL.

THE TARGET DISCHARGE FOR PHASE 1 IS 50% OF
THE HISTORIC FLOW RATE BUT IN NO CASE ^{WILL THE FLOW R.} ~~BE~~
~~BE~~ GREATER THAN HISTORIC FLOW RATE. THE
GOAL OF THIS PLAN ~~AND~~ AND FUTURE PHASES IS
TO DIVERT THE MAXIMUM FLOWS AWAY FROM
MARTINEZ TOWN AND INTO LOMAS.

THIS PLAN WILL NEED TO ADDRESS THE ^{AND} AND RESOLVE THE
POTENTIAL FOR STORM WATER FLOWS ENTERING MARTINEZ
TOWN THRU HIGH ST FROM LOMAS. THIS IS WARRANTED AS
A RESULT OF THE INCREASED ^{THAT} FLOWS TO LOMAS.

NOTE: PHASE 1 DEVELOPMENT IS ABOUT WOODWARD PL.

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: [Signature]
TITLE: [Signature]
DATE: 3/11/93

SIGNED: [Signature]
TITLE: SADIA FOUNDATION AGENT
DATE: 3/11/93

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

JOB NO. 9226142
FILE: CDP:[C9226142]REVEX.WK3
DATE: 3/29/93

BASIN	TOTAL AREA (ac)	EXISTING LAND TREATMENT AREAS				EXISTING PEAK DISCHARGE RATE				EXISTING PEAK DISCHARGE					
		A	B	C	D	A	B	C	D	10 YEAR	100 YEAR				
		(ac)	(ac)	(ac)	(ac)	(cfs/ac)	(cfs/ac)	(cfs/ac)	(cfs/ac)	(cfs)	(cfs)				

PHASE I															
OFFSITE BASINS															
A-2	0.63	0.30	0.08	0.25	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.62	1.44
A-3	0.41	0.30	0.05	0.06	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.26	0.77
B-2	0.54	0.00	0.09	0.45	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.86	1.62
C-2	0.72	0.72	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.27	1.12
Subtotal	2.30													2.01	4.95
ON-SITE BASINS															
A-1	3.50	3.12	0.30	0.08	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.61	5.80
A-4	0.79	0.67	0.07	0.05	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.41	1.36
B-1	5.00	3.92	0.80	0.28	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.73	8.82
C-1	3.50	2.88	0.52	0.10	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.76	5.99
C-3	2.40	1.68	0.18	0.54	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.73	4.73
Subtotal	15.19													8.23	26.70
Total	17.49													10.24	31.65
PHASE II															
OFFSITE BASINS															
D-2	0.14	0.14	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.05	0.22
I-2	0.19	0.19	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.07	0.30
Subtotal	0.33													0.13	0.51
ON-SITE BASINS															
C-4	3.36	0.58	0.39	2.39	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	4.68	9.30
C-5	0.76	0.57	0.05	0.14	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.50	1.44
D-1	0.51	0.28	0.04	0.19	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.47	1.12
E-1	0.45	0.10	0.30	0.05	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.41	1.00
F-1	1.75	0.17	0.26	1.32	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.57	5.00
G-1	0.27	0.00	0.00	0.27	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.46	0.85
H-1	0.60	0.15	0.00	0.45	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.83	1.65
I-1	1.80	0.82	0.06	0.18	0.74	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	3.00	5.46
Subtotal	9.50													12.92	25.82
Total	9.83													13.04	26.33
Total	27.32													23.29	57.98

COVERT HOUSE - HYDROLOGY

Historic Basin Areas

CALCULATED AREAS: BASIN1

AREA	UNITS
-----	-----
297453.198	SQ. FEET
33050.355	SQ. YARDS
0.011	SQ. MILES
6.829	ACRES

CALCULATED AREAS: BASIN2

AREA	UNITS
-----	-----
401741.410	SQ. FEET
44637.934	SQ. YARDS
0.014	SQ. MILES
9.223	ACRES

CALCULATED AREAS: TOTAL

AREA	UNITS
-----	-----
698212.458	SQ. FEET
77579.162	SQ. YARDS
0.025	SQ. MILES
16.029	ACRES

16.09

CALCULATED AREAS: ROAD1

AREA	UNITS
-----	-----
10685.431	SQ. FEET
1187.270	SQ. YARDS
0.000	SQ. MILES
0.245	ACRES

$$+ 580' \times 12' / 43560 \\ = 0.16$$

$$\Rightarrow 0.40 \text{ acres}$$

DEVELOPED

CALCULATED AREAS: D-1

AREA -----	UNITS -----
22894.871	SQ. FEET
2543.875	SQ. YARDS
0.001	SQ. MILES
0.526	ACRES

CALCULATED AREAS: E-1

AREA -----	UNITS -----
47326.191	SQ. FEET
5258.466	SQ. YARDS
0.002	SQ. MILES
1.086	ACRES

CALCULATED AREAS: F-1

AREA -----	UNITS -----
103829.642	SQ. FEET
11536.627	SQ. YARDS
0.004	SQ. MILES
2.384	ACRES

CALCULATED AREAS: H-1

AREA -----	UNITS -----
61597.717	SQ. FEET

6844.191	SQ. YARDS
0.002	SQ. MILES
1.414	ACRES

CALCULATED AREAS: I-1

AREA	UNITS
-----	-----
67606.583	SQ. FEET
7511.843	SQ. YARDS
0.002	SQ. MILES
1.552	ACRES

EXISTING

CALCULATED AREAS: D-1

AREA -----	UNITS -----
29763.083	SQ. FEET
3307.009	SQ. YARDS
0.001	SQ. MILES
0.683	ACRES

CALCULATED AREAS: E-1

AREA -----	UNITS -----
52594.622	SQ. FEET
5843.847	SQ. YARDS
0.002	SQ. MILES
1.207	ACRES

CALCULATED AREAS: G-1

AREA -----	UNITS -----
12256.396	SQ. FEET
1361.822	SQ. YARDS
0.000	SQ. MILES
0.281	ACRES

CALCULATED AREAS: F-1

AREA -----	UNITS -----
164363.790	SQ. FEET
18262.643	SQ. YARDS
0.006	SQ. MILES
3.773	ACRES

CALCULATED AREAS: H-1

AREA -----	UNITS -----
81661.935	SQ. FEET
9073.548	SQ. YARDS
0.003	SQ. MILES
1.875	ACRES

CALCULATED AREAS: I-1

AREA -----	UNITS -----
86176.545	SQ. FEET
9575.172	SQ. YARDS
0.003	SQ. MILES
1.978	ACRES

CALCULATED AREAS: I-2

AREA -----	UNITS -----
8142.145	SQ. FEET
904.683	SQ. YARDS
0.000	SQ. MILES
0.187	ACRES

DRAINAGE MANAGEMENT PLAN FOR THE GATEWAY CENTER



BOHANNAN HUSTON

Courtyard One

7500 JEFFERSON NE

Albuquerque

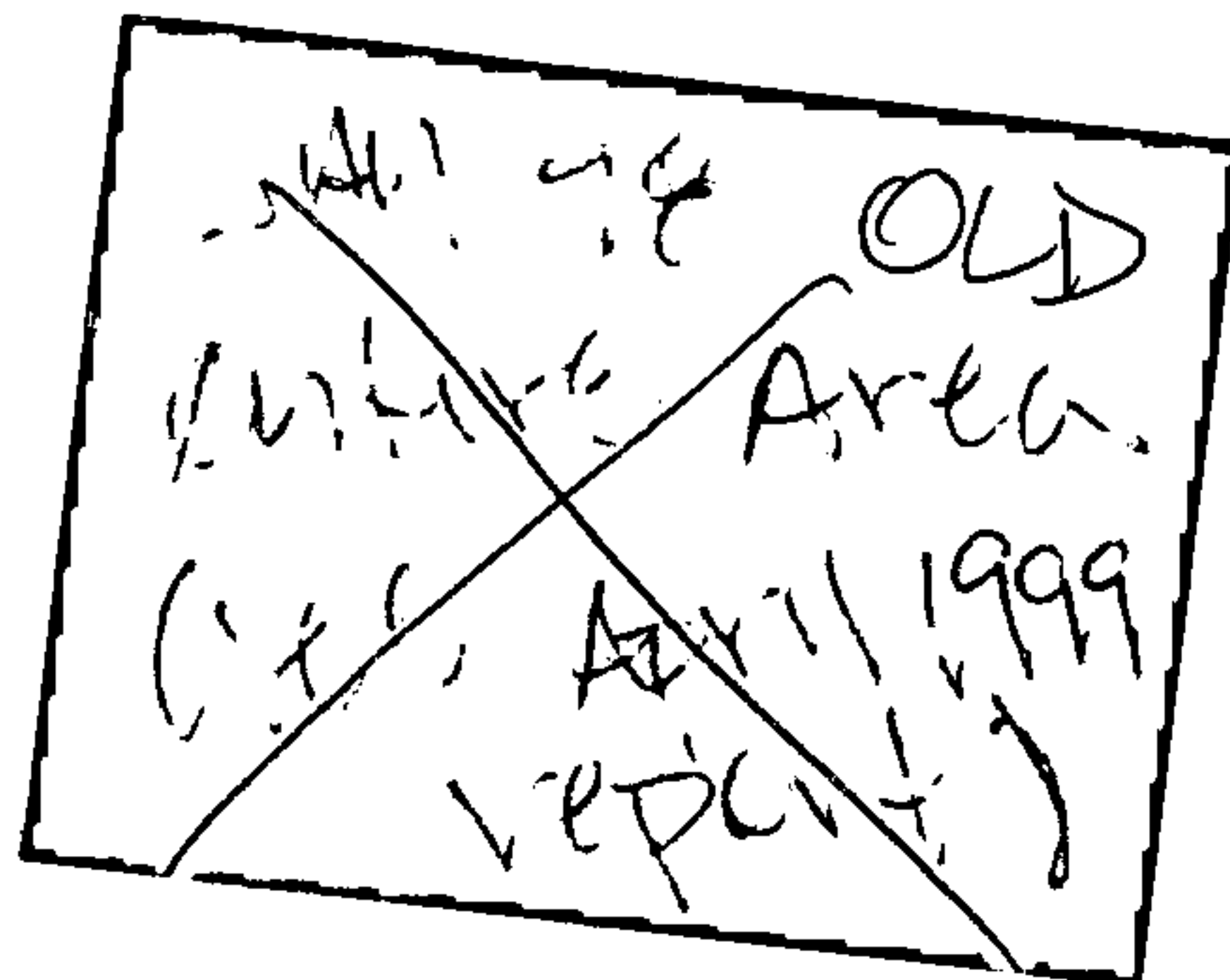
NEW MEXICO 87109

voice 505.823.1000

fax 505.821.0892

APRIL, 1993

REVISED JANUARY 16, 1998



PREPARED FOR:

**SANDIA FOUNDATION
TWO WOODWARD CENTER
700 LOMAS BLVD. NE, SUITE 204
ALBUQUERQUE, NM 87102**

DRAINAGE INFORMATION SHEET

PROJECT TITLE: GATEWAY CENTER ZONE ATLAS/DRNG. FILE # J-15/D35

DRB #: 97-466 EPC #: Z-93-46 WORK ORDER #: N/A

LEGAL DESCRIPTION: TRACTS P, Q, & Y OF PLAT OF VARIOUS TRACTS OF LAND OF SOUTHWESTERN CONSTRUCTION CO.

CITY ADDRESS: LOMAS & WOODWARD

ENGINEERING FIRM: BOHANNAN-HUSTON INC.

ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109

OWNER: SANDIA FOUNDATION

ADDRESS: 2 WOODWARD CENTER

ARCHITECT: _____

ADDRESS: _____

SURVEYOR: BOHANNAN HUSTON

ADDRESS: _____

CONTRACTOR: _____

ADDRESS: _____

CONTACT: RICK BELTRAMO

PHONE: (505) 823-1000

CONTACT: RUSSEL D. HILLER, III

PHONE: 242-2684

CONTACT: _____

PHONE: _____

CONTACT: DWAIN WEAVER

PHONE: 823-1000

CONTACT: _____

PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ FINAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

PRE-DESIGN MEETING:

☒ YES
☐ NO
☒ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUB'D. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☒ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER _____ (SPECIFY)

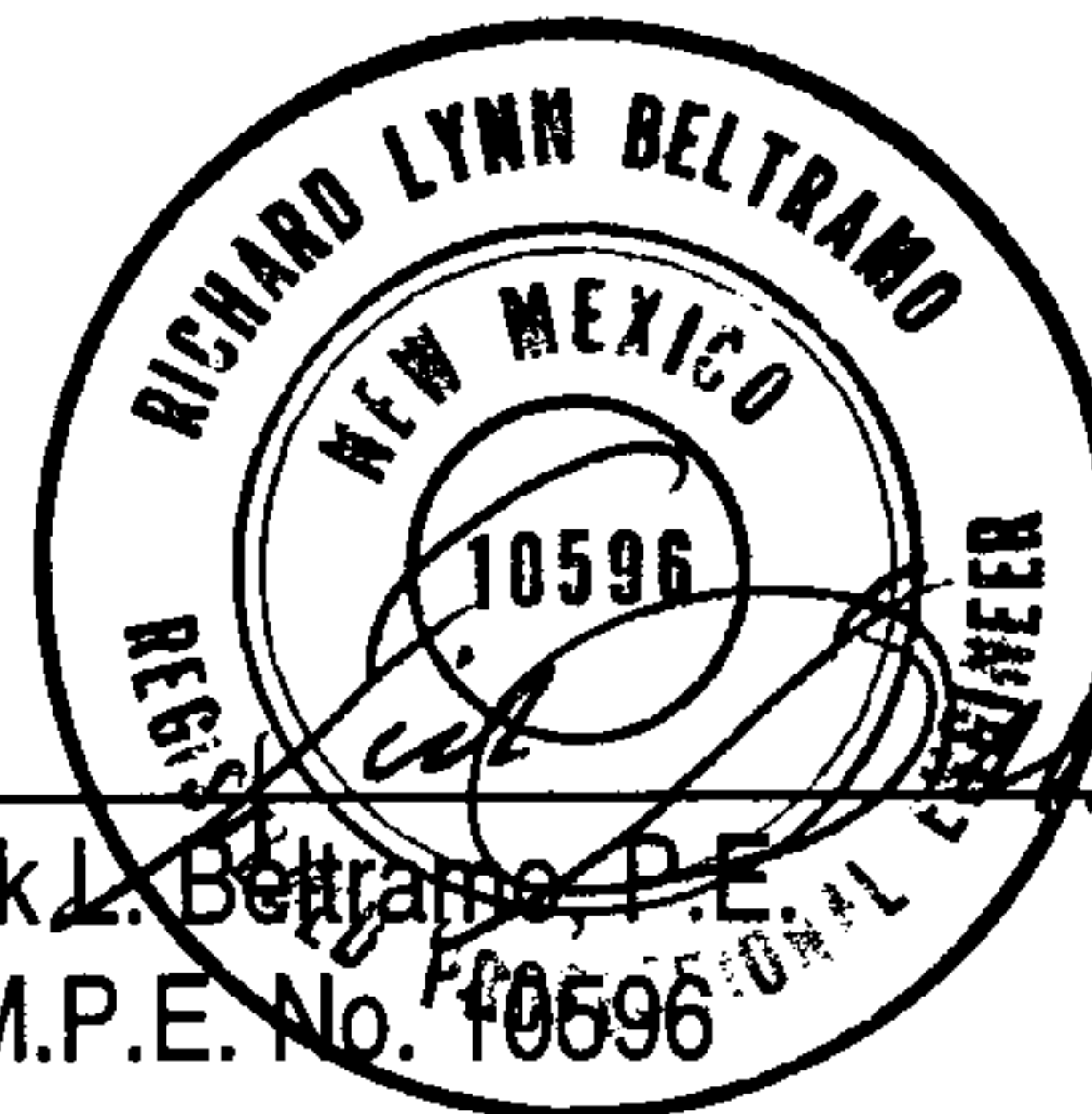
DATE SUBMITTED: FEBRUARY 17, 1998

BY: RICK BELTRAMO

**DRAINAGE
MANAGEMENT PLAN FOR THE
GATEWAY CENTER**

JANUARY 16, 1998

I, Rick L. Beltramo, being a Registered Professional Engineer, registered in the state of New Mexico, hereby certify that this report was written by me or under my direct supervision, and that the information contained herein is true and accurate to the best of my knowledge and belief.



Rick L. Beltramo, P.E.
N.M.P.E. No. 10596

Date:

1/16/98

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TABLES

TABLE 1 - HISTORIC 100-YEAR RUNOFF SUMMARY
TABLE 2 - PROPOSED 100-YEAR RUNOFF SUMMARY

APPENDICES

APPENDIX 1 - PRE-DESIGN CONFERENCE NOTES
APPENDIX 2 - HYDROLOGIC ANALYSIS

EXHIBITS

EXHIBIT 1 - HISTORIC DRAINAGE
EXHIBIT 2 - GRADING/DRAINAGE PLAN
EXHIBIT 3 - SITE PLAN FOR SUBDIVISION

I. PURPOSE

The purpose of this plan is to establish the management of storm water runoff from a 24.9 ± acre parcel of land. The parcel of land is being subdivided for site development by the owner of the property, the Sandia Foundation. The proposed development is referred to as the "Gateway Center." This report presents the drainage management plan for development of the site. The developed sites will have controlled discharge at 50% of the 100-year storm historic runoff and the proposed street will have free discharge. By controlling the discharge from the developed sites, the overall runoff will be slightly less than historic. Additionally, this plan greatly reduces the amount of runoff historically directed at the neighboring residential area west of the site through positive grading.

