

FILE COPY



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION  
123 Central NW, Albuquerque, NM 87102  
(505) 766-7644

September 12, 1986

John A. Andrews, P.E.  
Andrews, Asbury & Robert, Inc.  
149 Jackson, NE  
Albuquerque, New Mexico 87108

RE: DRAINAGE PLAN SUBMITTAL OF KEEBLER/LEASE SPACE,  
MEMO RECEIVED SEPTEMBER 9, 1986 FOR BUILDING PERMIT APPROVAL  
(F-16/D3D)

Dear John:

The above referenced submittal, drawings dated July 1, 1986, is approved for Building Permit sign-off by Hydrology. Include these approved drawings with the construction sets routed for permit sign-off.

Also approved is the design for the private storm drain improvements within City Right-of-Way (SO #19) for the pond drain into the detention pond. The contractor must obtain a separate excavation/construction permit with this approved design from the Construction Division.

If you have any questions, call me at 766-7644.

Cordially,

Roger A. Green, P.E.  
C.E./Hydrology Section

RAG/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

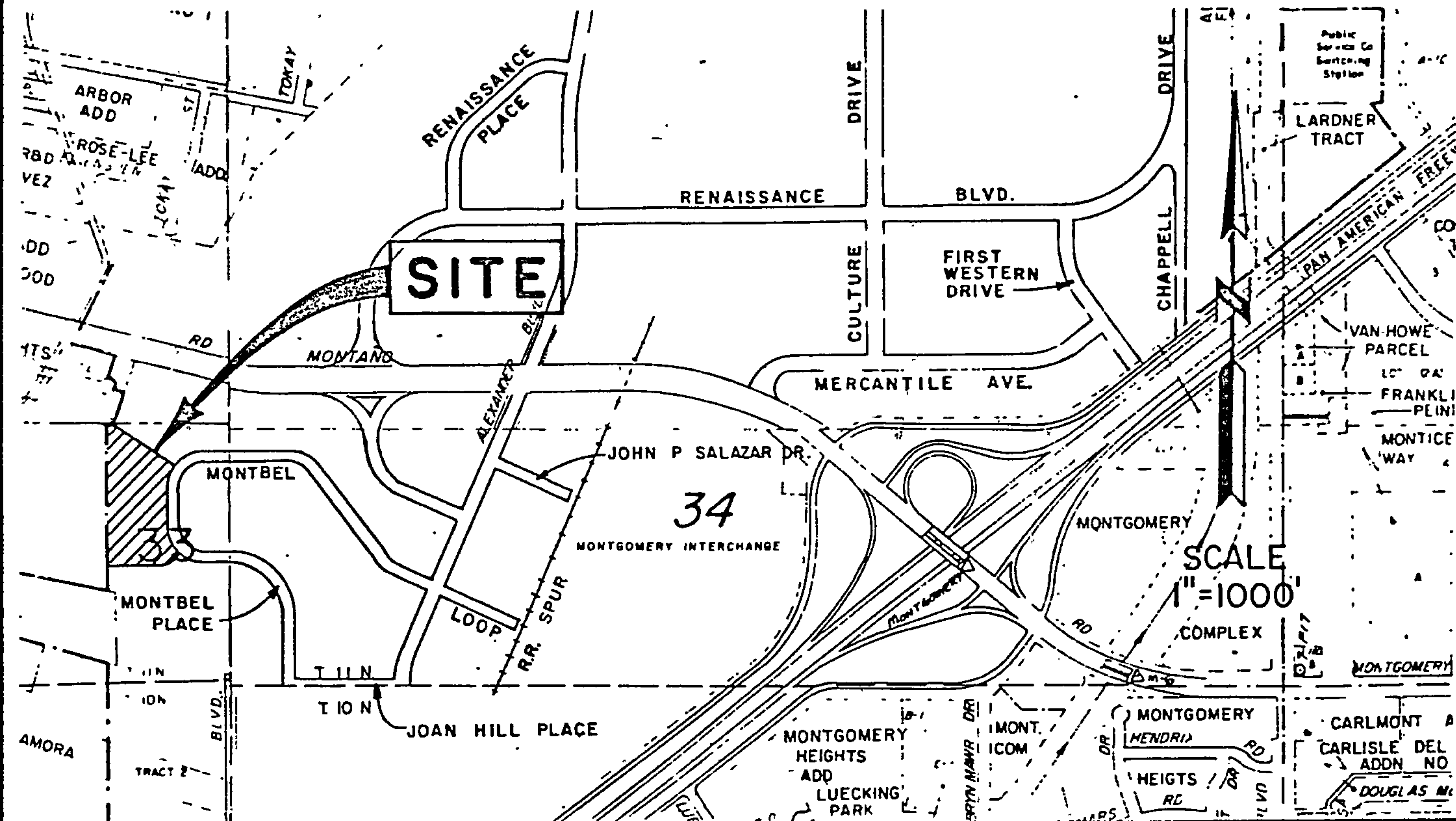
ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

