City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 6, 1999

Kim R. Kemper, PE
Kemper-Vaughan Cons. Engrs.
3700 Coors Rd. NW Ste C
Albuquerque, NM 87120

RE: GRADING & DRAINAGE PLAN FOR INS PARKING LOT (M-15/D34)
RECEIVED AUG 16, 1999 FOR PAVING PERMIT
ENGINEER'S STAMP DATED 8-13-99

Dear Mr. Kemper:

Based on the information included in the submittal referenced above, City Hydrology accepts the grading & drainage plan for paving permit. Ultimately the discharge from the railroad spur will be controlled by the capacity of the storm drain system in University Blvd.

Engineer's Certification of grading & drainage, per DPM checklist, must be submitted to City Hydrology when the paving is completed.

If I can be of further assistance, You may contact me at 768-2727.

Sincerely,

John P. Curtin, P.E.
Project Manager, PWD/Hyd

c: Inspector

DRAINAGE INFORMATION SHEET

PROJECT TITLE: I.N.S. PARKING LOT. ZONE ATLAS/DRNG. FILE #: M-15 / D034

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

LEGAL DESCRIPTION: NEWPORT INDUCTRIAL PARK WEST.

CITY ADDRESS: 1720 RANDOLPH ROAD.

ENGINEERING FIRM: KEMPER-VAUGHAN CONS. ENGRS. CONTACT: KIM R. KEMPER.

ADDRESS: 3700 COORS RD, NW SUITE C PHONE: 831-4520.

OWNER: (AGENT) CURA DEVELOPMENT CONTACT: Mr. MARK HAILEY.

ADDRESS: 8001 HORIZON BLVD. PHONE: 798-7180.

ARCHITECT: DWSC CONTACT BRIAN BUCKLEY.

ADDRESS: 4808 JEFFERSON. PHONE: 843-9639.

SURVEYOR: RIO GRANDE SURVEYING CO., INC. CONTACT: REX VOLGER.

ADDRESS: 3700 COORS RD NW SUITE C PHONE: 841-4511.