This plan has been prepared in accordance with the prior reports approved by the City of Albuquerque, the pre-design meeting held with City Hydrology Division, and in accordance with the City of Albuquerque Development Process Manual (DPM), including the latest revisions dated August, 1991 (DPM update).

II. PROJECT LOCATION AND DESCRIPTION

The project site is located at the northwest corner of the intersection of Interstate (I-25) and Lomas Boulevard, see Plan Sheet 1 of 2 for location map. The site is bounded by I-25 to the east, Lomas Boulevard to the south, Mountain Road to the north and Martineztown neighborhood to the west. The site generally slopes from east to west with very steep slopes adjacent to the interstate and Martineztown neighborhood. The north and south edges of the site slope steeply toward Mountain Road and Lomas Boulevard respectively. Slopes vary greatly over the site ranging from near level to in excess of 1:1. In the central portion of the site is a large relatively flat area that has been utilized in the past for gravel production. The west central portion of the site is traversed by a deep bowled arroyo with its outlet at Maggie's Avenue.

Soils on the site consist primarily of course to fine graded sands and gravel within the Bluepoint-Kokan Association (BKD). The SCS Soil Survey of Bernalillo County describes the

Bluepoint-Kokan soils as soils which experience slow runoff and moderate or severe erosion. The soil survey also identifies a portion of the site as Cut and Fill Land (CU), which is described as "sandy loam and very gravelly sand." Both soils are within hydrologic soils Group A.

III. HISTORIC (UNDEVELOPED) DRAINAGE

The project site is located within a larger watershed which has a history of flooding problems. However, recent storm drain improvements both upstream and downstream of the site have significantly reduced the magnitude of flooding in the watershed. With the completion of the I-25 northbound storm sewer diversion to Odelia Pond, the flooding hazard that currently exists as the Broadway Boulevard Pump Station, which is the terminus of the watershed in which the project site resides, has been partially relieved. Similarly, drainage improvements in Lomas Boulevard from Broadway to Eighth Street have relieved downstream flooding.

Interstate 25, which forms the easterly watershed boundary of the site precludes the majority of upstream offsite runoff from reaching the site. However, runoff from the strip of land located between the Lomas off ramp and the east property boundary does enter the site. Similarly, the strips of land between the property and Mountain Road and Lomas Boulevard combine with site runoff. Both Mountain Road and Lomas Boulevard have curb and gutter, which serve as watershed divides.

The site was subdivided into eight undeveloped, existing condition basins, see Plan Sheet 1 of 2. Basins UD-1 and UD-2 drain directly to Mountain Road while Basin UD-7 drains directly to Lomas Boulevard. The remaining basins drain to the west to the Martineztown neighborhood. Runoff in Martineztown drains to Lomas Boulevard and Mountain Road, downstream of the project site. Hydrology calculation for the historic basins are shown on Plan Sheet 1 of 2. A summary of the 100-year historic peak discharge rates for each of these basins is shown in Table 1.

TABLE 1

HISTORIC 100-YEAR
RUNOFF SUMMARY

<u>BASIN</u>	<u>PEAK DISCHARGE (CFS)</u>
To Lomas Boulevard UD-7	5.99
To Mountain Road UD-1	15.20
UD-2	<u>2.70</u>
Subtotal	17.90
To the Martineztown Neighborhood UD-3	2.32
UD-4	0.85
UD-5	20.29
UD-6	4.33
UD-8	<u>2.83</u>
Subtotal	30.62
TOTAL	54.51

- 0.72 cfs (a)

(a) See EXHIBIT 1 (Sheet 1 of 2) Historic Drainage

IV. DRAINAGE MANAGEMENT PLAN

A. General



The site and surrounding contributing areas were divided into two phases. All of the grading and drainage issues for the first phase, Phase I, and an easterly portion of the second phase, Phase II, are addressed by this plan. The drainage area for Phase I was divided into five on-site basins and four off-site basin. Similarly, for the Phase II drainage area, eight on-site basins and two off-site basins were identified. Plan Sheet 2 of 2 shows all of the proposed basins and the hydrologic analysis of the site and surrounding contributing areas for proposed conditions. Also included in this analysis for comparison are historic undeveloped peak discharge rates at the outfall for each proposed basin for both the 10-year and the 100-year storms.

Currently, the larger watershed in which the site resides is experiencing flooding problems. Unlike most development which increases runoff, this plan reduce the overall site runoff below historic levels. This plan includes storm water runoff detention provisions that will reduce the aggregate runoff to Martineztown from the developed areas to 50% of the historic runoff. It is proposed that the street improvements will be allowed free discharge (30-62 cfs versus 10.83 developed). However, as can be seen in Table 2, even with free discharge from the street, the total runoff for this development due to on-site detention storage will be approximately equal to historic runoff for the site.

B. Land Use

Under this plan, grading will occur only within the following basins: A-1, A-4, B-1, C-1, C-3, C-4, C-5, and I-1. For each of these basin, the developed conditions 10-year and 100-year peak discharge rates were based on the following land treatment assumptions found in the appendix.

TABLE 2

PROPOSED 100-YEAR
RUNOFF SUMMARY

PROPOSED Basin	Historic Peak Discharge (cfs)	Developed Peak Discharge (cfs)	Maximum Allowable Developed Peak Discharge* (cfs)	Total Flowrate Reduction (cfs)
To Lomas Boulevard:				
B-1	12.31	30.60	4.41	26.19
C-1	3.29	8.17	2.99	5.18
C-4	5.60	14.13	4.65	9.48
C-3	4.00	10.34	10.42	-0.08
I-1	3.00	5.65	2.73	2.92
Subtotal	28.20	68.89	25.20	43.69
To Mountain Road:				
A-1	4.64	11.53	2.90	8.63
C-5	1.27	3.20	0.72	2.48
A-4	1.32	3.40	3.42	-0.02
Subtotal	7.23	18.13	7.04	11.09
To the Martineztown Neighborhood:				
D-1	0.85	1.19	1.19	0.00
E-1	0.75	1.41	1.41	0.00
F-1	2.92	5.50	5.50	0.00
G-1	0.72	0.85	0.85	0.00
H-1	1.00	1.88	1.88	0.00
Subtotal	5.97	10.83	10.83	0.00
TOTAL	41.40	97.85	43.07	54.78

- (1) Flow rates are based upon assumed land development.
(2) Based on reducing the developed peak discharge for developed sites to 50% of historic levels.

(a) See EX. 1 (0.72 cfs)

Doesn't
show



These percentages were based upon typical development land treatment types. Plan Sheet 2 of 2 show the historic and developed 10-year and 100-year peak discharge rates for each proposed basin. Developed flow rates were based on the above land use percentages. Supporting hydrology calculations for the historic flow rates for the proposed basin configuration and maximum allowable peak discharge rates are shown in the Appendix. It is anticipated that actual future development of this site will not match the shown developed flow rates exactly. However, for review and comparison purposes, these rates represent a reasonable approximation of the expected future rates. A significant reduction in the developed discharge rates occurs with the proposed detention scheme.

C. Grading/Drainage Plan

Under existing conditions, Basin A-1, B-2 and C-1 primarily drain directly to either Lomas Boulevard or Mountain Road. Under the proposed plan, the historic flow destinations for these basin will not change. The proposed street will also drain to these locations as well as a portion of the site west of the proposed street (Basins C-4 and C-5). The grading plan will drain basins B-1, C-1, C-3, C-4 and I-2 to Lomas Boulevard, while basins A-1, A-4, and C-5 will drain to Mountain Road. Table 1 provides a summary of the 100-year historic peak discharge rates to both Lomas Boulevard and Mountain Road.

Table 2 This table also shows for each basin the maximum allowable developed discharge rates permitted in order to reduce the developed (non-street) site runoff to 50% of the historic runoff.

No hardened improvements will be constructed within Phase II (west of the proposed street) as a part of this plan. Except for tie slopes required to tie the site to the existing ground near the west site boundary, grading within Phase II area will be limited to grading schemes that carry drainage to the proposed street. Construction of temporary detention ponds will be required to reduce the runoff to the maximum allowable discharge rates as shown in Table 1 and on Plan Sheet 2 of 2. The ultimate limits of Phase II grading will depend upon future development plans, however, the 100-year peak

discharge shall not exceed 4.65 cfs for Basin C-4 and 0.72 cfs for Basin C-5 either during or after construction Phase I or upon future development of Phase II.

No platting for further subdivision of the Phase II area is to occur with the Phase I plat. The initial Phase I plat will identify the proposed street (Area 4) and three parcels on the east side of the street (Area 1, 2, and 3).

D. Runoff to Lomas Boulevard and Mountain Road

Based on the restriction of limiting the developed site (non-street) flow rates to 50% of historic levels, detention ponds will be required to achieve discharge reductions for each graded site draining to Lomas Boulevard or Mountain Road. The pond volumes required for each basin will be determined as site specific drainage plans are developed. Runoff will be discharged from these ponds directly to the proposed street or Lomas Boulevard in the case of Basin I-1. A portion of the street flow will then be collected by a series of inlets along the proposed street at both Lomas Boulevard and Mountain Road. The proposed storm drain system will be designed to collect the proposed controlled discharge from Phase I and Basins C-4 and C-5. Storm drains will then convey the flow from the inlets to existing storm drains in Lomas Boulevard and Mountain Road.

Also as a part of this plan, the north leg of the High Street/Lomas Boulevard intersection will be reconstructed to provide a water block on High Street to prevent runoff on Lomas Boulevard from entering High Street.

V. EROSION CONTROL PLAN

The contractor shall ensure that no soil erodes from the site into public right-of-way or adjacent property. Plan Sheet 2 of 2 provides a temporary erosion control detail and temporary detention ponds for erosion control purposes.

VI. CONCLUSION

This plan presents grading/drainage plan for the "Gateway Center." For each developed site, excluding the street, the flow rate will be reduced to 50% of the historic site runoff and the proposed street will be allowed free discharge. Overall runoff from the site will be less than historic as a result of on-site detention storage provided.

APPENDIX 1

PRE-DESIGN CONFERENCE NOTES

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

PRE-DESIGN CONFERENCE

DRAINAGE FILE/ZONE ATLAS PAGE NO.: J15-D35 DATE: 3/11/93
EPC NO.: _____ DRB NO.: _____ ZONE: _____
SUBJECT: SADIA FOUNDATION / FEDERAL COURTHOUSE SITE
STREET ADDRESS: INTERSECTION OF LOMAS AND I-25 (N.W. CORNER)
LEGAL DESCRIPTION: UNPLATTED

APPROVAL REQUESTED: ☒ PRELIMINARY PLAT ☒ FINAL PLAT (4 LOT SUBDIVISION)
☐ SITE DEVELOPMENT PLAN ☐ BUILDING PERMIT
☐ GRADING/PAVING PERMIT ☒ OTHER
SITE PLAN FOR SUBDIVISION

	WHO	REPRESENTING
ATTENDANCE:	<u>Mike Emery</u>	<u>Bohannon</u>
	<u>JAMES TOPMILLER</u>	<u>Bohannon</u>
	<u>DAN HOBAN</u>	<u>CITY</u>
	<u>FRED J. AGUIRRE</u>	<u>CITY</u>

FINDINGS:

PHASE 1 DEVELOPMENT: AN APPROVED CONCEPTUAL
GRADING & DRAINAGE PLAN IS REQUIRED FOR SITE
PLAN FOR SUBDIVISION APPROVAL.

THE TARGET DISCHARGE FOR PHASE 1 IS 50% OF
THE HISTORIC FLOW RATE BUT IN NO CASE ~~WILL THE FLOW~~
BE GREATER THAN HISTORIC FLOW RATE. THE
GOAL OF THIS PLAN ~~AND~~ AND FUTURE PHASES IS
TO DIVERT THE MAXIMUM FLOWS AWAY FROM
MARTINEZ TOWN AND INTO LOMAS.

THIS PLAN WILL ~~NEED~~ ADDRESS THE ~~AND~~ AND RESOLVE THE
PROBLEM FOR STORM WATER FLOWS ENTERING MARTINEZ
TOWN FROM HIGH ST FROM LOMAS. THIS IS WARRANTED AS
A RESULT OF THE INCREASED ~~THAT~~ FLOWS TO LOMAS.

NOTE: PHASE 1 DEVELOPMENT IS ~~A~~ ABOUT WOODWARD PL.

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: [Signature]
TITLE: _____
DATE: 3/11/93

SIGNED: [Signature]
TITLE: SADIA FOUNDATION AGENT
DATE: 3/11/93

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

APPENDIX 2

HYDROLOGIC ANALYSIS

BASIN	TOTAL AREA (ac)	PROPOSED LAND TREATMENT AREAS				PEAK DISCHARGE RATE								PROPOSED PEAK DISCHARGE		EXISTING PEAK DISCHARGE	
		A (ac)	B (ac)	C (ac)	D (ac)	A (cfs/ac)	B (cfs/ac)	C (cfs/ac)	D (cfs/ac)	10 YR (cfs)	100 YR (cfs)	10 YR (cfs)	100 YR (cfs)				
PHASE I																	
OFFSITE BASINS																	
A-2	0.63	0.32	0.08	0.24	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.60	1.41	0.29	1.05
A-3	0.41	0.31	0.05	0.05	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.25	0.76	0.19	0.68
B-2	0.54	0.00	0.08	0.46	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.86	1.63	0.25	0.90
C-2	0.72	0.72	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.27	1.12	0.27	1.20
	2.3													1.99	4.92	1.00	3.83
ON-SITE BASINS																	
A-1	2.78	0.00	0.28	0.56	1.95	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	7.33	11.53	1.29	4.64
A-4	0.79	0.00	0.00	0.20	0.59	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.20	3.40	0.37	1.32
B-1	7.38	0.00	0.74	1.48	5.17	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	19.45	30.60	3.44	12.31
C-1	1.97	0.00	0.20	0.39	1.38	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	5.19	8.17	0.92	3.29
C-3	2.4	0.00	0.00	0.60	1.80	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	6.68	10.34	1.12	4.00
	15.32													40.84	64.04	7.14	25.56
Subtotal	17.62													42.83	68.96	8.14	29.39
PHASE II																	
OFFSITE BASINS																	
D-2	0.14	0.14	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.05	0.22	0.05	0.22
I-2	0.19	0.19	0.00	0.00	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.07	0.30	0.07	0.30
	0.33													0.13	0.51	0.12	0.52
ON-SITE BASINS																	
C-4	3.36	0.00	0.25	0.67	2.44	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	9.04	14.13	1.56	5.60
C-5	0.76	0.00	0.06	0.15	0.55	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.04	3.20	0.35	1.27
D-1	0.51	0.23	0.05	0.23	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.53	1.19	0.24	0.85
E-1	0.45	0.00	0.00	0.45	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.77	1.41	0.21	0.75
F-1	1.75	0.00	0.00	1.75	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	2.99	5.50	0.81	2.92
G-1	0.27	0.00	0.00	0.27	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	0.46	0.85	0.13	0.45
H-1	0.6	0.00	0.00	0.60	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	1.03	1.88	0.28	1.00
I-1	1.8	0.00	0.00	1.80	0.00	0.38	1.56	0.95	2.28	1.71	3.14	3.14	4.70	3.08	5.65	0.84	3.00
	9.5													19.94	33.82	4.42	15.84
Subtotal	9.83													20.06	34.33	4.54	16.36
TOTAL	27.45													62.89	103.29	12.68	45.75

(a) INCORRECT SEE EXHIBIT 1 - Basin UD-4, $Q_{100} = 0.72$ cfs

Area	Acreage (Gross)	Use	Building Area	Height	FAR
<u>PHASE I (PLAT APPROVAL PENDING)</u>					
Area 1	1.97 acres	General Office	141,400 GSF	180 feet	1.65
Area 2	7.38 acres	Hotel	530,500 GSF	180 feet	1.65
Area 3	2.78 acres	Restaurant	200,150 GSF	180 feet	1.65
Area 4	1.6 acres	Public Street Right-of-Way	n/a	n/a	n/a
<u>PHASE II (SEE NOTE 10)</u>					
Area 5	6.0 acres	General Office	110,000 GSF	60 feet	0.50
Area 6	4.0 acres	General Office	70,000 GSF	60 feet	0.50
Area 7	1.65 acres	Specialty Retail & Restaurant	20,000 GSF	30 feet	0.33
Project Totals	25.38 acres		1,072,000 GSF		

EXHIBIT 1

HISTORIC DRAINAGE

EXHIBIT 2

GRADING/DRAINAGE PLAN

EXHIBIT 3

SITE PLAN FOR SUBDIVISION



BOHANNON HUSTON

Courtyard One

7500 JEFFERSON NE

Albuquerque

NEW MEXICO 87 09

voice 505.823.0000

fax 505.821.0292

nc'd!
11-15-00
gls

SANTA BARBARA/MARTINEZTOWN NEIGHBORHOOD ASSOCIATION

1127 Walter NE
Albuquerque, NM 87102
(505)246-9601/440-9187

November 13, 2000

Patrick Glennan, Executive Director
Sandia Foundation
700 Lomas NE, Suite 204
Albuquerque, NM 87102

Dear Mr. Glennan:

The Santa Barbara/Martineztown Neighborhood Association is writing this letter to remind you of the neighborhood association meeting on Thursday, November 16, 2000 at 6:30 p.m. at 1420 Edith NE, the Old Santa Barbara School.