# CITY OF ALBUQUERQUE

## DRAINAGE FACILITIES WITHIN CITY RIGHT OF WAY



ZONE ATLAS MAP F-15

### VICINITY MAP

#### DESCRIPTION OF WORK

STORM DRAIN PIPE & HEADWALL

#### LEGAL DESCRIPTION

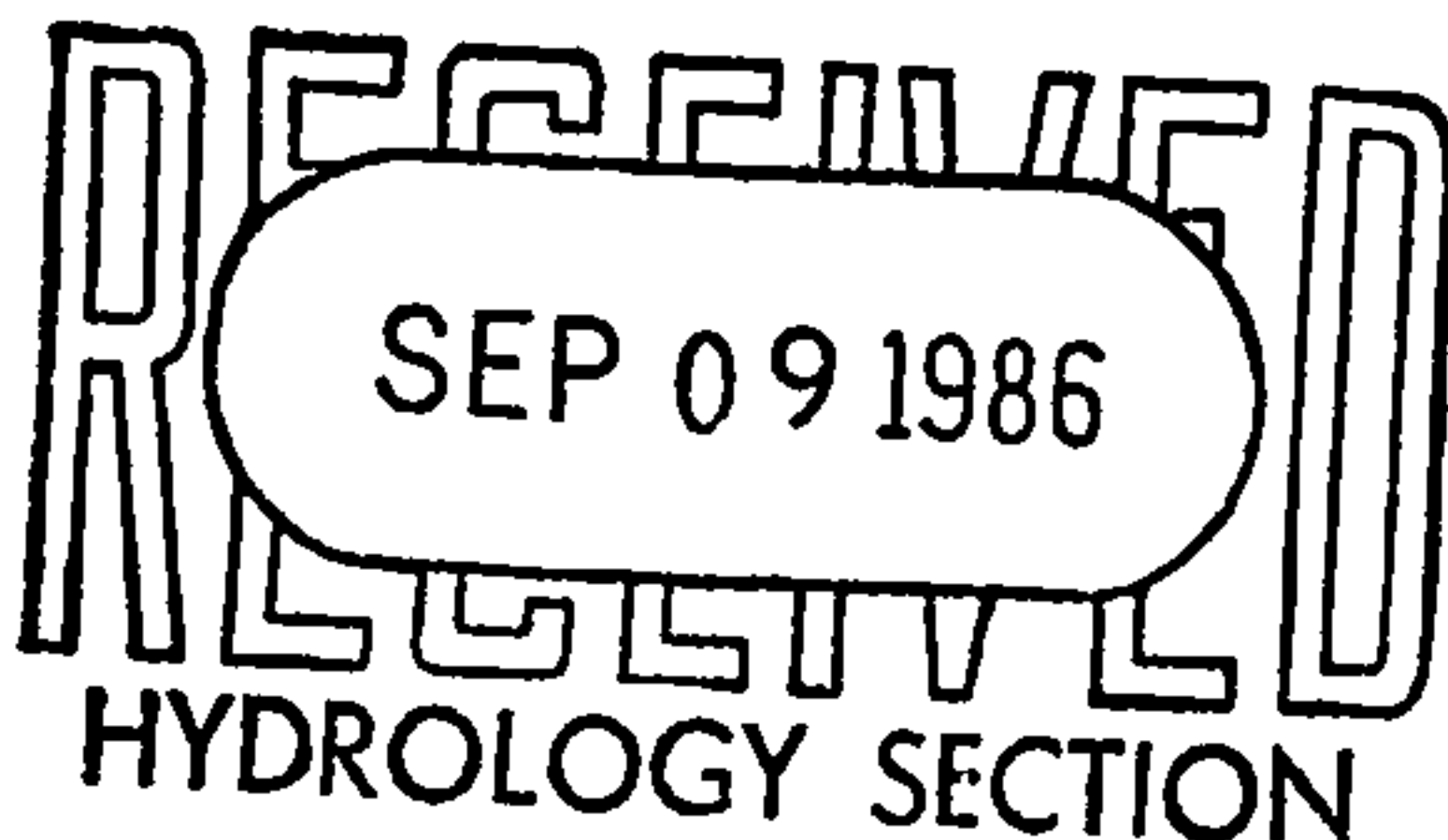
TRACT 16 OF RENAISSANCE CENTER II  
(FILED MAY 30, 1985)

#### BENCH MARK

ACS STA. 2-F16 - STANDARD ACS BRASS TABLET ON TOP OF CONCRETE  
POST PROJECTING 0.2 FT. ABOVE GROUND AND LOCATED 0.4 MILES  
WEST OF I-25 IN THE MEDIAN OF MONTANO ROAD, N.E. - ELEV. = 5062.08

#### 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 THE CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985 EDITION.
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 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D-1557.
6. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.

