M15/D5

3 Plans

Address 2309 Pinard S.C Engr/~~Arch~~ Tom Mann

Plans Approved 6-30-82 Cond. _____

Comments: M-11-DC

Inspection Requested 1-18-83 Contractor _____

Appr. _____ Disappr. 1-18-83 30 Day Temp. _____

Comments: Tom Mann will certify

certified by Tom Mann on 2-18-83

Reinspection and/or comments:

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 24, 1983

Mr. Jeffrey Mortensen
Project Engineer
Tom Mann Associates, Inc.
811 Dallas NE
Albuquerque, New Mexico 87110

Ref: Certification of Craddock Office Building #6, Dated 2/17/83
(M15-D5)

Dear Jeff:

Your Letter of Certification and as-built plan for the referenced project is approved. Please advise your client that the Certificate of Occupancy will be released upon receipt of a signed Special Order 19 for the construction in City right-of-way.

If you have any questions regarding the above, please feel free to call me at 766-7644.

Sincerely,

Fred J. Aguirre, P. E.
Civil Engineer/Hydrology

FJA/el

cc: Drainage File
Reading File

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 2, 1982

Mr. Jeff Mortensen
Tom Mann & Associates, Inc.
811 Dallas NE
Albuquerque, New Mexico 87110

Re: Revised Drainage Plan Office Bldg. No. 7, Dated 10/6/82
(M15-D5)

Dear Jeff:

The revised drainage plan submitted October 7, 1982 is approved.

Please accept my apologies for my late reply of approval,

Sincerely,

Fred J. Aguirre, PE
Civil Engineer/Hydrology

FJA/el

cc: ✓Drainage File
Reading File

811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

Engineers Tom Mann Associates, Inc.

81013
October 7, 1982

Mr. Fred Aguirre
Civil Engineer/Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Revised Drainage Plan Office Building No. 7

Dear Fred:

Transmitted herewith for your review are two copies of the revised drainage plan for the subject project. The hydrology file number for this project is M-15-D5. It was approved under your signature on August 28, 1981.

The revisions shown on the attached plan reflect changes which have been requested by the owner during the construction of the proposed improvements. The changes are the result of minor modifications to the building.

If you have any questions or comments concerning this submittal, do not hesitate to call.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:jj
Encs.
xc:Claudio Vigil, w/encs.

RECEIVED
OCT 1982

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

Re: Drainage Report Approval
(Name of Plat)

Your report has been reviewed and the concepts outlined agree in principle with AMAFCA Resolution 72-2 and current City drainage practices and is therefore approved.

When submitting your final drainage and grading plans, the back up material listed on Attachment No. 1 must be included to facilitate the review procedure. If this data is not included, it will cause delays in the checking procedure.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 28,1981

M-15-D5

Jeff Mortensen
Project Engineer
Tom Mann & Associates, Inc.
811 Dallas N.E.
Albuquerque, New Mexico 87110

REF: CRADDOCK OFFICE BUILDING NO. 7 DATED AUGUST 24, 1981

Dear Jeff:

The referenced Drainage Report is approved.

Sincerely,

Fred J. Aguirre, P.E.
Civil Engineer

cc: Drainage File
Reading File

Tom Mann Associates, Inc. Engineers
811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

9-101
August 25, 1981

Mr. Fred Aguirre
Engineering/Hydrology Division
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Grading and Drainage Plan
for Office Building No. 7

Dear Fred:

Transmitted herewith for your review are four (4) prints of the subject grading and drainage plan. You will note that this plan has been revised as per our meeting held on August 24, 1981.

Your prompt attention to the review and approval of this plan will be greatly appreciated. If you have any further questions or comments, do not hesitate to call.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
xc: Claudio Vigil

KSM
9/21/31

9-101 cdes

Tract 1 = 5.3 Ac ±
OB #7 site = 2 Ac ±

$Q_{UNDEV,\ OB-7} = 2(5.4)(0.40) = 4.3$ cfs.

$Q_{DEV.,\ Tract\ 1} = 16.9$ cfs

$\Delta Q = 12.6$ cfs
Remaining area = 3.3 Ac
$i = 5.4$ in/hr.
$C \simeq 0.71$

A-1 = 2.65 Ac
$Q = 0.71(5.4)(2.65) = 10.2$ cfs $\simeq 10$ cfs

A-2 = 0.65 Ac
$Q = 0.71(5.4)(0.65) = 2.4$ cfs $\simeq 2$ cfs.

~ 1/3 of OB#7 site drains to Buena Vista
(i.e. A = 0.7 Ac ±)

$Q_{TO\ BUENA\ VISTA,\ DEV.} = 0.83(5.4)(0.7) = 3$ cfs.

$Q_{TO\ S/W\ PLATE,\ DEV} = 10 + 9 - 3 = 16$ cfs.

Capacity of s/w plate

$v = C_v\sqrt{2gh} = 0.82\sqrt{2(32.2)(1)} = 6.6 \text{ fps}$

where $C_v = 0.82$
$g = 32.2 \text{ ft/sec}^2$
$h = 1'$

$Q = vA = 6.6(2) \approx 13.2 \text{ cfs}$
where $v = 6.6 \text{ fps}$
$A = 3'(0.67') \approx 2 \text{ sf} \pm$

$\Delta Q_{spillway} = 19 - 3 - 13.2 \approx 3 \text{ cfs}$

During a 100-yr storm, ~3 cfs may spill over curb and onto the sidewalk plate, then flow over a hard surface into the knuckle at Renard & Buena Vista.

811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

Tom Mann Associates, Inc. Engineers

9-101
August 5, 1981

AUG 0 5 1981

RECEIVED
AUG 13 1981
ENGINEERING

Mr. Charles M. Easterling
Principal Assistant
City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Plan for Office Building No. 7

Dear Chuck:

Transmitted herewith for your review are two (2) prints of the drainage plan for Craddock Development's Office Building No. 7. This project adjoins Craddock Development's Office Building No. 6 which was previously submitted, reviewed and approved by Hydrology. It may be helpful to your staff to reference the previous submittal when reviewing this one.

Your prompt attention to the review of this drainage plan will be greatly appreciated. If you have any questions or comments concerning this submittal, do not hesitate to call.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Thomas T. Mann, Jr., P.E.
President

TTM:bb
Encs. 2
xc: Claudio Vigil

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 16, 1981 M-15-D5

Mr. Jeff Mortensen
Project Engineer
Tom Mann & Associates, Inc.
811 Dallas N.E.
Albuquerque, New Mexico 87110

Ref: Craddock Office Building No. 6 Dated July 15, 1981

Dear Jeff:

The referenced drainage report is approved.

Sincerely,

Fred Aguirre
Civil Engineer/Hydrology

FA/fs

MUNICIPAL DEVELOPMENT DEPARTMENT
Richard S. Heller, P.E., City Engineer ENGINEERING DIVISION Telephone (505) 766-7467

811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

Engineers Tom Mann Associates, Inc.

9-101
July 15, 1981

Mr. Fred Aguirre
Engineering/Hydrology Division
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Craddock Office Building No. 5

Dear Fred:

Transmitted herewith are two (2) copies of the grading and drainage plan for the subject project. As you will note, I have added a project benchmark and related the finish floor elevation to mean sea level datum. These revisions have been made in response to your comments made during our meeting held July 15, 1981.

Your prompt attention to the review and approval of this plan will be greatly appreciated. If you have any further questions or comments, do not hesitate to call.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
Encs.

811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

Tom Mann Associates, Inc.
Engineers

1-043
July 15, 1981

Mr. Charles M. Easterling, P.E.
Principal Assistant
City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Newport Industrial Park - West, Unit 2

Dear Chuck.

The purpose of this letter is to solicit your approval of the release of two (2) temporary drainage easements. The temporary drainage easements in question are shown on the attached plat (copy) and described as follows:

Easement 1 - A temporary drainage easement situated in Tract 3 of Newport Industrial Park - West, Unit 2, and described by a centerline bearing N 00°08'25" E a distance of 371.15 feet.

Easement 2 - A temporary drainage easement situated in Tract 3 of Newport Industrial Park - West, Unit 2, and described by a centerline bearing N 00°22'00" W a distance of 226.61 feet.

Of course, Easement 2 will remain a utility easement.

Your signature below will serve as approval for the release of these temporary drainage easements. Your cooperation in this release will be greatly appreciated.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
Enc.

Approval for the release of Easement 1:
SUBJECT TO FILING OF REPLAT DEDICATING NEW EASEMENT.

Charles M. Easterling, P.E.
Principal Assistant
City Engineer/Hydrology

Date 7/16/81

Approval for the release of Easement 2:
SUBJECT TO FILING OF REPLAT DEDICATING NEW EASEMENT.

Charles M. Easterling, P.E.
Principal Assistant
City Engineer/Hydrology

Date 7/16/81

THIS MICROIMAGE IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT

81 10859

State of New Mexico)
County of) ss
This instrument was filed for record

Found Brass Cap
Section Corner
T10N, R8E

LEGAL DESCRIPTION

APPROVALS

City Engineer
City of Albuquerque — 10/30/79

Traffic Engineer
City of Albuquerque — 2-20-79

Director of Parks and Recreation
City of Albuquerque — 2/27/79

Chief Surveyor
City of Albuquerque — 8/20/79

— 2-22-79

— 8-6-79

Public Service Co. of New Mexico

Gas Company of New Mexico

3/7/79

Director of Water Resources
City of Albuquerque

Albuquerque Metropolitan Arroyo Flood Control Authority — 10/30/79

Property Management
City of Albuquerque — 2/26/81

9th February
March 80

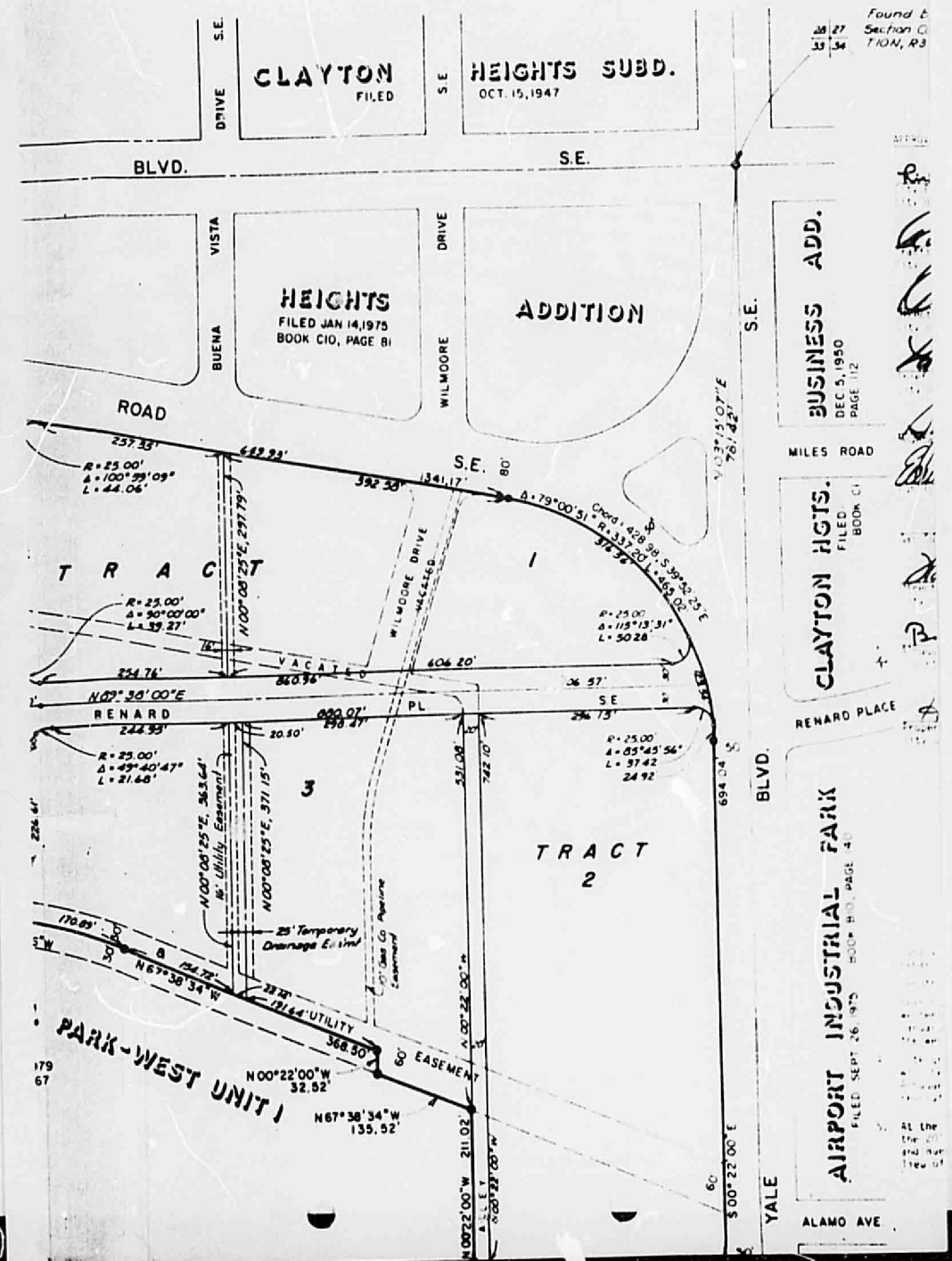
L-Endorsed by L.V. Kay P-79 420 11/5/79 A-1509

NOTES:

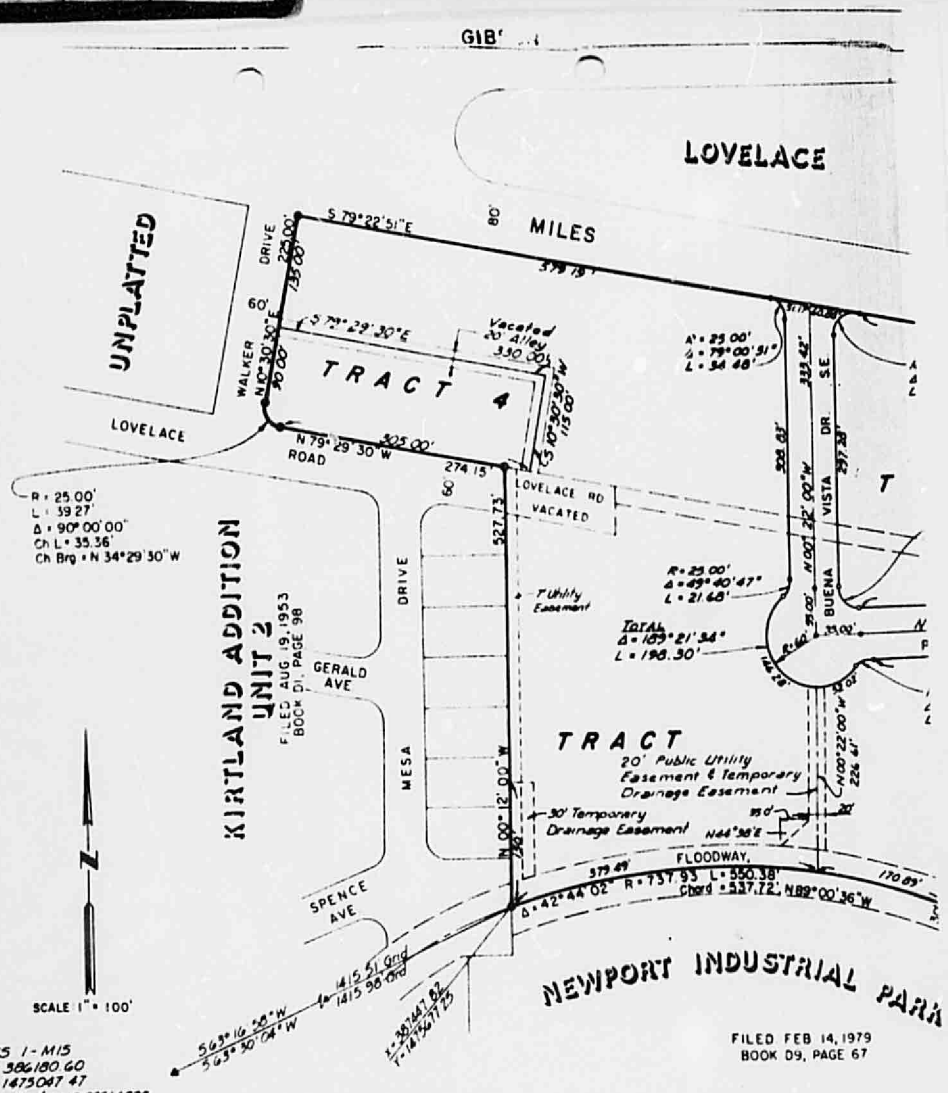
1. Subdivision corners designated by the symbol ● indicate [illegible] rebar & cap, monument set in the field.
2. Length of streets created by this plat is 0.2556 miles.
3. Bearings as shown hereon are based on the bearing as shown on the westerly line of the recorded plat of Lovelace Heights Addition filed January 14, 1975. Said westerly line of Lovelace Heights Addition being the westerly line of this plat.
4. Site grading, drainage patterns and alterations to the soil [illegible] will be performed in accordance with applicable ordinances of Albuquerque and Albuquerque Metropolitan Arroyo Flood Control Authority Ordinances and resolutions and in accordance with an approved drainage report.
5. At the time this amended plat is filed, Wilmore Drive, Lovelace Road and the 20' alley connecting Wilmore Drive to Lovelace Road will be vacated and Buena Vista Drive and Renard Place as shown hereon is dedicated in lieu of the vacated streets and alley indicated above.