The neighborhood association is prepared to meet with you to discuss the request for vacation of Page and Slate Street NE. The other issue the neighborhood association is concerned with and would like to discuss with Sandia Foundation is the development of the western pad sites within the Gateway Master Plan. As stated in the Official Notification of Decision from the Environmental Planning Commission, the Sandia Foundation is required to comply with the approved master plan Z-93-46. The neighborhood association is requesting that a retaining wall and landscape be constructed immediately on the western slope before any building permits or site plan amendments are approved on the Gateway site. The Gateway Center is providing intense urban center uses and the neighborhood residential area needs to be buffered from these uses. An effective buffer would include a retaining wall along the western slope of the Gateway site and incorporation of a pedestrian/bicycle network.

At the neighborhood association meeting, the board would like to be assured that Sandia Foundation is ready to rectify immediately (if any damages occurred) to the adjoining residential property during the grading of the Gateway site.

We look forward to meeting with you. If you have any questions or concerns, please call us.

Con Sinceridad,



Jesse A. Lopez
Vice President

pc: Mayor Jim Baca
Rick Miera, State Representative
Richard Romero, State Senator
Adele Hundley, City Councilor Board of Directors
Janet Stephens, Manager, DRB
Fred Aquirre, Hydrologist, Public Works Department
Chuck Gara, EPC Chair
Phillip Martinez, Attorney
Narciso Garcia, Attorney

Gateway
Proj.
File
JIS/D35

SANDIA FOUNDATION

Patrick F. Glennon
Executive Director

November 15, 2000

Mr. Jesse A. Lopez
Vice President
Santa Barbara/Martineztown Neighborhood Association
1127 Walter NE
Albuquerque, New Mexico 87102

Dear Mr. Lopez:

I received your letter of November 13, 2000 yesterday afternoon. I wanted to let you know that unfortunately I am unable to attend the neighborhood association meeting that is scheduled for tomorrow evening and to respond to some of the inquiries in your letter.

Your letter inquires about the proposed vacation of portions of Page and High Streets. As you know from discussions at prior neighborhood association meetings, Sandia Foundation originally understood that the neighborhood association asked Sandia Foundation to assist it by requesting vacation of portions of Page and Slate Streets. Based upon that understanding and in an effort to assist the neighborhood, Sandia Foundation initiated an informal preliminary sketch plat review of the proposed vacation with the City Development Review Board. However, since that time it has become clear at neighborhood meetings that certain neighbors and board members object to the proposed vacation. Sandia Foundation does not wish to pursue any voluntary action on behalf of the neighborhood association when it is apparent that some members of the neighborhood association board and neighbors are opposed to this action. For these reasons Sandia Foundation is not proceeding with the proposed vacation action.

Your letter also inquires about compliance with the Gateway Master Plan (EPC Case # Z-93-46). Sandia Foundation has reviewed carefully the conditions set forth in the Gateway Master Plan

Two Woodward Center, Suite 204
700 Lomas Boulevard, N.E.
Albuquerque, New Mexico 87102
(505) 242-2684 FAX (505) 246-2411

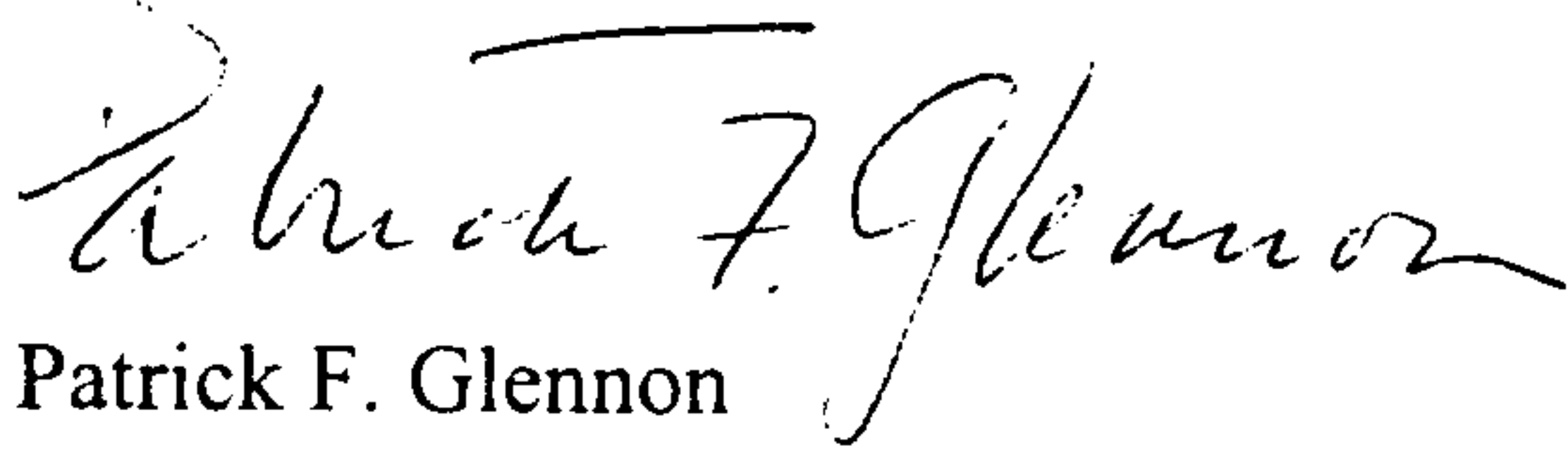
rec'd 11-17-00
TERRY, FILE this with the Gateway project
11/20/00

Mr. Jesse A. Lopez
November 15, 2000
Page 2

and believes that it has complied fully with those conditions. If you have any information concerning any condition for which there is not compliance, please let me know. Additionally, your letter seems to imply that a retaining wall and pedestrian/bicycle network are conditions of the Gateway Master Plan. However, these are not conditions of the Gateway Master Plan except for the installation of sidewalks and Sandia Foundation did complete the installation of sidewalks in accordance with City approved building plans some months ago.

Lastly, your letter inquires about damages from grading, if any, to residential properties adjoining Sandia Foundation property. We are not aware of any damages or claims for damages arising from the grading work performed on Sandia Foundation property. Additionally, Sandia Foundation understands that the design engineer has certified that the grading work was completed in accordance with the grading plan approved by the City Hydrology Department and the City Development Review Board. Also, as you probably are aware the City had substantial near record breaking rainfall throughout the month of October and Sandia Foundation did not receive any complaints or notices of drainage problems arising from its adjoining property.

Very truly yours,



Patrick F. Glennon
Executive Director

cc: Mayor James Baca
State Representative Rick Miera
State Senator Richard Romero
City Councilor Adele Hundley
Janet Stephens, Development Review Board Chair
Fred Aguirre, City Engineer
Charles Gara, City Environmental Planning Commission Chair
Phillip Martinez, Attorney
Narciso Garcia, Attorney
Frank Martinez, President Martineztown Neighborhood Association
Christina E. Chavez, President Martineztown/Santa Barbara Neighborhood Association

Law Offices

MODRALL, SPERLING, ROEHL, HARRIS & SISK, P.A.

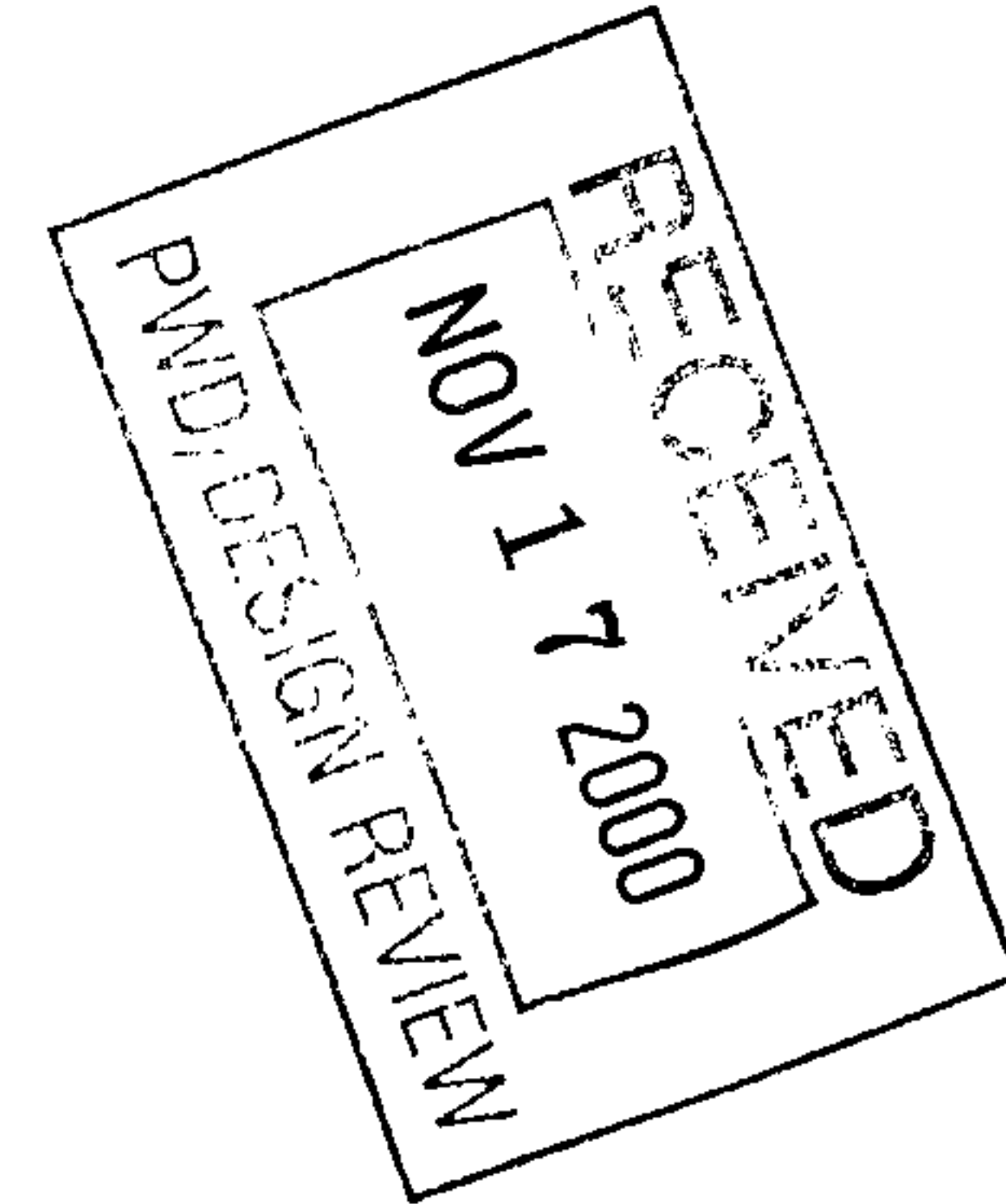
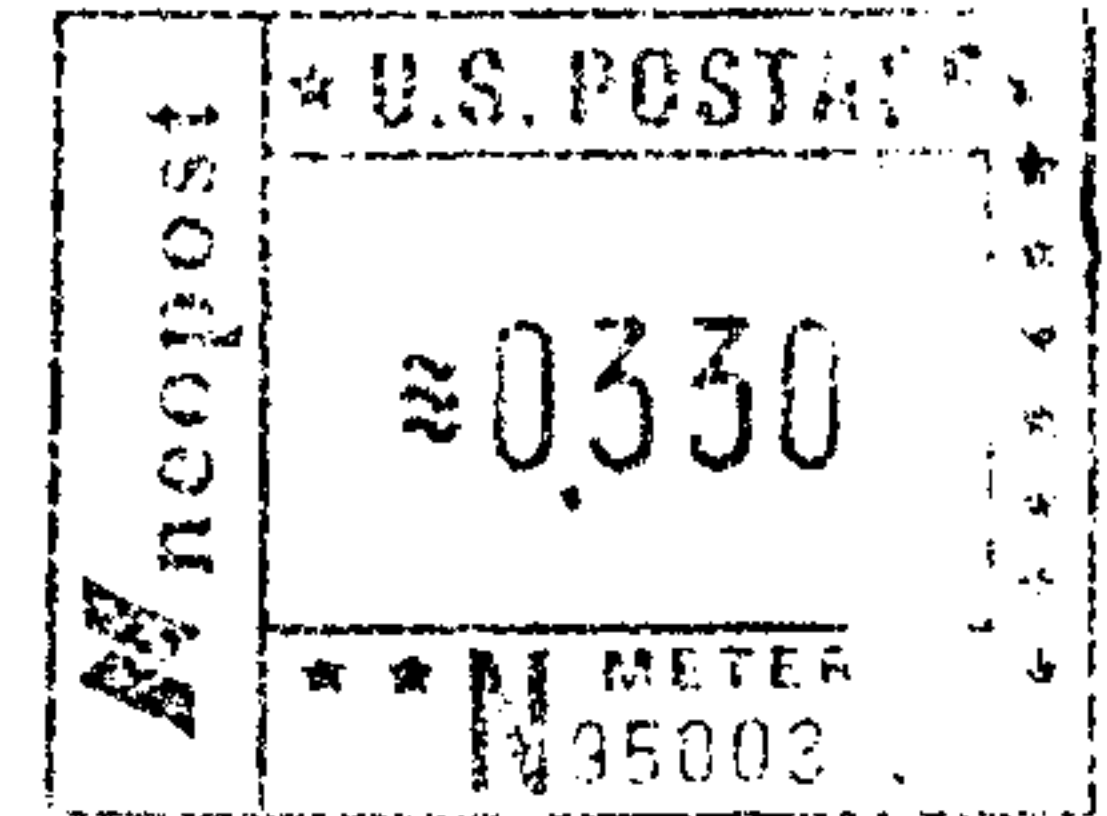
500 Fourth Street NW

Bank of America Centre, Suite 1000

Post Office Box 2168

Albuquerque, New Mexico 87103-2168

Fred Aguirre
City Engineer
Plaza Del Sol - 2nd Fl. W.
600 2nd St., NW
Albuquerque, NM 87102



87102-2263 23





rbeltram@bhinc.com

06/12/00 12:08 PM

To: FAguirre@cabq.gov

cc:

Subject: RE: Gateway Project at the intersection of Lomas & 1-25

Fred,

I will meet with Sandia Foundation to relay and address these concerns. Some of the concerns should be easy to address with final, detailed grading, which has yet to be done. Others, such as landscape improvements desired by the neighborhood are preferably delayed until the adjacent site is developed.

I will conduct a site inspection in the next few days and report to you my findings and recommendations of action.

Thanks for keeping me informed.

Rick.

JIS/D35

-----Original Message-----

From: FAguirre@cabq.gov [SMTP:FAguirre@cabq.gov]

Sent: Friday, June 09, 2000 5:14 PM

To: rbeltram@bhinc.com

Subject: Gateway Project at the intersection of Lomas & 1-25

----- Forwarded by Fred J. Aguirre/PWD/CABQ on 06/09/00 05:13 PM -----

Fred J.
Aguirre

To: rbeltramo@bhinc.com
cc: Audrey R. Garcia/MAYOR/CABQ@COA
Subject: Gateway Project at the intersection
of Lomas & 1-25

06/09/00
04:20 PM

Rick, the Mayor's Office has been receiving e-mails from some of the residences in Martinez Town regarding the construction activity on the Gateway site. They are concerned that they could be damaged from storm runoff from this project. I advised the mayor's office that a drainage plan was reviewed and approved by this office which plan redirects the developed storm runoff away from Martinez Town and into the adjacent streets (Lomas Blvd and Mountain Rd.) I also advised the Mayor's Office that you are the engineer of record and are responsible for overseeing the construction and grading activities onsite. Please monitor the grading and drainage closely to avoid any flooding in Martinez Town. Thanks, Fred.



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 23, 2001

Rick Beltramo, P.E.
BOHANNAN HUSTON, INC.
7500 Jefferson NE
Albuquerque, New Mexico 87109

**Re: Grading and Drainage Certification
Gateway Center- Drainage Management Plan (J-15/D035)
Submitted for Release of Financial Guaranty
Engineers Stamp dated 11/24/2000
Engineers Certification Dated 2/16/2001**

Dear Mr. Beltramo:

Based upon the information provided in your submittal dated 2/16/2001, the above referenced plan is adequate to satisfy the Grading and Drainage Certification requirements for Release of Financial Guaranty.

Please note that this certification is for the mass grading of the site.

Also keep in mind, that the individual sites require site specific grading plans and engineers certification in the future.

If I can be of further assistance, please contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Senior Civil Engineer, Hydrology
Public Works Dept./C.O.A.

C: Arlene Portillo, PWD – #584781

file

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Gateway Center Development ZONE MAP/DRG. FILE # J-15/D35
DRB #: 97-466 EPC#: Z-93-46 WORK ORDER#: 5958.81

LEGAL DESCRIPTION: Tracts P, Q, & Y of Plat of Various Tracts of Land of Southwestern Construction Co.