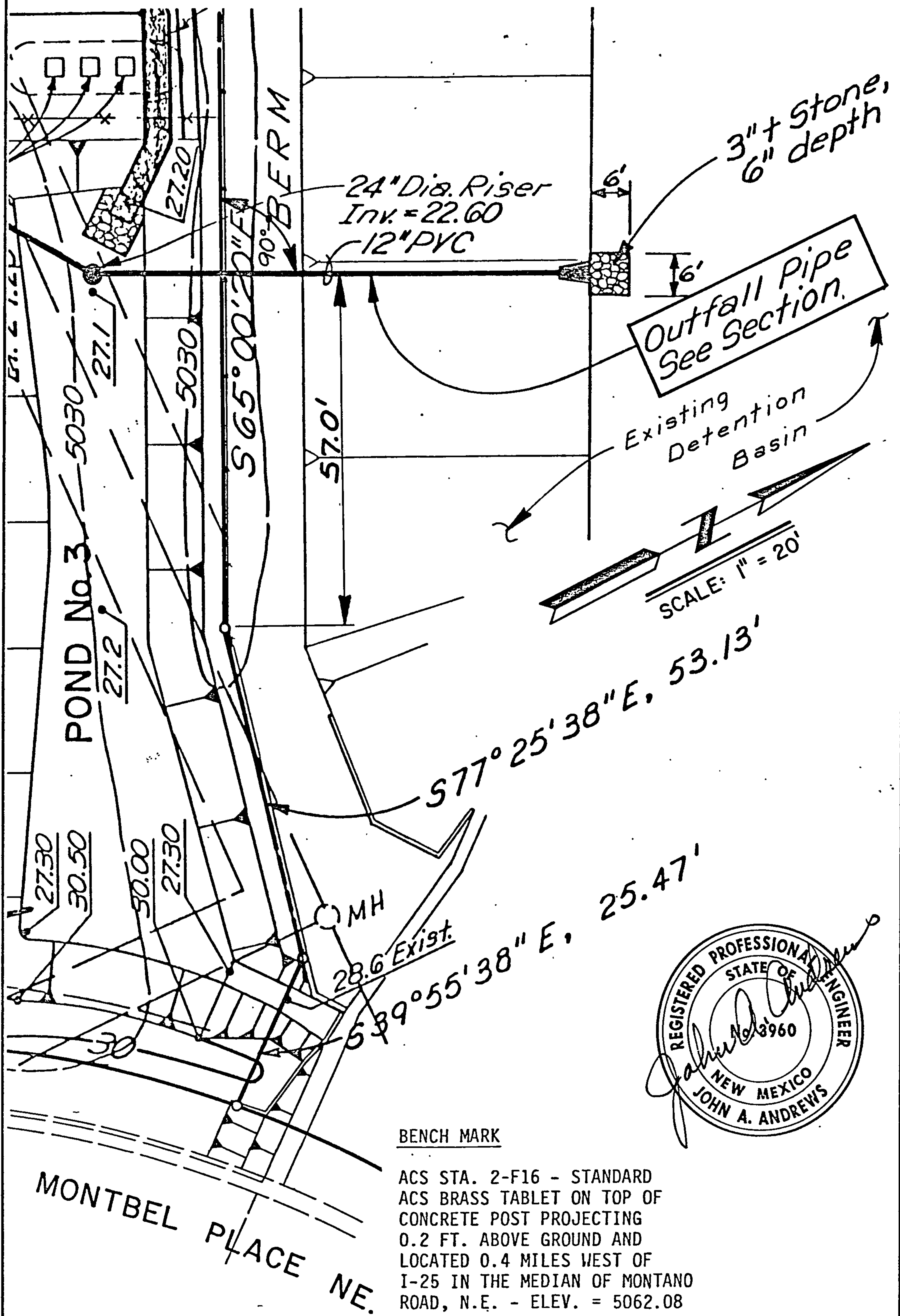


APPROVALS	ENGINEER	DATE	TITLE:	
A.C.E./DESIGN	<i>Roger A. Green, Jr.</i>	9/9/86	STORM DRAIN PIPE & HEADWALL	
INSPECTOR			KEEBLER/LEASE SPACE	
A.C.E./FIELD			4611 MONTBEL PLACE NE.	
			SHEET 1 OF 3	MAP NO. F-15



