



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 19, 1995

Larry L. Parker
Galloway Romero & Associates
14202 E. Evans Ave.
Aurora, CO 80014

RE: DIAMOND SHAMROCK CORNER STORE (E17/D49). ENGINEER'S
CERTIFICATION FOR CERTIFICATE OF OCCUPANCY APPROVAL.
ENGINEER'S CERTIFICATION DATED DECEMBER 18, 1995.

Dear Mr. Parker:

Based on your submittal dated December 19, 1995, the above
referenced project is approved for Certificate of Occupancy.

If I can be of further assistance, please feel free to contact me
at 505-768-3622 or Loren Mainz at 505-768-3654.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 9, 1995

Larry L. Parker
Galloway Romero & Associates
14202 E. Evans Ave.
Aurora, CO 80014

RE: DIAMOND SHAMROCK CORNER STORE (E17/D49). DRAINAGE REPORT
FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED APRIL
19, 1995. RECEIVED AUGUST 3, 1995.

Dear Mr. Parker:

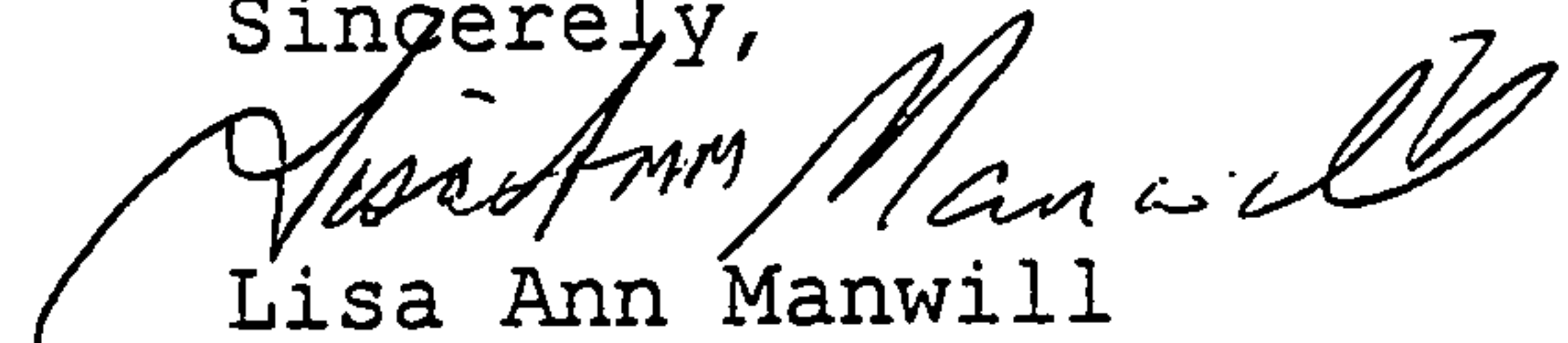
Based on your submittal dated August 3, 1993 and your August 14, 1995 telephone conversation with Mr. Loren Mainz, the above referenced project is approved for Building Permit.

My previous letter, dated August 9, 1995 states the the detention basin and rundown should be lined with cobblestone or landscape rock for removal of floating oils/fuels. Please make certain that this item is clearly shown on as-built drawings.