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_____DRAINAGE REPORT

__X__DRAINAGE PLAN

_____CONCEPTUAL GRADING & DRAINAGE PLAN

__X__GRADING PLAN

_____EROSION CONTROL PLAN

_____ENGINEER'S CERTIFICATION

_____OTHER_____

_____PRE-DESIGN MEETING

_____YES

__X__NO

_____COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____SKETCH PLAT APPROVAL

_____PRELIMINARY PLAT APPROVAL

_____ S. DEV. PLAN FOR SUB'D APPROVAL

_____S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

_____SECTOR PLAN APPROVAL

_____FINAL PLAT APPROVAL

_____FOUNDATION PERMIT APPROVAL

_____BUILDING PERMIT APPROVAL

_____CERTIFICATE OF OCCUPANCY APPROVAL

_____GRADING PERMIT APPROVAL

__X__PAVING PERMIT APPROVAL

_____S.A.D. DRAINAGE REPORT

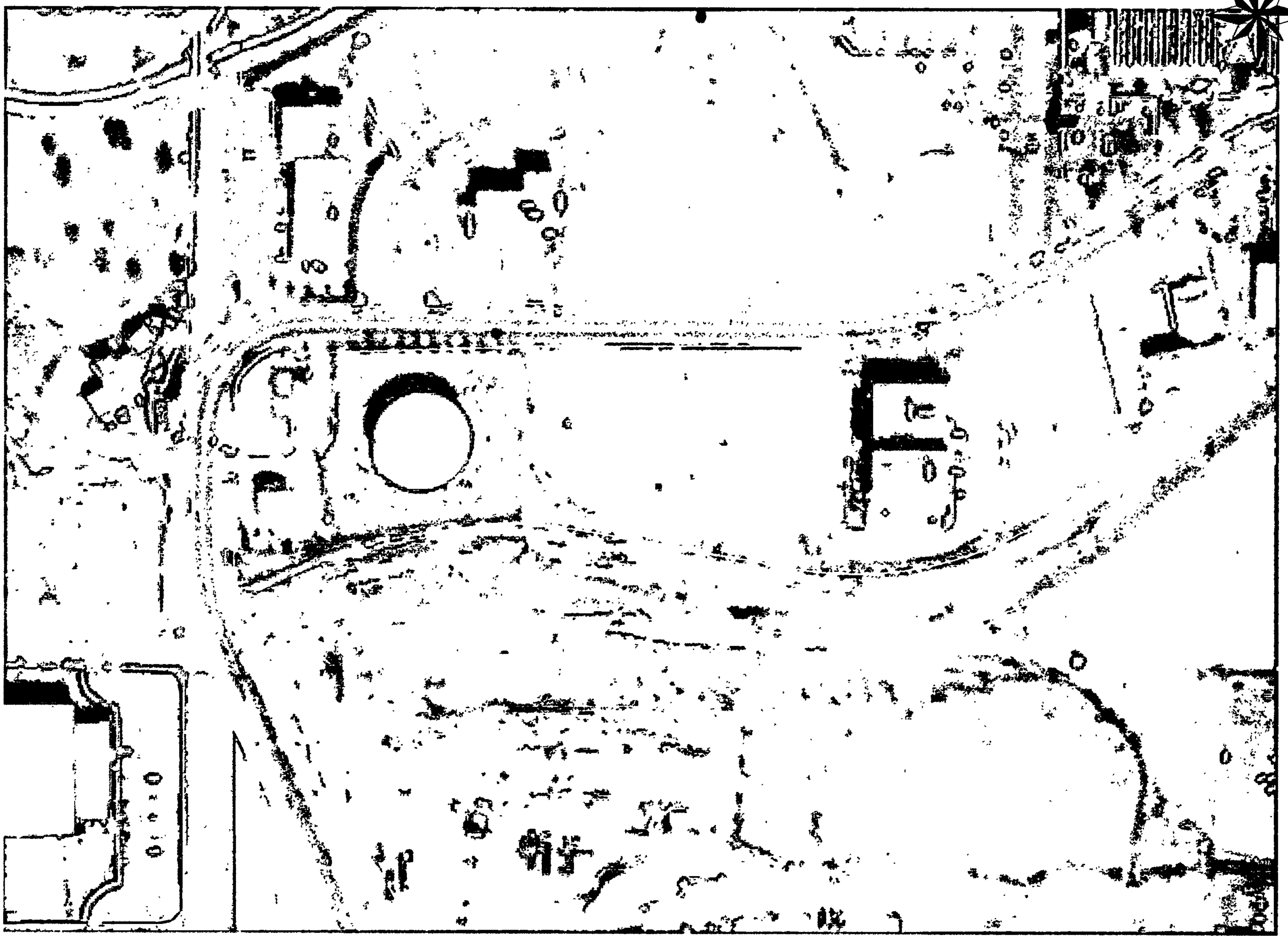
_____DRAINAGE REQUIREMENTS

_____OTHER_____(SPECIFY)

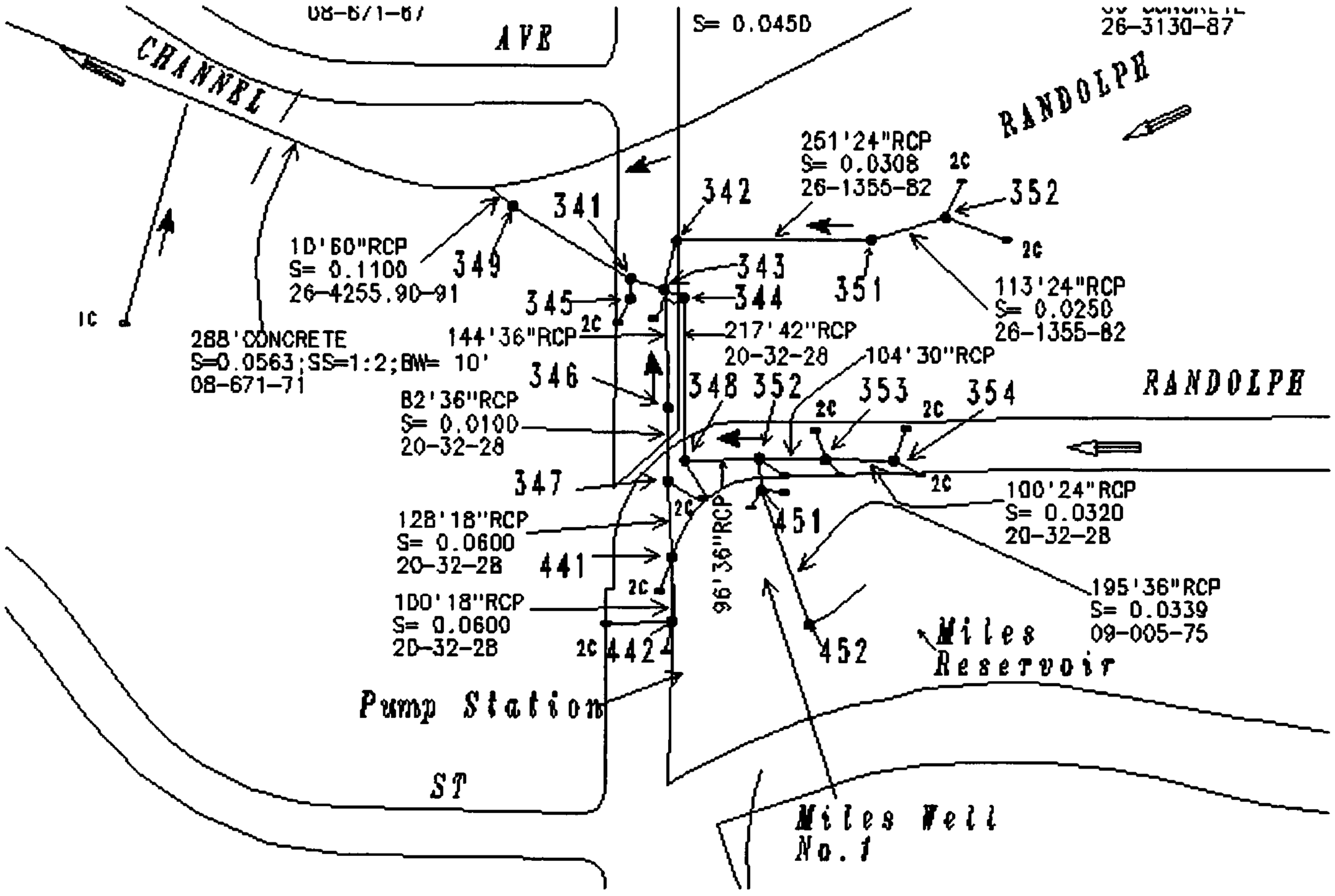
DATE SUMITTED: 8/13/99

BY: _____

RECEIVED
AUG 16 1999
HYDROLOGY SECTION



GIS PRODUCT REFERENCE: OPTIONS FOR ADDRESS 1730 RANDOLPH RD SE 10 06 99 PWHYD HYDRO #INAGRA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08-671-67
AVE
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CHANNEL
RANDOLPH
251'24"RCP
S= 0.0308
26-1355-82
2C
341
342
352
10'60"RCP
S= 0.1100
26-4255.90-91
349
343
344
345
351
113'24"RCP
S= 0.0250
26-1355-82
1C
288'CONCRETE
S=0.0563;SS=1:2;BW= 10'
08-671-71
144'36"RCP
217'42"RCP
20-32-28
104'30"RCP
346
348
352
353
354
RANDOLPH
82'36"RCP
S= 0.0100
20-32-28
347
100'24"RCP
S= 0.0320
20-32-28
128'18"RCP
S= 0.0600
20-32-28
441
96'36"RCP
451
195'36"RCP
S= 0.0339
09-005-75
100'18"RCP
S= 0.0600
20-32-28
442
452
Miles
Reservoir
Pump Station
ST
Miles Well
No.1