PK 2/24/81

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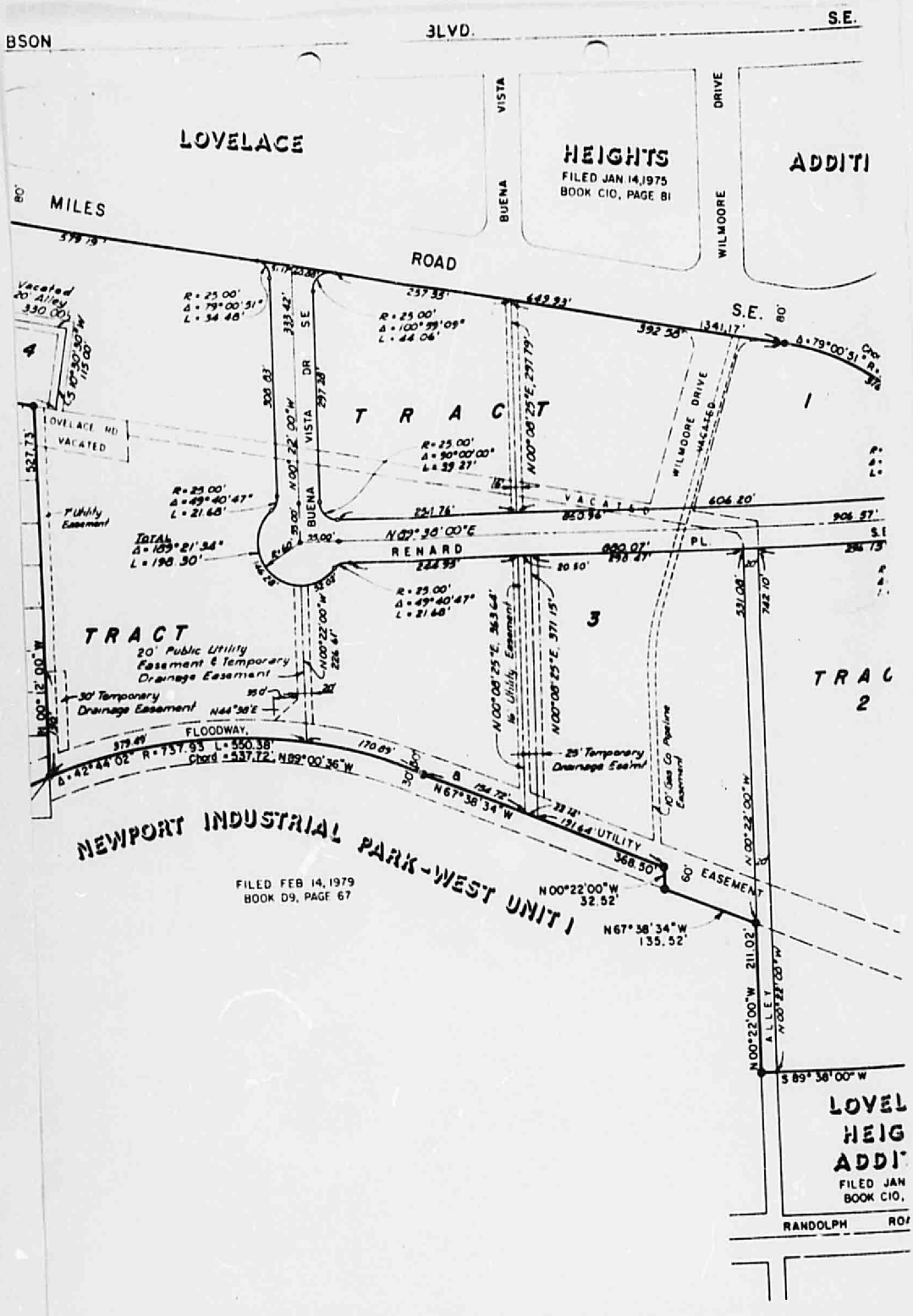


LOCATION MAP

ZONE ATLAS MAP INDEX No. M-15

PLAT NUMBER _____

THIS MICROIMAGE IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT



THIS MICROIMAGE IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT

GRANT OF TEMPORARY EASEMENT FOR DRAINAGE

THIS INDENTURE made and executed this _____ day of _____, 1981 by and between Craddock Development Company in the County of Bernalillo and State of New Mexico hereinafter called the Grantors and THE CITY OF ALBUQUERQUE, NEW MEXICO, a municipal corporation, hereinafter called Grantee.

WITNESSETH, that for good and valuable consideration the Grantors this day convey unto the City of Albuquerque a temporary drainage easement including the right to enter upon the real estate hereinafter described at any time that it may see fit to maintain said easement. This easement shall be limited to the conveyance of stormwater runoff.

It is further agreed that this temporary easement will revert back to the Grantors upon development of said land. At that time, the Grantors will provide an alternate scheme to adequately convey stormwater runoff to the existing 60-foot wide drainage and utility right-of-way located along the south boundary of Tract 3.

The land affected by the grant of this temporary easement is located in the County of Bernalillo and State of New Mexico and is more particularly described as follows:

A 20-foot wide temporary drainage easement lying within Tract 3 of Newport Industrial Park-West, Unit 2 and shown on the "Construction Plans for the Development of Newport Industrial Park-West, Unit 2" prepared by Tom Mann & Associates, July, 1981.

TO HAVE AND TO HOLD this said right and easement for the uses and purposes aforesaid, unto Grantee its successors and assigns for so long as said easement shall not be abandoned for use as an easement.

The Grantors do hereby convenant with Grantee that they are lawfully seized and possessed of the real estate above described and that they have a good and lawful right to convey it or any part thereof, that it is free from all encumbrances except those of record and taxes due and owing the Treasurer of Bernalillo County and that they forever warrant and defend the title thereto against the lawful claims of all persons whomsoever.

copy Please review Jeff Mortensen

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As a part of the consideration for this grant, the Grantors do hereby release any and all claims for damages for whatsoever cause incidental to the exercise of the rights herein granted provided, however, that the Grantee agrees to save Grantors harmless from any and all liability that may arise as a result of the use of the easement for the purposes set forth.

IN WITNESS WHEREOF, the parties have set their hands and seals this _____ day of _____, 1981.

_____
Richard H. Johnston
Craddock Development Company, Inc.

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

The foregoing instrument was acknowledged before me this _____ day of _____, 1981 by _____

_____

_____
Notary Public

My commission expires:

_____

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811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

Tom Mann Associates, Inc. Engineers

1-043
July 13, 1981

Mr. Charles M. Easterling
Principal Assistant
City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Newport Industrial Park - West, Unit 2

Dear Chuck:

Transmitted herewith are some additional calculations which addressed those items both hydraulic and hydrologic in nature raised during our meeting held on June 23, 1981, concerning the construction drawings for the subject project. With this submittal it it requested that you please sign off on the subject construction drawings.

Your prompt attention to this matter will be greatly appreciated.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
Enc.

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1-043
JGN
7/13/81

GUNITE SPILLWAY

ENTRANCE CONDITIONS - WEIR

$Q = 3.33\ L\ H^{3/2}$

where $L = 19'$
$H = 0.5'$

$Q_{capacity} = 22.4$ cfs

$Q_{actual} = 0.95(5.4)(1.6) = 8.2$ cfs (MAX)

where
Area $= 342 \times 200 = 1.6$ Ac
$i = 5.4$ in/hr
$C = 0.95$

$H^{3/2} = \frac{Q}{3.33\ L} \Rightarrow H = 0.25'$

OUTLET CONDITIONS - CHANNEL

$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

where $n = 0.025$
$S = 0.06$ (MIN.)
bottom width $= 7'$
sidewalls are vert.

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OF THE ORIGINAL DOCUMENT

$Q = 31.9$ cfs @ $d = 6''$

$Q \sim 10$ cfs @ $d = 3''$

let bottom width (inside to inside) = 7'
(i.e. outer width = 8')

THIS MICROFILM IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT

1-043
JSM
7-7-81

1. According to Drainage Report for Newport Industrial Park- West, Unit 2 Site Improvements (Revised Sept 12, 1979)", by Andrews, Asbury & Robert, Inc., the discharge reaching the "Knuckle" is 23.2 cfs

2. By weir analysis, $Q = 3.33 L H^{3/2}$

when $L = 10'$ & $H = 1'$

$Q = 3.33(10)(1)^{3/2} = 33.3$ cfs.

3. The improvement of Tract 1 increases runoff by ~1 cfs/ac.

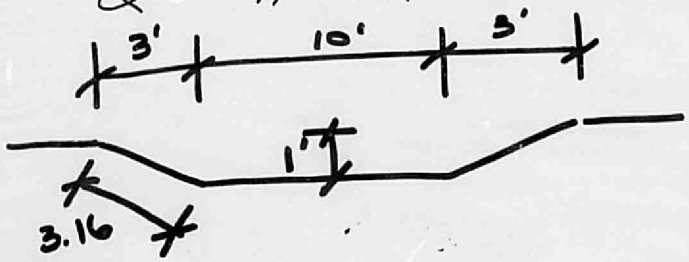
$Q_{TOTAL} = 23.2 + 5.5 = 28.7$ cfs

$Q_{TOTAL} < Q_{WEIR}$ OK ✓

THIS MICROIMAGE IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT

4. Channel analysis by Manning Eqn.

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$



$A = 13$ sf

$P = 10 + 2(3.16) = 16.3'$

$R = \frac{A}{P} = 0.80$

$n = 0.025$

$S = 0.0050$ (minimum)

$Q_{capacity} = 47$ cfs

if $Q = 28.7$ cfs $\simeq 30$ cfs,
$d = 0.78'$

With a minimum slope = 0.0050 and the channel configuration shown above, the discharge from the "Knuckle" can be conveyed

to the existing drop structure at the SW cor. of Tract 3

Conclusion:

Items 1 through 4 address all questions, hydraulic and hydrologic in nature, raised by C.M. Easterling, in a meeting held on 6/23/81 Re: Newport Industrial Park - West, Unit 2.

Tom Mann Associates, Inc. Engineers
811 DALLAS, N.E. • ALBUQUERQUE • NEW MEXICO • 87110 • 505-265-5611

9-101
June 25, 1981

Mr. Charles M. Easterling
Principal Assistant
City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

RECEIVED
JUN 25 1981
CITY ENGINEER

Re: Drainage Plan for Office Bldg. 6

Dear Chuck:

Transmitted herewith for review are two (2) copies of the drainage plan for Craddock Development's Office Building 6. This plan has been revised as per our meeting on June 22, 1981. As I mentioned in that meeting, this plan should be reviewed in conjunction with the construction drawings for the Newport Industrial Park-We- Unit 2.

If you have any further questions or comments, do not hesitate to call. Your prompt attention in this matter will be greatly appreciated.

Sincerely,

TOM MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
Encs. 2
xc: Loren Meeker, Craddock w/encs. (2)

06-16

Goldberg - Mann & Associates, Inc.
Engineers - Planners
811 Dallas St., N.E. Albuquerque, New Mexico 87110 (505) 265-5611

May 29, 1981

9-101

Mr. Charles M. Easterling
City Engineer/Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

RECEIVED
JUN 03 1981
CITY ENGINEER

Re: Grading and Drainage Plan for
Office Building 6

Dear Chuck:

Transmitted herewith are two (2) copies of the grading and drainage plan for Office Building 6. Office Building 6 is located on Tract 1 of the Newport Industrial Park - West, Unit 2. This grading and drainage plan is being submitted concurrently with the construction drawings for the Newport Industrial Park - West, Unit 2 Subdivision. It may be advantageous to you to review both drawings together.

Also transmitted at this time is a copy of previous correspondence concerning the project. In particular, the correspondence deals with previous agreements regarding City drainage policies for the site.

Please review and comment at your earliest convenience. If you have any questions or comments, do not hesitate to call.

Sincerely,

GOLDBERG-MANN & ASSOCIATES, INC.

Jeffrey G. Mortensen
Project Engineer

JGM:bb
Encs.
xc: Loren Meeker, Craddock

Goldberg - Mann & Associates, Inc.
Engineers - Planners
811 Dallas St., N.E. Albuquerque, New Mexico 87110 (505) 265-5611

1-043

May 20, 1981

RECEIVED
MAY 20 1981
CITY ENGINEER

Mr. Charles M. Easterling
Hydrology Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Newport Industrial Park - West, Unit 2
Drainage Report Revisions

Dear Chuck:

Transmitted herewith for your review are two (2) copies of the revision to the drainage report for the Newport Industrial Park - West, Unit 2. Please review and comment at your earliest convenience.

If you have any questions or comments concerning this submittal, do not hesitate to call.

Sincerely,

GOLDBERG-MANN & ASSOCIATES, INC.

Jeffrey G. Mottensen
Project Engineer

JGM:bb
Encs. (2)
xc: Loren Meeker, Craddock w/encs. (2)

RECEIVED
APR 08 1981
CITY ENGINEER

Craddock
Development Company
2501 Yale Blvd., S.E., Albuquerque, New Mexico 87106 (505) 842-9136

L.R.F.
Copy File M15-D5

April 8, 1981

HAND DELIVERED

Mr. Dick Heller
City Engineering Dept.
P. O. Box 1293
Albuquerque, NM 87103

Re: Drainage Plan, Newport Office Building VI

Dear Dick:

As per our meeting of this morning, April 8, 1981, Craddock Development Company does hereby certify that we will comply with the findings of said meeting.

The meeting was attended by Dick Heller, Charles M. Easterling, Bruno Conigliano, Tom Mann, Claudio Vigil, and Richard H. Johnston.

We intend to comply with the solutions found for the unresolved portion of the drainage plan. The City Engineering Department, in conjunction with Tom Mann, will find a solution to the grading of the alley, street grade, and overall drainage problems.

Sincerely,

Richard H. Johnston
VICE PRESIDENT/GENERAL MANAGER

RHJ/eja

RSH RSA ADM
HRO SUR
CDS COUN
DES SEC
INSP FILE
Copy → HYDRO CME RETURN

Craddock
Development Company

2501 Yale Blvd., S.E., Albuquerque, New Mexico 87106 (505) 842-0136

File M15-D5

April 8, 1981

HAND DELIVERED

Mr. Dick Heller
City Engineering Dept.
P. O. Box 1293
Albuquerque, NM 87103

Re: Drainage Plan, Newport Office Building VI

Dear Dick:

As per our meeting of this morning, April 8, 1981, Craddock Development Company does hereby certify that we will comply with the findings of said meeting.

The meeting was attended by Dick Heller, Charles M. Easterling, Bruno Conigliano, Tom Mann, Claudio Vigil, and Richard H. Johnston.

We intend to comply with the solutions found for the unresolved portion of the drainage plan. The City Engineering Department, in conjunction with Tom Mann, will find a solution to the grading of the alley, street grade, and overall drainage problems.

Sincerely,

Richard H. Johnston
VICE PRESIDENT/GENERAL MANAGER

RHJ/eja

cc: BSW

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

July 30, 1979

Mr. Richard S. Heller
City Engineer
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

HAND-DELIVERED
City Hall

SUBJECT: NEWPORT INDUSTRIAL PARK-WEST, UNIT 1
PHASE II - SITE IMPROVEMENTS

Dear Mr. Heller:

Returned herewith are the original tracings for subject project on which we have shown the hydraulic grade line and the water surface profile of the drainage channel to be concrete-lined.

In addition, please find enclosed a copy of the computations made in determining this hydraulic grade line and water surface profile.

Very truly yours,

John A. Andrews

JOHN A. ANDREWS, P.E.

JAAsm
Enclosures

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

RECEIVED
ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
DATE MAR 1 1981
JOB
COMMENTS
ANDREWS
ASBURY
ROBERT
FILE

February 26, 1981

Andrews, Asbury & Robert, Inc.
401 San Pedro, N.E.
Albuquerque, N.M. 87108

RE: NEWPORT INDUSTRIAL PARK WEST, UNIT 2

Dear Mr. Andrews:

In regard to the subject subdivision, the City Engineer's Office cannot approve the plans currently being reviewed by this office. The major reason for this is that a portion of the site is currently in to the Environmental Planning Commission (EPC) for review for a zone change for land use re-programming. Until such time as the EPC decides what improvements will have to be made on Miles Road, or whether or not that street will be vacated, this office will not approve the plans because they will have to be revised in the very near future to include improvements on Miles, or to show the vacation of Miles Road.

The plan also shows grading in public ways which are not being paved or improved. Grading in public alleyways and streets will not be allowed unless the alleyway or street is improved to the satisfaction of this office. The major reason for this is that major drainage will then be coming into a graded alley and no erosion control for the silt and sediment will be taken into account.

Should you have any further questions, please feel free to contact me.

Sincerely,

Richard S. Heller
City Engineer

RSH/kdb
cc: City Planning
MDD/Administration

005

RECEIVED

JUN 03 1981

CITY ENGINEER

January 4, 1980

Mr. Richard Heller
City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Requirements for Craddock Development Co.

Dear Mr. Heller:

On October 24, 1979 I met with you, Claudio Vigil and Tom Mann concerning the drainage report for the Commerce Center, Phase II. During the resolution of the drainage requirements for the Commerce Center you indicated that if Craddock Development Co. would prepare a set of plans and specifications for a bridge in the vicinity of San Jose Avenue S.E. and University Blvd. S.E. , the City would allow direct discharges of storm-water runoff into the channel upstream of the bridge.

At this time Craddock Development Co. is prepared to enter into a contract with Goldberg-Mann 7 Associates to prepare plans and specifications for that bridge. The plans and specifications will be prepared in accordance with City of Albuquerque standards. Craddock will compensate Goldberg-Mann for the design of the bridge. It is my understanding that the City of Albuquerque will pay for the construction of the bridge and will proceed with the construction of the bridge as soon as the plans and specifications have been accepted by the City.

Enclosed are two xerox copies of the zone atlas showing the properties owned by Craddock that would be affected by this agreement. All the properties designated on the xeroxes and listed below would be allowed to discharge directly into the drainage channel. The specific properties are as follows:

Tract 2 of the Newport Industrial Park-West, Unit 1
Tracts 1, 2, 3 and 4 of the Newport Industrial Park-West, Unit 2

A portion of Block E, Lot 1 of the Lovelace Heights Addition
Tracts A-1, B-1, C-1 and D-1 of the Airport Park

In addition, I would like to have an extension of time for completing the drainage requirements for Tract 2 of the Newport Industrial Park-West, Unit 1. This tract is commonly referred to as the BDM Site. In accordance with the drainage plan, a drainage easement is to be constructed along the east property line of that site. In lieu of the above commitments, I would like to build a temporary drainage swale along the east property line at this time. Within the next six months Craddock will have begun construction of BDM, Phase II and at that time it would be more appropriate for us to hardline that channel in accordance with our drainage plan. I feel that the temporary swale will work for the next six months until we can get a more permanent solution. However, we do not want this change in the drainage plan to hold up our certificate of occupancy for BDM, Phase I.