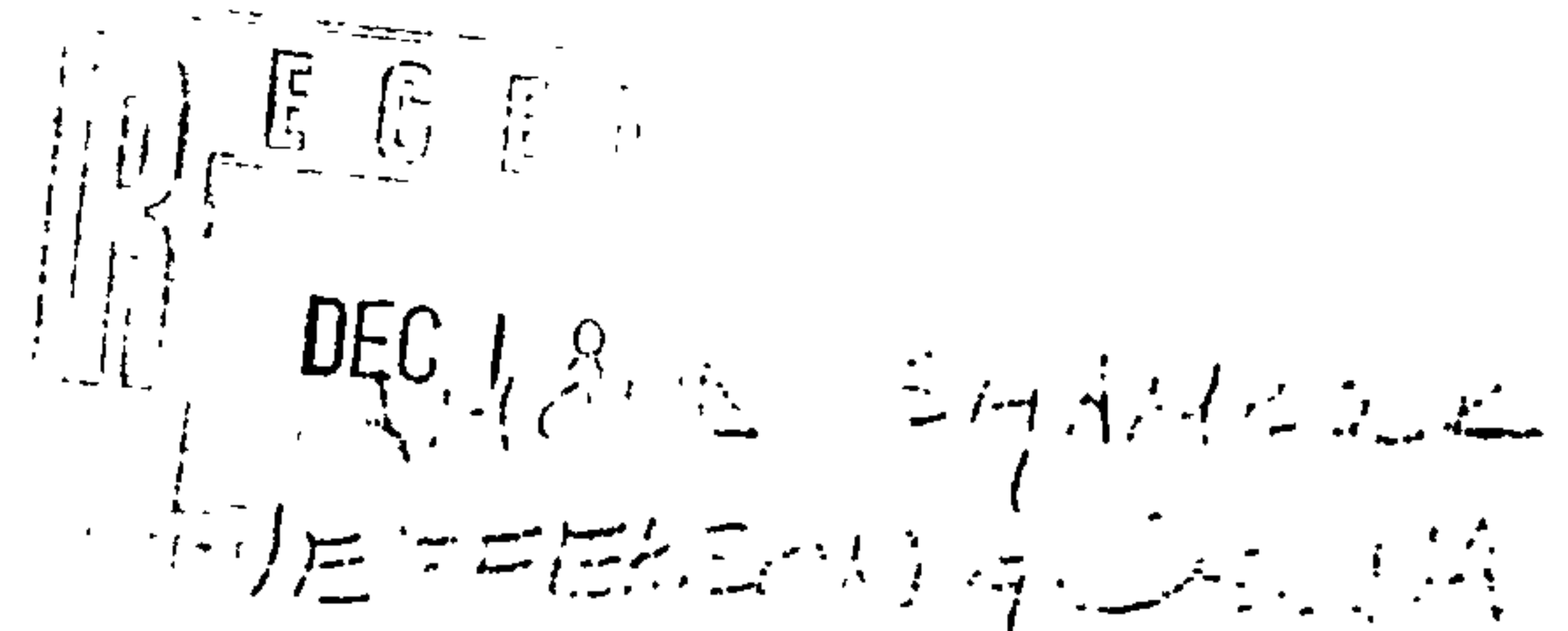
Prior to obtaining a final Certificate of Occupancy, an Engineer's Certification for the entire approved plan must be completed according to the Albuquerque D.P.M. checklist.

If I can be of further assistance, please feel free to contact me at 505-768-3622 or Loren Mainz at 505-768-3654.

Sincerely,


Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Loren Mainz
Andrew Garcia
File