# CITY OF ALBUQUERQUE

## DRAINAGE FACILITIES WITHIN CITY RIGHT OF WAY



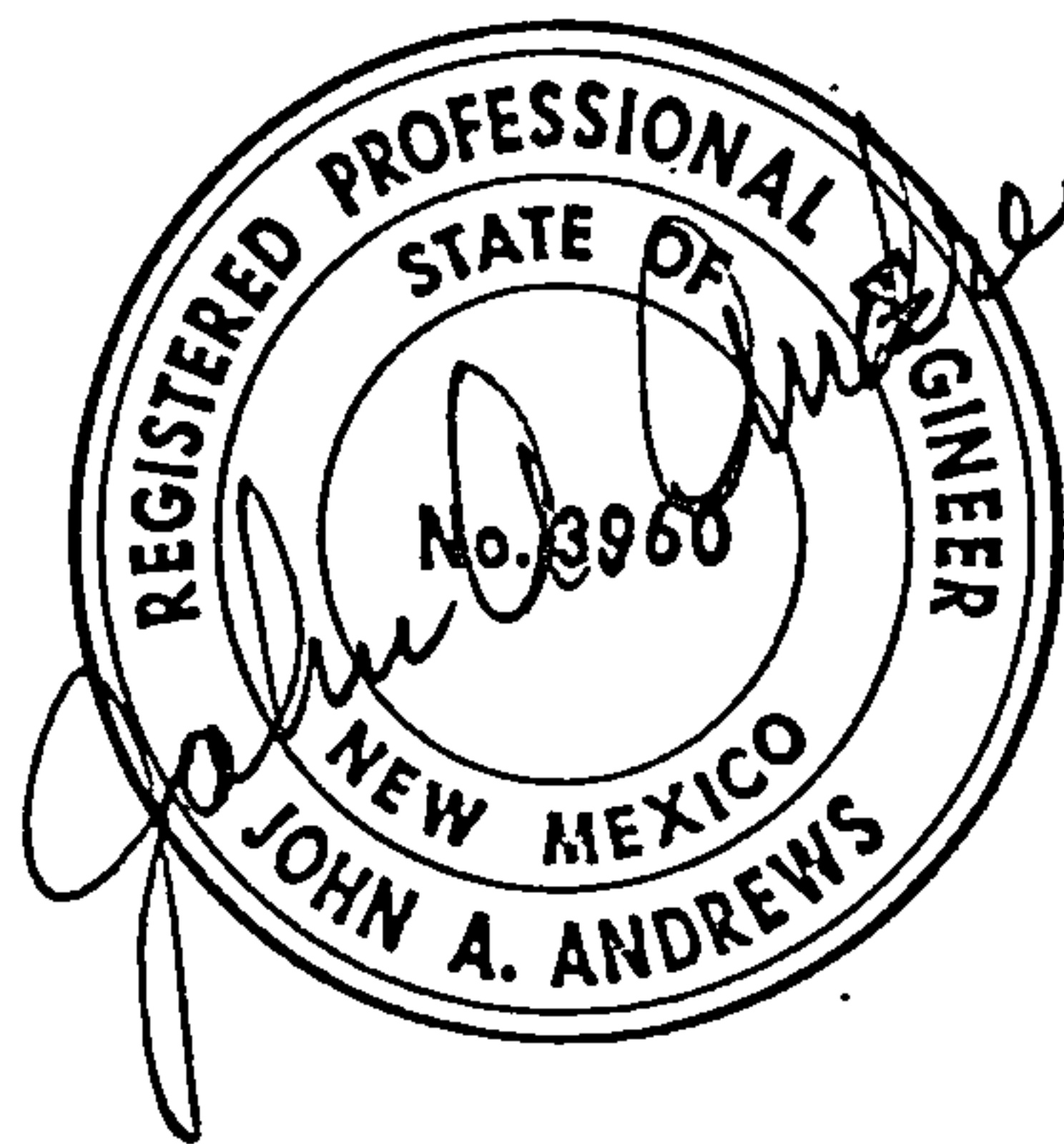
APPROVALS	ENGINEER	DATE	TITLE: STORM DRAIN PIPE & HEADWALL KEEBLER / LEASE SPACE 4611 MONTBEL PLACE NE.	
A.C.E./DESIGN			SHEET <b>2</b> OF <b>3</b>	MAP NO. F-15
INSPECTOR				
A.C.E./FIELD				

## DRAINAGE FACILITIES WITHIN CITY RIGHT OF WAY



# CONCRETE HEADWALL

SCALE: 3/8"=1'-0"



APPROVALS	ENGINEER	DATE	TITLE: <b>STORM DRAIN PIPE &amp; HEADWALL</b> KEEBLER /LEASE SPACE 4611 MONTBEL PLACE NE.	
A.C.E./DESIGN				
INSPECTOR				
A.C.E./FIELD			SHEET <b>3</b> OF <b>3</b>	MAP NO. <b>F-15</b>

ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 1 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

REVISED

DRAINAGE ANALYSIS  
(REVISED JULY 6, 1987)

KEEBLER/LEASE SPACE  
4611 MONTBEL PLACE, NE

TRACT 16 - RENAISSANCE CENTER II  
ZONE ATLAS F-15



NOTE: DRAINAGE ANALYSIS REVISED TO PROVIDE FOR ADDITIONAL PARKING WEST  
SIDE OF KEEBLER BUILDING

DRAINAGE AREAS

OFFSITE - NONE

ONSITE - 4.2583 ACRES

PEAK RATE OF RUNOFF - DRAINAGE AREAS

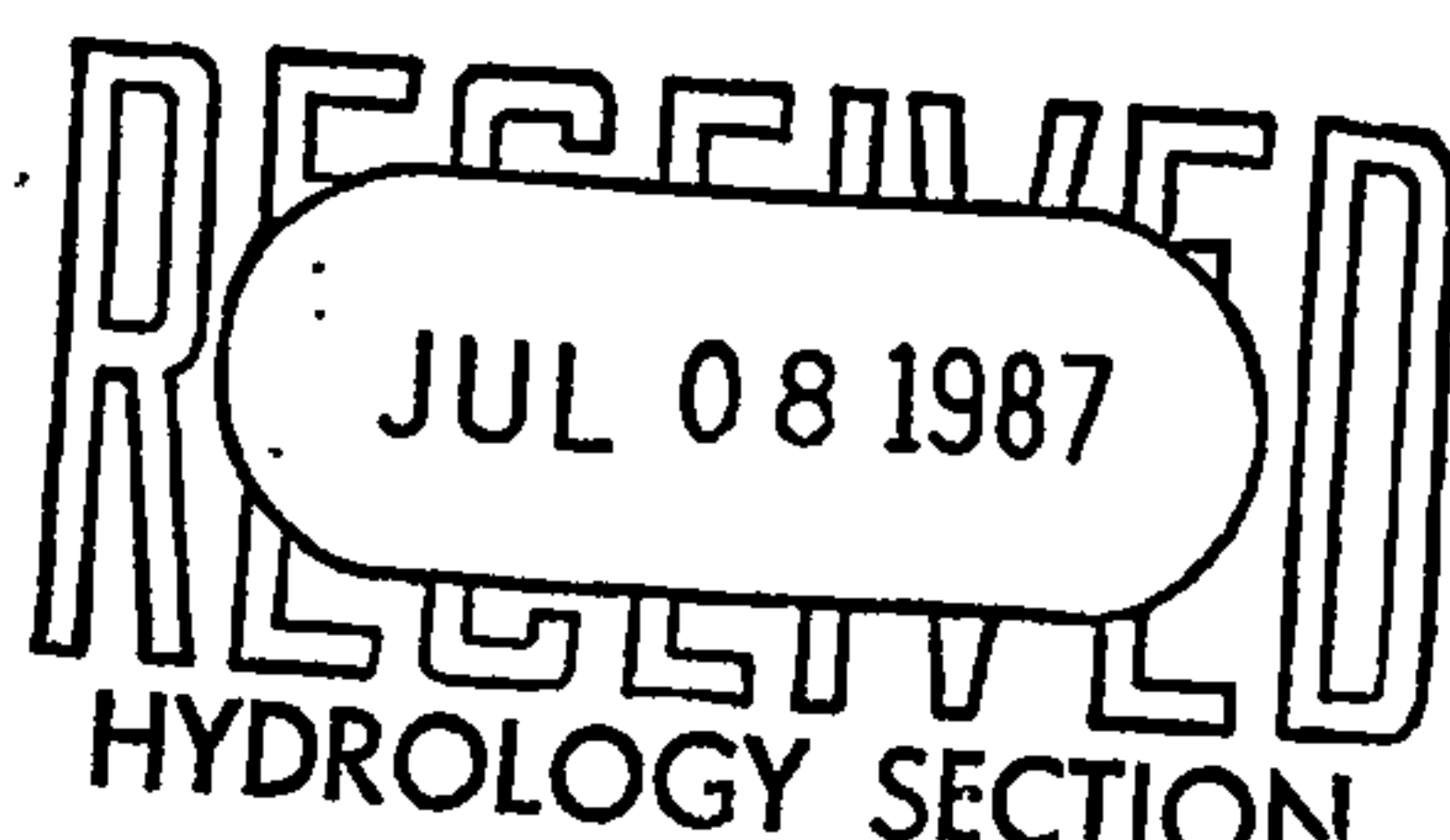
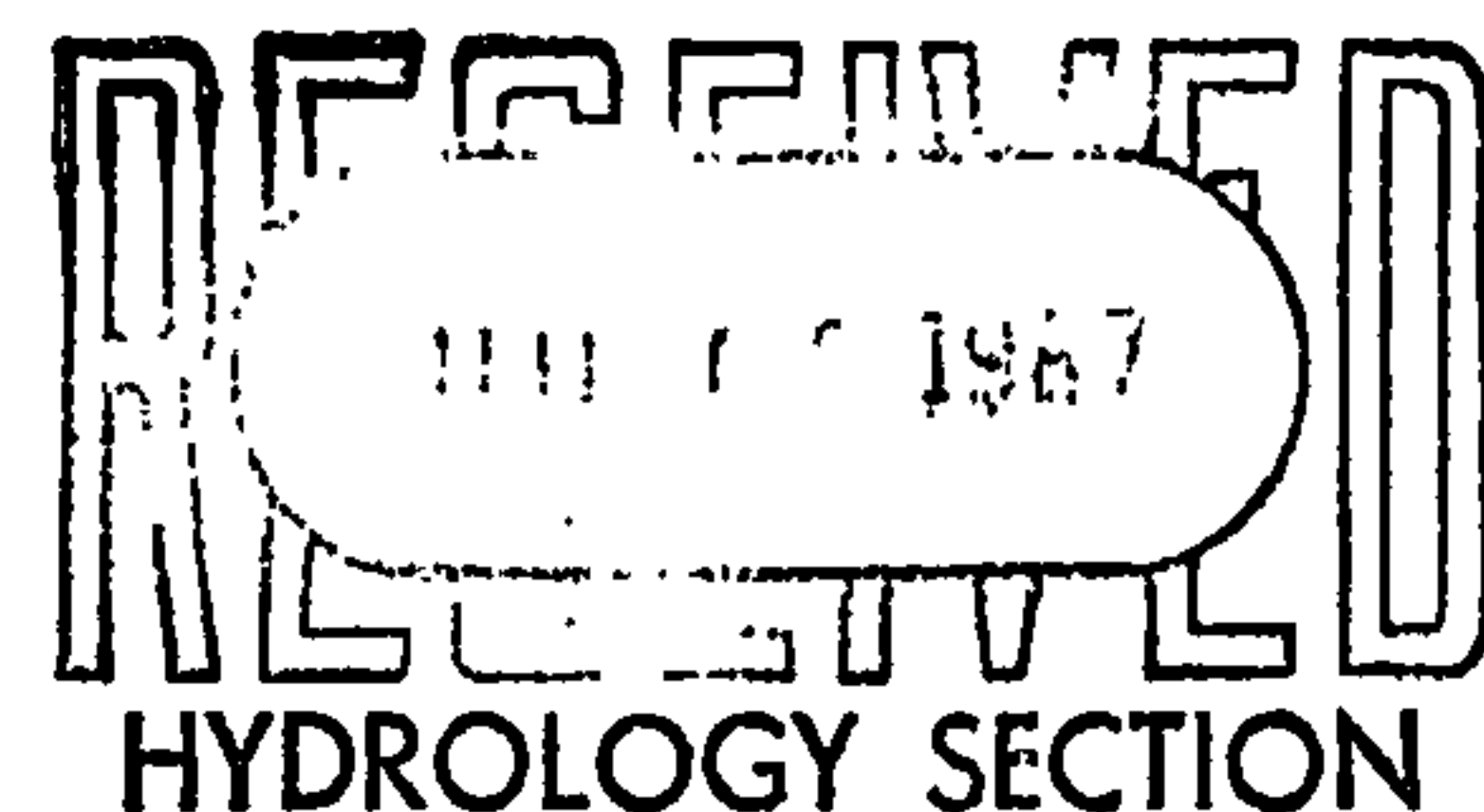
(SEE DRAINAGE PLAN FOR DRAINAGE AREA LOCATIONS AND  
DESIGNATIONS.)