CITY ADDRESS: Lomas & Woodward

ENGINEERING FIRM: BOHANNAN-HUSTON
ADDRESS: 7500 JEFFERSON NE
CITY, STATE: ALBUQUERQUE, NM 87109

CONTACT: RICK BELTRAMO
PHONE: (505) 823-1000
ZIP CODE: _____

OWNER: Sandia Foundation
ADDRESS: 2 Woodward Center
CITY, STATE: _____

CONTACT: Patrick F. Glennon
PHONE: (505) 242-2684
ZIP CODE: _____

ARCHITECT: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

SURVEYOR: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

CONTRACTOR: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

TYPE OF SUBMITTAL:
☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☒ ENGINEER'S CERTIFICATION
☐ CLOMR/LOMR
☐ OTHER

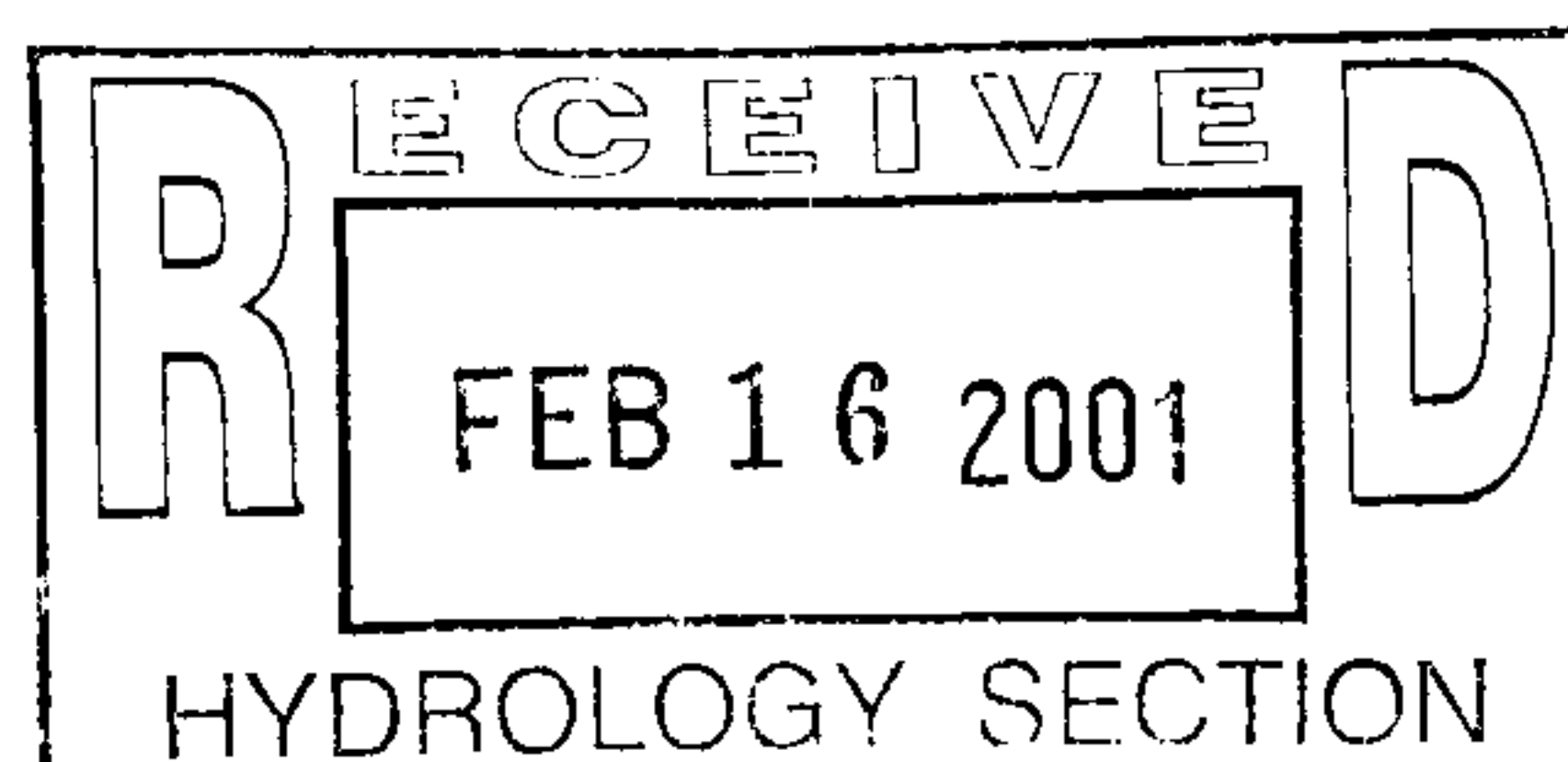
WAS A PRE-DESIGN CONFERENCE ATTENDED:
☐ YES
☐ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
☒ 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 APPROVAL
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☒ OTHER (SPECIFY)

DATE SUBMITTED: 2/16/01 BY: Rick Beltramo

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 submittal may be required based on the following:

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



CLIENT/COURIER TRANSMITTAL



BOHANNAN HUSTON

Courtyard One

7500 JEFFERSON NE

Albuquerque

NEW MEXICO 87109

voice 505.823.1000

fax 505.821.0892

To: Bradley Bingham
City of Albuquerque
One Stop Shop
600 2nd Street 2nd Floor
505-924-3986

Requested By: Scott Steffen

Date: February 16, 2001

Time Due: ☐ This A.M. ☒ This P.M.
☐ Rush ____ ☐ By Tomorrow

Job No.: 97286

Job Name: Gateway Development

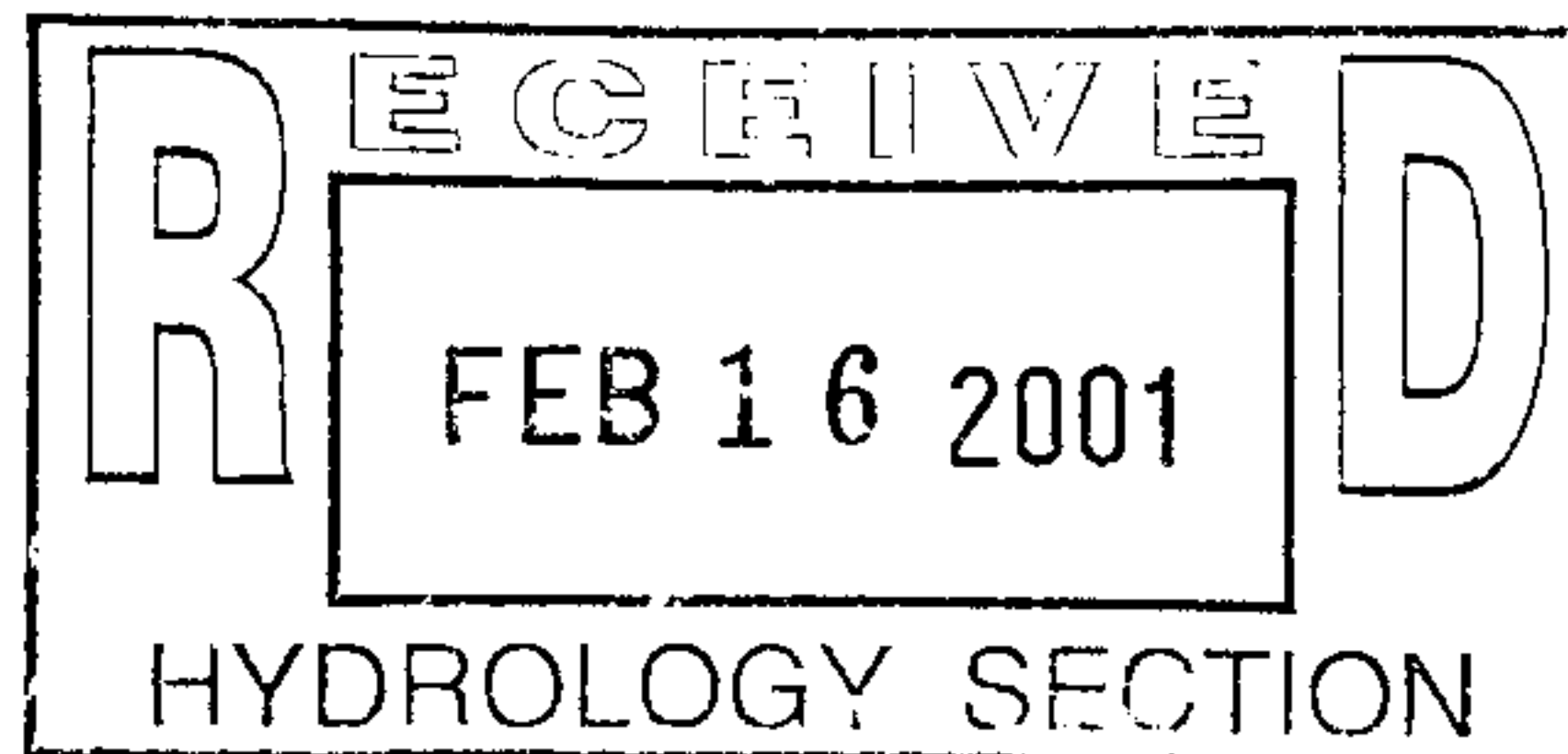
DELIVERY VIA

- ☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other _____

PICK UP

Item: _____

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	1	Drainage Information Sheet
2	1	As-built grades and Drainage Certification
3	1	Transmittal Letter

COMMENTS / INSTRUCTIONS

REC'D BY: _____ DATE: _____ TIME: _____



February 16, 2001

BOHANNAN-HUSTON, INC.

Courtyard One

7500 JEFFERSON NE

Albuquerque

NM 87109-4335

voice 505.823.1000

fax 505.821.0892

Brad Bingham, P.E.
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Gateway Center Development - Grading and Drainage Certification

Dear Brad:

Submitted for your review is the grading and drainage certification. Included in this request is one copy of the certification drawing and the drainage information sheet.

If you have questions or comments, please call me anytime.

Sincerely,
Bohannon Huston, Inc.


Rick L. Beltramo, P.E.
Community Development
and Planning Group

Enclosures

cc: Patrick Glennon, Sandia Foundation

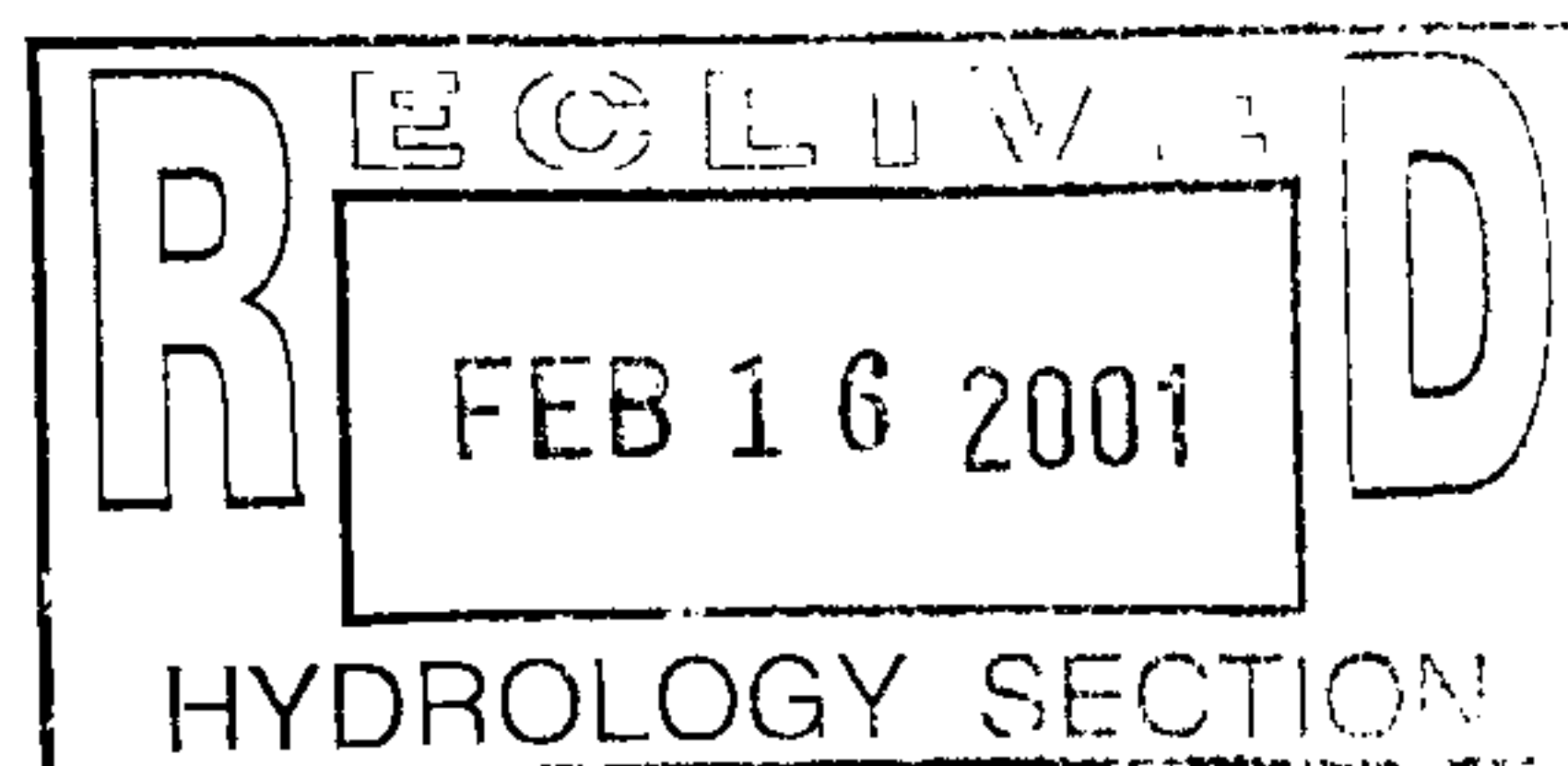


FIGURE 6
CITY OF ALBUQUERQUE
NOTICE OF D.R.C. MEETING
5-19-99
(DATE)

DRB NO: 97-466
PROJECT NO: 61588P
ZONE ATLAS: J-1S
5958.81
ON-SITE

PROJECT NAME: GATEWAY FOUNDATION DEV
LOCATION: LOMAS 1-25

TYPE OF PROJECT: AHBA ☒ CIP ☐ PWC ☐ SAD ☐ ALL PRIVATE ☐

Contact Person: RICK BELTRAMO Phone: 823-1000
Firm: BOHANNAN HUSTON

☒ Scheduled with the D.R.C. on 5-26-99 at 1:30 Plaza Del Sol/2nd Fl.
☐ No DRC Meeting Scheduled. Please return any comments by _____

The Project Is Scheduled For:

☐ / / Design Report Review	☐ / / Final Plan Review
☐ / / Pre-Design Meeting	☐ / / Signoff of Plans
☒ / / Preliminary Plan Review	☐ / / _____

The Project Relates To:

☒ Water ☒ San. Sewer ☒ Paving ☒ Storm Drainage ☐ / / _____

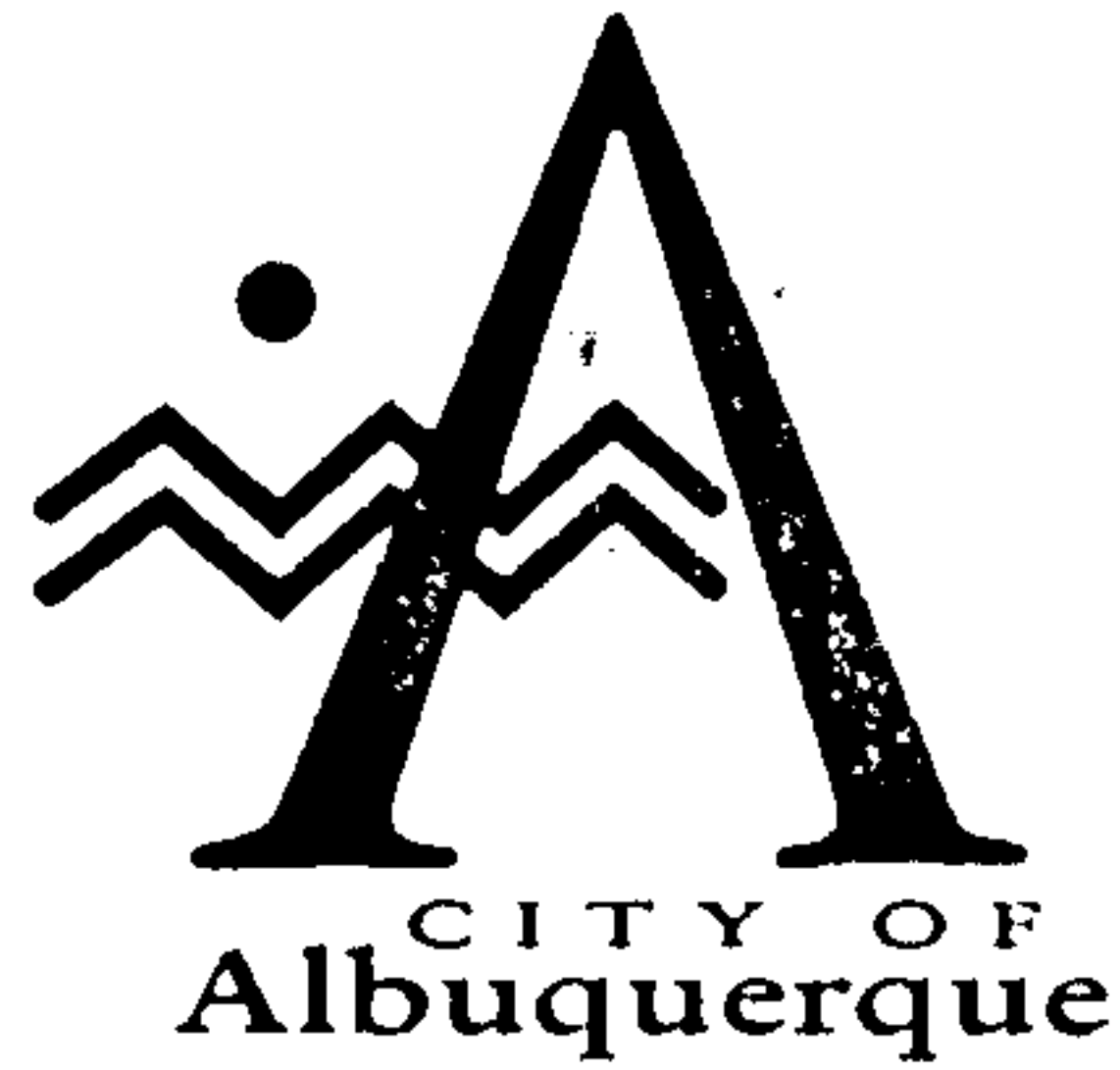
The Attached Package Includes:

/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. It will be the Project Managers responsibility to notify consulting engineering firms of date and time of scheduled meetings.