**Final Drainage Report
for
Diamond Shamrock
Jefferson Street N.E. & Osuna N.E.
Albuquerque, New Mexico**

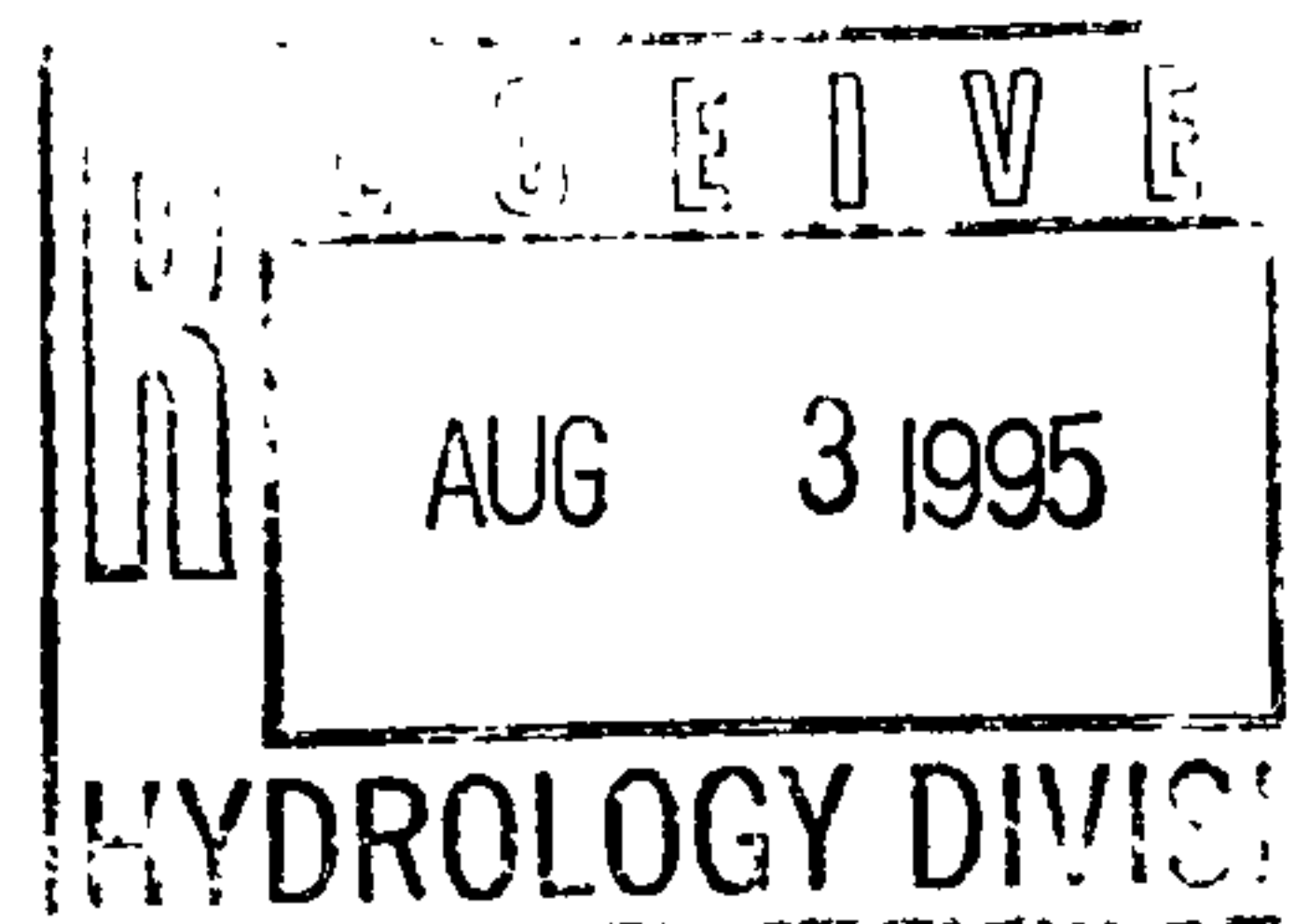
**Revised June 1995
Revised July 1995**

Prepared for:

**Diamond Shamrock
6390 E. Thomas Road
Building 3, Suite 326
Scottsdale, Arizona 85251
(602) 949-7525
Attn: Jim Reed**

Prepared by:

**Galloway, Romero & Associates
14202 E. Evans Ave.
Aurora, CO 80014
(303) 745-7448
Attn: Larry L. Parker**



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I. INTRODUCTION

This report is being prepared for Diamond Shamrock, Inc., the owner/developer of the site, to fulfill the final drainage requirements of Albuquerque, New Mexico. The report analyzes offsite and onsite runoff from the minor, 10 year frequency, and major, 100 year frequency storms and routes these flows through the site.

The 0.8547 acre site is part of projected Section 26, Township 11 North, Range 3 East of the New Mexico Prime Meridian, City of Albuquerque, County of Bernalillo, State of New Mexico. The site is bound by Jefferson Street on the east, by Osuna Road on the south, by an undeveloped, light manufacturing zoned parcel on the west and by a developed light manufacturing zoned parcel on the north. According to Flood Insurance Rate Map, for the City of Albuquerque, Community Panel Number 350002 0016 C, with an effective date of October 14, 1983, the site lies in Zone C, an area of minimal flooding.

Currently the site is undeveloped and for the most part, covered with native grasses and weeds. A landscape belt along the southerly and easterly line exists and delineates an east/west ridge that traverses the site. This ridge directs the majority of the sites runoff (approximately 75%) the north and onto the light manufacturing zoned parcel. The remaining runoff from the site is directed south where it discharges onto Osuna Road. This ridge prevents offsite runoff from flowing onto the site.

II. DESIGN CRITERIA

This report is being prepared using the criteria and methodology as presented in Section 22.2, Hydrology of the "Development Process Manual" for the City of Albuquerque in cooperation with Bernalillo County, New Mexico, dated January 1993. Peak runoff for the minor and major storms (10 and 100 year frequency, respectively), excess precipitation and runoff volume was calculated using values for Precipitation Zone 2. Calculations and applicable tables and graphs are included in the appendix of this report.

III. EXISTING DRAINAGE

As previously stated, the site is not subject to offsite flows. Historically, the existing ridge divides the site into two basins, A and B. Basin A is a 0.196 acre basin along the southerly portion of the site. This basins land coverage was consider be 100% treatment A. The basins 10 and 100 year peak discharge of 0.07 and 0.31 cfs, respectively, is unconcentrated and discharges into Osuna Road.

Basin B is a 0.658 acre basin that consists of the northerly 75% of the site. The northeasterly corner of the basin, in the easement area, is paved while the remaining area is covered with

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native grasses and weeds. The discharge calculations treat this basin as if its land coverage was treatment A. The basins 10 and 100 year peak discharge of 0.25 and 1.03 cfs flows northwesterly and discharges onto the adjacent site.

IV. DEVELOPED DRAINAGE

General Concept A pre-design conference, the site's drainage was to flow towards Osuna Road. This was accomplished by raising the site's northerly property line and shifting the ridge to that location. As part of the Diamond Shamrock development, this area is being regraded and paved per a separate easement agreement.