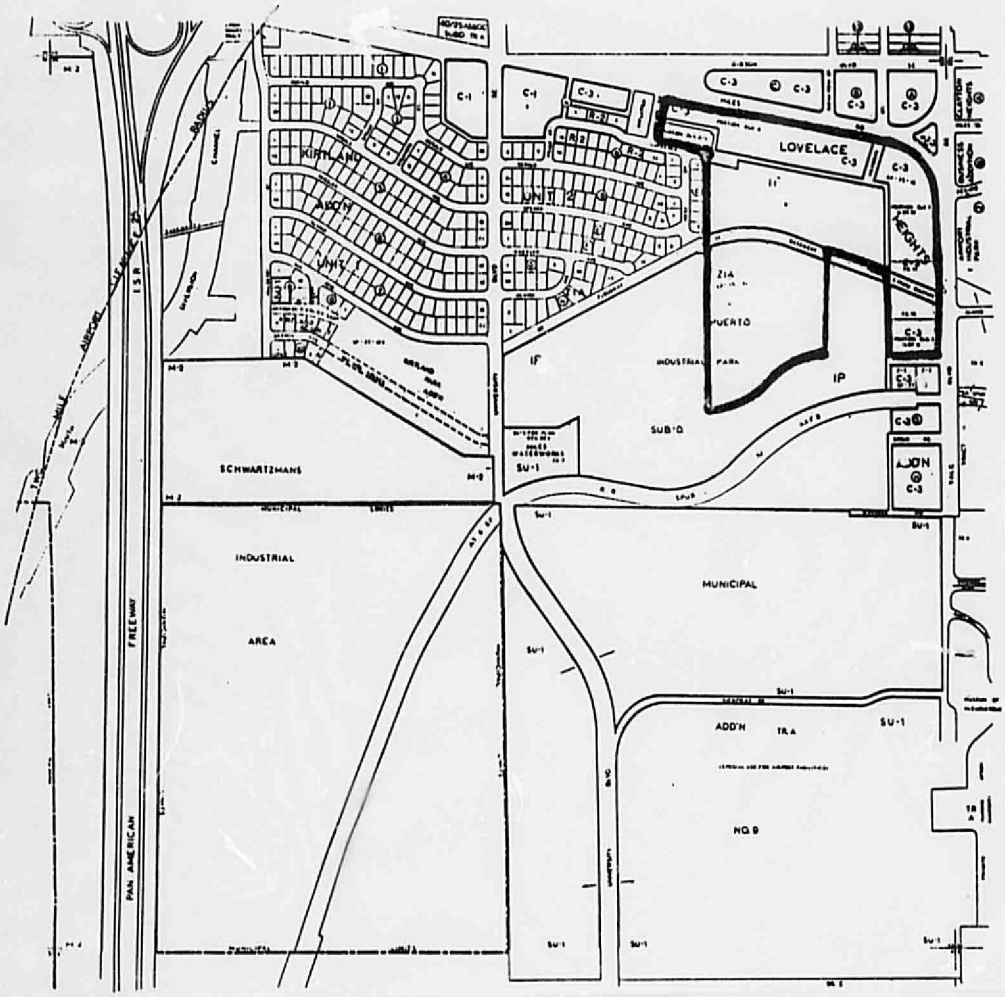
If you concur with the above, your signature below will indicate your acceptance of this agreement. As soon as I have received your acceptance of this agreement, I will enter into a contract for the design of the bridge on University. The preliminary drawings for the bridge will be submitted to you within 60 days of our signing the contract with the engineer.

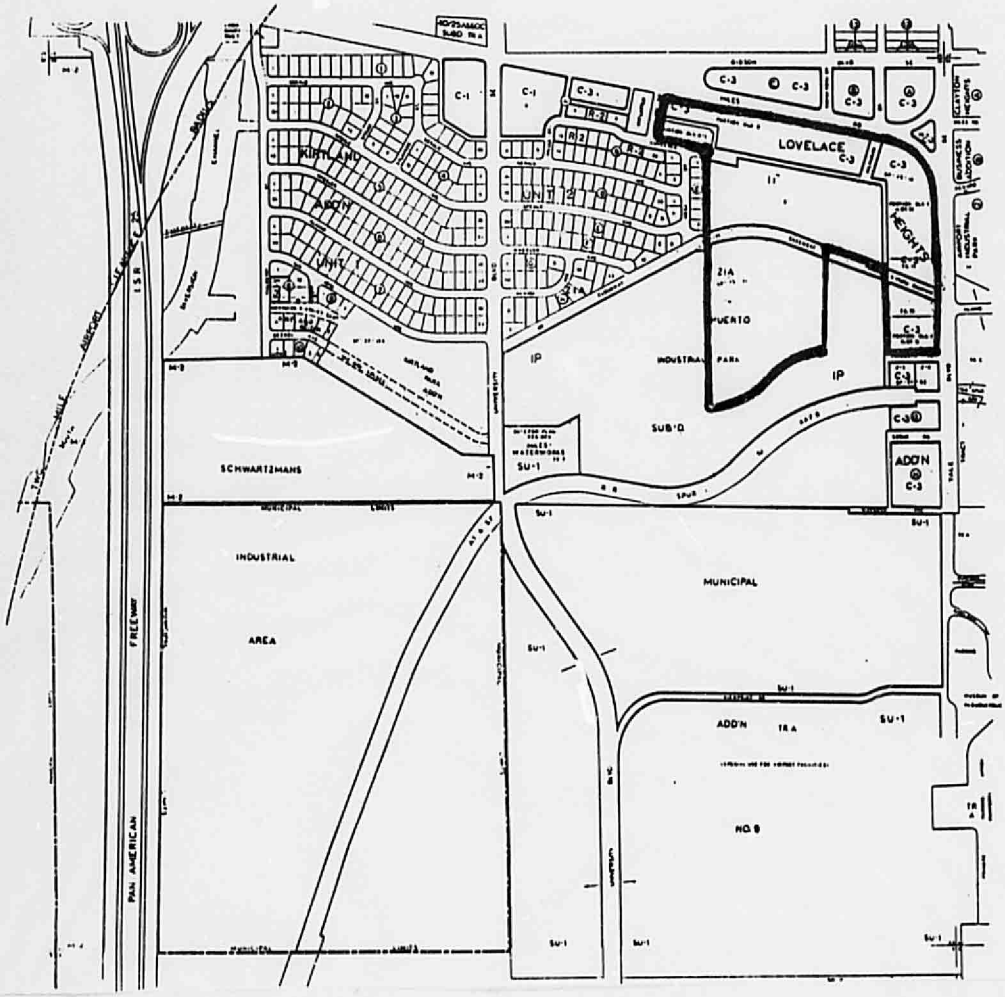
If you have any questions or comments, please do not hesitate to call. Thank you.

Yours truly,

Richard H. Johnston
Vice President and General Manager

cc:Goldberg-Mann, w/encs.


KIRTLAND
ADD'N
UNIT 1
UNIT 2
LOVELACE
C-3
C-1
R-2
ZIA
PUERTO
IP
IF
SUB'D
SCHWARTZMANS
SU-1
INDUSTRIAL
AREA
MUNICIPAL
ADD'N
TRA
NO. 9
PAN AMERICAN
FREEWAY
M-15-Z


LOVELACE
ZIA
PUERTO
IP
INDUSTRIAL PARK
SUB'D
ADD'N
C-3
SCHWARTZMANS
SU-1
INDUSTRIAL
AREA
MUNICIPAL
ADD'N
NO. 9
PAN AMERICAN
FREEWAY
I-25
M-15-Z

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 25, 1979

Mr. John Robert
Andrews, Asbury & Robert, Inc.
401 San Pedro N.E.
Albuquerque, New Mexico 87108

Subject: Revised Drainage Report - Newport Industrial Park-West, Unit 2

Dear Mr. Robert:

Your report has been reviewed and the concepts outlined agree in principle with AMAFCA Resolution 72-2 and current City drainage practices, and is therefore approved.

When submitting your final drainage and grading plans, the back up material listed on Attachment No. 1 must be included to facilitate the review procedure. If this data is not included, it will cause delays in the checking procedure.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller, City Engineer
Rich Leonard, AMAFCA
Drainage File

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

RECEIVED
OCT 02 1979
CITY ENGINEER

September 28, 1979

HAND-DELIVERED
City Hall

Mr. Bruno Conegliano
Assistant City Engineer
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

SUBJECT: REVISED DRAINAGE REPORT
NEWPORT INDUSTRIAL PARK-WEST, UNIT 2

Dear Mr. Conegliano:

Please find enclosed two (2) copies of a Revised Drainage Report for subject project. Revisions made include changes in the boundary of onsite drainage areas to reflect changes in the street alignment within the subdivision. This street alignment was requested by the Owner of the subdivision.

As you requested, we have added Drainage Easements on the Plat at locations necessary for the conveyance of storm waters to the Drainage Easement Channel.

Your early approval of this revised report and approval of the Plat will be appreciated.

Very truly yours,

JOHN A. ANDREWS, P.E.

JAAsm
Enclosures
cc: Craddock Development Company (w/encl.-1)

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 7, 1979

Mr. John A. Andrews
Andrews, Asbury & Robert, Inc.
401 San Pedro, NE
Albuquerque, New Mexico 87108

SUBJECT: PLAT FOR NEWPORT INDUSTRIAL PARK WEST, UNIT 2

Dear John:

As I have verbally indicated to Mr. John Roberts, I will not be able to sign the plat for this development if a drainage easement is not dedicated either by plat or concurrently by separate instrument, to convey the flows from the public streets to the proposed drainage facilities to the south.

If you have any questions on the above, please do not hesitate to call me.

Very truly yours,

Bruno Conegliano
Assistant City Engineer - Hydrology

BC:bm
CC: Richard Leonard, Amafca
Richard Heller
Drainage File

ZIA PUERTO - JOINT VENTURE
ALBUQUERQUE, NEW MEXICO

HYDRAULIC GRADE LINE AND WATER SURFACE PROFILE COMPUTATIONS

FOR

NEWPORT INDUSTRIAL PARK-WEST, UNIT 1
PHASE II
DRAINAGE CHANNEL

July 30, 1979

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE
Albuquerque, New Mexico 87108

STA.	INVERT ELEV.	DEPTH OF FLOW (FT)	WATER SURFACE ELEV.	VELOCITY HEAD (FT)	SPECIFIC ENERGY (FT)	HYDRAULIC GRADE LINE ELEV.	NOTES
30+86.33 INSIDE JUNCTION BOX	81.48	-	-	-	8.83	90.31	sh. 11
30+86.33 INSIDE PIPES	81.48	1.5'	82.98	5.61	8.11	89.59	sh. 11
24+08.4 INSIDE PIPES	57.00	2.79	59.79	8.53	11.33	68.33	sh 12
24+08.4 DOWNSTREAM OF HEADWALL	57.00	1.11'	58.11	7.48	8.59	65.59	sh. 13
23+10 BEND TRANSITION	54.03	1.84	55.87	8.19	10.03	64.06	sh 8
19+00 PVT	41.60	1.84	43.44	8.19	10.03	51.63	sh 8
16+83.43 UPSTREAM OF INLET	35.65	2.03	37.68	6.38	8.41	44.06	sh 9
16+83.43 DOWNSTREAM OF INLET	35.65	2.63	38.28	3.81	6.44	42.09	sh. 10

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-0631

Project Mayport Unit 2 Sheet 14 of 13
Phase 2 - Drainage Channel Job No. 133
By RSF Chkd JA Date 7/1/81

STA	Invert Elev.	Depth of Flow (ft.)	Water Surface Elev.	Velocity Head (ft.)	Specific Energy (ft.)	Hydraulic Grade Line Elev.	Notes
13+00 PVC	28.18	2.36	30.64	5.08	7.44	35.62	sh. 7
3+90.1 PVI	15.08	2.36	17.44	5.08	7.44	22.52	sh 6
3+43.64 Manhole	12.67	3.48	16.15	5.98	9.47	22.14	sh 1 Flow 5

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

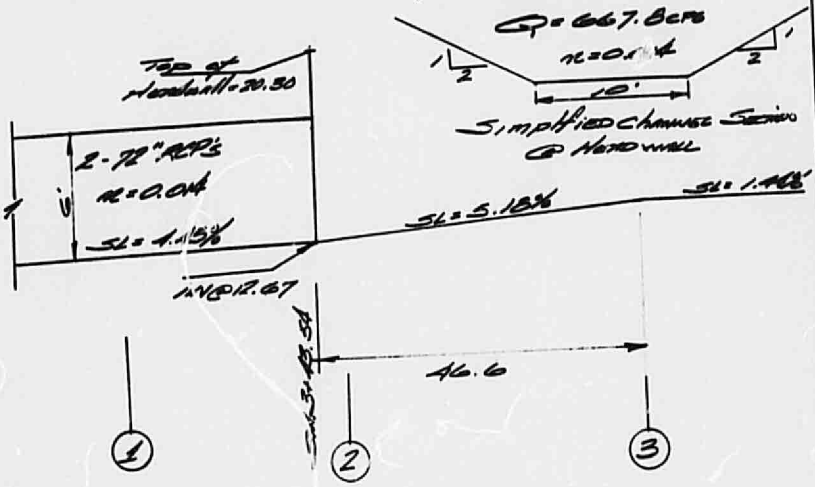
Project Mesquite Unit 2 Sheet 15 of 13
Title E. Diversion Channel Job No. 1132
By BE Chkd JA Date 7/11/89

ANDREWS, ASSBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-5631

Project Newport Unit 1 Sheet 1 of 13
Phase II - Drainage Channel Job No. 179
By RGF Chk'd JA Date 2/17/79

HYDRAULIC GRADIENT COMPUTATIONS

Sta. 3+43.54 @ Inlet to 2-72" RCP's under University Blvd.



$$\text{Head loss} = H_L = K_L \frac{V^2}{2g}$$

K_L - entrance losses = .2

K_L - losses due to inflow @ surface inlet = .2

$$E_1 = E_2 - H_L \Rightarrow E_1 = E_2 - .4\frac{V^2}{2g}$$

Establish Total Energy Head in Pipes @ Inlet

$$E = y + \frac{V^2}{2g} = y + \frac{Q^2}{2gA}$$

then

$$y_1 + \frac{Q^2}{2gA_1} = y_2 + \frac{Q^2}{2gA_2} - .4\frac{V_2^2}{2g}$$

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

Project Newport Unit 2 Sheet 2 of 13
Phase II: Drainage Channel Job No. 129
By RSF Ch'd JA Date 7/17/79

1. Determine normal depth in pipes:

Total Q = 667.8 cfs

Assume flow splits @ headwall & $Q/2$ enters each pipe ∴

$$Q = \frac{667.8}{2} = 333.9 \text{ cfs}$$

∴ from p. 559, Table B-3, Design of Small Dams

$$\frac{Qn}{D^{8/3}S^{1/2}} = \frac{333.9 \times 0.014}{(16)^{8/3}(.0445)^{1/2}} = 0.1864$$

hence $d/D = 0.44 \Rightarrow d = y = 2.64$ ft.

$A/D^2 = 0.5328 \Rightarrow A = 11.98$ ft.

$$E = y + \frac{Q^2}{2gA^2} = 2.64 + \frac{333.9^2}{2g(11.98)^2}$$

$$= 2.64 + 12.06 = 14.70 \text{ ft.}$$

$$V = Q/A = \frac{333.9}{11.98} = 27.87 \text{ ft/sec}$$

2. Determine normal depth in channel @ Sc = 5.0%:

Q = 667.8 cfs

by trial & error,

y	T (surface width)	A	P	R	$R^{2/3}$	Q
1.72	16.88	23.12	17.69	1.31	1.20	667.5 OK

then $y_N = 1.72$ ft.

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

Project Newport Unit I Sheet 3 of 13
Phase II - Drainage Channel Job No. 129
By RAF Ck'd JA Date 7/17/79

$$V = \frac{Q}{A} = \frac{667.8}{23.12} = 28.87 \text{ ft/sec}$$

$$E = y + \frac{V^2}{2g} = 1.72 + \frac{28.87^2}{2g}$$

$$= 1.72 + 12.94 = 14.66 \text{ ft.}$$

then $E_1 = E_2 - H_s$

$$E_1 = \left[1.72 + 12.94\right] - .4\,\frac{28.87^2}{2g}$$

$$= 14.66 - 5.18$$

$$= 9.48 \text{ FT.}$$ TOTAL ENERGY HEAD

then determine depth in pipe for $E_1 = 9.48$

$$9.48 = y_1 + \frac{Q^2}{2gA^2} \Rightarrow Q = 333.9 \text{ cfs.}$$

by TRIAL & ERROR

y/D	y	A/D^2	A	$\frac{Q^2}{2gA^2}$	E	
0.50	3	.3927	14.14	8.66	11.66	
0.69	3.54	.4822	17.36	5.745	9.28	
0.58	3.48	.4724	17.006	5986	9.17	ok

then $y_1 = 3.48$ ft.

$$V_1 = \frac{Q}{A} = \frac{333.9}{17.006} = 19.63 \text{ ft/sec.}$$

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

Project Newport Unit 4 Sheet 4 of 13
Phase II - Drainage Channel Job No. 129
By RDF Chk'd JA Date 2/10/99

CHECK with ENERGY HEAD in CHANNEL

$$\underbrace{E_1}_{\text{PIPES}} = \underbrace{E_2 - H_L}_{\text{CHANNEL}}$$

$$y_1 + \frac{V_1^2}{2g} = y_2 + \frac{V_2^2}{2g} - 0.4\frac{V_2^2}{2g}$$

$$3.18 + \frac{19.63^2}{2g} = 1.72 + \frac{28.87^2}{2g} - 0.4\frac{28.87^2}{2g}$$

$$3.18 + 5.98 = 1.72 + 12.94 - 5.18$$

$$9.17 = 9.16 \quad \text{OK.}$$

THERE depth of flow in 72" RCP is 3.18 ft.

46.6 ft. upstream of headwall, channel grade flattens to 1.44%, ∴ determine depth @ grade break.