RATIONAL FORMULA -  $Q = CIA$

RAINFALL INTENSITY -  $I_{100} = 4.65$  IN./HR.

RUNOFF COEFFICIENT - DETERMINED FROM EMERGENCY RULE DATED  
1-14-86

	<u>ACRES</u>	<u>AREA ACRES</u>	<u>"C" VALUE</u>	<u>Q<sub>100</sub> CFS</u>	<u>Q<sub>10</sub> CFS</u>
(REVISED)	A	0.4083	0.811	1.54	1.01
	B-1	1.3378	0.888	5.52	3.63
	B-2	0.8290	0.904	3.48	2.28
	C	0.8337	0.690	2.67	1.75
	D	0.3233	0.762	1.15	0.76
	E	0.0860	0.825	0.33	0.22
	F	0.3470	0.682	1.10	0.72
	G	0.0932	0.846	0.37	0.24





ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 2 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

ONSITE HYDRAULICS

REVISED

(REVISED)

CURB INLETS - DRAINAGE AREAS B-1 & B-2

TOTAL AREA =  $1.3378 + 0.8290 = 2.1668$  ACRES

COMBINED "C" = 0.894

$Q = CIA = (0.894)(4.65)(2.1668) = 9.0$  CFS

THEREFORE INLETS SHALL COLLECT 9.0 CFS

USE 1 - CITY STANDARD SINGLE "C" CURB INLET,  
CAPACITY = 15 CFS+ WITH WATER LEVEL AT TOP OF CURB  
(INLET IS AT LOW POINT)

(REVISED)

POND NO. 4 - (60" RCP) - OVERFLOW

TOTAL VOLUME OF POND (60" RCP) AT OVERFLOW IS 6,519 CU. FT.

TOTAL VOLUME OF RUNOFF FROM AREA B-2 IS:

$VOLUME = 2.2/12 \times 0.904 \times 0.8290 \times 43,560 = 5,985$  CU. FT.

THIS RUNOFF VOLUME IS LESS THAN THE TOTAL VOLUME OF POND  
NO. 4 (60" RCP); THEREFORE, A SAFETY FACTOR WILL RESULT IF  
THE OVERFLOW FROM POND NO. 4 (60" RCP) IS DESIGNED FOR THE  
RATE OF RUNOFF FROM AREA B-1 = 5.52 CFS.

OVERFLOW IS 12" PVC VERTICAL PIPE INSIDE TEE MANHOLE AT  
DOWNSTREAM END OF 60" RCP.

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

SHARP CRESTED WEIR -  $C = 3.0$

$L =$  CIRCUMFERENCE OF 12" PIPE = 3.14 FT.

USE -  $H = 1.0$  FT.

$Q = (3.0)(3.14)(1.0) = 9.14$  CFS > 5.52 CFS - OK

12" PVC PIPE CAPACITY

TOP OF OVERFLOW AT END OF 60" RCP = 27.20

CENTERLINE ELEV. - 12" PVC PIPE

AT MANHOLE NO. 1 =

DIFF.  $\frac{20.30}{6.90}$  FT.

LENGTH OF 12" PVC PIPE = 236 FT.

SLOPE (S) =  $6.90/236 = 0.0292$  FT./FT.

$Q = 0.785 \times 1.486/0.013 (0.25)^{2/3} (0.0292)^{1/2}$

$Q = 6.08$  CFS > 5.52 CFS - OK

ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 3 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

REVISED

(UNCHANGED) RUNDOWN "B" - DRAINAGE AREA "C"

$$Q = 2.67 \text{ CFS}; C = 3.0; L = 3.0 \text{ FT.}$$

$$H = (Q/CL)^{2/3} = [2.67/(3.0 \times 3.0)]^{2/3} = 0.44 \text{ FT.}$$

USE ENTRANCE OF 3.0 FEET WIDE AND 0.50 FEET DEPTH.

(UNCHANGED) POND NO. 3 OVERFLOW

A 5 FEET WIDE BY 10 INCH DEEP CONCRETE CHANNEL EXISTS AT THE NORTHEAST CORNER OF POND NO. 3.

DRAINAGE AREA "C",  $Q = 2.67 \text{ CFS}$

$$H = CLH^{3/2} = [2.67/(3.0 \times 5.0)]^{2/3} = 0.31$$

$$H = 0.31 < 0.83 - \text{OK}$$

ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 4 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

REVISED

DRAINAGE VOLUME ANALYSIS

CRITERIA

VOLUME OF FREE RUNOFF FROM SITE IS BASED ON A RUNOFF  
COEFFICIENT ("C") = 0.40.

DETAIN INCREASED RUNOFF CAUSED BY DEVELOPMENT AND RELEASE  
AT MAXIMUM OF 0.10 CFS/ACRE.

100 YEAR 6-HOUR RAINFALL = 2.2" FROM PLATE 22.2 D-1 OF DPM.

VOLUME OF RUNOFF

ONSITE DRAINAGE AREA = 4.2583 ACRES

COMPOSITE COEFFICIENT OF RUNOFF DEVELOPED

(REVISED)	PAVING AND WALKS	55.2% X 0.95 = 0.524
	ROOF AREAS	25.9% X 0.90 = 0.233
(REVISED)	UNDEVELOPED	3.7% X 0.40 = 0.015
	LANDSCAPED	15.2% X 0.25 = <u>0.038</u>

(REVISED) COMPOSITE "C" = 0.810

(REVISED) VOLUME OF RUNOFF DEVELOPED =  
 $4.2583 \times 0.81 \times 2.2/12 \times 43,560 = 27,545 \text{ CU. FT.}$

VOLUME OF RUNOFF ALLOWED - UNDEVELOPED  
 $4.2583 \times 0.40 \times 2.2/12 \times 43,560 = 13,602 \text{ CU. FT.}$

(REVISED) VOLUME OF DETENTION PONDING REQUIRED = 13,943 CU. FT.