☐ D/ DRC Chairman	Project Review Section	All Drawings
☐ D/ Traffic Repres	Transportation Development	All Drawings
☐ D/ Utility Dev. (Bob Kane)	Utility Design	All AHBA Drawings
☐ / Utility Dev. (Keith Reed)	Utility Design	All CIP Drawings
☒ ~~D/ Hydro Repres.~~	Hydrology	All Drawings
☐ D/ Const. Repres.	Construction	All Drawings
☐ D/ Ray Chavez	Traffic Operations	All Drawings
☐ D/ Sergio Miranda	Water (Shutoff Plan)	All Water Shutoff
☐ D/ CIP/Parks Repres.	Parks & Recreation	ALL Landscaping
☐ / / Andre Houle	Street Maintenance	All Paving
☐ / / Kevin Broderick	Utility Coordinator	ALL PWC & CIP
☐ D/ Tom Murphy	Transit Department	All Drawings
☐ / / Joe Luehring	Construction Coordinator	CIP/Memo
☐ / / Jim Fink	Line Maintenance	CIP & SAS/Memo
☒ / George Gee	City Architect	Arch. Drawings
☐ / / Lee Lunsford	SAD Engineer	SAD/Memo
☐ / / Tom Ellis	Park Mangement	Parks/Community Ctrs/APS
☐ / / Gene Bustamante	General Services Dept.	Arch. Drawings
☐ / Greg Smith	PWD/Legal	Specs & Dwgs.
☐ / / Richard Sertich	Planning Department	CIP/Memos
☐ / / CIP Project Manager	CIP	CIP/Memos
☐ / / Donald Bartlett	Risk Management	Arch. Drawings
☐ / / _____	_____	_____

February 13, 1998



Rick Beltramo, P.E.
Bohannon-Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

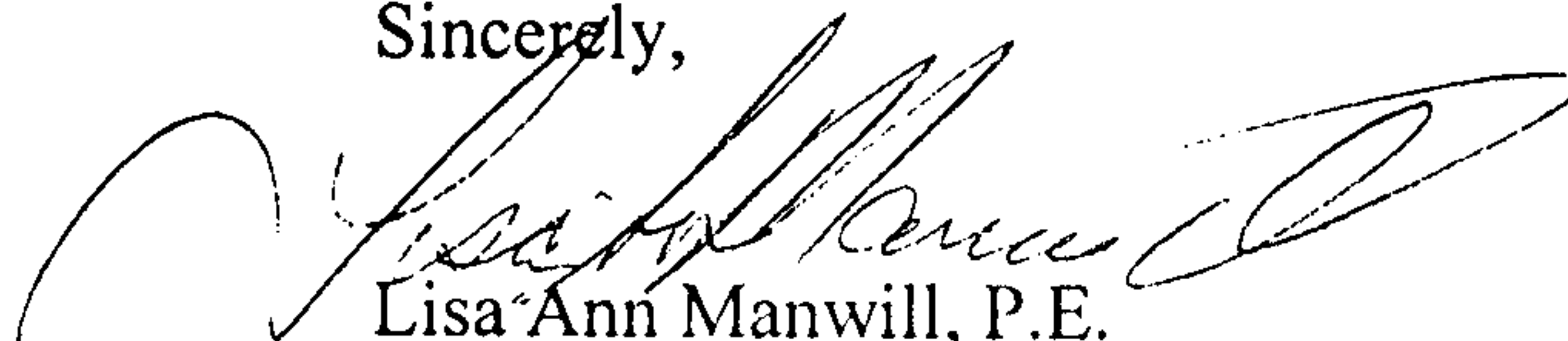
**RE: GATEWAY CENTER (J15-D35). DRAINAGE PLAN FOR FINAL PLAT
APPROVAL. ENGINEER'S STAMP DATED JANUARY 16, 1998**

Dear Mr. Beltramo:

Based on the information provided on your January 20, 1998 submittal, the above referenced project is approved for Site Development Plan for Subdivision and Final Plat.

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

Sincerely,



Lisa Ann Manwill, P.E.
Hydrology

c: Andrew Garcia
File

Good for You, Albuquerque!



DRAINAGE INFORMATION SHEET

PROJECT TITLE: GATEWAY CENTER ZONE ATLAS/DRNG. FILE # J-15/D35

DRB #: 97-466 EPC #: Z-93-46 WORK ORDER #: N/A

LEGAL DESCRIPTION: TRACTS P, Q, & Y OF PLAT OF VARIOUS TRACTS OF LAND OF SOUTHWESTERN CONSTRUCTION CO.

CITY ADDRESS: LOMAS & WOODWARD

ENGINEERING FIRM: BOHANNAN-HUSTON INC. CONTACT: RICK BELTRAMO

ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109 PHONE: (505) 823-1000

OWNER: SANDIA FOUNDATION CONTACT: RUSSEL D. HILLER, III

ADDRESS: 2 WOODWARD CENTER PHONE: 242-2684

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: BOHANNAN HUSTON CONTACT: DWAIN WEAVER

ADDRESS: _____ PHONE: 823-1000

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☐ DRAINAGE PLAN
- ☐ FINAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

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

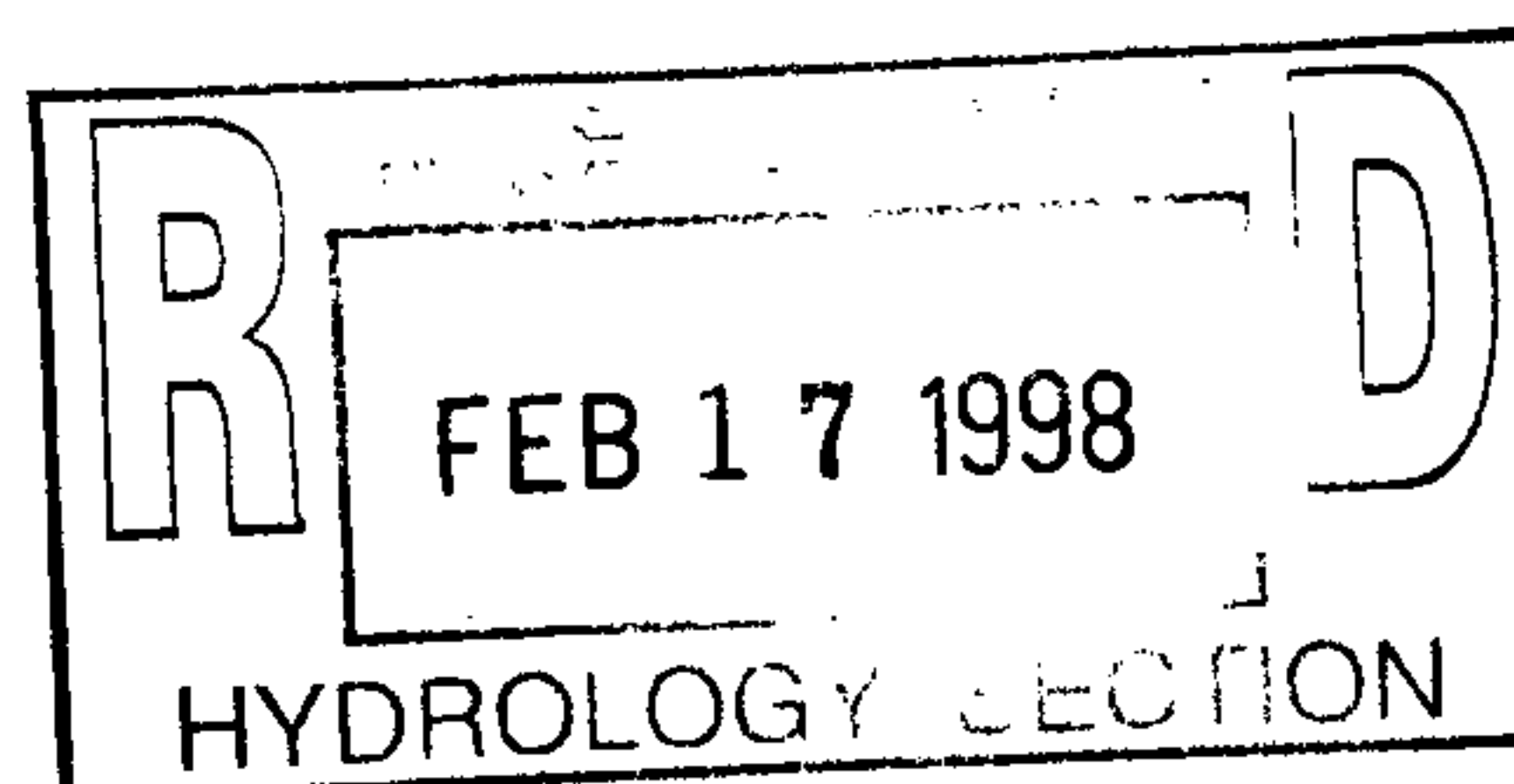
PRE-DESIGN MEETING:

- ☒ YES
- ☐ NO
- ☒ COPY PROVIDED

*Approved
Engr. Stamp
1-16-98*

DATE SUBMITTED: FEBRUARY 17, 1998

BY: RICK BELTRAMO



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Gateway Center ZONE ATLAS/DRNG. FILE # J-15/D35
 DRB #: 97-466 EPC #: Z-93-46 WORK ORDER #: _____
 LEGAL DESCRIPTION: Sandia Foundation Tracts P, Q and Y
 CITY ADDRESS: West of I-25 between Lomas Blvd. and Mountain Rd. (Containing 24.83 acres)

ENGINEERING FIRM: BOHANNAN HUSTON, INC.
 ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109
 OWNER: Sandia Foundation
 ADDRESS: 700 Lomas Blvd., NE
Albuquerque, NM 87102
 ARCHITECT: _____
 ADDRESS: _____
 SURVEYOR: _____
 ADDRESS: _____
 CONTRACTOR: _____
 ADDRESS: _____

CONTACT: RICK BELTRAMO
 PHONE: 823-1000
 CONTACT: R. HILLER
 PHONE: _____
 CONTACT: _____
 PHONE: _____
 CONTACT: _____
 PHONE: _____
 CONTACT: _____
 PHONE: _____

TYPE OF SUBMITTAL:

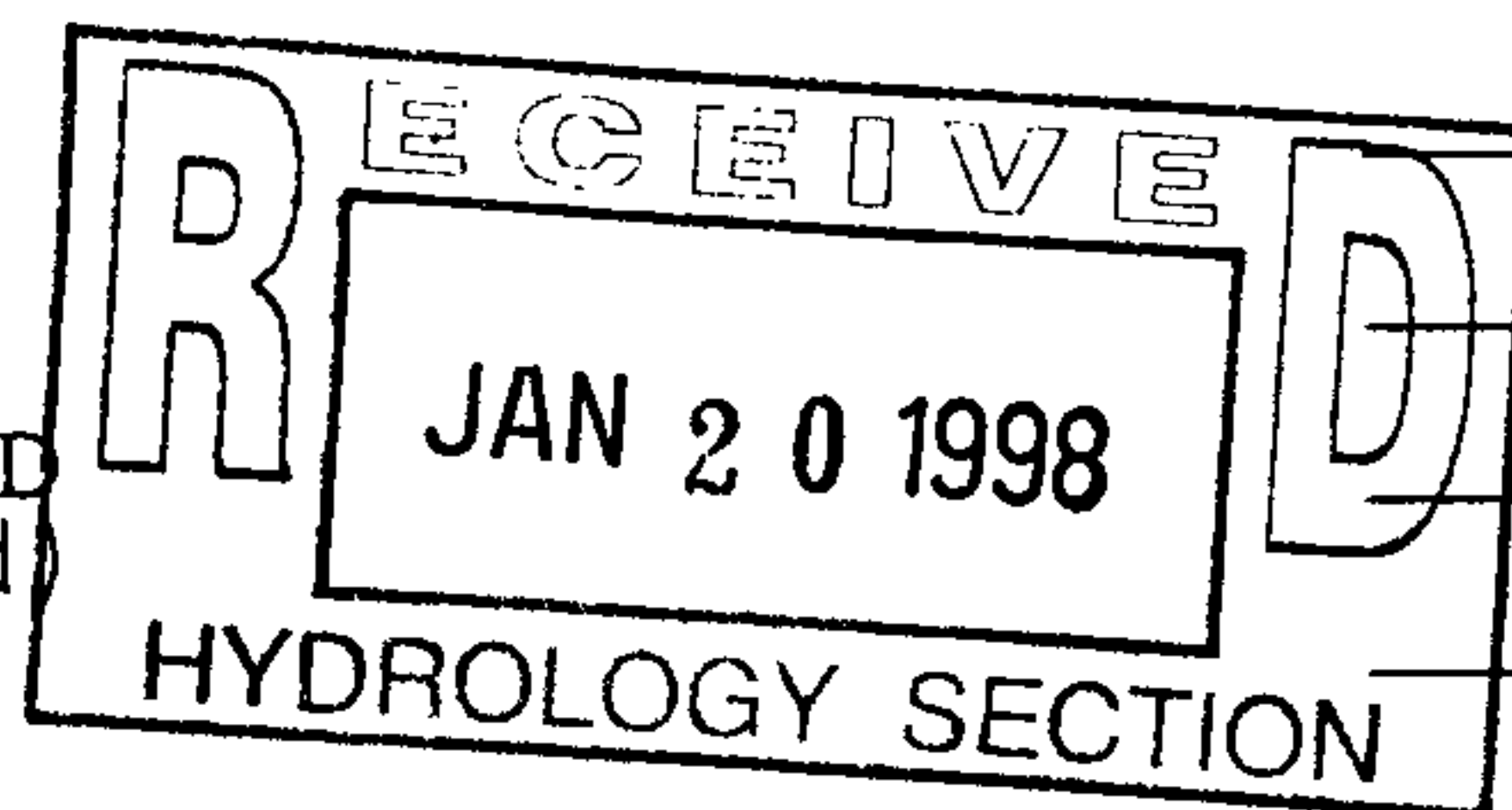
____ DRAINAGE REPORT
XX DRAINAGE PLAN
 ____ CONCEPTUAL GRADING & DRAINAGE PLAN
 ____ GRADING PLAN
 ____ EROSION CONTROL PLAN
 ____ ENGINEER'S CERTIFICATION
 ____ OTHER

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
XX FINAL PLAT APPROVAL
 ____ FOUNDATION PERMIT APPROVAL
 ____ BUILDING PERMIT APPROVAL
 ____ CERTIFICATE OF OCCUPANCY APPROVAL
 ____ GRADING PERMIT APPROVAL
 ____ PAVING PERMIT APPROVAL
 ____ S.A.D. DRAINAGE REPORT
 ____ DRAINAGE REQUIREMENTS
 OTHER _____ (SPECIFY)

PRE-DESIGN MEETING:

X YES
 ____ NO
 ____ COPY PROVIDED
 (See attached)



DATE SUBMITTED: Jan 20, 1998

BY: [Signature]

CLIENT/COURIER TRANSMITTAL

TO: FRED AGUIRRE, P.E.
CITY HYDROLOGIST

Requested By: _____

Date: _____

Attn: Lisa Manwill, P.E.

Time Due: ☒ This A.M. ☐ This P.M.
☒ Rush ☐ By Tomorrow

Job No.: 97286 CORR FIVE
CC: 97286 A OG

Job Name: GATEWAY CENTER



BOHANNAN HUSTON

Courtyard One

7500 JEFFERSON NE

Albuquerque

NEW MEXICO 87109

voice 505.823.1000

fax 505.821.0892

DELIVERY VIA

☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other _____

PICK UP

Item: _____

ITEM NO.