@ (2) Q = 667.8 CFS

(3) Q = 628.5 CFS

H_2 = 7.48 ft. P = 25.66

V_2 = 28.87 ft/sec R = 2.31

A = 59.03 ft²

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Newport Unit 6 Sheet 5 of 13
Phase II - Drainage Channels Job No. 429
By BJP Chk'd JR Date 3/17/87

SLOPE of ENERGY LINE =

$$S_f = \frac{2g \times 0.014^2}{1.486^2} \times \frac{V^2/2g}{R^{4/3}}$$

$$S_f = 0.005716 \frac{V^2/2g}{R^{4/3}}$$

∴ THE following is a form of the STEP METHOD AS PRESENTED by HENDERSON in OPEN CHANNEL FLOW

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Hayward Unit I Sheet 6 of 13
Street E. Diversion Channel Job No. 123
By BSF Chkd JA Date 7/19/79

STA.	y	A	z	$\frac{v^2}{2g}$	H_1	P	R	$R^{4/3}$	Sf	S_{fm}	L	h_f	H_2
3+18.84	5.43	57.02	0	5.93	9.47	25.56	2.31	3.0516	0.00378				
3+90.1	4.00	42.00	2.41	1.13	7.54	27.29	2.582	3.542	.00214	.00297	166	.73	9.20
	2.4	35.52	2.41	1.86	9.87	20.29	1.752	2.0477	0.00388	.00244	166	.40	9.87
	2.36	34.74	2.41	5.08	9.85	20.59	1.700	2.0289	.00512	.00302	166	.42	9.89 ✓

Actual depth of flow @ Sta 3+90.1 = 2.36 ft.

$$E = y + \frac{Q^2}{2gA^2}$$

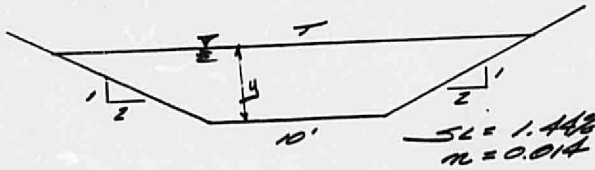
$$= 2.36 + \frac{428.5^2}{2g \times 34.74^2} = 7.44 \text{ ft.}$$

$V = 13.09$ ft/sec

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

Project Newport Unit 1 Sheet 7 of 8
Phase II - Drainage Channel Job No. 127
By EAF Chk'd JA Date 7/17/69

DETERMINE NORMAL depth of flow
for Q = 628.5 CFS, channel slope = 1.44%



SL = 1.44%
n = 0.014

by TRIAL

y	T	A	P	R	$R^{2/3}$	Q
2.4	19.60	35.52	20.73	1.71	1.43	649.07
2.3	19.20	33.58	20.29	1.66	1.40	599.73
2.36	19.44	34.74	20.55	1.69	1.42	629.09 OK

THEN $y = \underline{2.36}$ ft.

$$V = \frac{628.5}{34.74} = \underline{18.09 \text{ ft/sec}}$$

$$E = y + \frac{V^2}{2g} = 2.36 + \frac{18.09^2}{2g}$$

$$= 2.36 + 5.08 = \underline{7.44 \text{ ft.}}$$

$$F_r^2 = \frac{Q^2 B}{g A^3} = \frac{628.5^2 \times 19.44}{32.2 \times 34.74^3} = 5.69$$

$F_r = 2.38 \Rightarrow$ SUPERCRITICAL

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 266-6831

Project Newport Unit 6 Sheet 2 of 13
Phase II - Drainage Channel Job No. 127
By BSF Chk'd JA Date 7/19/89

STA. 19+00 to 23+10

DETERMINE NORMAL depth for Q = 578 CFS

SAME SECTION - $S_L = 3.03\%$, $n = 0.014$

y	T	A	P	R	$R^{2/3}$	Q
1.8	17.2	24.18	18.04	1.356	1.225	554.18
1.85	17.4	25.34	18.27	1.387	1.244	582.39
1.84	17.36	25.17	18.23	1.381	1.240	576.69 OK

then $y_n = 1.84$ ft

$V = \frac{578}{25.17} = 22.96$ ft/sec

$E = 1.84 + \frac{22.96^2}{2g} = 1.84 + 8.19$

$= 10.03$ ft.

$F_r^2 = \frac{578^2 \times 17.36}{g \times 25.17^3} = 11.30$

$F_r = 3.36$

Between STA. 13+00 & STA. 17+00 there is a 600' vertical curve connecting slopes of 1.44% downstream & 3.03% upstream. Assume that flow will increase in depth proportionally from 1.84 ft to 2.36 ft in 600 ft.

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 266-6631

Project Newport Unit 6 Sheet 7 of 12
Phase II - Drainage Channel Job No. 129
By RSF Chk'd JA Date 7/17/09

Also, at Sta 16+56.46 & Sta 16+83.43 there occurs an inflow & channel widening, upstream Q=578, downstream Q=628.5 cfs.

To be conservative assume both inflows occur @ Sta 16+83.43

Then flow depth just upstream of Sta. 16+83.43

$$\frac{y}{} = \frac{2.36-1.84}{600} \times 383.43 + 1.84$$

$$y = 2.03 \text{ ft.}$$

$$\therefore A = 28.50 \text{ ft.}$$

$$V = 20.28 \text{ ft/sec}$$

$$\frac{V^2}{2g} = 6.38$$

$$E = 2.03 + 6.38 = 8.41 \text{ ft.}$$

$$F_r^2 = \frac{578^2 \times 18.12}{28.5^3} = 8.12; \quad F_r = 2.85$$

The channel bottom increases from $b_1 = 10'$ to $b_2 = 27$ ft.

then, for channel enlargement - Energy losses

$$\Delta E = \frac{1}{3}\frac{V_1^2}{2g}\left[\left(1 - \frac{b_1}{b_2}\right)^2 + \frac{2F_{r_1}^2 b_1^3 (b_2 - b_1)}{b_2^4}\right]$$

From Henderson, Open Channel Flow

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Newport Unit 1 Sheet 10 of 13
Phase II - Diversion Channel Job No. 129
By BSF Chk'd JA Date 7/7/79

$$\Delta E = \frac{1}{3}\,\frac{\overline{20.28}^2}{29}\left[\left(1-\frac{10}{27}\right)^2 + \frac{2\times 8.12\times\overline{10}^3\,(21-10)}{\overline{27}^4}\right]$$

$$= 2.13\left[0.40 + .52\right] = 1.96\ ft.$$

$$\therefore E_2 = 3.41 - 1.96 = 6.45\ ft.$$

then $Q = 628.6\ cfs$, $E = 6.45\ ft$

determine y by TRIAL:

y	A	$\frac{Q^2}{2gA^2}$	E	
2.5	37.50	4.36	6.86	
2.6	39.52	3.93	6.53	
2.7	41.58	3.55	6.25	
2.63	40.13	3.81	6.44	OK

then after inflow & channel expansion

$y = 2.63\ ft.$

$V = \frac{Q}{A} = \frac{628.5}{40.13} = 15.66\ ft/sec$

$E = 6.44\ ft.$

$$F_r^2 = \frac{\overline{628.5}^2 \times 20.52}{g \times 40.13^3} = 3.90$$

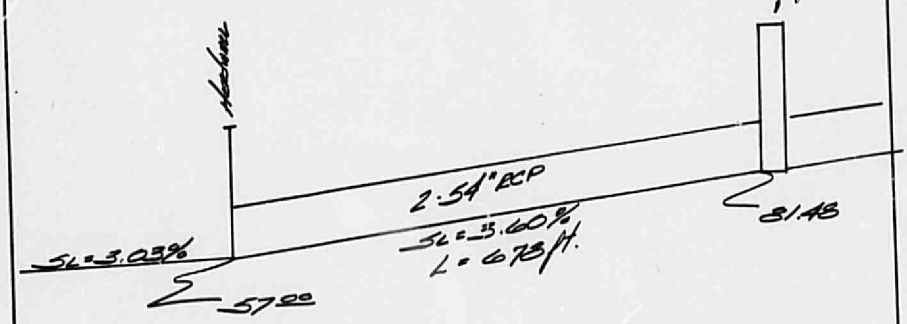
$$F_r = 1.97$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Newport Unit 2 Sheet 11 of 13
Phase II - Drainage Channel Job No. 129
By RSC Chk'd JA Date 7/17/89

Next, determine flow profile from head wall @ sta. 24+08.4 to junction box @ sta 30+86.33.

Q into junction box from drainage report = 485.8 cfs.



Assume turbulence @ junction box drowns soffit of pipes flow full

$\therefore \frac{485.8}{2} = 242.90$ cfs to each pipe

then $V = \frac{Q}{A} = \frac{242.9}{15.90} = 15.28$ ft/sec

entrance losses $= .2\frac{V^2}{2g} = \frac{15.28^2}{2g} .2 = .72$ ft.

$\therefore$ E @ Junction box $= 4.5 + 3.61 + .72$
$= 8.83$ ft.

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Newport Unit 1 Sheet 12 of 13
Phase II - Drainage Channels Job No. 127
By BSF Chk'd JA Date 7/17/99

Assume flow in 54" RCP's returns to normal depth in pipes, therefore determine normal depth in 54" RCP's.

$Q = 485.8$ cfs

$Q/2 = 242.90$ cfs to each pipe.

then from Table B-3, p. 559 "Small Dams"

$$\frac{Qn}{D^{8/3} S^{1/2}} = \frac{242.90 \times .014}{(4.5)^{8/3} (.036)^{1/2}} = 0.3247$$

Again from Table B-3, p. 559

$d/D = .62 \Rightarrow d = y = 2.79$ ft

depth of flow in pipe = 2.79 ft.

$A/D^2 = 0.5115 \Rightarrow A = 10.36$ ft^2

$$E = y + \frac{Q^2}{2gA^2} = 2.79 + \frac{242.9^2}{2g(10.36)^2}$$

$$= 2.79 + 8.54$$

$$= 11.33 \text{ ft.}$$

$\therefore V = 23.45$ m/sec ; $F_r = 2.68$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project Newport Unit 6 Sheet 13 of 13
Phase II - Drainage Channels Job No. 129
By BSF Chk'd JA Date 7/17/79

At Sta 24+08.4 (Headwall) channel bottom, $b_2 = 21.5$ with 1:2 sideslopes

then for channel enlargement, Energy losses

$$\Delta E = 1/3 \frac{V_1^2}{2g}\left[\left(1-\frac{b_1}{b_2}\right)^2 + \frac{2F_1^2 b_1^3 (b_2-b_1)}{b_2^4}\right]$$

where $V_1 = 23.45$ ft/sec
$F_{r_1} = 2.68$
$b_1 = 9$ ft
$b_2 = 21.5$ ft.

then $$\Delta E = 1/3 \frac{23.45^2}{2g}\left[\left(1-\frac{9}{21.5}\right)^2 + \frac{2\times 2.68^2 \times 9^3 (21.5-9)}{21.5^4}\right]$$

$= 2.85[.34 + .61]$

$= 2.70$

then E immediately downstream of Headwall

$= 11.33 - 2.70 = 8.63$ ft.

by trial & error

y	A	$\frac{Q^2}{2gA^2}$	E	
1.2	28.68	6.31	7.51	
1.1	26.07	7.63	8.71	
1.11	26.33	7.48	8.59	← OK

then $y = 1.11$ ft

$V = Q/A = \frac{578}{26.33} = 21.95$ ft/sec

$E = 1.11 + 7.48 = 8.59$ ft.

8" CF required on Adm Lowell

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-8631

Project: Supplemental Calcs. Sheet 1 of 2
Pino Canyon Townhomes Job No. 142
By BSE Chk'd _____ Date 7/30/79

DETERMINE STORM RUNOFF FLOWING WEST IN ADMIRAL LOWELL AVE. AT ADMIRAL DEWEY AVE. INTERSECTION.

A = 12.4 ACRES
C = 0.40
TC = < 10 MIN ∴ USE 10 MINS MIN.
I = 5.4 IN/HR

$Q = CIA = 0.4 \times 5.4 \times 12.4 = 26.2$ CFS

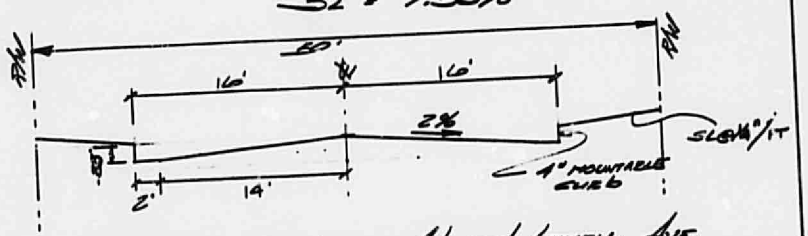
ASSUME THAT HALF OF THE FLOW WILL COME THROUGH THE INTERSECTION & FLOW THROUGH PINO CANYON TOWNHOMES Subd. IN ADMIRAL LOWELL AVE.

THEN FROM PREVIOUS DRAINAGE REPORT FOR PINO CANYON TOWNHOMES & ABOVE CALCULATIONS, TOTAL STORM RUNOFF IN ADMIRAL LOWELL AVE AT LAYTON AVE. INTERSECTION IS,

$$Q = 18.2 + \frac{26.2}{2} = 18.2 + 13.1$$

$$= 31.3 \text{ CFS.}$$

THEN DETERMINE DEPTH OF FLOW IN ADMIRAL LOWELL JUST EAST OF LAYTON AVE. for:
Q = 31.3 CFS
SL = 1.53%



TYPICAL SECTION @ Admiral Lowell Ave.

ANDREWS, ASSBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 268-6831

Project: Subdivision Calc. Sheet 2 of 2
Rio Communications Job No. 112
By RSF Chk'd Date 7/20/78

Assume flow is 0.09 ft above top of curb.

$\therefore$ $A = 8.26\ ft^2$ $n = 0.016$
$p = 41.31\ ft.$
$R = A/p = 0.20\ ft.$

$$Q = \frac{1.49}{n} R^{2/3} S^{1/2} A$$
$$= \frac{1.49}{0.016} (0.20)^{2/3} (0.0153)^{1/2} (8.25)$$
$$= 32.3\ cfs \quad OK$$

Then flow in Admiral Lowell Ave. will be 0.09 ft (1"±) above top of curb

$$V = \frac{Q}{A} = \frac{32.3}{8.25} = 3.92\ ft/sec.$$

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6831

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

April 18, 1979

RECEIVED
APR 19 1979
CITY ENGINEERS

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

HAND-DELIVERED
City Hall

SUBJECT: DRAINAGE REPORT
NEWPORT INDUSTRIAL PARK-WEST, UNIT 2 - SITE IMPROVEMENTS

Dear Mr. Conegliano:

Transmitted herewith, for your review and approval, are two (2) copies of the Drainage Report for Newport Industrial Park-West, Unit 2, Site Improvements.

As you are aware, a Drainage Report for Newport Industrial Park-West, Unit 1, is on file in your office, and we have referenced such report in the report submitted herewith. Unit 2 lies directly to the North of Unit 1, with the 60'-wide Floodway and Utility Easement serving as a common boundary to the two units. I am sending a print of the proposed subdivision plat, for your information.

We are now in the process of designing and preparing the Contract Plans for the improvements to the 60'-wide Drainage and Utility Easement, and we propose to submit these plans to the City by approximately April 30, 1979. Therefore, your early review of this report will be appreciated.

For your informatwon, we are working with Mr. Ken Hovey, the Architect for Craddock Development Company, in the design of inlets to the proposed concrete-lined channel so that they will receive the runoff flows from Tract 2 of Newport Industrial Park-West, Unit 1, which they are developing, at this time.

Very truly yours,

John A. Andrews

JOHN A. ANDREWS, P.E.

JAAsm
Enclosures
cc: Mr. Dick Johnson
Craddock Development Company (w/encls.-1)

5 of 10

tom Muchmore & associates

COMMERCIAL REALTORS

February 12, 1979

Mr. James C, Jaramillo
Chief Administrative Officer
400 Marquette NW
Mayor's Office
Albuquerque, New Mexico 87103

Re: NEWPORT INDUSTRIAL PARK-WEST, UNIT NO. 1

Dear Mr. Jaramillo:

We, as the owners and developers of the above-referenced subdivision, feel that the development of our lands has been unduly delayed due to not receiving timely and adequate response from the Drainage Section of the City Engineer's Office. As a result of these delays, our project is far behind schedule and may, in turn, jeopardize the sale and construction of facilities to house a major industry proposing to move on this site.

Our engineers on this project are Andrews, Asbury & Robert, Inc., Consulting Engineers. The principals of this firm are John Andrews, Ted Asbury, and John Robert and are most competent in preparing drainage reports, designs, and plans.

May we first state that our engineers have indicated to us that they have had no problems in obtaining timely replies from the other City Departments to which they must submit their documents for review and comment.

From progress reports submitted to us by our engineers, they submitted the Drainage Report for this project on December 5, 1978, and it was not until January 19, 1979 that they received any comments on the Report, an elapsed time of 45 days. In accordance with Section 17 AMAFCA Drainage Resolution 1972-2, comments on drainage reports should be received within seven (7) days after submittal.

20 First Plaza, Suite 515 • Albuquerque, New Mexico 87102 • (505) 247-4161

Since the date our engineers received comments on the Drainage Report, they have had numerous meetings to resolve and discuss the comments made on the report. I have been in attendence at some of these meetings. A revised Drainage Report was submitted by our engineers on February 7, 1979 to comply with the City's comments.

It is my opinion and that of our engineers that the revised report met all requirements of the City's ordinances and resolutions, yet the Drainage Section has requested that I sign a letter prepared by them in which they have recapitulated, for all practical purposes, the same items covered in the Drainage Report. In order to expedite the project, I have signed the letter based on the incorporation of certain clarifications; however, I feel that this requirement was unduly warranted as well as an act of procrastination, and that it should be considered as only a delay tactic, since all subsequent contract plans and designed improvements must meet the approval of the Drainage Section. I am enclosing a copy of the Drainage Section's letter and a copy of an excerpt from the Drainage Report indicating a comparison of the items included.

We wish to inform you, as we have informed the Drainage Section, that we do not want to build, nor will our engineers design, anything less than that required to conform with all applicable ordinances and resolutions.

I am attaching hereto a copy of an Easement which is an excerpt from an Agreement executed between the governing authorities and American Square Subdivision Owners. This Easement is similar to the type of Easement we had proposed for Newport Industrial Park-West, Unit No.1. We, therefore, respectfully request that you allow us to have our engineers and lawyers prepare a similar Easement so that we may have the latitude to develop our subdivision in a more economical and satisfactory manner to all concerned. I would like to reiterate that this method would result in much less time expended and cost for all concerned and allow the Drainage Section of the City of Albuquerque to fulfill their obligations to the developers and the citizens of Albuquerque to do their work timely in accordance with the existing drainage regulations.

As a last point, I would like to state that the owners of Newport Industrial Park-West Unit No. 1 have agreed to pay for the installation of the North half of the West 1271.81 feet of the Floodway Easement, even though the land adjacent to the North half was developed as a residential subdivision by others and would normally be the expense of that subdivider or the city of Albuquerque.

We are giving the engineers' office our full cooperation and will continue to do so.