Specific Details The site is divided into 2 developed basins, A through B. Basin A is a 0.484 acre basin that consists of roof, paved and landscaped areas. The 10 and 100 year runoff of 1.37 and 2.11 cfs, respectively, flows southwesterly and is discharged into Osuna Road through the proposed curb cut.

Basin B is a 0.371 acre basin that consists of roof, paved and landscaped areas. The 10 and 100 year runoff of 1.01 and 1.57 cfs, respectively, flows to low point in the landscape area at the southwesterly corner of the site. A sidewalk culvert, modified to provide a headwall with trashrack, conveys the runoff to Osuna Road. Should this outlet structure fail or plug, water will pond to a depth of 1.5 feet before overflowing the curb cut return's high point. The overflow elevation is 2.8 feet below the convenience store's finished floor.

Osuna Road Capacity: the capability of Osuna Road to convey the 100 year storm was previously analyzed in a report titled "Drainage Report for ABQ Venture II Office & Warehouse Facility" by McDowell Engineering, Inc., in November 1993. That report, for a site on Jefferson Street approximately 1100 feet south of the Jefferson/Osuna intersection, analyzed flows at the intersection and in Osuna as it meets the AMAFCA diversion channel approximately 3600 feet west of the intersection. At the AMAFCA channel, design point AP2, the report calculated a 100 year flow of 203 cfs. The roadway sections of the report indicated 100 year capacity of 174.73 cfs for the existing street section and 188 cfs for the ultimate road section, thus implying that Osuna Road is over capacitated. The 203 cfs value was examined and found to have been calculated utilizing the peak discharge values from Table A-9 of the "Criteria Manual." Those values, associated with a time of concentration of 0.2 hours or 12 minutes, were used throughout the basin analysis. This report re-analyzed the 100 year runoff using the following methodology.

- A. Using equations b-4, b-5, b-6 and the values from Table B-1 and B-2, a time of concentration for the basin was calculated. It was found to be 22.1 minutes.
- B. Using equation a-12 of the "Criteria Manual," an intensity was calculated.
- C. Using this intensity, Table A-11's rational method coefficients and the ABQ reports land areas a 100 year flow of 152.2 cfs was calculated. This indicates that Osuna has capacity to handle runoff from the Diamond Shamrock site.

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The same methodology was used to calculate a 10 year runoff of 142. cfs.

Per the City's drainage policy, Osuna Road was to provide a 12 foot wide dry driving land during the 10 year storm. The previously mentioned drainage report has identified the existing conditions to exceed this requirement and as such a variance to this requirement is being requested. A copy of the City's previous grant of variance and copies of those portions of the ABQ Venture II Drainage Report is included in the Appendix of this report.

V. CONCLUSIONS

This report has been prepared using the methodology and information contained within Section 22.2 of the Development Process Manual for the City of Albuquerque in cooperation with Bernalillo County, New Mexico, dated January, 1993. Runoff from the minor/major storms is safely routed through the site and is discharged without causing potential harm to the public. The capacity calculations for Osuna Road indicate the ability to convey the flows from this site.

TABLE A-9. PEAK DISCHARGE (cfs/acre)				
Zone	Treatment			
	100-YR [2-YR, 10-YR]			
	A	B	C	D
1	1.29 [0.00, 0.24]	2.03 [0.03, 0.76]	2.87 [0.47, 1.49]	4.37 [1.69, 2.89]
2	1.56 [0.00, 0.38]	2.28 [0.08, 0.95]	3.14 [0.60, 1.71]	4.70 [1.86, 3.14]
3	1.87 [0.00, 0.58]	2.60 [0.21, 1.19]	3.45 [0.78, 2.00]	5.02 [2.04, 3.39]
4	2.20 [0.05, 0.87]	2.92 [0.38, 1.45]	3.73 [1.00, 2.26]	5.25 [2.17, 3.57]

TABLE A-8. EXCESS PRECIPITATION, E (INCHES) - 6 HOUR STORM				
Zone	Treatment			
	100-YR [2-YR, 10-YR]			
	A	B	C	D
1	0.44 [0.00, 0.08]	0.67 [0.01, 0.22]	0.99 [0.12, 0.44]	1.97 [0.72, 1.24]
2	0.53 [0.00, 0.13]	0.78 [0.02, 0.28]	1.13 [0.15, 0.52]	2.12 [0.79, 1.34]
3	0.66 [0.00, 0.19]	0.92 [0.06, 0.36]	1.29 [0.20, 0.62]	2.36 [0.89, 1.50]
4	0.80 [0.02, 0.28]	1.08 [0.11, 0.46]	1.46 [0.27, 0.73]	2.64 [1.01, 1.69]