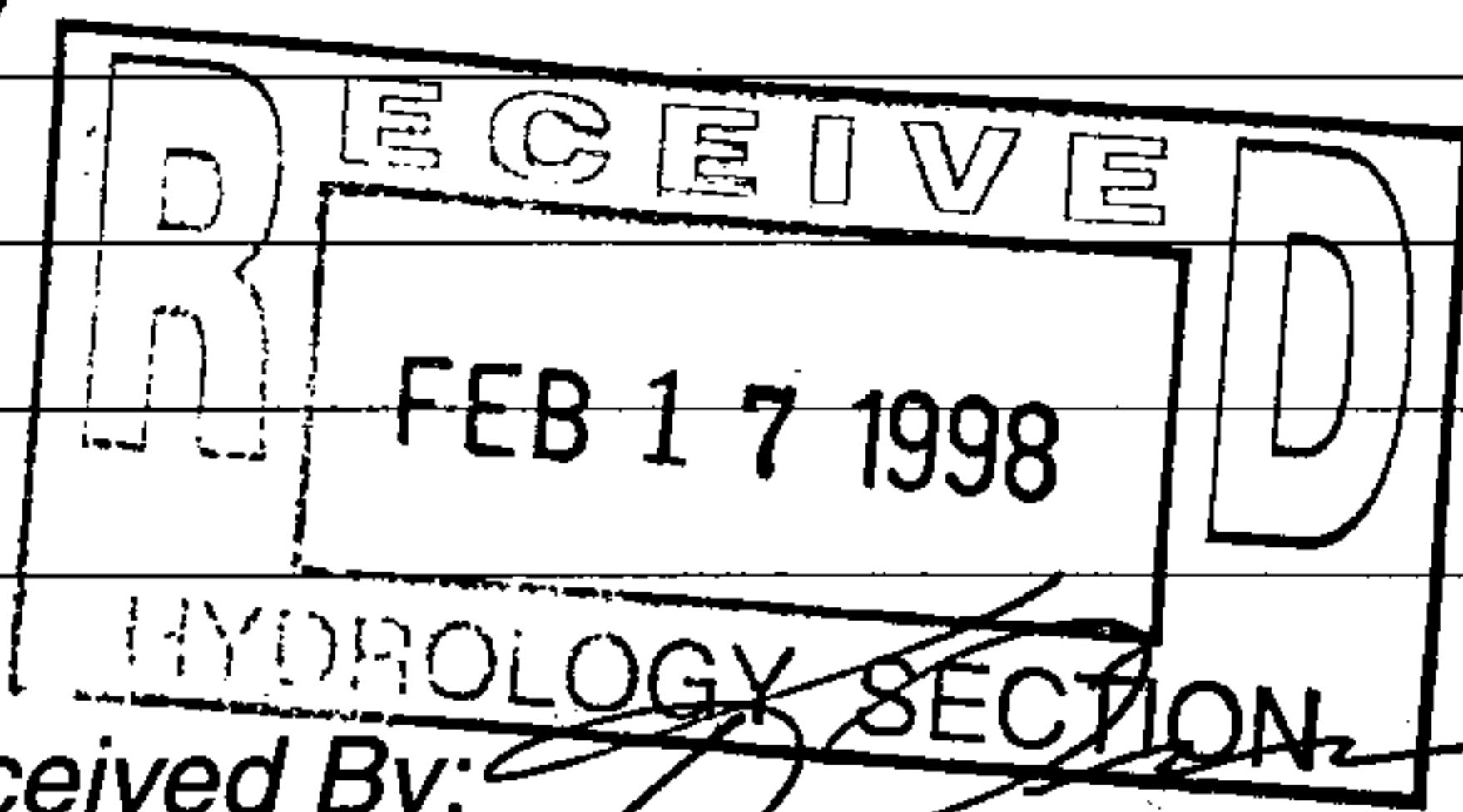
QUANTITY

DESCRIPTION

<u>1</u>	<u>1</u>	<u>DRAINAGE Plan</u>
<u>2</u>	<u>1</u>	<u>DRAINAGE INFO SHEET</u>

COMMENTS/INSTRUCTIONS

Lisa, as per our discussion on Friday, Feb 13,
I have revised the Drainage Report to be consistent
with the revised Grading Plan. Should you have any
questions, please call anytime.



Received By: [Signature]

Date: _____ Time: _____

[Signature]



February 13, 1998

Rick Beltramo, P.E.
Bohannon-Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

**RE: GATEWAY CENTER (J15-D35). DRAINAG PLAN FOR FINAL PLAT APPROVAL.
ENGINEER'S STAMP DATED JANUARY 16, 1998**

Dear Mr. Beltramo:

Based on the information provided on your January 20, 1998 submittal, City Hydrology has the following comment:

1. According to our files, this project was submitted in April of 1993 for Site Development Plan. The April 1993 report was conceptual in nature, as was the approval. You are now requesting Final Plat approval, which requires a detailed drainage report. Please update our files with a detailed drainage study.

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

Sincerely,

Lisa Ann Manwill, P.E.
Hydrology

c: Andrew Garcia
File 

Good for You, Albuquerque!





BOHANNAN HUSTON
Court yard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109
voice 505.823.1000
fax 505.821.0892

January 20, 1998
Fred Aguirre, P.E.
Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

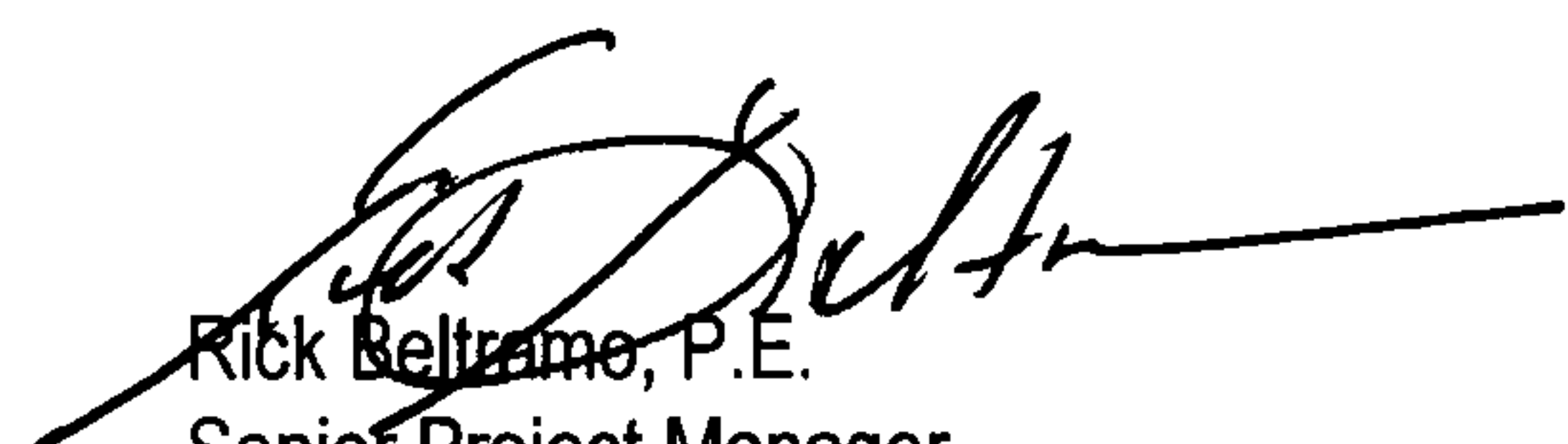
Re: Gateway Development at Lomas & I-25 for Sandia Foundation
Ref: EPC Z-93-46, DRB-97-466, Drng. File J-15/D35

Dear Fred:

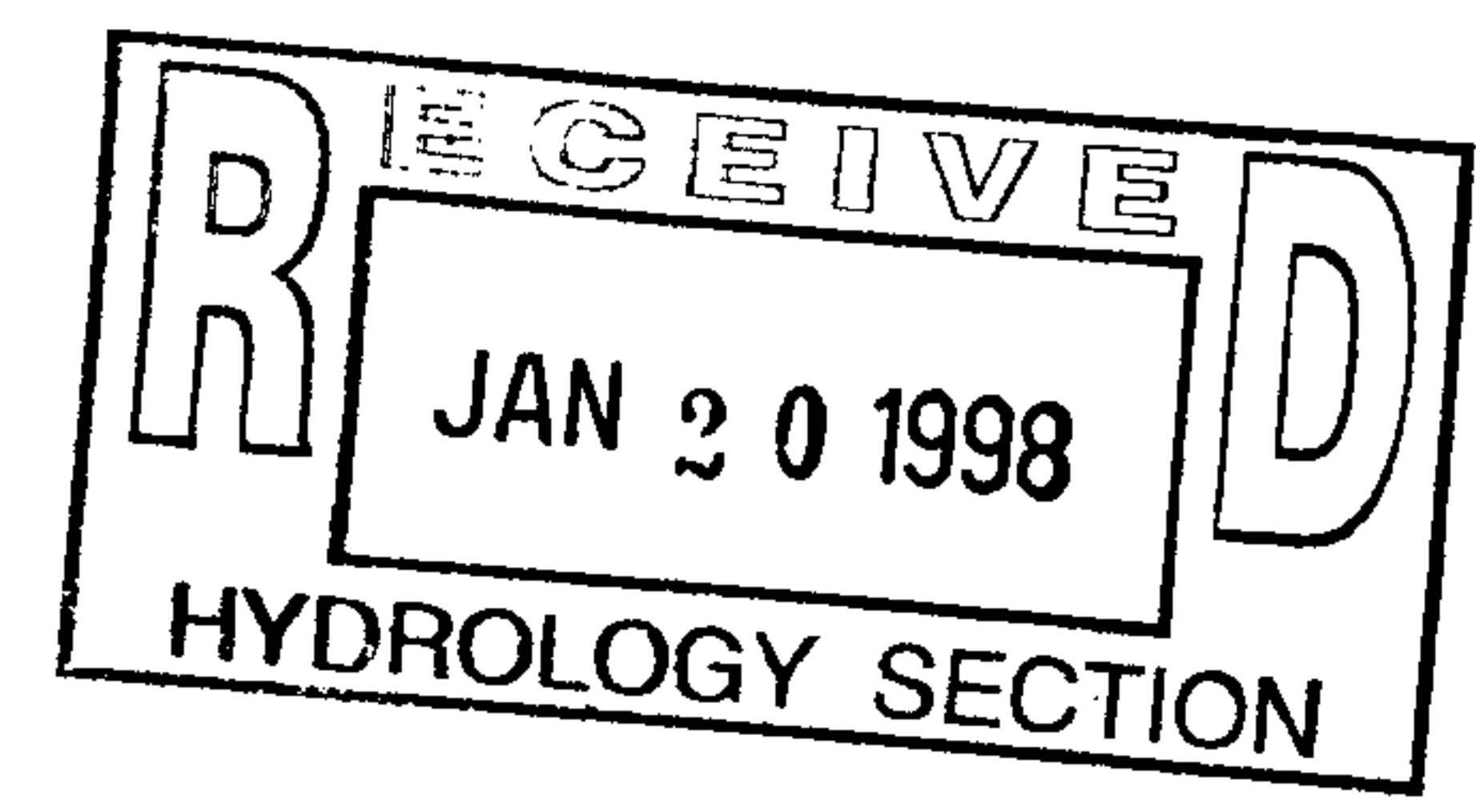
Submitted is the revised Grading Plan for the Gateway Development. The revisions reflect the recent changes on the corresponding Site Plan and Final Plat. Changes consist of modifying tract lines. The change did not modify the concept of the Drainage Plan.

The Owner is anxious to record a final plat. Should you see a problem with this plan, please call me at 823-1000 as soon as possible.

Sincerely,
Bohannon Huston


Rick Beltrame, P.E.
Senior Project Manager
Community Development and Planning Group

RB/mls
Enclosures
cc: Mr. Russell Hiller, Sandia Foundation





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 20, 1993

James Topmiller, P.E.
Bohannon Huston, Inc.
7500 Jefferson NE
Albuquerque, N.M. 87109

RE: CONCEPTUAL GRADING & DRAINAGE PLAN FOR GATEWAY CENTER ((J-15/D35))
RECEIVED APRIL 8, 1993 FOR SITE DEVELOPMENT PLAN APPROVAL
ENGINEER'S STAMP DATED 4-2-93

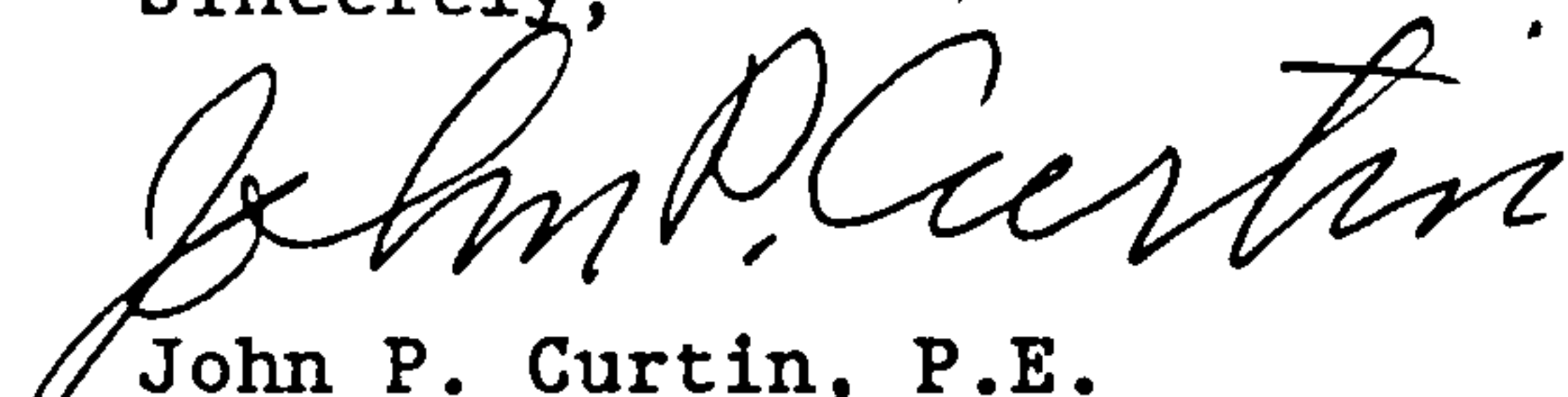
Dear Mr. Topmiller:

Based on the information included in the submittal referenced above, City Hydrology APPROVES the Site Development Plan for this project.

The west boundary of the project appears arbitrary and varies from sheet 1 to sheet 2. Verify the property boundaries if practical and be consistent with the boundary.

If you have any questions about this project, you may contact me at 768-2727.

Sincerely,


John P. Curtin, P.E.
PWD/Hydrology

xc: Fred Aguirre

WPHYD+7700;jpc

PUBLIC WORKS DEPARTMENT

DRAINAGE INFORMATION SHEET

PROJECT TITLE:

Gateway Center

ZONE ATLAS/DRNG. FILE #

5-15/035

DRB #:

EPC #:

WORK ORDER #:

LEGAL DESCRIPTION:

CITY ADDRESS:

Lomas & Navinetae Rd - West of I-25ENGINEERING FIRM: BOHANNAN HUSTON, INC.ADDRESS: 7500 JEFFERSON NE, ALB. NM 87109

OWNER:

Sandra J. Jaramila

ADDRESS:

700 Lomas NR

ARCHITECT:

ADDRESS:

SURVEYOR:

ADDRESS:

CONTRACTOR:

ADDRESS:

CONTACT:

James Jaramila

PHONE:

823-1000

CONTACT:

Tom Taylor

PHONE:

CONTACT:

PHONE:

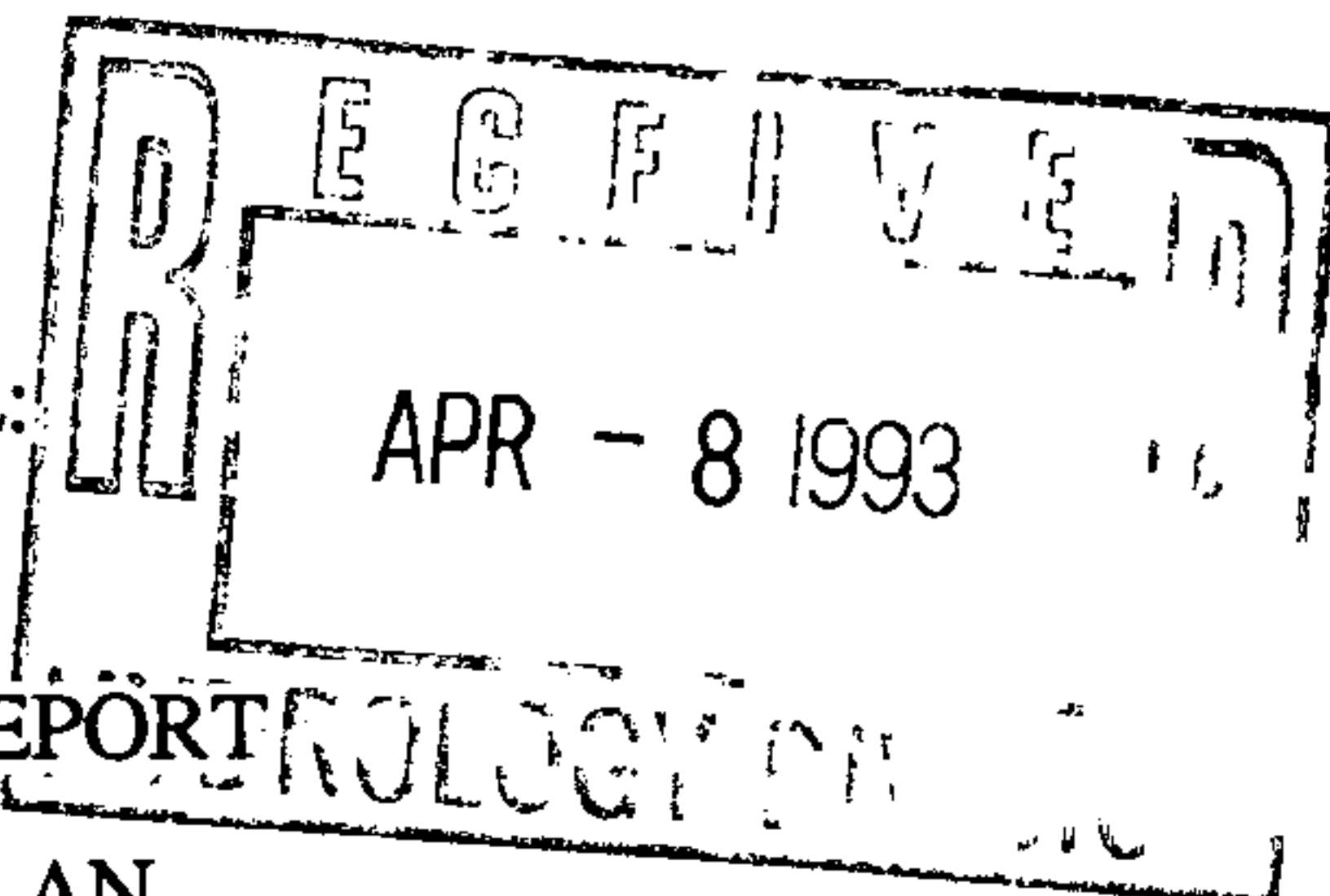
CONTACT:

PHONE:

CONTACT:

PHONE:

TYPE OF SUBMITTAL:



CHECK TYPE OF APPROVAL SOUGHT:

- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☒ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

SKETCH PLAT APPROVAL

PRELIMINARY PLAT APPROVAL

S. DEV. PLAN FOR SUB'D. APPROVAL

S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

SECTOR PLAN APPROVAL

FINAL PLAT APPROVAL

FOUNDATION PERMIT APPROVAL

BUILDING PERMIT APPROVAL

CERTIFICATE OF OCCUPANCY APPROVAL

GRADING PERMIT APPROVAL

PAVING PERMIT APPROVAL

S.A.D. DRAINAGE REPORT

DRAINAGE REQUIREMENTS

OTHER _____ (SPECIFY)

PRE-DESIGN MEETING:

- ☐ YES
☐ NO
☐ COPY PROVIDED

DATE SUBMITTED:

5.7.93

BY:

James Jaramila7700

April 7, 1993

Fred Aguirre, P.E.
Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Conceptual Drainage Management Plan -
Gateway Center Project at Lomas and I-25

Dear Fred:

Enclosed for your review and comment is the conceptual drainage management plan for the Sandia Foundation's Gateway Center project. This project of approximately 25-acres is located between Lomas Boulevard and Mountain Road, immediately west of Interstate 25.

This plan is prepared and submitted in support of a Site Plan for Subdivision, under the same name, to be heard by the Environmental Planning Commission in May.

The drainage management and grading concepts presented in this plan are those discussed and outlined in a pre-design meeting with City Hydrology staff (see Memo enclosed in this report). These concepts provide, to the extent possible, for discharge of onsite developed flows at historic, or less, flowrates to Lomas Boulevard or Mountain Road. This plan permits significant, heretofore unavailable, protection to downstream residential subdivisions located immediately west of the site.

Finally, the enclosed plan provides for greater grading of the Phase II lands (west of the proposed street) than originally considered and discussed with City Staff. However, the additional grading conforms to the intent of the original drainage discussion by diverting onsite flows to Lomas and Mountain and therefore reducing flows that impact the westerly residential subdivisions.

Please review and comment on this plan at your earliest opportunity. If we can provide any additional information, please call me.

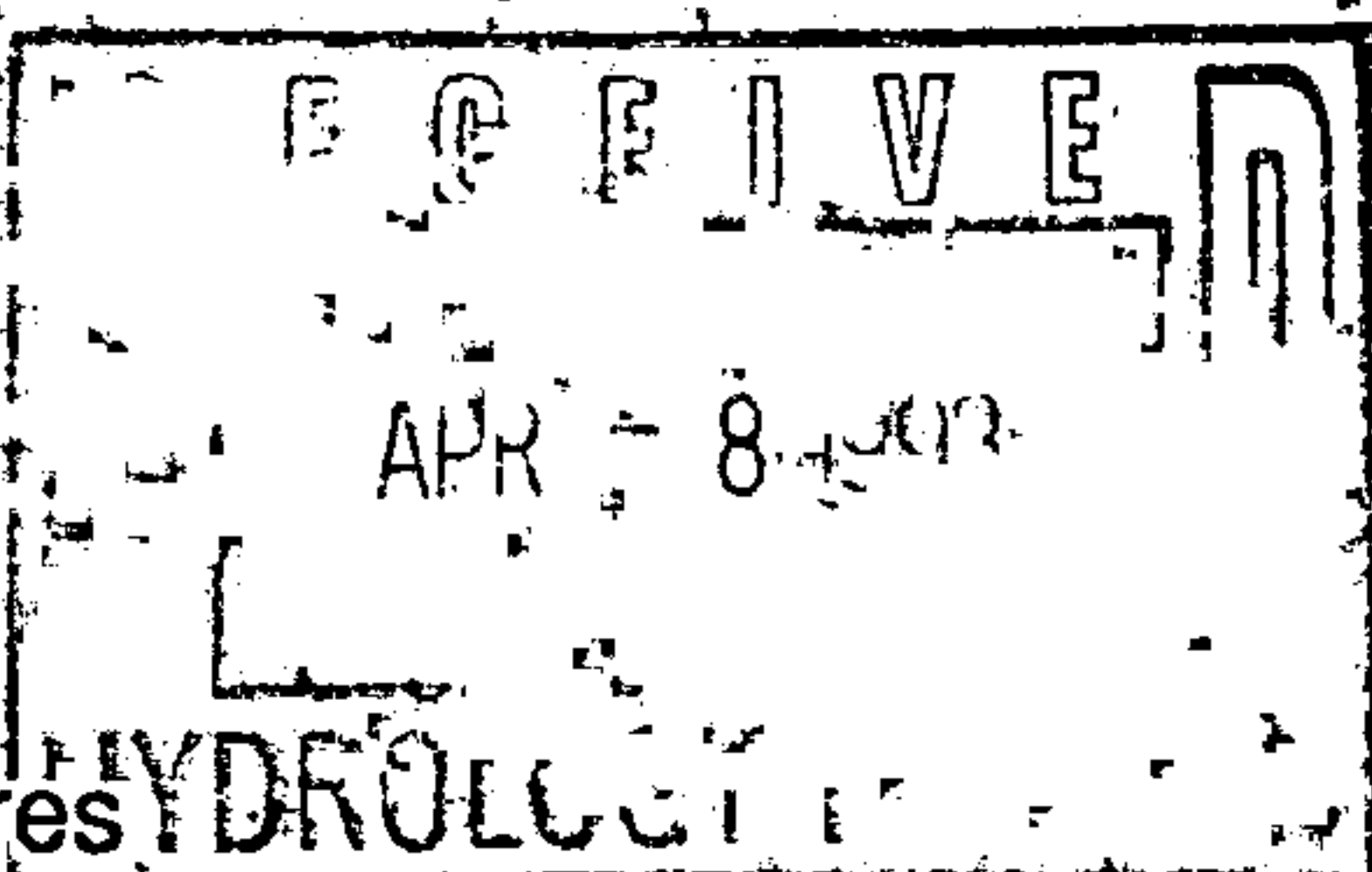
Sincerely,

BOHANNAN-HUSTON, INC.

James R. Topmiller
James R. Topmiller, P.E.

Project Manager
Community Development and Planning

JRT/mls
Enclosures



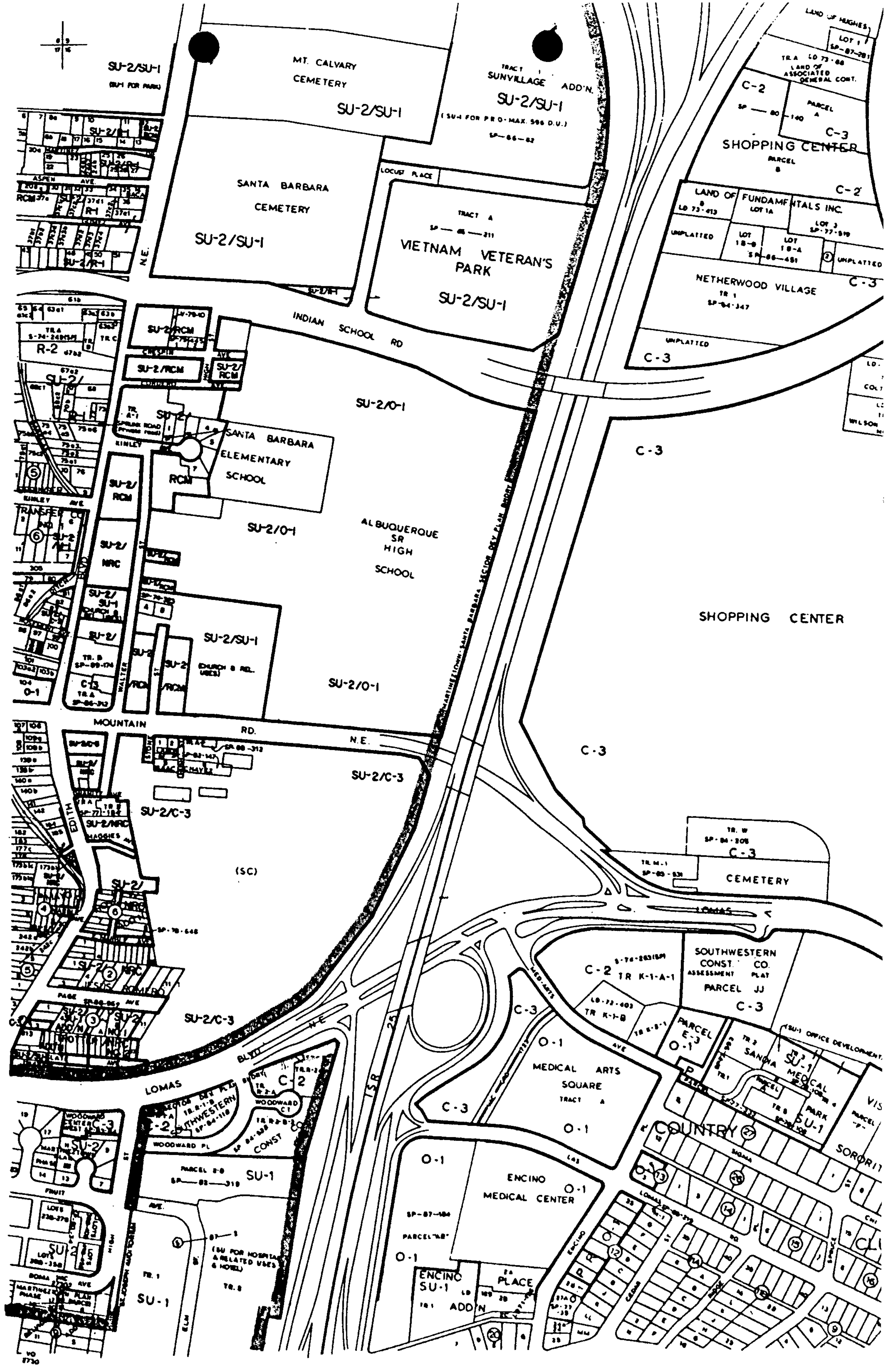
cc: Mr. Tom Taylor
Mr. Joe Chato
Mr. Jon Moore
Mr. Lawrence Kline
Mr. Steve Rosenthal

BHI_ADMIN: [SECPOOL.CDP.9226143] aguirre.drainage

LARRY W. HUSTON
MICHAEL M. EMERY, P.E.
BRIAN G. BURNETT, P.E.

KERRY L. DAVIS, P.E.
ROBERT G. KLETZLI
LARRY A. LARRAÑAGA, P.E.

HOWARD C. STONE, P.E.
WILLIAM L. VREEKE, P.E.
GORDON A. WALHOOD JR., P.E.



$$Q = \# \overset{6/2}{\left(\frac{1}{2} \right)}$$

East half

Woodward Rd

HYDROLOGY SECTION
PLANNING DEPARTMENT
DEVELOPMENT & BUILDING SERVICES DIVISION
600 SECOND STREET NW SUITE 201
ALBUQUERQUE, NM 87102
505-924-3982

Records Withdrawal Form

Requested by: JASON WOODRUFF, GND, LLC Phone No.: 899-6182
Name and Company

Hydrology File: J-15/D035A EMBASSY SUITES @ Gateway.
a. File b. Microfilm c. (other) Approved G&D dated 2-02-04

Hydrology File: _____
a. File b. Microfilm c. other _____

Hydrology File: _____
a. File b. Microfilm c. other _____

Hydrology File: _____
a. File b. Microfilm c. other _____

Hydrology File: _____
a. File b. Microfilm c. other _____

Hydrology File: _____
a. File b. Microfilm c. other _____

Hydrology File: _____
a. File b. Microfilm c. other _____

Picked Up By:

Name: Chris Kile
Print

Organization: Academy Repro

Signed: [Signature]

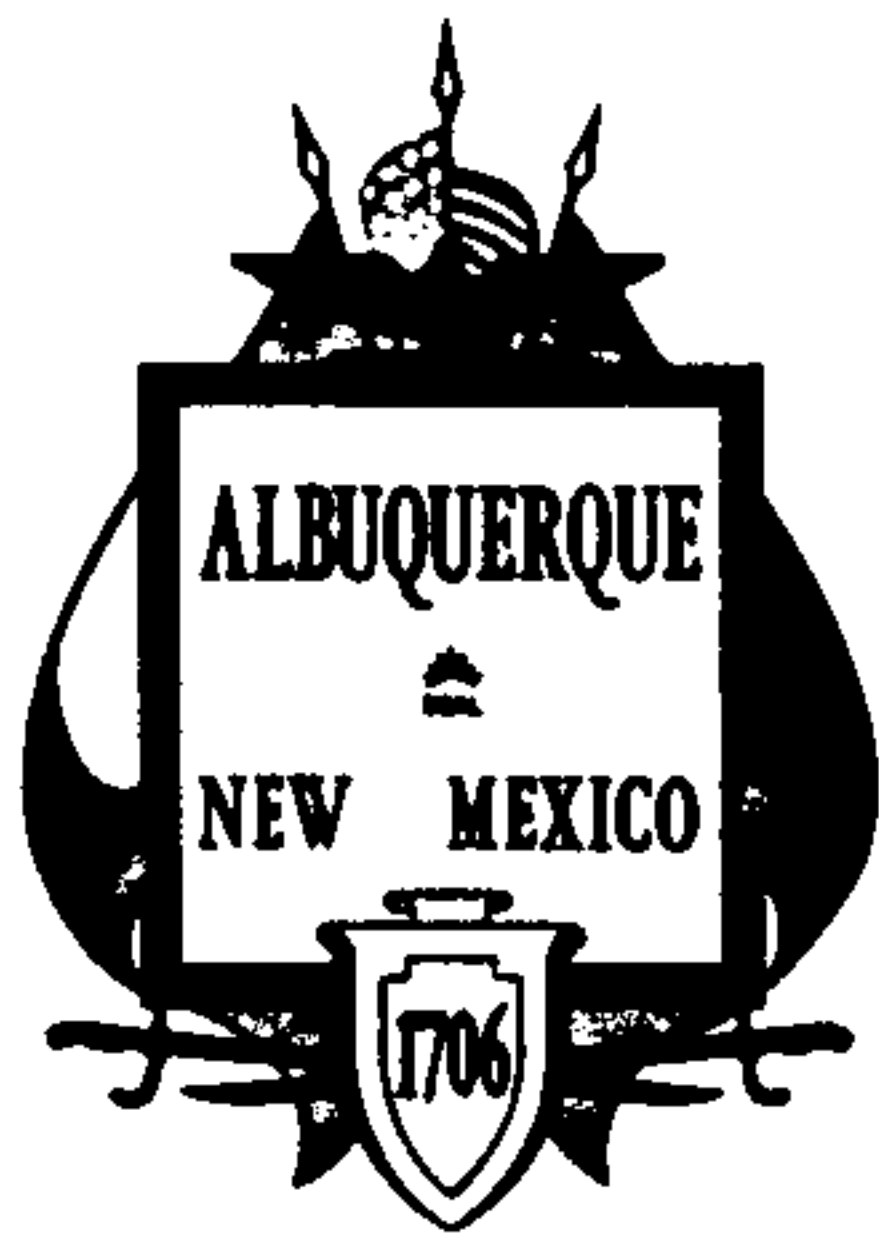
Date: 4/5/07

Office Use Only

Return Acknowledged:

Received by: [Signature]

Date: 4/5/07



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 24, 2004

Rick Beltramo, P.E.
Bohannon Huston, Inc.
7500 Jefferson NE – Courtyard 1
Albuquerque, NM 87109

**Re: Embassy Suites, Lomas Blvd. & Woodward Pl., Grading and Drainage Plan
Engineer's Stamp dated 2-02-04 (J15/D35A)**

Dear Mr. Beltramo,

Based upon the information provided in your submittal received 2-02-04, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

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 Public Works Hydrology section at 768-3654 (Charles Caruso) or 768-3645 (Brian Wolfe).