Respectfully submitted,

Thomas M. Muchmore

TMM:jap
Attachments

1.Copy of Drainage Section's letter

2.Excerpt from Drainage Report

3.Copy of an Easement

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

February 7, 1979

Mr. John Andrews
Andrews, Asbury & Robert
401 San Pedro N.E.
Albuquerque, New Mexico 87108

RE: NEWPORT PARK DEVELOPMENT

Dear Mr. Andrews:

I have received the revised drainage report for the captioned development together with your letter dated February 6, 1979. The drainage report is supposed to provide a conceptual outline of the scheme of solution to the drainage problem and not a detailed hydrologic and hydraulic analysis of the proposed facilities. In practice it is difficult to evaluate one without the other. I will therefore outline the drainage provisions that need to be provided and concurrence by your client will allow the approval of the plat for this development. Detailed design data will have to be supplied by your office to verify the adequacy and appropriateness of the facilities proposed.

1. A concrete lined channel will be constructed in the arroyo along the northern boundaries of this property.

2. The flood plain study by the U.S. Corp of Engineers, Albuquerque Arroyos, Part V, Albuquerque, New Mexico, April 1975, indicates that the existing facilities (the 2-54" pipes mentioned in the report) may not be adequate to convey the flood flows. Plate 6 in said report indicates that undesirable flows may be conveyed down Yale Blvd. This situation is not desirable from the point of view of the City, and an adequate way to convey these flood flows to the arroyo need to be provided. As far as this parcel is concerned the requirement is that an adequate intake structure be provided to receive the flows emanating from the east without damages to the lined channel. The solution will be provided in cooperation and participation with the City.

3. Discussions that I have had yesterday and today with engineers of the Soil Conservation Service and of the Corps of Engineers, have confirmed my opinion that it will be very difficult to convey the predicted flow of 614.7 cfs across the existing structure under University Blvd. A partial redesign of the structure may be required to convey the supercritical flow in the lined channel through the 2-72" pipe culverts. It is doubtful at this point whether a well designed inlet structure could prevent the formation of a hydraulic jump and the diversion of the flow to the northwest into the Kirtland Addition. A solution to this problem will be part of the facilities constructed with this development with the cooperation and the participation of the City.

4. Randolph Road will be design to accept the offsite flows from the offsite areas designated as A3, A4 and C2 in the drainage report. These flows will be collected within this subdivision and conveyed through the appropriate drainage easements to a storm sewer to be constructed at the western side of this property and to the flood channel through an appropriate structure.

5. Temporary desilting facilities will be provided to prevent the discharge of sediment onto Randolph Rd. until development of the tracts south of Randolph Rd. are developed.

6. At the time of development of the individual tracts, the location of the drainage easements may be modified but the flows will be collected in an appropriate facility as approved by the City Engineer.

7. The tracts to the north of Randolph Rd. will not be allowed to discharge into the flood channel in an uncontrolled fashion, but will be collected and conveyed through an inlet structure that will nto affect the structural integrity of the lining.

The developer can indicate his concurrence with the stipulations above with signature on the space provided. Copy of this letter will be attached to the drainage report as it constitutes a prerequisite to approval of the plat.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

-c - James C. Jaramillo, C.A.O.
Richard S. Heller, City Engineer
Rick Leonard, A.M.A.F.C.A.
Drainage File

ACCEPTED:

Tom Huchmore

Revised 2/6/79
2

III

DEVELOPED CONDITIONS

A. General

Drainage patterns in the proposed developed condition for onsite and offsite drainage areas together with the drainage area designations and their contributory flows are shown on Map No. 3. This subdivision is to be developed as an Industrial Park; however, it is not known at the time of the writing of this report what the actual type, size or location of buildings will be or the actual type of ground cover proposed in the ultimate development of the subject site. The intent of this report is to establish the major drainage patterns and flows of the offsite and onsite drainage. In addition, this report will serve as a guide for the preparation of drainage plans on an individual basis when the actual construction of buildings and associated facilities is to occur.

B. Proposed Improvements

As an initial construction project, it is proposed to construct improvements to provide access to the subdivision, utility service and drainage facilities to control storm water runoff. This report addresses the drainage portion of the proposed improvements.

Drainage improvements to be constructed under the initial construction phase shall include the following:

1. Construct drainage facilities to convey storm waters generated by Drainage Areas A-3 and A-4 from the South boundary of the subdivision to Randolph Road, SE;
2. Construct drainage facilities to convey storm waters generated by Drainage Area C-2 from the South boundary of

the subdivision to Randolph Road, SE, and a facility to carry this flow from Randolph Road North, to the floodway easement. The latter facility shall be designed to collect and convey the flows from Drainage Area C-1 as well as convey the flows from Drainage Area C-2;

3. Construct a ditch and dike along the Southerly boundary of the subdivision to collect and direct local flows to the above-described facilities. This ditch and dike shall extend to the West across the Northerly limits of Drainage Area A-2 to direct the local flows from this drainage area to University Boulevard;

4. Construct pavement and curb and gutter on Randolph Road, SE. This pavement and curb and gutter should extend around the curve connecting University Boulevard to Randolph Road and to the South as necessary to collect the flows on University Boulevard.

5. Construct a storm sewer system in the vicinity of the intersection of Randolph Road and University Boulevard, SE, as required to collect and convey storm water flows converging at this intersection. The storm sewer shall extend Northerly along University Boulevard and connect to the existing 60" RCP storm sewer under University Boulevard that flows to the Northwest and into the existing concrete-lined drainage channel. (See Map No. 3 for location).

6. Construct storm sewer lines in the floodway easement from the West right-of-way line of Yale Boulevard, SE, to the East boundary of the subdivision. These storm sewer lines shall connect to the existing lines presently projecting from under Yale Boulevard on the West side;

7. Construct a continuous concrete-lined channel in the 60-foot wide Floodway and Utility Easement located along the Northerly boundary of the subdivision. Limits of the lining shall be from the drainage structure under University Boulevard, SE, to the East boundary of the subdivision and shall connect to the storm sewer lines described under Item No. 6, above;

8. Special transition structures and/or sections will be required to be included in the design of the above-described concrete-lined channel. These special transition structures shall be designed to provide for stable and continuity of flow in the channel. As a minimum, special transition structures will be required at the following locations:

   A. At the outlet of the storm sewer lines at the East boundary of the subdivision;

   B. At the connection of the two types of channel sections proposed near the midpoint of the subdivision;

   C. At the channel connection to the drainage structure under University Boulevard. This transition structure shall be designed to provide for a high velocity inlet to the two (2) 72" diameter pipes presently under University Boulevard, SE;

9. Inlets to the concrete lined channel shall be constructed as required to allow for the local and onsite flows to enter the channel. Channel inlets shall be designed to minimize disturbances in channel flow.

C. Onsite Drainage Control

Control of onsite drainage during the actual development of all portions of the Newport Industrial Park-West, Unit 1, all applicable City of Albuquerque and Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) ordinances and resolutions shall be complied with.

Particular attention is directed to Section 2, Paragraph B of the AMAFCA Resolution 1972-2 which states:
"...the storm water runoff from such lot, tract or parcel will discharge from such lot, tract or parcel into, and in such manner as does not exceed the capacity of storm drainage facilities downstream or, in the alternative, will discharge from such lot, tract, or parcel at no greater rate of flow, velocity and quantity or different location than existed before such alteration."

GRANT OF SURFACE DRAINAGE EASEMENT

MAURICE LIBERMAN and MARGUERITE LIBERMAN, his wife, JOSEPH GREVEY and SIMONE GREVEY, his wife, JACK GREVEY and JOHANNA M. GREVEY, his wife, DR. L. H. WILKINSON and LANETTE LIESE WILKINSON, his wife, EMANUEL BLAUGRUND and FRIEDA R. BLAUGRUND, his wife, (hereinafter called "Grantors"), for consideration grant to the City of Albuquerque, a municipal corporation, (hereinafter called "Grantee") a surface drainage easement in Albuquerque, Bernalillo County, New Mexico as follows:

1. Initial Location: The easement will be initially located as follows: A tract of land commencing and centered on the dedicated right of way of Phoenix Avenue, N.E. at its terminus approximately seven hundred and three feet (703') west of the west right of way line of Carlisle Boulevard, N.E. and running from thence west to the east right of way line of Richmond Drive, N.E. in such a manner that the center line of this easement will intersect the latter right of way line at a point parallel to and coincident with the center line of a similar surface drainage easement reserved by the Grantee between the west right of way line of Richmond Drive, N.E. and the east boundary line of the Albuquerque Metropolitan Arroyo Flood Control Authority, (hereinafter called the A.M.A.F.C.A.) North Diverson Channel.

2. Purpose: Initial Configuration: This initial easement, and all substitute drainage easements or facilities, are for the sole purpose of draining surface waters deposited on and flowing across the land traversed by such easements or facilities. The initial drainage easement shall be thirty feet (30') wide, shall be shaped so that it does not interfere with pedestrian or vehicular traffic, and shall be paved by grantors with a one and one-half inch (1½") asphalt paving.

3. Relocation: Grantors may relocate this easement, or any substitute easement or substitute drainage facility relocated under this paragraph, at any time after the following conditions precedent to the exercise of the right of relocation have been performed:

(a) The substantially complete construction of the substitute drainage easement or substitute drainage facility which begins and ends at the beginning and ending points of the easement granted herein; the substitute may otherwise be located and shaped as grantors, or their successors in interest, may choose; the substitute must be adequate to carry a flow of water of 88 cubic feet per second in the present unpaved condition of the land traversed by the easement, and must be adequate to carry a flow of water of up to 132 cubic feet per second at such time as the land traversed by the easement is completely paved; and

(b) The grantors have submitted to A.M.A.F.C.A. drawings or construction plans for the substitute easement or substitute drainage facility, and have notified Grantee of their action, and the submission has been approved by A.M.A.F.C.A.; the submission will be deemed approved unless formal written objection thereto is made within ten days after submission.

4. Relocation Documentation and Effect: The location of a substitute easement, or substitute drainage facility will be described in an "Affidavit of Relocation" executed and acknowledged by Grantors, and filed for record with the Bernalillo County Clerk. Such execution, acknowledgment and filing for record will work a termination or vacation of any previous initial or relocated easement or facility, and will constitute a grant of the substitute easement or facility.

5. Effective Date: This grant of surface drainage easement shall be effective simultaneously with the vacation by the Grantee of the dedicated right of way of Phoenix Avenue, N.E., between the beginning and ending points of this easement. Relocations will be effective upon filing the Affidavit of Relocation. The burdens and benefits of this document run with the land.

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

February 12, 1979

Mr. Bruno Conegliano
Assistant City Engineer - Hydrology
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

SUBJECT: NEWPORT INDUSTRIAL PARK - WEST. UNIT NO. 1

Dear Mr. Conegliano:

Enclosed is a copy of your letter dated February 7, 1979, on which we have obtained the signature of owner, Tom Muchmore. In signing this letter, the owners requested that the following clarifications to your letter be incorporated as a part of the agreement:

Paragraphs 2 and 3:

From the statements made in these paragraphs, it is our understanding that the City will bear the costs associated with any modifications and/or additions to the City's existing streets, storm sewer system and structures that may be required at Yale Boulevard, SE, and the 60-ft. Floodway Easement and at University Boulevard, SE, and the 60-ft. Floodway Easement;

Paragraph 4:

For clarity, this paragraph is re-written as follows: ... "Randolph Road will be designed to accept and convey the flows from offsite drainage areas designated as A-3, A-4 and C-2 in conjunction with flows from applicable onsite areas shown in the Drainage Report. All offsite flows will be collected and conveyed through appropriate drainage easements to Randolph Road. An appropriate storm sewer system will be constructed at the Western side of this subdivision on Randolph Road and University Boulevard to collect and convey storm water flows for ultimate disposal into the flood channel as included in the Drainage Report;" ...

Paragraph 5:

Although we are unaware that desilting facilities are required by existing City ordinances, we have agreed to construct these desilting facilities as requested;

Paragraph 6:

It is understood that the City will permit the use of swales in paved parking areas for conveying the drainage easement flows, provided existing ordinances regulating velocities and depths of flow are complied with in the design of the swales.

It is requested that this letter be attached to the Drainage Report along with your letter which Mr. Muchmore has signed.

Very truly yours,

JOHN A. ANDREWS, P.E.

JAAsm
Enclosure
cc: Mr. Tom Muchmore
Mr. James C. Jaramillo, C.A.O.
Mr. Richard S. Heller, City Engineer
Mr. Richard Leonard, A.M.A.F.C.A.

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

File

February 12, 1979

Mr. Bruno Conegliano
Assistant City Engineer - Hydrology
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

RECEIVED
FEB 13 1979
CITY ENGINEERS

SUBJECT: NEWPORT INDUSTRIAL PARK - WEST, UNIT NO. 1

Dear Mr. Conegliano:

Enclosed is a copy of your letter dated February 7, 1979, on which we have obtained the signature of owner, Tom Muchmore. In signing this letter, the owners requested that the following clarifications to your letter be incorporated as a part of the agreement:

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Very truly yours,

JOHN A. ANDREWS, P.E.

JAAsm
Enclosure
cc: Mr. Tom Muchmore
Mr. James C. Jaramillo, C.A.O.
Mr. Richard S. Heller, City Engineer
Mr. Richard Leonard, A.M.A.F.C.A.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rush

26r 6671

February 7, 1979

Mr. John Andrews
Andrews, Asbury & Robert
401 San Pedro N.E.
Albuquerque, New Mexico 87108

Re: Newport Park Development

Dear Mr. Andrews:

I have received the revised drainage report for the captioned development together with your letter dated February 6, 1979. The drainage report is supposed to provide a conceptual outline of the scheme of solution to the drainage problem and not a detailed hydrologic and hydraulic analysis of the proposed facilities. In practice it is difficult to evaluate one without the other. I will therefore outline the drainage provisions that need to be provided and concurrence by your client will allow the approval of the plat for this development. Detailed design data will have to be supplied by your office to verify the adequacy and appropriateness of the facilities proposed.

1. A concrete lined channel will be constructed in the arroyo along the northern boundaries of this property.

2. The flood plain study by the U.S. Corp of Engineers, Albuquerque Arroyos, Part V, Albuquerque, New Mexico, April 1975, indicates that the existing facilities (the 2-54" pipes mentioned in the report) may not be adequate to convey the flood flows. Plate 6 in said report indicates that undesirable flows may be conveyed down University Blvd. This situation is not desirable from the point of view of the City, and an adequate way to convey these flood flows to the arroyo need to be provided. This problem is at this time outside the boundaries of the proposed development and will have to be addressed separately by others. As far as this parcel is concerned the requirement is that an adequate intake structure be provided to receive the flows emanating from the east without damages to the lined channel. The solution will be provided in coloperation & participation with the City

3. Discussions that I have had yesterday and today with engineers of the Soil Conservation Service and of the Corps of Engineers, have confirmed my opinion that it will be very difficult to convey the predicted flow of 614.7 cfs across the existing structure under University Blvd. A partial

redesign of the structure may be required to convey the supercritical flow in the lined channel through the 2-72" pipe culverts. It is doubtful at this point whether a well designed inlet structure could prevent the formation of a hydraulic jump and the diversion of the flow to the northwest into the Kirtland Addition. A solution to this problem will be part of the facilities constructed with this development with the participation of the a'h

4. Randolph Road will be designed to accept the offsite flows from the offsite areas designated as A3, A4 and C2 in the drainage report. These flows will be collected within this subdivision and conveyed through the appropriate drainage easements ~~supplied by plat~~ to a storm sewer to be constructed at the western side of this property and to the flood channel through an appropriate structure.

5. Temporary desilting facilities will be provided to prevent the discharge of sediment onto Randolph Rd. until development of the tracts south of Randolph Rd. are developed.

6. At the time of development of the individual tracts, the location of the drainage easements may be modified but the flows will be collected in an appropriate facility as ~~specified~~ approved by the City Engineer.

7. The tracts to the north of Randolph Rd. will not be allowed to discharge into the flood channel in an uncontrolled fashion, but will be collected and conveyed through an inlet structure that will not affect the structural integrity of the lining.

The developer can indicate his concurrence with the stipulations above with signature on the space provided. Copy of this letter will be attached to the drainage report as it constitutes a prerequisite to approval of the plat.

Very truly yours,

Bruno Conegliano

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - James C. Jaramillo
Dick Heller
Rich Leonard
Drainage File

Accepted:

Tom Muchmore

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

February 7, 1979

RECEIVED
FEB 14 1979
CITY ENGINEERS

Mr. John Andrews
Andrews, Asbury & Robert
401 San Pedro N.E.
Albuquerque, New Mexico 87108

RE: NEWPORT PARK DEVELOPMENT

Dear Mr. Andrews:

I have received the revised drainage report for the captioned development together with your letter dated February 6, 1979. The drainage report is supposed to provide a conceptual outline of the scheme of solution to the drainage problem and not a detailed hydrologic and hydraulic analysis of the proposed facilities. In practice it is difficult to evaluate one without the other. I will therefore outline the drainage provisions that need to be provided and concurrence by your client will allow the approval of the plat for this development. Detailed design data will have to be supplied by your office to verify the adequacy and appropriateness of the facilities proposed.

1. A concrete lined channel will be constructed in the arroyo along the northern boundaries of this property.

2. The flood plain study by the U.S. Corp of Engineers, Albuquerque Arroyos, Part V, Albuquerque, New Mexico, April 1975, indicates that the existing facilities (the 2-54" pipes mentioned in the report) may not be adequate to convey the flood flows. Plate 6 in said report indicates that undesirable flows may be conveyed down Yale Blvd. This situation is not desirable from the point of view of the City, and an adequate way to convey these flood flows to the arroyo need to be provided. As far as this parcel is concerned the requirement is that an adequate intake structure be provided to receive the flows emanating from the east without damages to the lined channel. The solution will be provided in cooperation and participation with the City.

3. Discussions that I have had yesterday and today with engineers of the Soil Conservation Service and of the Corps of Engineers, have confirmed my opinion that it will be very difficult to convey the predicted flow of 614.7 cfs across the existing structure under University Blvd. A partial redesign of the structure may be required to convey the supercritical flow in the lined channel through the 2-72" pipe culverts. It is doubtful at this point whether a well designed inlet structure could prevent the formation of a hydraulic jump and the diversion of the flow to the northwest into the Kirtland Addition. A solution to this problem will be part of the facilities constructed with this development with the cooperation and the participation of the City.

4. Randolph Road will be design to accept the offsite flows from the offsite areas designated as A3, A4 and C2 in the drainage report. These flows will be collected within this subdivision and conveyed through the appropriate drainage easements to a storm sewer to be constructed at the western side of this property and to the flood channel through an appropriate structure.

5. Temporary desilting facilities will be provided to prevent the discharge of sediment onto Randolph Rd. until development of the tracts south of Randolph Rd. are developed.