I.N.S. BUILDING - RANDOLPH ROAD

GRADING PLAN & DRAINAGE PLAN

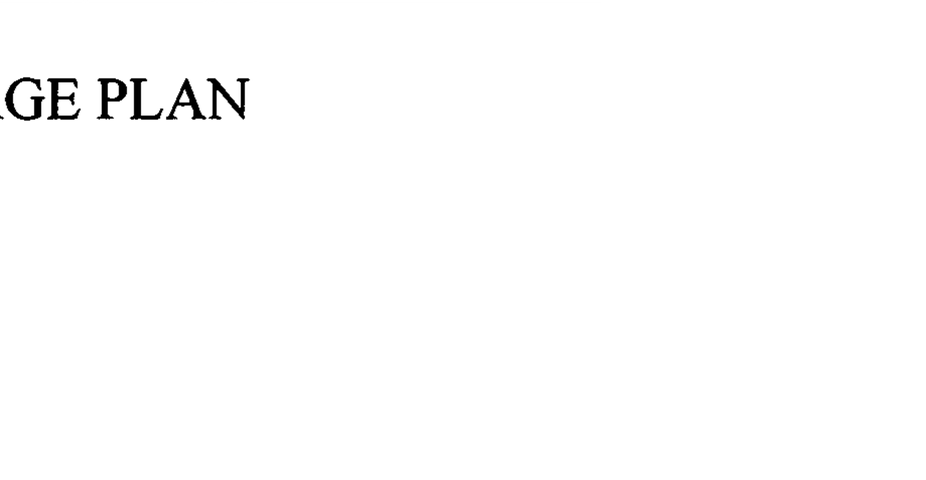
AUGUST 1999

Prepared for:

Cura Development Services, Inc.