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Charles Caruso, Public Works Hydrology
file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

J-15/D35A

PROJECT TITLE: Embassy Suites ZONE MAP/DRG. FILE # _____
DRB # 1000060 EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Tract B & C Gateway Subdivision
CITY ADDRESS: _____

ENGINEERING FIRM: Bohannon Huston, Inc.
ADDRESS: 7500 Jefferson NE - Courtyard I
CITY, STATE: Albuquerque, NM

CONTACT: Glenn Broughton
PHONE: (505) 823-1000
ZIP CODE: 87109

OWNER: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

ARCHITECT: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

SURVEYOR: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

CONTRACTOR: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

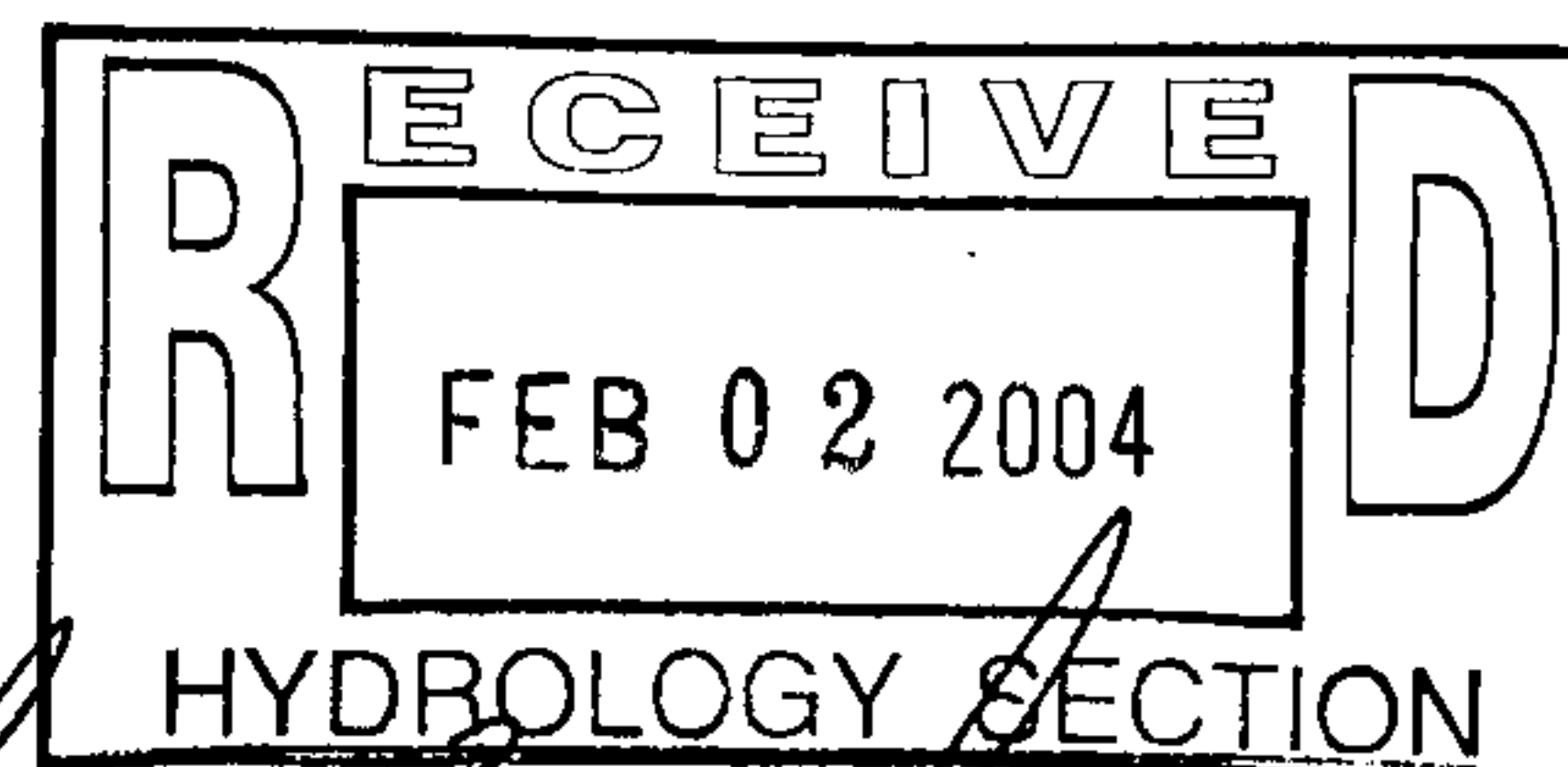
- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, **REQUIRES TCL or equal**
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ 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
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: 2/2/04 BY: Glenn Broughton

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 submittal may be required based on the following:

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

J-15 / D35A

February 2, 2004

Courtyard I
7500 Jefferson NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
fax: 505.798.7988
toll free: 800.877.5332

Brad Bingham, P.E., Senior Engineer
Planning Dept/Hydrology Dev Section
City of Albuquerque
P O Box 1293
Albuquerque, NM 87103

Re: Embassy Suites - Lomas Boulevard & Woodward Place (J15/D35A)

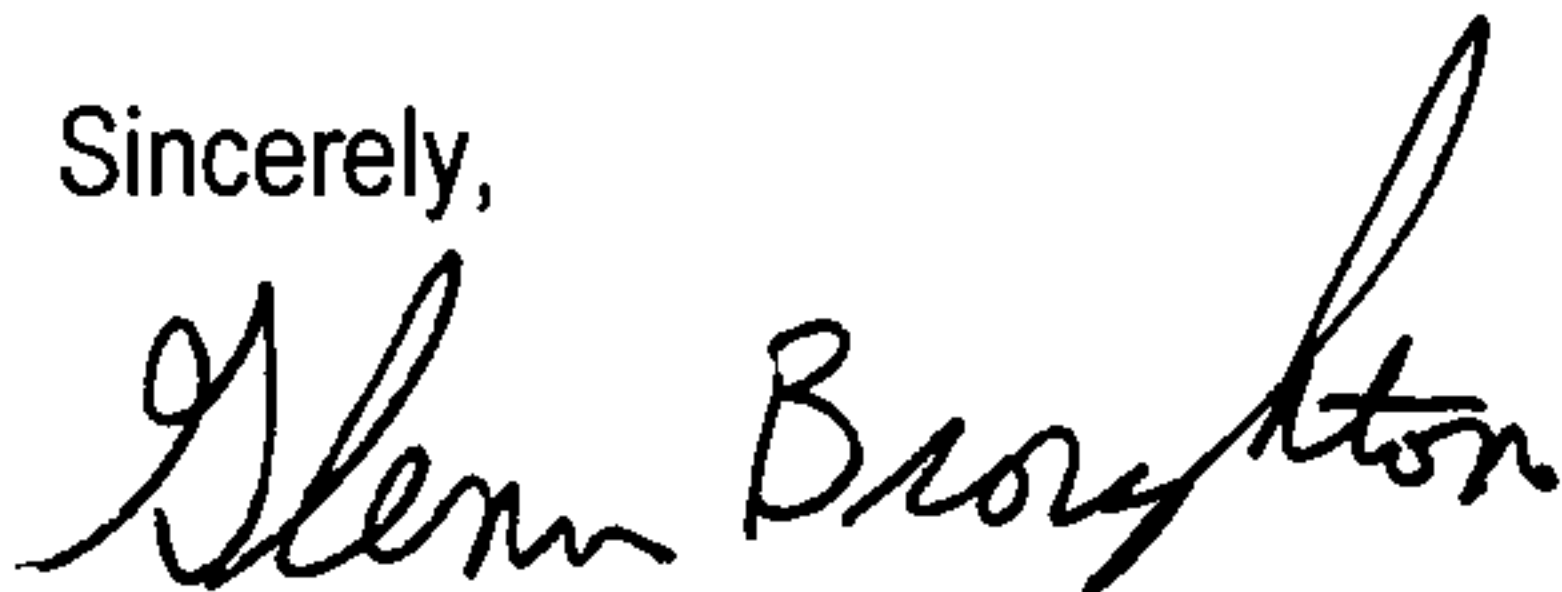
Dear Brad:

The grading and drainage plan for Embassy Suites, Engineers Stamp dated 9/05/3, has been reviewed and approved by your office. The approved design proposed two subsurface storm water detention systems. These detention areas are located at the north and south ends of the site. Detention storage volume was contained within a gallery of 60" HPDE pipes.

The contractor has proposed to substitute the 60" pipes with 48" HDPE pipes and revise the detention system layout. The total linear footage of the 48" pipe was increased to provide the minimum required volume per the approved grading plan. These revised plans reflect the design revisions requested by the contractor. The site grading plan was not affected by this change and was not revised; however, the storm drain and detail sheets were revised and included in this submittal.

With the submittal of the revised plans, we are seeking Building Permit approval.

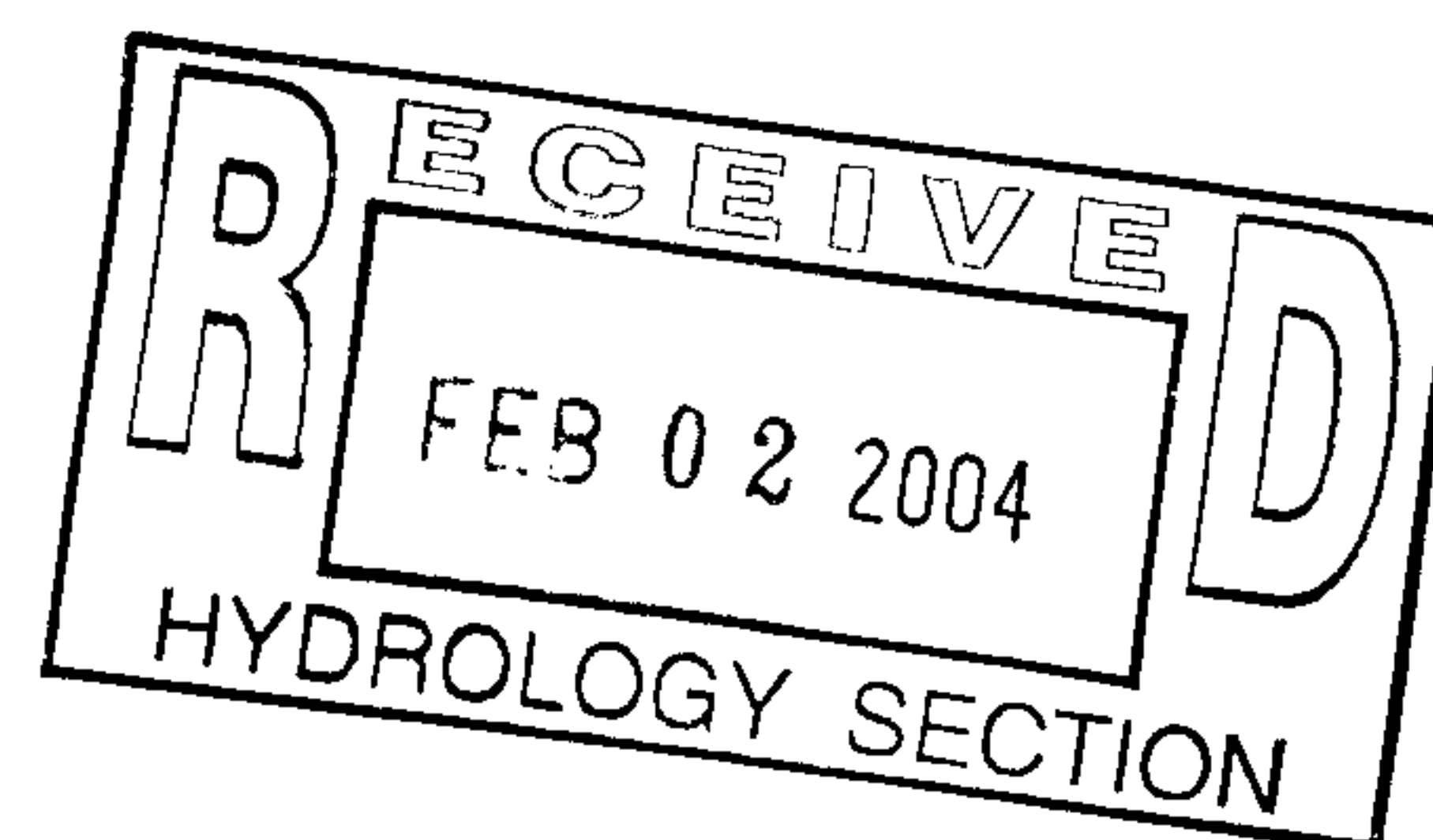
Sincerely,



Glenn S. Broughton, P.E.
Project Manager
Community Development and Planning

GSB/am
Enclosures

cc: Paul Wymer, BHI



ENGINEERING ▲

SPATIAL DATA ▲

ADVANCED TECHNOLOGIES ▲

CLIENT/COURIER TRANSMITTAL

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

To: Brad Bingham, P.E.
Drainage Section
Municipal Development Department
City of Albuquerque
600 Second Street NW - 2nd Floor West

Requested by: Glenn Broughton - am

Date: February 2, 2004

Time Due: ☒ This A.M.
☐ This P.M.
☐ Rush _____
☐ By Tomorrow

Phone: 924-3986

Job No.: 01 152

Job Name: Embassy Suites

DELIVERY VIA

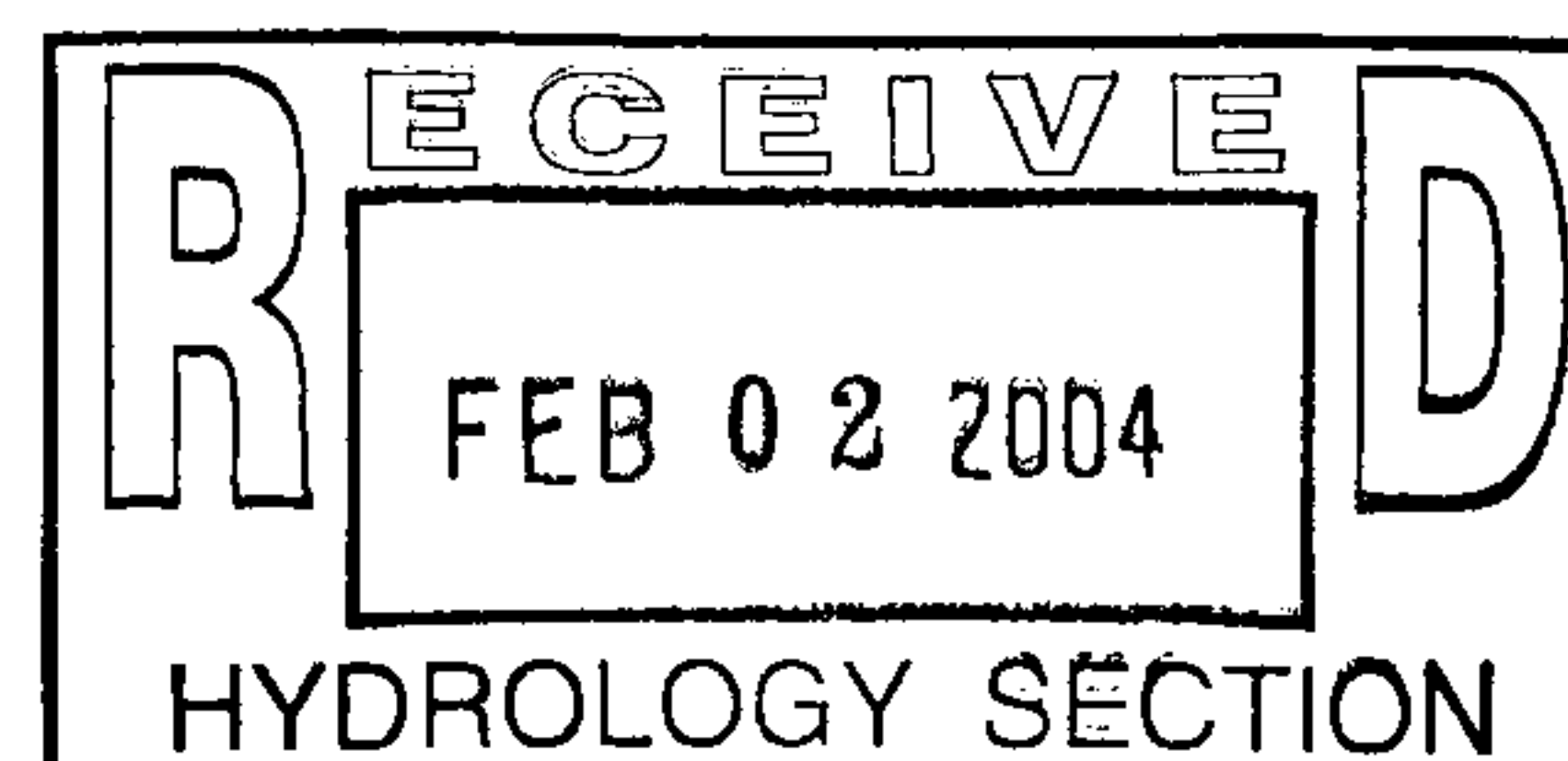
☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other

PICK UP

Item: _____

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	1	Letter dated 2/2/04 re: Grading & Drainage Resubmittal.
2	1	Drainage Information Sheet.

COMMENTS / INSTRUCTIONS



REC'D BY: _____ DATE: _____ TIME: _____

ENGINEERING 

SPATIAL DATA 

ADVANCED TECHNOLOGIES 