6. At the time of development of the individual tracts, the location of the drainage easements may be modified but the flows will be collected in an appropriate facility as approved by the City Engineer.

7. The tracts to the north of Randolph Rd. will not be allowed to discharge into the flood channel in an uncontrolled fashion, but will be collected and conveyed through an inlet structure that will nto affect the structural integrity of the lining.

The developer can indicate his concurrence with the stipulations above with signature on the space provided. Copy of this letter will be attached to the drainage report as it constitutes a prerequisite to approval of the plat.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

-c - James C. Jaramillo, C.A.O.
Richard S. Heller, City Engineer
Rick Leonard, A.M.A.F.C.A.
Drainage File

ACCEPTED:

Tom Muchmore

Revised 2/6/79
2

III

DEVELOPED CONDITIONS

A. General

Drainage patterns in the proposed developed condition for onsite and offsite drainage areas together with the drainage area designations and their contributory flows are shown on Map No. 3. This subdivision is to be developed as an Industrial Park; however, it is not known at the time of the writing of this report what the actual type, size or location of buildings will be or the actual type of ground cover proposed in the ultimate development of the subject site. The intent of this report is to establish the major drainage patterns and flows of the offsite and onsite drainage. In addition, this report will serve as a guide for the preparation of drainage plans on an individual basis when the actual construction of buildings and associated facilities is to occur.

B. Proposed Improvements

As an initial construction project, it is proposed to construct improvements to provide access to the subdivision, utility service and drainage facilities to control storm water runoff. This report addresses the drainage portion of the proposed improvements.

Drainage improvements to be constructed under the initial construction phase shall include the following:

1. Construct drainage facilities to convey storm waters generated by Drainage Areas A-3 and A-4 from the South boundary of the subdivision to Randolph Road, SE;
2. Construct drainage facilities to convey storm waters generated by Drainage Area C-2 from the South boundary of

the subdivision to Randolph Road, SE, and a facility to carry this flow from Randolph Road North, to the floodway easement. The latter facility shall be designed to collect and convey the flows from Drainage Area C-1 as well as convey the flows from Drainage Area C-2;

3. Construct a ditch and dike along the Southerly boundary of the subdivision to collect and direct local flows to the above-described facilities. This ditch and dike shall extend to the West across the Northerly limits of Drainage Area A-2 to direct the local flows from this drainage area to University Boulevard;
4. Construct pavement and curb and gutter on Randolph Road, SE. This pavement and curb and gutter should extend around the curve connecting University Boulevard to Randolph Road and to the South as necessary to collect the flows on University Boulevard.
5. Construct a storm sewer system in the vicinity of the intersection of Randolph Road and University Boulevard, SE, as required to collect and convey storm water flows converging at this intersection. The storm sewer shall extend Northerly along University Boulevard and connect to the existing 60" RCP storm sewer under University Boulevard that flows to the Northwest and into the existing concrete-lined drainage channel. (See Map No. 3 for location).

6. Construct storm sewer lines in the floodway easement the West right-of-way line of Yale Boulevard, SE, to East boundary of the subdivision. These storm sewer shall connect to the existing lines presently projec from under Yale Boulevard on the West side;

7. Construct a continuous concrete-lined channel in the 60-foot wide Floodway and Utility Easement located a the Northerly boundary of the subdivision. Limits of lining shall be from the drainage structure under Un Boulevard, SE, to the East boundary of the subdivisio shall connect to the storm sewer lines described unde Item No. 6, above;

8. Special transition structures and/or sections will be required to be included in the design of the above-de concrete-lined channel. These special transition st shall be designed to provide for stable and continuit of flow in the channel. As a minimum, special transi structures will be required at the following locatio

   A. At the outlet of the storm sewer lines at the Eas boundary of the subdivision;

   B. At the connection of the two types of channel sec proposed near the midpoint of the subdivision;

   C. At the channel connection to the drainage structu under University Boulevard. This transition stru shall be designed to provide for a high velocity inlet to the two (2) 72" diameter pipes presently under University Boulevard, SE;

9. Inlets to the concrete-lined channel shall be constructed as required to allow for the local and onsite flows to enter the channel. Channel inlets shall be designed to minimize disturbances in channel flow.

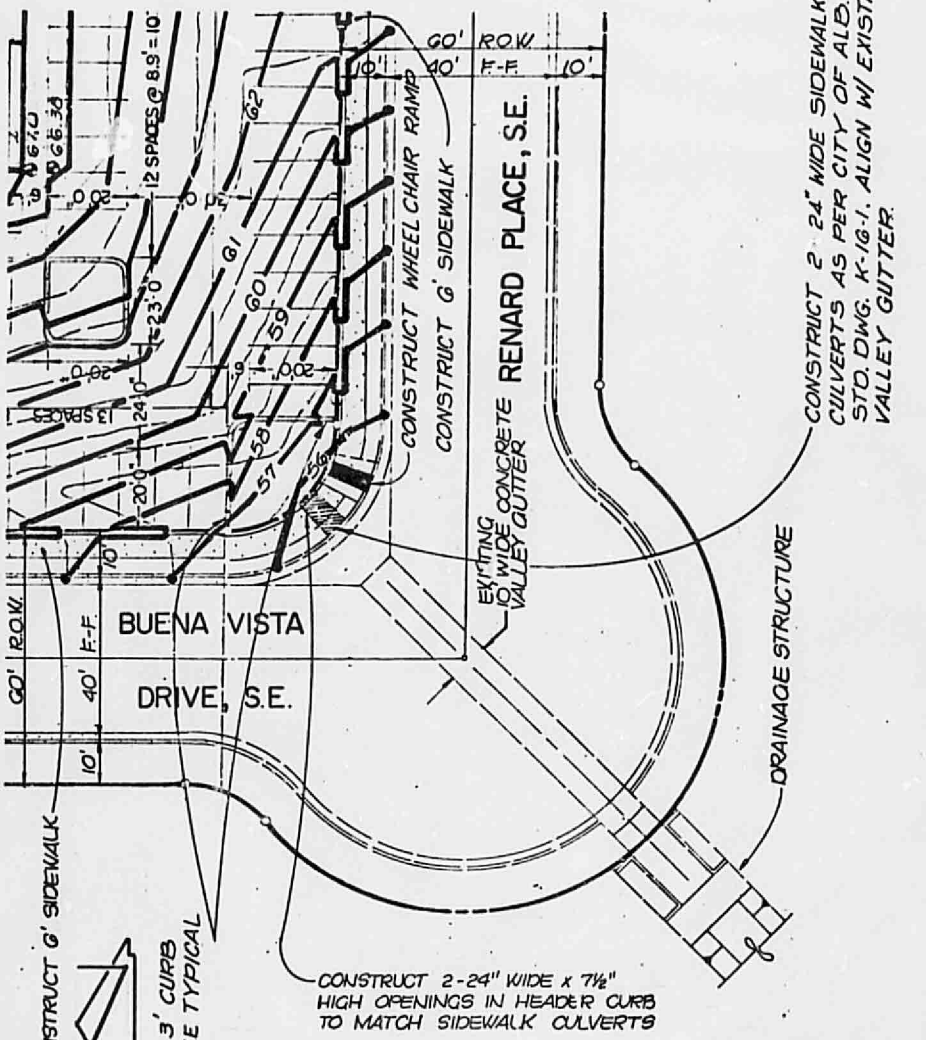
C. Onsite Drainage Control

Control of onsite drainage during the actual development of all portions of the Newport Industrial Park-West, Unit 1, all applicable City of Albuquerque and Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) ordinances and resolutions shall be complied with.

Particular attention is directed to Section 2, Paragraph B of the AMAFCA Resolution 1972-2 which states:
"...the storm water runoff from such lot, tract or parcel will discharge from such lot, tract or parcel into, and in such manner as does not exceed the capacity of storm drainage facilities downstream or, in the alternative, will discharge from such lot, tract, or parcel at no greater rate of flow, velocity and quantity or different location than existed before such alteration."

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
THOMAS T. MARR JR.
5792
AND LAND SURVEYOR

11/2/82

APPROVALS	NAME	DATE
A.C.E./DESIGN		4/16/82
INSPECTOR		7-26-83
A.C.E./FIELD	Emil L. Hayett for W.D. Kearney	6-30-83

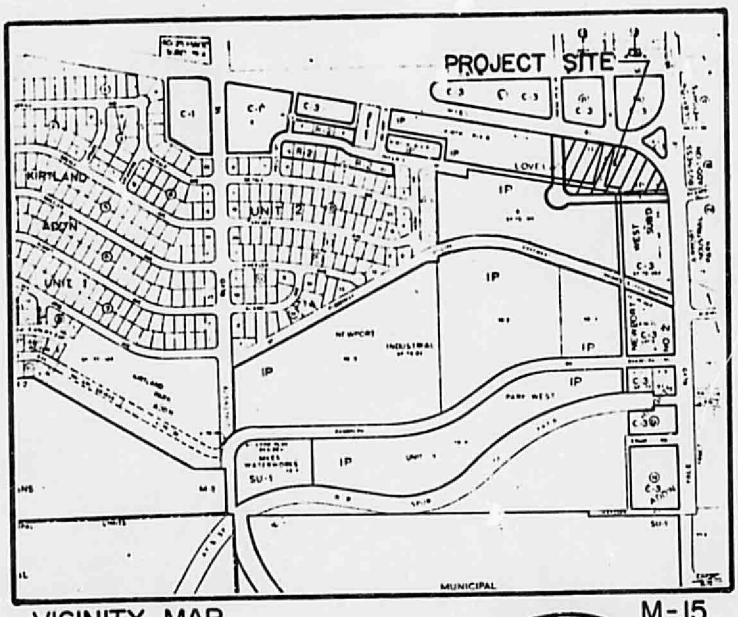
TITLE: NEWPORT OFFICE BUILDING 7
2309 RENARD PLACE S.E.

PERMIT NO.
SHEET 2 OF 2

MAP NO. M-15

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



VICINITY MAP M-15.

SCALE: 1" = 800'

REGISTERED PROFESSIONAL ENGINEER
STATE OF
THOMAS T.
MANN, JR.
3792
NEW MEXICO
AND LAND SURVEYOR

11/4/82

NOTICE TO CONTRACTOR

1. An excavation/construction permit will be required before beginning any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.
2. All work detailed on these plans to be performed, except as otherwise stated or provided hereon, shall be constructed in accordance with "Contract Documents for City-Wide Utilities and Cash Paving No. 31"
3. Two working days prior to any excavation, contractor must contact Line Locating Service, 765-1234, for location of existing utilities.
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to RESIDENTIAL street use.

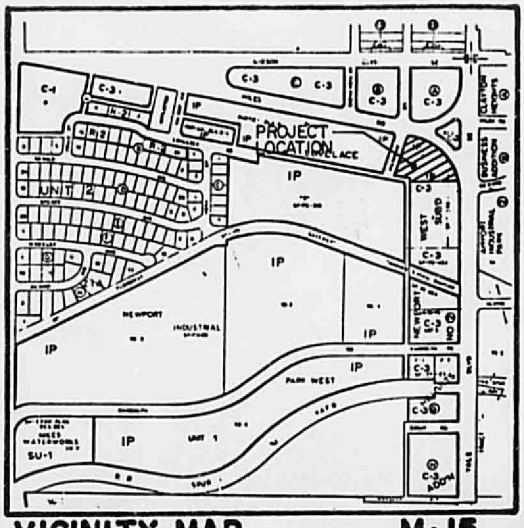
B-5B

APPROVALS	NAME	DATE	TITLE: NEWPORT OFFICE BUILDING 7 2309 RENARD PLACE S.E.
A.C.E./DESIGN	[illegible]	11/8/82	
INSPECTOR	[illegible]	2-28-83	
	[illegible]	6-30-83	PERMIT NO. [illegible] 1 [illegible] 2 — MAP NO. M-15

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY

(1) Design
(2) Hydrology



VICINITY MAP **M-15**

SCALE: 1" = 800'

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
STATE OF NEW MEXICO

Thomas F. Hatley
4/26/83

NOTICE TO CONTRACTOR

1. An excavation/construction permit will be required before beginning any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.
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3. Two working days prior to any excavation, contractor must contact Line Locating Service, 765-1234, for location of existing utilities.
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to ARTERIAL street use.

C-50-03944 L&P Constr

APPROVALS	NAME	DATE
A.C.E./DESIGN	[illegible]	26 Apr 83
INSPECTOR	[illegible]	May 25 83
[illegible]	[illegible]	[illegible]

TITLE:
SIDEWALK CULVERT
CRADDOCK OFFICE BUILDING NO. 6
2305 RENARD S.E.

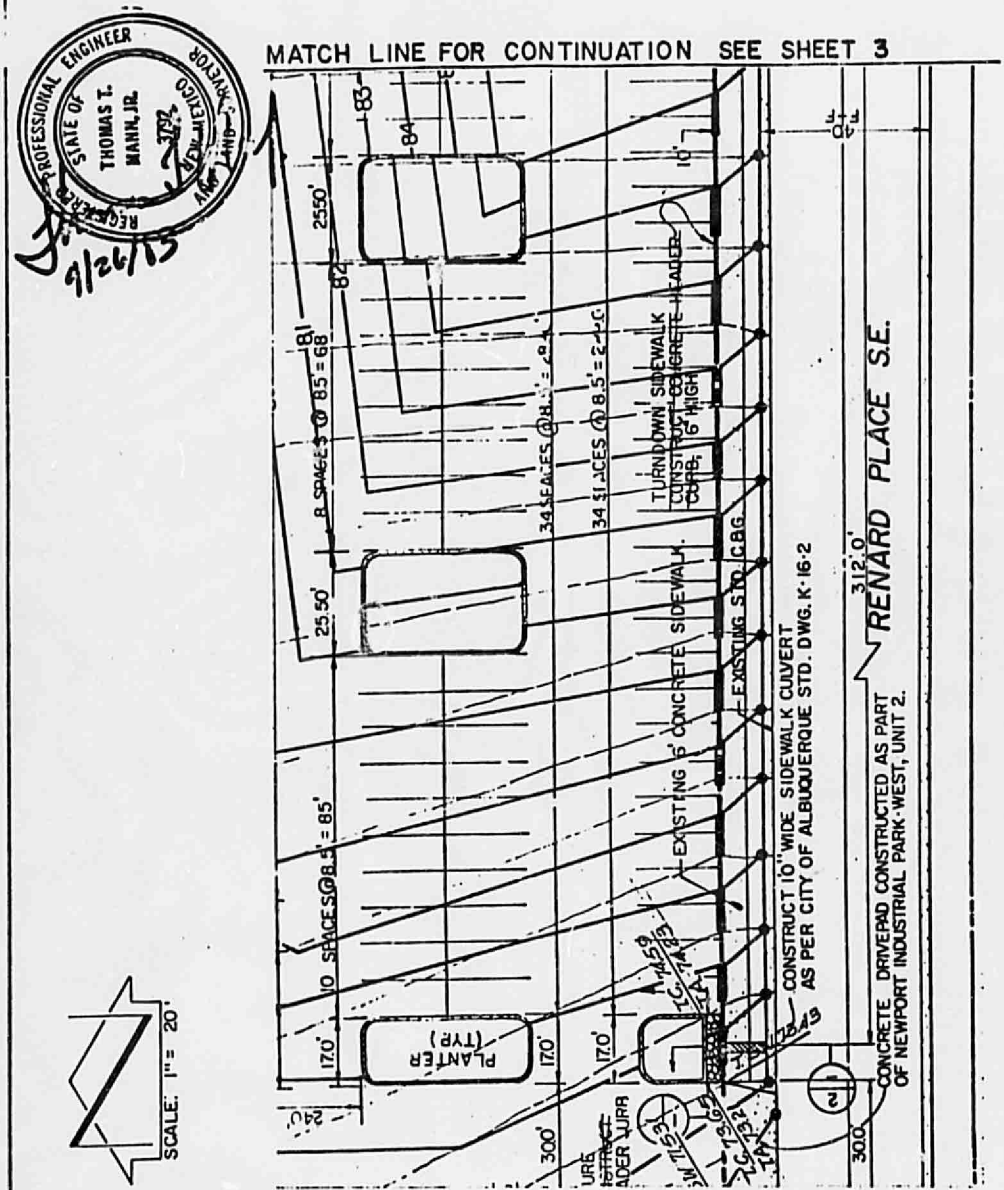
PERMIT NO. [illegible]

MAP NO. M-15

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
THOMAS T. MANN, JR.
9/26/83



C-50

APPROVALS	NAME	DATE
A.C.E. / DESIGN	[illegible]	26 Apr 83
INSPECTOR	[illegible]	May 25, 83
A.C.E. / FIELD		

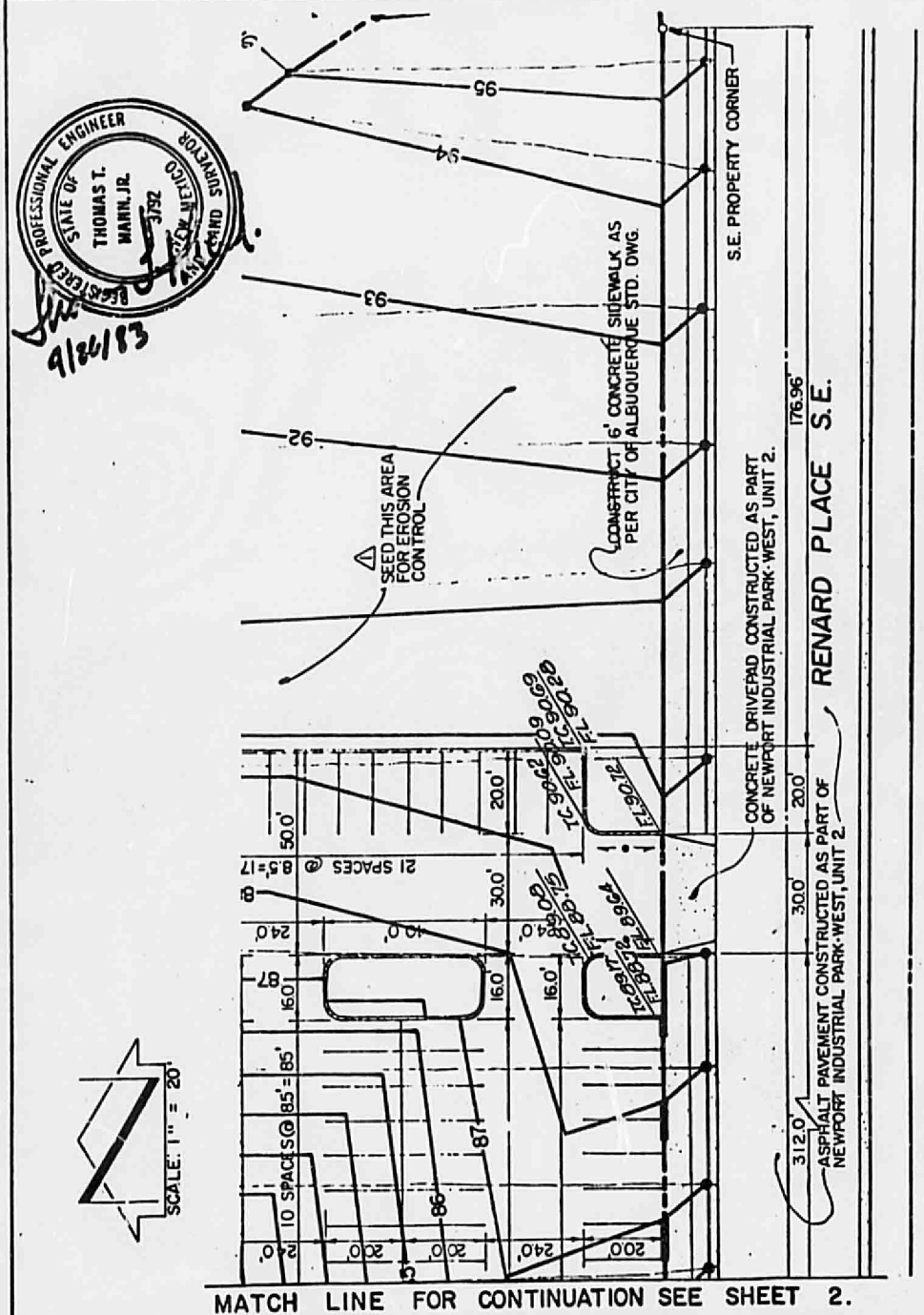
TITLE:
SIDEWALK CULVERT
CRADDOCK OFFICE BUILDING NO. 6
2305 RENARD S.E.