8001 Horizon Blvd., N.E.

Albuquerque, New Mexico 87113

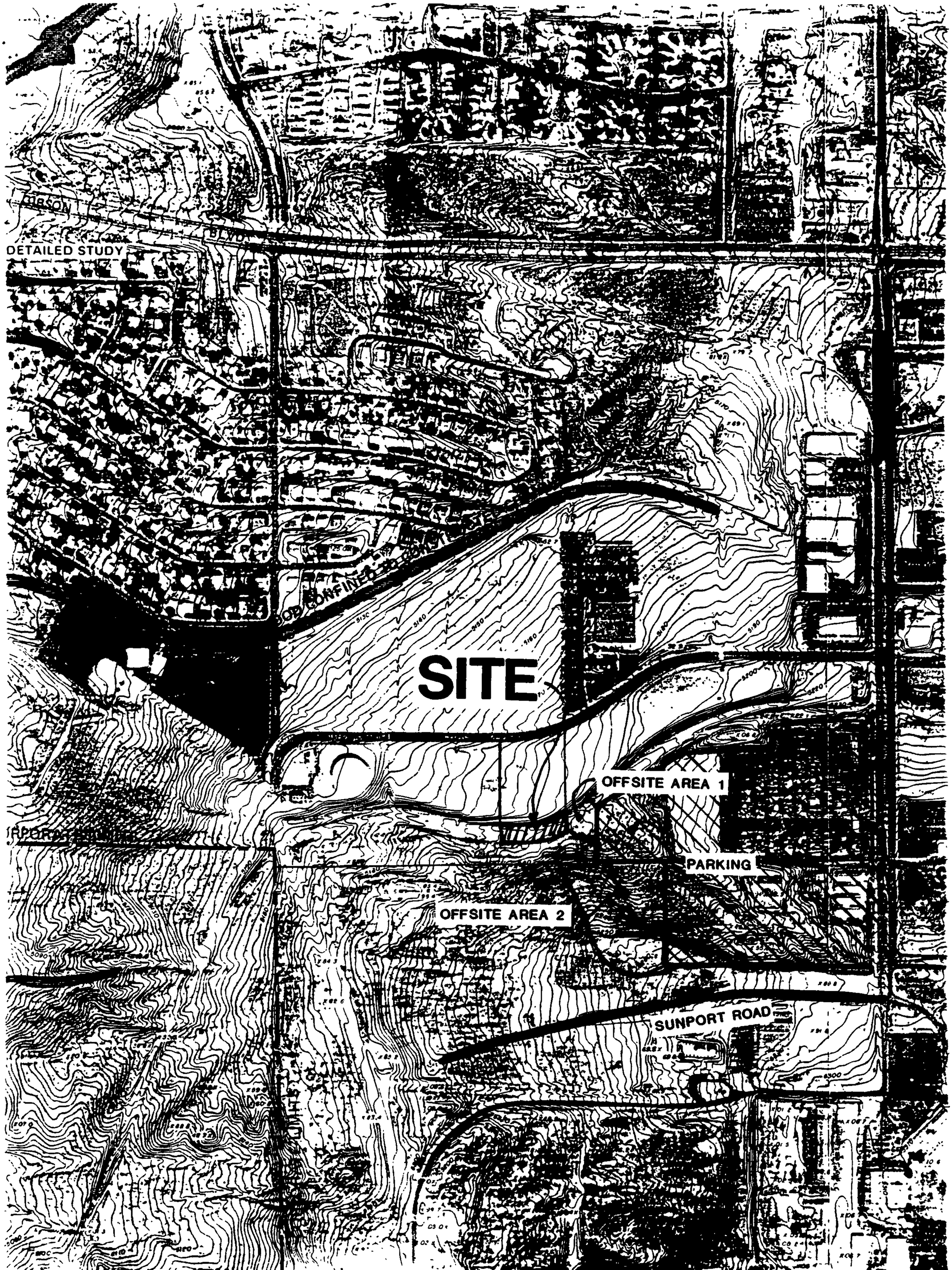


Prepared by:

KEMPER-VAUGHAN CONSULTING ENGINEERS

3700 Coors Road NW

Albuquerque, New Mexico 87120


DETAILED STUDY
SITE
OFFSITE AREA 1
PARKING
OFFSITE AREA 2
SUNPORT ROAD

DRAINAGE PLAN

The proposed project includes the construction of 64 in parking spaces for an existing building located at 1720 Randolph Road near the Albuquerque International Airport. Of the 64 new spaces, 50 are secured spaces for use by the facility user only (I.N.S.). The construction of this parking lot is part of a City of Albuquerque Economic Development initiative. The City of Albuquerque owns the property on which the new work will be completed. The property is remnants of an old railroad spur.

To accommodate the building user vehicular traffic, very minor modification of the existing site curbing was required. This revision is shown on the traffic circulation layout. This project has no impact on the drainage conditions surrounding the existing property. An approved grading and drainage plan for the existing facilities was prepared in January 1986.

The most current available contour information surrounding the property is the 1983 Flood Boundary Maps. Attached is a copy of this area with delineated data reflecting current conditions. Much of the upland area has been developed into parking lots for the Airport. Storm waters from these lots are carried to existing storm sewer which convey water to improvements shown on the plan immediately east of the subject parcel. This has significantly reduced the offsite flows to the new parking lot property. Two minor offsite areas have been identified on both the flood boundary may and the grading plan. Calculations determining peak rate of discharge and volumetric runoff for each of these areas are attached. Offsite area 1 as shown on the plan will be allowed to traverse the proposed parking lot. Offsite area 2 was slightly redirected to avoid the new improvements. This realignment will not affect the out fall location.

Other drainage improvements exist both east and west of the lot in the form of rundowns that convey waters to Randolph Road. The location of these rundowns is shown on the grading plan. This plan proposes to control all runoff within the parking lot itself. A detention pond, controlled out and overflow weir have been provided to emulate existing conditions and to reduce the erosion potential.

With the construction of the proposed improvements in accordance with the grading/construction plans and details included with this submittal, the following conditions will be provided.