HISTORIC PEAK DISCHARGE

BASIN NAME	AREA ACRES	TREATMENT A ACRES	Q10 CFS	Q100 CFS
A	0.196	0.196	0.07	0.31
B	0.658	0.658	0.25	1.03

✓ → to Oseuna
✓ → adjacent prop

DEVELOPED PEAK DISCHARGE

BASIN NAME	AREA ACRES	TREATMENT B ACRES	D ACRES	Q10 CFS	Q100 CFS
A	0.484	0.070	0.414	1.37	2.11
B	0.371	0.070	0.301	1.01	1.57
					3.68

✓ } Drains
3 to Oseuna

ADDITIONAL FLOW
FROM DEVELOPMENT ⇒ 2.34
a 3.37 CFS
increase to Oseuna

3.68 is the total
proposed runoff
from the site.

OSUNA ROAD CAPACITY ANALYSIS

BASIN REACHES

ABQ VENTURE II SITE

$$L_1 = 605' \quad S_1 = \frac{62-48}{605} = 0.0231 \text{ FT/FT}$$

JEFFERSON STREET

$$L_2 = 1100 \quad S_2 = \frac{48-39}{1100} = 0.0082 \text{ FT/FT}$$

OSUNA ROAD

$$L_3 = 3600 \quad S_3 = \frac{5139-5090}{3600} = 0.0136 \text{ FT/FT}$$

$$L = 605 + 1100 + 3600 = 5305$$

$$S = \frac{[(0.0231 * 605) + (0.0082 * 1100) + (0.0136 * 3600)]}{5305}$$

$$S = 72/5305 = 0.0136 \text{ FT/FT}$$

$$L_1 / (K_1 * S_1^{1/2}) = 605 / (2 (0.0231)^{1/2}) = 1,990.3$$

$$L_2 / (K_2 * S_2^{1/2}) = 1100 / (3 (0.0082)^{1/2}) = 4,049.1$$

$$L_3 / (K_3 * S_3^{1/2}) = 3600 / (3 (0.0136)^{1/2}) = 10,289.9$$

$$\Sigma \quad 16329.3$$

$$L / S^{1/2} = 5305 / 0.0136^{1/2} = 45490.0$$

$$K = 45490 / 16329.3 = 2.79$$

$$T_L = \left(\frac{(12000 - 5305)}{(72000 (2.79) (0.0136)^{1/2})} + \frac{((5305 - 4000) * 0.021 * \left(\frac{2900}{5305}\right)^{0.33}}{(552.2 * (0.0136)^{0.165}} \right)$$

$$T_L = (6695/23426) + (22.45/271.7) = 0.3684 \text{ HRS}$$

$$T_L = 22.1 \text{ MIN.}$$

INTENSITY @ $T_c = 0.3684$ HRS ✓

P_{60} ZONE 2 = 2.01 INCHES ✓

$$I = 0.726 (\log_{10} (24.6 (0.3684))) (\frac{1}{0.3684}) 2.01 ✓$$

$I = 3.79$ INCHES

FROM THE APPROVED REPORT $A_{TREATMENT B} = 10.00$ ACRES
 $A_{TREATMENT C} = 5.00$ ACRES, $A_{TREATMENT D} = 35.00$ ACRES

$$Q_{100} = 3.79 ((10.00 \cdot 0.45) + (5.00 \cdot 0.62) + (35.00 \cdot 0.93)) ✓$$