PERMIT NO.
SHEET 2 OF 4

MAP NO. M-15

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



C-50

APPROVALS	NAME	DATE
A.C.E. / DESIGN	Kichick	26 Apr 83
INSPECTOR	Dewey G.	May 25 '83
A.C.E. / FIELD		

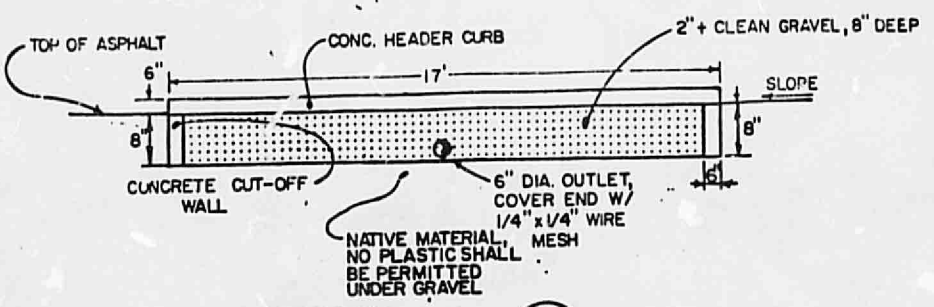
TITLE:
SIDEWALK CULVERT
CRADDOCK OFFICE BUILDING NO. 6
2305 RENARD S.E.

PERMIT NO
SHEET 3 OF 4

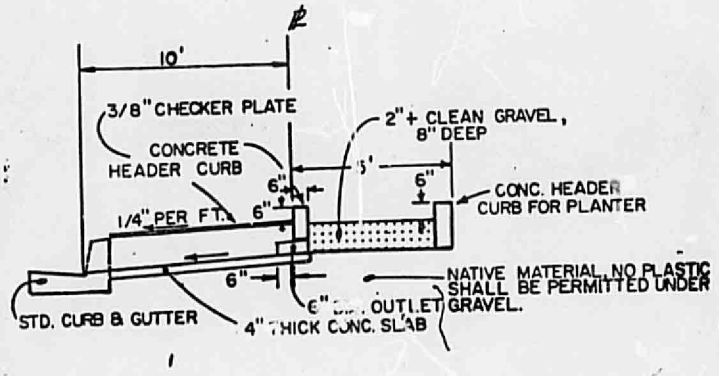
MAP NO. M-15

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



⚠ SECTION 1/— SCALE: 1/4" = 1'-0"



⚠ SECTION 2/— SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR STATE OF NEW MEXICO 3792

9/26/83

C-50

APPROVALS	NAME	DATE
A.C.E. / DESIGN	G. Kelich	26 Apr 83
INSPECTOR		

TITLE: SIDEWALK CULVERT
CRADDOCK OFFICE BUILDING NO. 6
2305 RENARD S.E.

PERMIT NO.

REVISION TO
DRAINAGE REPORT FOR NEWPORT INDUSTRIAL PARK - WEST, UNIT 2 SITE IMPROVEMENTS
MAY 18, 1981

RECEIVED
MAY 20 1981
CITY ENGINEER



PREPARED FOR CRADDOCK DEVELOPMENT COMPANY

PREPARED BY GOLDBERG-MANN & ASSOCIATES
811 DALLAS N.E.
ALBUQUERQUE, NEW MEXICO 87110
(505) 265-5611

INTRODUCTION

The purpose of this "revision" is to further clarify, or refine, the analysis of Basin H as defined in the "Drainage Report for Newport Industrial Park - West, Unit 2 Site Improvements" prepared by Andrews, Asbury and Robert, Inc., Consulting Engineers, for Craddock Development Company. The drainage report was submitted to the City of Albuquerque Municipal Development Department Engineering Division for review on September 12, 1979. The report was approved by the Engineering Division on October 25, 1979, as shown by Exhibit A.

This revision continues the discussion of the existing drainage conditions present in Basin H. The discussion which follows is based upon additional field reconnaissance and analytical calculations concerning the basin in question.

EXISTING CONDITIONS

The runoff generated in Basin H is due to two (2) sub-basins, H_1 and H_2, shown in Exhibit B. The runoff from H_1 flows westerly in Baylor Drive, SE to Renard Place, SE and then onto Yale Boulevard, SE. The runoff from H_2 flows westerly as sheet flow and enters Yale Boulevard south of Renard Place. The two (2) flows converge at the intersection of Yale Boulevard and Renard Place where the combined discharge turns northward and flows toward Gibson Boulevard, SE in Yale Boulevard.

The runoff generated upstream from the intersection of Yale Boulevard and Renard Place (i.e. Basin F-4) is intercepted by existing storm drainage facilities at the intersection of Yale Boulevard and Alamo Avenue. Because of this, this runoff is of no concern in the analysis of Basin H. This is discussed in further detail in the reference drainage report.

CONCLUSION

In analyzing the runoff leaving Basin H, the following points have been considered:

1. The discharge leaving Renard Place, 37 cfs, has a velocity of approximately 5 to 6 fps and an average depth of approximately 4 inches. This flow will begin to turn northward upon approaching Yale Boulevard due to the 2%+ cross-slope of the existing pavement. Supporting calculations follow.

2. The flows converging at Yale Boulevard and Renard Place, as shown by vector analysis, have a resultant which trends northwesterly. Supporting calculations follow.

3. If the resultant discharge continues to flow in a northwesterly direction, it will eventually be deflected by the median in Yale Boulevard. This median is 6 inches in height as determined by Exhibit C.

4. If the flow discharging from Renard Place onto Yale Boulevard does not behave entirely as described above, a small portion of it will spill over a 4-inch crown in Yale Boulevard at the existing median opening. After spilling, the runoff will have dissipated a significant amount of energy and will flow northerly in the southbound lanes of Yale Boulevard. Once in the southbound lanes, the runoff will flow as described in the reference drainage report for Basin E-2.

From the consideration of Items 1 through 4, it appears that the runoff from a 100-year storm travelling in Renard Place (east of Yale) will not enter the project site via the proposed Renard Place (west of Yale). As an added precaution, however, an 8-inch high water block will be designed for Renard Place (west of Yale).

The occurrence described in Item 4 appears unlikely. If runoff should spill across the crown of Yale Boulevard at the median opening, it will be a small quantity which will not appreciably affect the previous analysis for Basin E-2. Hence, a revision to the previous discussions of Basin E-2 is not necessary.

CALCULATIONS

BASIN H:

Area = 17.2 Ac±

Q_{H_1} = 37 cfs
Q_{H_2} = 12.5 cfs
} $Q_H = Q_{H_1} + Q_{H_2}$ = <u>50 cfs</u>

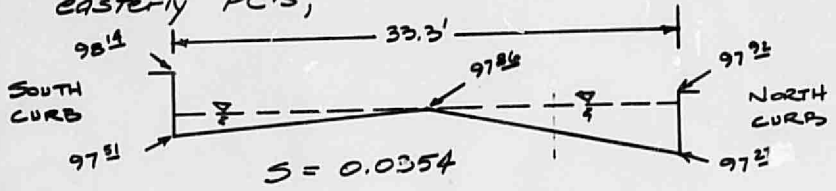
SUB-BASIN H_1:

Area = 11.4 Ac
Let C = 0.60 (Assumed)
t_c < 10 min ∴ let t_c = 10 min → i = 5.4 in/hr

By Rational Formula, Q = CiA,

Q_{H_1} = 0.60(5.4)(11.4) = 37 cfs

Channel analysis for Renard Pl. @ the easterly PC's,



Assuming that the street flows w/ W.S.L. = 97.86 (crown elev.)

$$Q_{S\frac{1}{2}} = \frac{1.49}{0.02}(2.91)(0.1712)^{2/3}(0.0354)^{1/2}$$

$Q_{S\frac{1}{2}}$ = 12.5 cfs

where $A = \frac{1}{2}(97.86 - 97.51)(16.65') = 2.91$ sf

$P = 16.65 + 0.35 = 17'$

$$R = \frac{A}{P} = 0.1712$$

$$Q_{N\frac{1}{2}} = \frac{1.49}{0.02}(4.91)(0.2848)^{2/3}(0.0354)^{1/2}$$

$$Q_{N\frac{1}{2}} = 29.7 \text{ cfs}$$

where $A = \frac{1}{2}(97.86 - 97.27)(16.65) = 4.91$ sf (0.59)

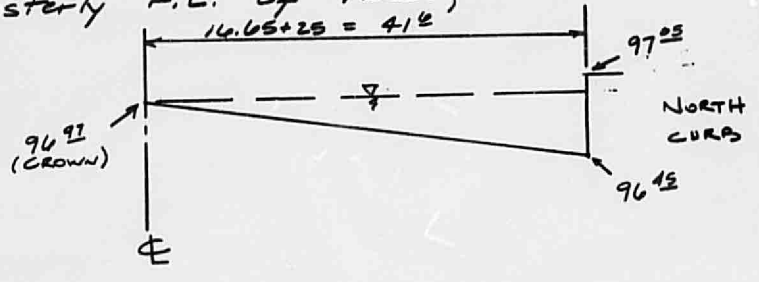
$P = 16.65 + 0.59 = 17.24'$

$R = \frac{A}{P} = 0.2848$

$$Q_{capacity} = Q_{S\frac{1}{2}} + Q_{N\frac{1}{2}} = 42 \text{ cfs}$$

Therefore, during a 100-yr. storm, the street will flow w/ approx. 7-in. depth in the north gutter and approx. 4-in. depth in the south gutter.

Channel analysis for Renard Pl. @ the easterly F.L. of Yale.,



Assuming that the street flows in north half only w/ W.S.L. = 96.97 (crown elev.) - Allowing flow in the south half will decrease water depth and flow velocity -

$$Q = \frac{1.49}{0.02}(10.8)(0.2565)^{2/3}(0.028)^{1/2} = 54 \text{ cfs}$$

where $A = \frac{1}{2}(41.6)(96.97 - 96.45) = 10.8$ sf

$P = 41.6 + 0.52 = 42.1$

$R = 0.2565$

$S = \frac{97.86 - 96.45}{50} = 0.028$ (cross-slope)

$Q_{actual} = 37 \text{ cfs} < 54 \text{ cfs}$

If 100-yr. storm flows in north half of Renard Pl. @ Yale, the maximum depth will be 6-in. in the north gutter; the average depth will be 4-in.

Analyzing velocity, $V = \frac{Q}{A}$

$V = \frac{54}{10.8} = 5 \text{ fps}$ or

$V = \frac{29.7}{4.91} = 6 \text{ fps}$

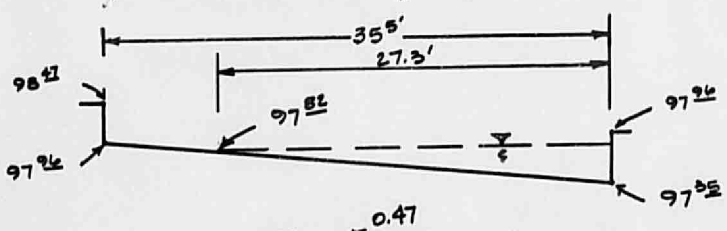
Runoff velocities (100-yr storm) in Renard Pl. @ Yale Blvd. can be expected to range from 5 to 6 fps.

SUB-BASIN H_2:

Area = 5.8 Ac ±
C = 0.40 (Assumed)
t_c < 10 min. ∴ let t_c = 10 min → i = 5.4 in/hr

Q = C·i·A = 12.5 cfs

By channel analysis, (STA 1+00 S)



$A = \frac{1}{2}(97.82 - 97.35)(27.3') = 6.4$ sf (0.47)

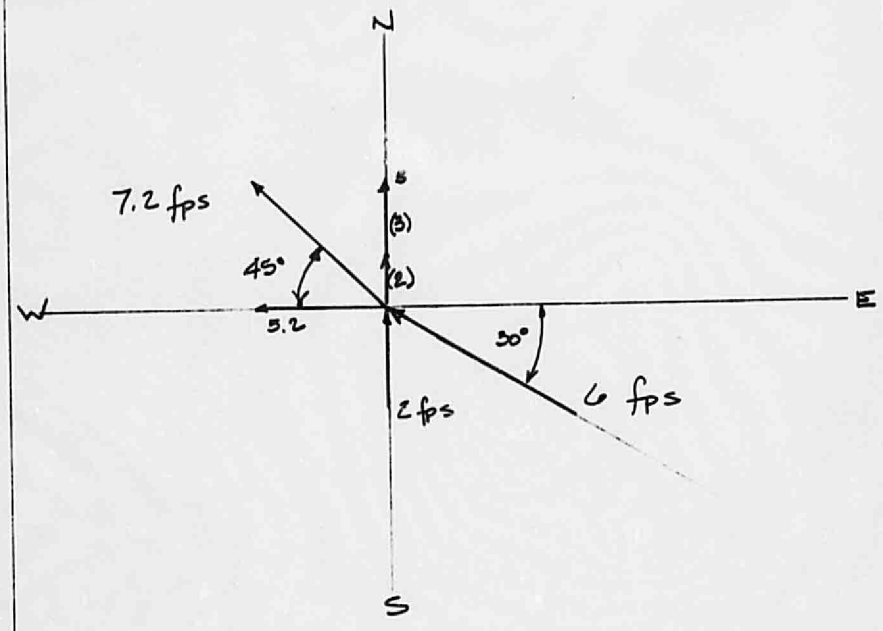
$P = 27.3 + 0.47 = 27.8'$

$R = \frac{A}{P} = 0.2302$

$Q = \frac{1.49}{0.02}(6.4)(0.2302)^{2/3}(0.005)^{1/2} = 12.6$ cfs

$v = \frac{Q}{A} = 2$ fps

VECTOR ANALYSIS:



∠ of entry from Renard Pl. assumed to be ~ 30° due to pavement cross-slope.

∠ of resultant discharge is ~ 45° (i.e. northwest).

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 25, 1979

Mr. John Robert
Andrews, Asbury & Robert, Inc.
401 San Pedro N.E.
Albuquerque, New Mexico 87108

Subject: Revised Drainage Report - Newport Industrial Park-West, Unit 2

Dear Mr. Robert:

Your report has been reviewed and the concepts outlined agree in principle with AMAFCA Resolution 72-2 and current City drainage practices, and is therefore approved.

When submitting your final drainage and grading plans, the back up material listed on Attachment No. 1 must be included to facilitate the review procedure. If this data is not included, it will cause delays in the checking procedure.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller, City Engineer
Rich Leonard, AMAFCA
Drainage File

EXHIBIT A

CITY OF ALBUQUERQUE, NEW MEXICO
MUNICIPAL DEVELOPMENT DEPARTMENT
Office of the City Engineer

Attachment No. 1

Back up data required for final plan submissions.

1. Hydraulic calculations including

   a. Existing and proposed channel profile on plan.
   b. Q & V on plan.
   c. Water surface (open channel) or HGL for close conduit on plan.
   d. Street cross sections showing depth of flow in street at intersections, storm drain inlets and rundowns.
   e. Channel cross section at 100' intervals on plans.

2. Grading Plan

   a. Sufficient offsite contours showing water courses channels, etc. w/100 year storm water surface.
   b. Wall elevations bottom and top including existing walls and proposed walls.
   c. Pond elevations, configurations and volumes, sideslopes and slope protection.
   d. Flow arrows on lots.
   e. Flow arrows on streets (layout sheet).

(Feb. 16, 1979)

EXHIBIT A

GIBSON
DR.
PL.
RD.
CORNELL
STANFORD
DR.
DR.
S.E.
COLUMBIA
DR.
S.E.
2.5 AC.
MILES
PENARD
TAYLOR
BLVD.
3200
3210
5220
5230
5240
5250
5260
5270
5280
AVE.
ALAMO
17.2 AC.
43 CFS
AREA "H"
17.2 AC.
"F-4"
170.1 AC.
485.8 CFS
EXHIBIT B

DRAINAGE REPORT
FOR
NEWPORT INDUSTRIAL PARK-WEST, UNIT 2
SITE IMPROVEMENTS
(Revised September 12, 1979)

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

CRADDOCK DEVELOPMENT COMPANY
ALBUQUERQUE, NEW MEXICO

RECEIVED
OCT 02 1979
CITY ENGINEER

DRAINAGE REPORT
FOR
NEWPORT INDUSTRIAL PARK-WEST, UNIT 2
SITE IMPROVEMENTS

APRIL, 1979

(Revised September 12, 1979)

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE
Albuquerque, New Mexico 87108
505-265-6631

Revised September 12, 1979

DRAINAGE REPORT
FOR
NEWPORT INDUSTRIAL PARK-WEST, UNIT 2
SITE IMPROVEMENTS

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MAPS	Existing Conditions	MAP NO. 2
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(See special pocket at back of report for Map No. 2 and Map No. 3)

Industrial Park - West, Unit 2, frequent reference is made herein to the previous Drainage Report prepared for Unit 1.