Pond:

Controlled outlet elevation	=	5184.4
Overflow weir elevation	=	5186.0
Breach confined area at elevation	=	5186.4

Volume of storage provided at elevation 5186.0 = approx. 1,750 cf

Controlled Peak Discharge:

See the attached pipe culvert analysis.

Overflow Weir Discharge:

Note: the overflow weir is provided to avoid breach of pond should the orifice become clogged or should a storm event greater than the design event occur.

Weir flow rate by equation $Q = (C)(L)(H)^{1.5}$

Then, $Q = (3.32)(2.5\ ft.)(0.40)^{1.5}$

$Q = 2.10$ cfs

NEW PARKING LOT AREA = 0.45 ac.

DRAINAGE ZONE 2
PRECIPITATION:

360 =	2.35	in.
1140 =	2.75	in.
10day =	3.95	in.

	EXCESS PRECIPITATION:	PEAK DISCHARGE:	
TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:	AREA	PROPOSED CONDITIONS: AREA
TREATMENT A	0 ac.	0 ac.
TREATMENT B	0 ac.	0 ac.
TREATMENT C	0.45 ac.	0 ac.
TREATMENT D	0 ac.	0.45 ac.

EXISTING EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(0.45)+(2.12)x(0.00)/ 0.45 ac.
= 1.13 in.
V100-360 = (1.13)x(0.45)/ 12 = 0.042375 ac-ft = 1846 cf

EXISTING PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(0.45)+(4.70)x(0.00)= 1.41 cfs

PROPOSED EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(0.00)+(2.12)x(0.45)/ 0.45 ac.
= 2.12 in.
V100-360 = (2.12)x(0.45)/ 12.0 = 0.079500 ac-ft = 3463 cf

V100-1440 = (0.08)+(0.45)x(2.75 - 2.35)/ 12 = 0.094500 ac-ft = 4116 cf

V100-10day = (0.08)+(0.45)x(3.95 - 2.35)/ 12 = 0.139500 ac-ft = 6077 cf

PROPOSED PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(0.00)+(4.70)x(0.45)= 2.12 cfs

RESULTS

2.12	-	1.41	=	0.70 cfs Increase in peak discharge
3463	-	1846	=	1617 cf Increase in runoff volume

OFFSITE AREA 1 AREA = 0.2 ac.

DRAINAGE ZONE 2
PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

	EXCESS PRECIPITATION:	PEAK DISCHARGE:	
TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:	AREA	PROPOSED CONDITIONS: AREA
TREATMENT A	0 ac.	0 ac.
TREATMENT B	0 ac.	0 ac.
TREATMENT C	0.2 ac.	0.2 ac.
TREATMENT D	0 ac.	0 ac.

EXISTING EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(0.20)+(2.12)x(0.00)/ 0.20 ac.
= 1.13 in.
V100-360 = (1.13)x(0.20)/ 12 = 0.018833 ac-ft = 820 cf

EXISTING PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(0.20)+(4.70)x(0.00)= 0.63 cfs

PROPOSED EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(0.20)+(2.12)x(0.00)/ 0.20 ac.
= 1.13 in.
V100-360 = (1.13)x(0.20)/ 12.0 = 0.018833 ac-ft = 820 cf

V100-1440 = (0.02)+(0.00)x(2.75 - 2.35)/ 12 = 0.018833 ac-ft = 820 cf

V100-10day = (0.02)+(0.00)x(3.95 - 2.35)/ 12 = 0.018833 ac-ft = 820 cf

PROPOSED PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(0.20)+(4.70)x(0.00)= 0.63 cfs

RESULTS

0.63 - 0.63 = 0.00 cfs Increase in peak discharge
820 - 820 = 0 cf Increase in runoff volume

OFFSITE AREA 2 AREA = 3.5 ac.

DRAINAGE ZONE 2
PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

	EXCESS PRECIPITATION:	PEAK DISCHARGE:	
TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:	AREA	PROPOSED CONDITIONS: AREA
TREATMENT A	0 ac.	0 ac.
TREATMENT B	0 ac.	0 ac.
TREATMENT C	3.5 ac.	0.52 ac.
TREATMENT D	0 ac.	2.98 ac.