$$Q_{100} = 3.79 (40.15) = 152.2 \text{ CFS} \leftarrow$$

PER REPORT Q_{100} ON EXISTING STREET SECTION = 174.73 CFS

Q_{100} AT FUTURE WIDENING = 188 CFS

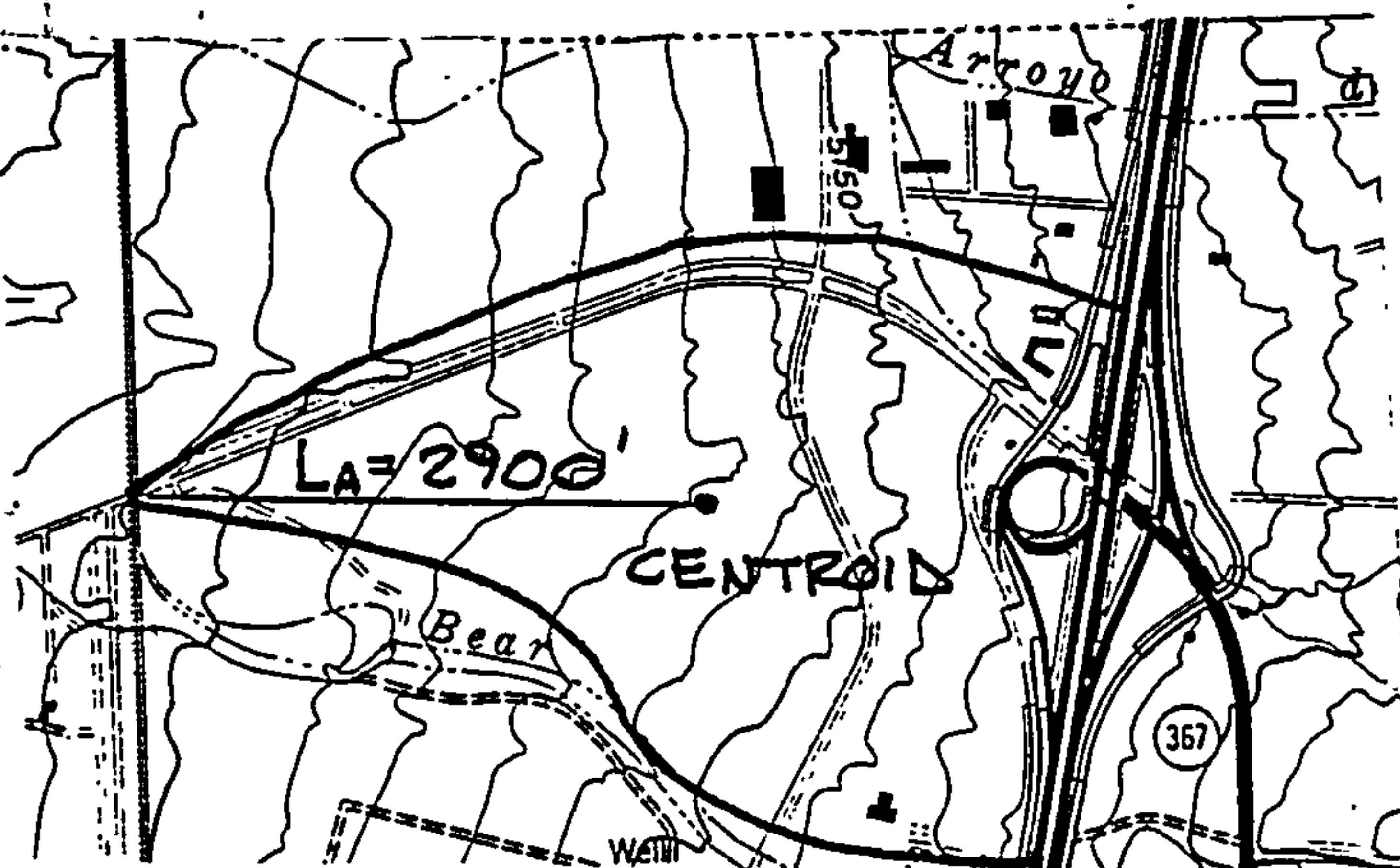
OSUNA HAS CAPACITY FOR THE ADDITIONAL 3.68 CFS

10 YEAR RUNOFF

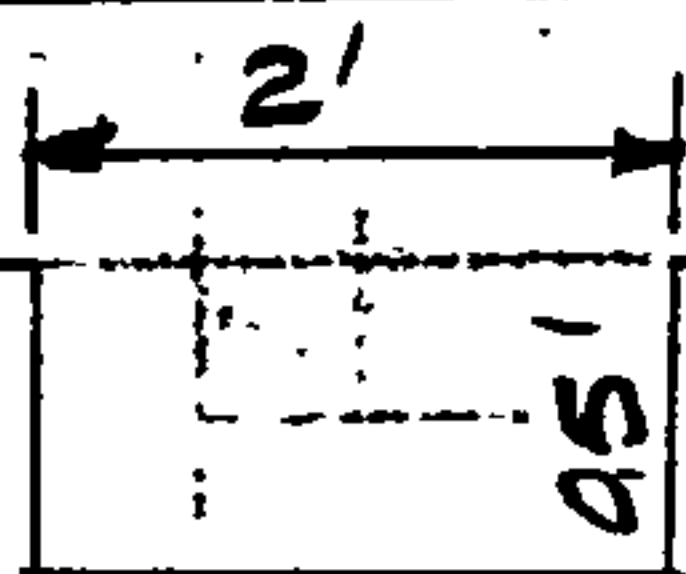
$$Q = 3.79 ((10.00 \cdot 0.28) + (5.00 \cdot 0.50) + (35.00 \cdot 0.92))$$