II

EXISTING CONDITIONS

Existing drainage patterns for onsite and offsite drainage areas are shown on Map No. 2 of this report, together with the drainage area designations.

Presently in existence on the Westerly portion of this site are two (2) commercial buildings with adjacent-paved parking areas. These building areas were developed subsequent to 1972 and were, therefore, assumed to have complied with Albuquerque Metropolitan Arroyo Flood Control Authority's Drainage Resolution 1972-2. Consequently, the runoff coefficient for this area was assumed to be equal to 0.40.

Areas external to the subject property that affect onsite drainage patterns exist to the South, East and North.

The area to the South of the 60'-wide Drainage and Utility Easement is known as Newport Industrial Park - West, Unit 1 Subdivision. The runoff from this area does not flow across, or onto, the subject property; however, it does contribute to the flow in the 60'-wide Drainage and Utility Easement which abuts Newport Industrial Park - West, Unit 2 on the South. Offsite drainage patterns for such Unit 1 Subdivision are presented in the Drainage Report on file in the City Engineer's Office for Newport Industrial Park - West, Unit 1.

The area to the East of Yale Boulevard that generates the storm runoff to the 60'-wide Drainage and Utility Easement has

been addressed in the Drainage Report for Newport Industrial Park - West, Unit 1. As in the aforementioned report, the area East of Yale Boulevard is designated as Drainage Area F. (See Map No. 2). Storm runoff from Area F drains to the intersection of Yale Boulevard and Alamo Avenue by a combination of storm sewers and street flow. At this intersection, the street flows are collected by cattleguard and curb-type inlets, and these flows are emptied by storm sewer pipes into the Drainage and Utility Easement on the West side of Yale Boulevard.

External areas to the East and North that generate offsite runoff, which affect onsite drainage of this subject subdivision, consist of only the West half of Yale Boulevard and the Southerly half of Miles Road, respectively.

Drainage Area H, as shown on Map No. 2, is intercepted by the East half of Yale Boulevard and directed to the North away from the subdivision.

A small portion of Newport Industrial Park - West, Unit 2, designated as Drainage Area G on Map No. 2, drains to the Southwest onto Lovelace Drive, Southeast, an improved street. This runoff from Drainage Area G flows West in Lovelace Drive and away from the property. All other onsite drainage areas flow to the 60' Drainage and Utility Easement.

The onsite drainage patterns, under existing conditions, are presented on Map No. 2.

III

DEVELOPED CONDITIONS

A. GENERAL

Drainage patterns in the proposed developed conditions for onsite and offsite drainage areas, together with the drainage area designations and their contributory flows, are shown on Map No. 3. This subdivision is to be developed as an industrial park; however, it is not known, at the time of this writing, what the actual type, size or location of buildings will be or the actual type of ground cover proposed in the ultimate development of the subject site. The intent of this report is to establish the major drainage patterns and flows of the offsite and onsite drainage. In addition, this report will serve as a guide for the preparation of drainage plans on an individual basis when actual construction of buildings and associated facilities is to occur.

B. PROPOSED IMPROVEMENTS

As an initial construction project, it is proposed to provide overall general grading of the entire site and to construct improvements to provide access to the subdivision, utility service and drainage facilities to control storm water runoff. This report addresses the drainage portion of the proposed improvements.

Drainage improvements to be constructed under the initial construction phase shall include the following:

1. Construct storm sewer lines in the 60'-wide floodway easement from the West Right-of-Way line of Yale Boulevard, Southeast, Westerly for approximately 740 feet. This storm sewer system shall connect to the existing lines presently projecting from under Yale Boulevard on the West side;

2. Construct a continuous concrete-lined channel in the 60'-wide Floodway and Utility Easement located along the Southerly boundary of the subject property. Limits of the lining shall be from, and connect to, the storm sewer lines described under Item No. 1 above and extending West to the West boundary of the subject property. Drainage facilities, as described in the Drainage Report for Newport Industrial Park - West, Unit 1, will complete the channel lining from the West boundary of Unit 2 to the drainage structure under University Boulevard, Southeast;

3. Special transition structures and/or sections will be required to be included in the design of the above-described concrete-lined channel. The transition structures shall be designed to provide for stable and continuity of flow in the channel. Reference to the Drainage Report for Newport Industrial Park - West, Unit 1 delinates the location and extent of the transition structures;

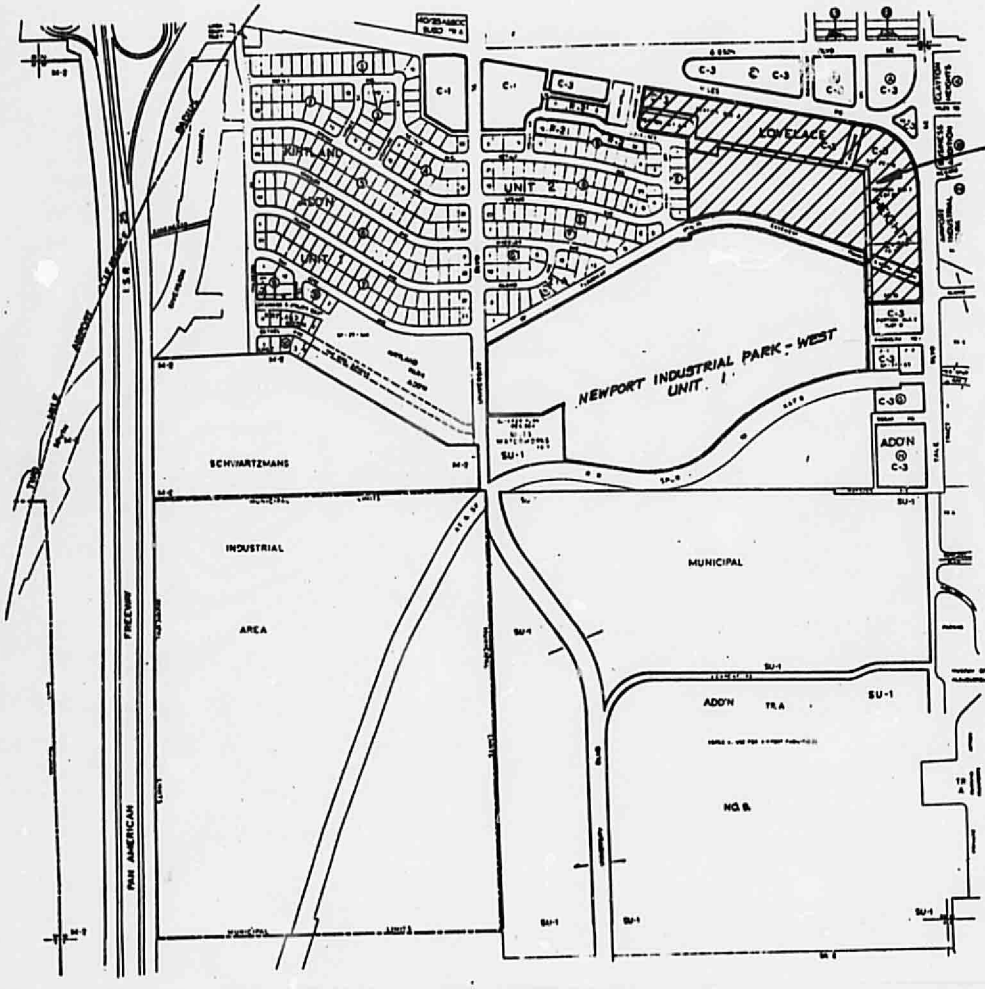
4. Inlets to the concrete-lined channel shall be constructed as required to allow for onsite flows, as shown

on Map No. 3, to enter the channel. Channel inlets shall be designed to minimize disturbances in channel flow.

C. ONSITE DRAINAGE CONTROL

Control of onsite drainage during the actual development of all portions of the Newport Industrial Park - West, Unit 2, shall comply with all applicable City of Albuquerque and Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) ordinances and resolutions.

The Grading Plan of the subdivision site shall provide for control and conveyance of storm waters to the 60'-wide Floodway and Utility Easement at locations shown on Map No. 3.



NEWPORT INDUSTRIAL PARK - WEST UNIT 2 DRAINAGE ANALYSIS

LOCATION MAP

M-15-Z

MAP No. 1

IV

DRAINAGE ANALYSIS

Following is the Drainage Analysis (computations) for determining the storm water runoff from the drainage areas affecting the subject subdivision, both in the existing and developed conditions.

For computations of runoff flows shown on Map No. 2 and Map No. 3 entering the 60'-wide Floodway and Utility Easement from the South and East, the reader of this report is referred to the Drainage Report for Newport Industrial Park - West, Unit 1, on file at the City Engineer's Office.

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Project N.I.P. - West Unit 2 Sheet 1 of 9
Drainage Analysis Job No. 129
By DF Chk'd JA Date 2-8-79

Drainage Analysis

Criteria

Design Storm - 100 year frequency
AMAFCA Drainage Resolution 1972-2
City of Albuquerque - Drainage Ordinance

Reference Material

1. Albuquerque Area (1961) Intensity - Duration - Frequency Curves.
2. 100 year - 6 hour precipitation, Rainfall Frequency Map, U.S. Weather Bureau.
3. Time of Concentration nomograph, p. 2, Kirpich

Design Parameters

Peak runoff rate - Rational Formula, $Q = cIA$

Runoff Volume = V = Runoff coefficient × Rainfall × Area

Runoff Coefficients
Existing Ground Surface = 0.40
Developed Surfaces = 0.65
Note: Where undeveloped & developed surfaces comprise one drainage area, a combined runoff factor was determined.

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Project N.I.P. - West, Unit 2 Sheet 2 of 9
Drainage Analysis Job No. 129
By RSF Chk'd JA Date 2-8-79

Existing Conditions

(Refer to Map No. 2 for Drainage Areas)

Drainage Area C-2 (Onsite)

A = 1.5 ac
H = 5208 - 5170 = 38 ft
L = 420 ft
C = 0.40
TC = 2.1 min. < 10 ∴ use 10 mins
I = 5.4 in/hr

Q = CIA = 0.40 × 5.4 × 1.5 = 3.2 cfs

$V = 0.4 \times 2.4'' \times 1.5 \times \frac{43560}{12} = 5227 \text{ ft}^3$

Drainage Area E-1 (Offsite)

A = 2.5 ac
H = 5208 - 5167 = 41 ft.
L = 1860 ft
C = 0.90
TC = 4.4 mins < 10 ∴ use 10 mins
I = 5.4 in/hr.

Q = CIA = 0.9 × 5.4 × 2.5 = 12.1 cfs

Drainage Area E-2 (Onsite)

A = 21.8 ac.
H = 5194 - 5136 = 58 ft
L = 1625 ft
C = 0.40
TC = 8.2 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr.

Q = CIA = 0.40 × 5.4 × 21.8 = 47.0 cfs

$V = 0.4 \times 2.4'' \times 21.8 \times \frac{43560}{12} = 75,968 \text{ ft}^3$

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Project M.R.P. West, Unit 2 Sheet 3 of 9
Drainage Analysis Job No. 127
By BF Chk'd JA Date 2-9-79

Drainage Areas E-1 & E-2 (Combined Flow)

A = 2.5 + 21.8 = 24.3 AC
H = 5208 - 5136 = 72 FT
L = 2610 FT
C = 0.45
TC = 8 MINS < 10 ∴ USE 10 MINS.

Q = CIA = 0.45 × 5.4 × 24.3 = 59.1 CFS

Drainage Area G (Onsite)

A = 2.5 AC
H = 5160 - 5136 = 24 FT
L = 330 FT
C = 0.40
TC = 1.9 MINS < 10 ∴ USE 10 MINS.
I = 5.4 in/hr.

Q = CIA = 0.40 × 5.4 × 2.5 = 5.4 CFS

$V = 0.4 \times 24'' \times 2.5 \times \frac{43560}{12} = 8712 \text{ FT}^3$

Summary of Onsite Drainage Areas

	Q (CFS)	V (FT³)
Drainage Area C-2	3.2	5227
Drainage Area E-2	47.0	75968
Drainage Area G	5.4	8712
TOTAL	55.6 CFS	89907 FT³

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Project N.I.R.
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(REFER TO MAP
DRAINAGE AR

DRAINAGE AREA E-1

A = 0.37 AC
H = 5208-5196 = 12 FT
L = 740 FT
C = 0.90
TC = 2.6 MINS < 10 :
I = 5.4 IN/HR.

Q = CIA = 0.90 ×

DRAINAGE AREA E-

A = 1.6 AC.
H = 5196 - 5173 =
L = 670 FT.
C = 0.40
TC = 4.2 MINS < 10 :
I = 5.4 IN/HR

Q = CIA = 0.40

V = 0.4 × 2.4" ×

DRAINAGE AREAS E

A = 2.57 AC.
H = 5208-5173 = 3
L = 1410 FT
C = 0.59
TC = 6.8 MINS < 10
I = 5.4 IN/HR.

Q = CIA = 0.59

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Project N.I.R.-West, Unit 2 Sheet 5 of 7
Drainage Analysis Job No. 129
By RSF Chk'd JA Date 2-9-79

Drainage Area E-2-2 (Onsite)

A = 9.1 ac.
H = 5196 - 5158 = 38 ft.
L = 740
C = 0.40
TC = 4.1 mins < 10 ∴ use 10 mins
I = 5.4 in/hr.

Q = CIA = 0.4 × 5.4 × 9.1 = 19.7 cfs

V = 0.4 × 2.4" × 9.1 × 43560/12 = 31712 ft³

Drainage Areas E-1-1, E-2-1 & E-2-2 (Combined Flow)

A = 11.67 ac.
H = 5196 - 5158 = 38 ft
L = 1780 ft
C = 0.45
TC = 8.8 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr

Q = CIA = 5.4 × 0.45 × 11.67 = 28.4 cfs

Drainage Area E-1-2 (Offsite)

A = 1.6 ac
H = 5196 - 5168 = 28 ft
L = 1090 ft
C = 0.90
TC = 2.6 mins < 10 ∴ use 10 mins
I = 5.4 in/hr

Q = CIA = 0.9 × 5.4 × 1.6 = 7.8 cfs

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Project N.I.R. West Unit 2 Sheet 6 of 9
Drainage Analysis Job No. 129
By RSE Chk'd JA Date 2-9-79

Drainage Area E-2-3 (Onsite)

A = 5.5 ac.
H = 5196 - 5156 = 40 ft
L = 920 ft
C = 0.40
TC = 5.0 mins < 10 ∴ use 10 mins
I = 5.4 in/hr.

Q = CIA = 0.40 × 5.4 × 5.5 = 11.9 cfs

V = 0.4 × 2.4" × 5.5 × $\frac{43560}{12}$ = 19166 ft³

Drainage Areas E-1-2 & E-2-3 (Combined Flow)

A = 7.1 ac.
H = 5196 - 5156 = 40 ft
L = 1540 ft
C = 0.51
TC = 5.3 mins < 10 ∴ use 10 mins
I = 5.4 in/hr.

Q = CIA = 0.51 × 5.4 × 7.1 = 19.7 cfs

Drainage Area E-2-4 (Onsite)

A = 1.9 ac.
H = 5174 - 5147 = 27 ft
L = 380 ft
C = 0.40
TC = 2.0 mins < 10 ∴ use 10 mins
I = 5.4 in/hr

Q = CIA = 0.40 × 5.4 × 1.9 = 4.1 cfs

V = 0.4 × 2.4" × 1.9 × $\frac{43560}{12}$ = 6621 ft³

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Project N.I.R. West, Unit 2 Sheet 7 of 9
Drainage Analysis Job No. 129
By RSF Chk'd JA Date 2-9-79

Drainage Areas E-1-2, E-2-3 & E-2-4 (Combined Flow)

A = 9.0 ac.
H = 5196 - 5147 = 49 ft
L = 1760
C = 0.49
TC = 6.9 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr

Q = CIA = 0.49 × 5A × 9.0 = 23.8 cfs

Drainage Area E-2-5 (Onsite)

A = 6.0 ac.
H = 5186 - 5136 = 50 ft
L = 880 ft
C = 0.40
TC = 5.4 mins. < 10 ∴ use 10 mins
I = 5.4 in/hr.

Q = CIA = 0.4 × 5.4 × 6.0 = 13.0 cfs

$V = 0.4 \times 2.4'' \times 6.0 \times \frac{43560}{12} = 20909\ ft^3$

Drainage Areas E-1-2, E-2-3, E-2-4 & E-2-5 (Combined Flow)

A = 15.0 ac.
H = 5196 - 5136 = 40 ft
L = 2160 ft
C = 0.45
TC = 8.6 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr.

Q = CIA = 0.45 × 5.4 × 15.0 = 36.5 cfs

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Project N.I.P. - West, Unit 2 Sheet 8 of 9
Drainage Analysis Job No. 127
By RSE Chk'd JA Date 8-9-79

Drainage Area G (Onsite)

A = 1.8 Ac
H = 5156 - 5136 = 20 FT
L = 370 FT
C = 0.40
TC = 2.2 mins < 10 ∴ use 10 mins
I = 5.4 in/hr.

$Q = CIA = 0.4 \times 5.4 \times 1.8 = 3.9$ cfs

$V = 0.40 \times 2.4'' \times 1.8 \times \frac{43560}{12} = 627.2$ FPS

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Project N.I.P.-West, Unit 2 Sheet 9 of 9
DRAINAGE ANALYSIS Job No. 129
By RSF Chk'd JA Date 2-9-79

SUMMARY OF ONSITE DRAINAGE AREAS

	Q (cfs)	V (ft³)
DRAINAGE AREA E-2-1	3.5	5576
" " E-2-2	19.7	31712
" " E-2-3	11.9	19166
" " E-2-4	4.1	6621
" " E-2-5	13.0	20909
DRAINAGE AREA G	3.9	6272
TOTAL	56.1	90256

NOTE: REFER TO NEWPORT INDUSTRIAL PARK-WEST, UNIT 1 DRAINAGE REPORT FOR FLOWS AND PROPOSED IMPROVEMENTS IN 60' DRAINAGE AND UTILITY EASEMENT AS WELL AS FLOWS ENTERING SAID EASEMENT FROM THE SOUTH & EAST.