DETENTION VOLUME PROVIDED

	VOLUME OF POND NO. 1	= 1,381 CU. FT.
	VOLUME OF POND NO. 2	= 1,597 CU. FT.
	VOLUME OF POND NO. 3	= 4,612 CU. FT.
(REVISED)	VOLUME OF POND NO. 4 (60" RCP)	= <u>6,519 CU. FT.</u>

(REVISED) TOTAL DETENTION VOLUME = 14,109 CU. FT.



ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 5 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

DETENTION POND RELEASE SYSTEM

REVISED

RELEASE RATE ALLOWABLE =  
 $4.2583 \times 0.10 \text{ CFS/ACRE} = 0.426 \text{ CFS}$

POND NO. 1, NO. 2 & NO. 3 CONNECTED  
RELEASE RATE FROM POND NO. 3 = 0.24 CFS

RELEASE RATE FROM POND NO. 4 (60" RCP) = 0.186 CFS

INSTALL RISER PIPE IN POND NO. 3 AND PROVIDE SLOTS IN RISER  
AS REQUIRED TO CONTROL RELEASE RATE.

USE ORIFICE FORMULA,  $Q = CA(2gH)^{1/2}$   
"C" = 0.6

MAXIMUM WATER SURFACE ELEV. = 28.60  
CENTERLINE OF SLOTS IN RISER PIPE ELEV. = 27.27  
HEAD ("H") = 1.33 FT.

$0.240 = 0.6 \times A \times (2g \times 1.33)^{1/2}$

$A = 0.24/5.55 = 0.0432 \text{ SQ. FT.} = 6.23 \text{ SQ. IN.}$

USE 4 SLOTS 5/16" WIDE X 5.00" LONG;  
AREA = 6.25 SQ. IN.

SINCE POND NO. 1 AND POND NO. 2 ARE IN SERIES WITH POND NO. 3  
THE RELEASE RATE OF POND NO. 1 AND POND NO. 2 CAN BE THE  
SAME AS POND NO. 3.

INSTALL 4" STEEL PIPE BETWEEN POND NO. 1 AND POND NO. 2 -  
NO RISER REQUIRED.

FOR PIPE FLOW RATE USE MANNING'S FORMULA.

$Q = A \times 1.486/n(R)^{2/3} S^{1/2}$   
 $S = 0.018$   
 $n = 0.014$   
 $Q = 0.087 \times 1.486/0.14 \times 0.1907 \times 0.134$   
 $Q = 0.236 \text{ CFS} < 0.24 - \text{OK}$

INSTALL RISER PIPE IN POND NO. 2 AND PROVIDE SLOTS IN RISER.

MAXIMUM WATER SURFACE ELEV. = 30.70  
CENTERLINE OF SLOTS IN RISER PIPE ELEV. = 29.70  
HEAD ("H") = 1.00 FT.

$0.240 = 0.6 \times A \times (2g \times 1.00)^{1/2}$

$A = 0.24/4.81 = 0.0500 \text{ SQ. FT.} = 7.20 \text{ SQ. IN.}$

USE 4 SLOTS 3/8" WIDE X 4-3/4" LONG;  
AREA = 7.125 SQ. IN.

ANDREWS, ASBURY & ROBERT, INC.  
CONSULTING ENGINEERS  
149 Jackson, N.E., Albuquerque, N.M. 87108  
Telephone (505) 265-6631

Project KEEBLER/LEASE SPACE Sheet 6 of 6  
TRACT 16 RENAISSANCE CENTER II Job No. 457  
By J.A. ANDREWS Chk'd \_\_\_\_\_ Date 7/6/87

REVISED

(REVISED) POND NO. 4 (60" RCP)

INSTALL SLOTTED CAP ON 12" PVC PIPE AT END OF 60" RCP

MAXIMUM WATER SURFACE ELEV. = 27.20  
CENTERLINE OF SLOTS IN 12" CAP = 21.70  
HEAD ("H") = 5.50 FT.

$$0.186 = 0.6 \times A \times (2g \times 5.50)^{\frac{1}{2}}$$

$$A = 0.186/11.29 = 0.017 \text{ SQ. FT.} = 2.45 \text{ SQ. IN.}$$

PROVIDE 3/4" DIA. HOLE @ BOTTOM = 0.44 SQ. IN.

AND USE 2 SLOTS 5/16" WIDE X 3.2" LONG = 2.00 SQ. IN.

TOTAL 2.44 SQ. IN.