$$Q = 3.79 (37.5) = 142.1 \text{ CFS}$$

BASIN CENTROID DERIVED FROM THIS DRAWING



CURB OPENING CAPACITY



$$Q = 3.4 L h^{3/2}$$

$$Q = 3.4 (2.00) (0.5)^{3/2}$$

$$Q = 2.4 \text{ CFS} > 2.11 \text{ CFS OK}$$

SIDEWALK CULVERT CAPACITY

12" WIDE CHASE @ $\frac{1}{4}$ " / FT $n = 0.017$

$$\text{AREA} = (7 (12) + 2 (\frac{1}{2} (6) \frac{1}{2})) - 12 (\frac{3}{8}) = 82.5 \text{ IN}^2$$

$$\text{AREA} = 0.573 \text{ FT}^2$$

$$W_P = 2 (7) + 2 ((6)^2 + (\frac{1}{2})^2)^{1/2} - 2 (\frac{3}{8}) = 25292 \text{ IN OR } 2.108 \text{ FT}$$

$$Q = \frac{1.486}{0.017} (0.573) \left(\frac{0.573}{2.108} \right)^{2/3} 0.0208^{1/2}$$

$$Q = 3.03 \text{ CFS} > 2.11 \text{ CFS OK}$$

7200 Valley Forge Pl. NE
Albuquerque, New Mexico 87109
Tele: (505)828-2430

Project: ABQ VENTURE EAST BLK

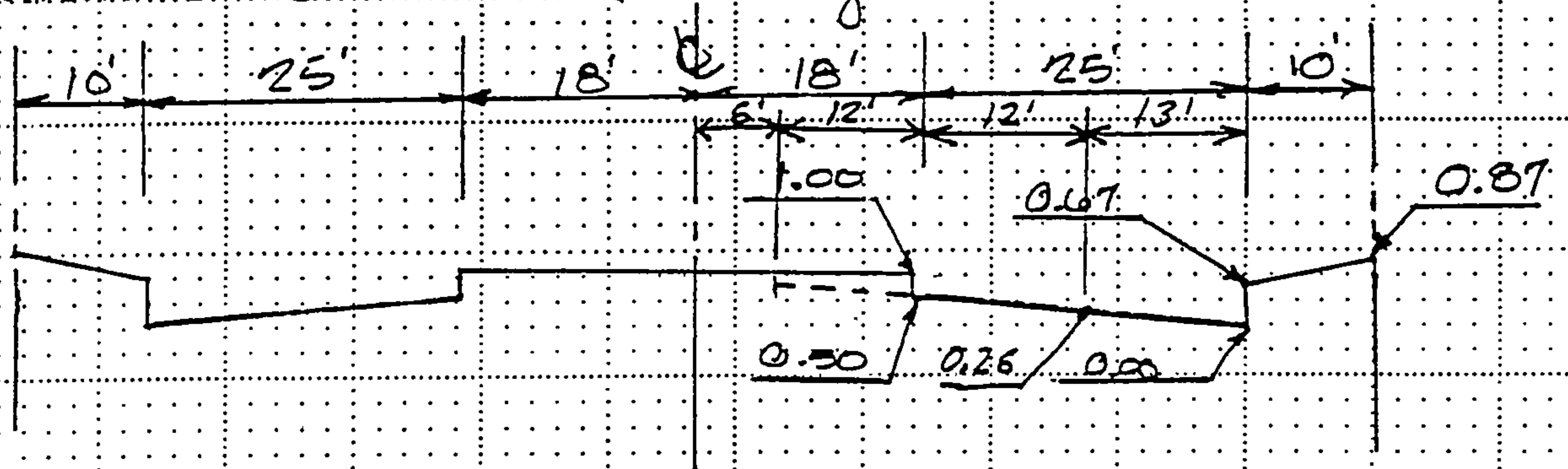
Project No.: AAE0193L Date: 10-5-73

Subject: Downstream Conditions

By: JRM Sheet 1 of 2

- Jefferson Street is identified as a Minor Arterial on the Long Range Major Street Plan.
- Osuna Road is identified as a Principal Arterial on the Long Range Major Street Plan.
- Jefferson Street currently has a right-of-way width of 106'.
- Osuna Road currently has a right-of-way width of 150'.

Jefferson Street Section (existing & ultimate): 106' R/W



Minimum Slope along Jefferson is 0.003', south of Osuna.