EXISTING EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(3.50)+(2.12)x(0.00)/ 3.50 ac.
= 1.13 in.
V100-360 = (1.13)x(3.50)/ 12 = 0.329583 ac-ft = 14357 cf

EXISTING PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(3.50)+(4.70)x(0.00)= 10.99 cfs

PROPOSED EXCESS PRECIPITATION:

Weighted E = (0.53)x(0.00)+(0.78)x(0.00)+(1.13)x(0.52)+(2.12)x(2.98)/ 3.50 ac.
= 1.97 in.
V100-360 = (1.97)x(3.50)/ 12.0 = 0.575433 ac-ft = 25066 cf
V100-1440 = (0.58)+(2.98)x(2.75 - 2.35)/ 12 = 0.674767 ac-ft = 29393 cf
V100-10day = (0.58)+(2.98)x(3.95 - 2.35)/ 12 = 0.972767 ac-ft = 42374 cf

PROPOSED PEAK DISCHARGE:

Q100 = (1.56)x(0.00)+(2.28)x(0.00)+(3.14)x(0.52)+(4.70)x(2.98)= 15.64 cfs

PROPOSED CONDITIONS SHOWN ASSUME A POTENTIAL FUTURE DEVELOPED CONDITION

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

August 13, 1999
RANDOLPH PARKING LOT
SOUTHERN OFFSITE SWALE
OFFSITE AREA 2

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PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Channel Bottom Slope (feet per foot)	0.0200
Manning`s Roughness Coefficient (n-value)	0.0300
Channel Side Slope - Left Side (horizontal/vertical)	3.00
Channel Side Slope - Right Side (horizontal/vertical)	6.00
Channel Bottom Width (feet)	1.0

==========

PROGRAM RESULTS:

Depth (ft)	Flow Rate (cfs)	Velocity (fps)	Froude Number	Velocity Head(ft)	Energy Head(ft)	Flow Area (sq ft)	Top Width (ft)
0.1	0.2	1.25	0.797	0.024	0.124	0.1	1.9
0.2	0.7	1.83	0.875	0.052	0.252	0.4	2.8
0.3	1.6	2.29	0.924	0.081	0.381	0.7	3.7
0.4	3.0	2.69	0.962	0.113	0.513	1.1	4.6
0.5	5.0	3.06	0.993	0.146	0.646	1.6	5.5
0.6	7.6	3.41	1.019	0.180	0.780	2.2	6.4
0.7	10.8	3.73	1.042	0.216	0.916	2.9	7.3
0.8	14.9	4.04	1.063	0.254	1.054	3.7	8.2
0.9	19.7	4.34	1.082	0.292	1.192	4.5	9.1

==========

TRAPEZOIDAL CHANNEL ANALYSIS COMPUTER PROGRAM, Version 1.3 (c) 1986 Dodson & Associates, Inc., 7015 W. Tidwell, #107, Houston, TX 77092 (713) 895-8322. A manual with equations & flow chart is available.

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

August 13, 1999
RANDOLPH PARKING LOT
CONTROLLED OUTLET FROM
DETENTION POND

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PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	1.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	3
Manning`s Roughness Coefficient (n-value)	0.0150
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	10.0
Culvert Slope (feet per foot)	0.0100

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.00	0.63	0.66	0.39	0.42	0.42	3.19
1.5	0.00	0.82	0.77	0.49	0.52	0.49	3.90
1.6	0.00	0.85	0.79	0.51	0.54	0.51	3.97
1.7	0.00	0.89	0.82	0.53	0.55	0.53	4.02
1.8	0.00	0.92	0.84	0.55	0.57	0.55	4.08
1.9	0.00	0.96	0.87	0.57	0.59	0.57	4.14
2.0	0.00	0.99	0.89	0.59	0.60	0.59	4.15
2.1	0.00	1.03	0.92	0.60	0.62	0.60	4.23
2.2	0.00	1.07	0.95	0.62	0.63	0.62	4.27

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