1/2 Capacity: $Q = \frac{1.486 A^{5/3} S^{1/2}}{n P^{2/3}}$ (1/2 street to R. e. elev. 0.87')

$A = (1/2)(25)(0.5) + (0.17)(25) + (1/2)(10)(0.20) + (0.20)(25)$
 $= 16.50 \text{ sf}$

$S = 0.003$

$n = 0.017$

$P = 35' \quad 36.04$

$Q = 47.85 \text{ cfs} \quad 46.9$

$A = 25'(.37 + .87)/2 + 10'(.2)/2 = 16.50 \text{ sf}$

$A_{10} = 13(.26)/2 = 1.69 \text{ sf}$

$P_{10} = 13.26$
 $Q_{10} = 2 \text{ cfs}$

~~$A_{.5} = 13(.5)/2 = 3.25 \text{ sf}$~~

~~$P_{.5} = 15.5'$~~

~~$Q_{.5} = 6 \text{ cfs}$~~

Full Street Capacity = 9570 cfs - Jefferson & Osuna

A.12

Project: ABQ VENTURE
EAST BLDG.

Project No.: AAR 0193L

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05-Oct-93

Calculations: Total Basin

Calculations are based on 'Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, January 1993 - basins < 40 acres'.

INTERSTATE INDUSTRIAL
TRACT, LOT 1 & LOT 2,
BLOCK D, UNIT II
(DRAINAGE BASIN TO
JEFFERSON)

Precipitation Zone = 2

Depth at 100-year, 6-hour storm: (Table A-2)

P = 2.35 inches

Land Treatments:

From Table 5 - Percent Treatment D

Single Family Residential =

$7 \times \text{SQR}((N \times N) + (5 \times N))$

where N = units/acre

N = ----- = -----, ok < 6

N = 0.00

Therefore Percent Treatment D =

0.00%

(includes local streets)

@ AP 1

Areas: (acres)	Existing	Proposed
Treatment A	18.93	0.00
Treatment B	0.00	3.79
Treatment C	0.00	1.89
Treatment D	0.00	13.25
Total (acres) =	18.93	18.93

20 %
10 %
70 %

Volume	100 year Existing	100 year Proposed	10 year Existing	10 year Proposed	2 year Existing	2 year Proposed
Volume (acre-feet) =	0.84	2.77	0.21	1.65	0.00	0.90
Volume (cubic feet) =	36,419	120,450	8,933	71,870	0	39,301

Total Q(p), cfs:	100 year Existing Q(p)*A	100 year Proposed Q(p)*A	10 year Existing Q(p)*A	10 year Proposed Q(p)*A	2 year Existing Q(p)*A	2 year Proposed Q(p)*A
Treatment A	29.53	0.00	7.19	0.00	0.00	0.00
Treatment B	0.00	8.64	0.00	3.60	0.00	0.30
Treatment C	0.00	5.93	0.00	3.23	0.00	1.13
Treatment D	0.00	62.28	0.00	41.61	0.00	24.65
Total Q (cfs) =	29.53	76.85	7.19	48.44	0.00	26.08

A.13

Project: ABO VENTURE
EAST BLOS.

Project No.: ARE 01936

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05-Oct-93

Calculations: Total Basin

Calculations are based on "Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, January 1993 - basins < 40 acres".

DRAINAGE BASIN TO
OSUNA / JEFFERSON

@ APZ

Precipitation Zone = 2

Depth at 100-year, 6-hour storm: (Table A-2)

P = 2.35 inches

Land Treatments:

From Table 5 - Percent Treatment D

Single Family Residential =

$7 * \text{SQR}((N * N) + (5 * N))$

where N = units/acre

N = ----- = -----, ok < 6

N = 0.00

Therefore Percent Treatment D = 0.00%

(includes local streets)

Areas: (acres)	Existing	Proposed
Treatment A	50.00	0.00
Treatment B	0.00	10.00
Treatment C	0.00	5.00
Treatment D	0.00	35.00
Total (acres) =	50.00	50.00

20%
10%
70%

Volume	100 year Existing	100 year Proposed	10 year Existing	10 year Proposed	2 year Existing	2 year Proposed
Volume (acre-feet) =	2.21	7.30	0.54	4.36	0.00	2.38
Volume (cubic feet) =	96,195	318,170	23,595	189,849	0	103,818

Total Q(p), cfs:	100 year Existing Q(p)*A	100 year Proposed Q(p)*A	10 year Existing Q(p)*A	10 year Proposed Q(p)*A	2 year Existing Q(p)*A	2 year Proposed Q(p)*A
Treatment A	78.00	0.00	19.00	0.00	0.00	0.00
Treatment B	0.00	22.80	0.00	9.50	0.00	0.80
Treatment C	0.00	15.70	0.00	8.55	0.00	3.00
Treatment D	0.00	164.50	0.00	109.90	0.00	65.10
Total Q (cfs) =	78.00	203.00	19.00	127.95	0.00	68.90