

CITY OF ALBUQUERQUE



March 12, 2007

Pavan K. Toletie, E.I.T.
Mark Goodwin & Associates, P.A.
PO Box 90606
Rio Rancho, NM 87199

Re: Bernardo Trails City Park, Engineer's Stamp dated 3-1-07, (E16/D27)
Calculations Revised 3-12-07

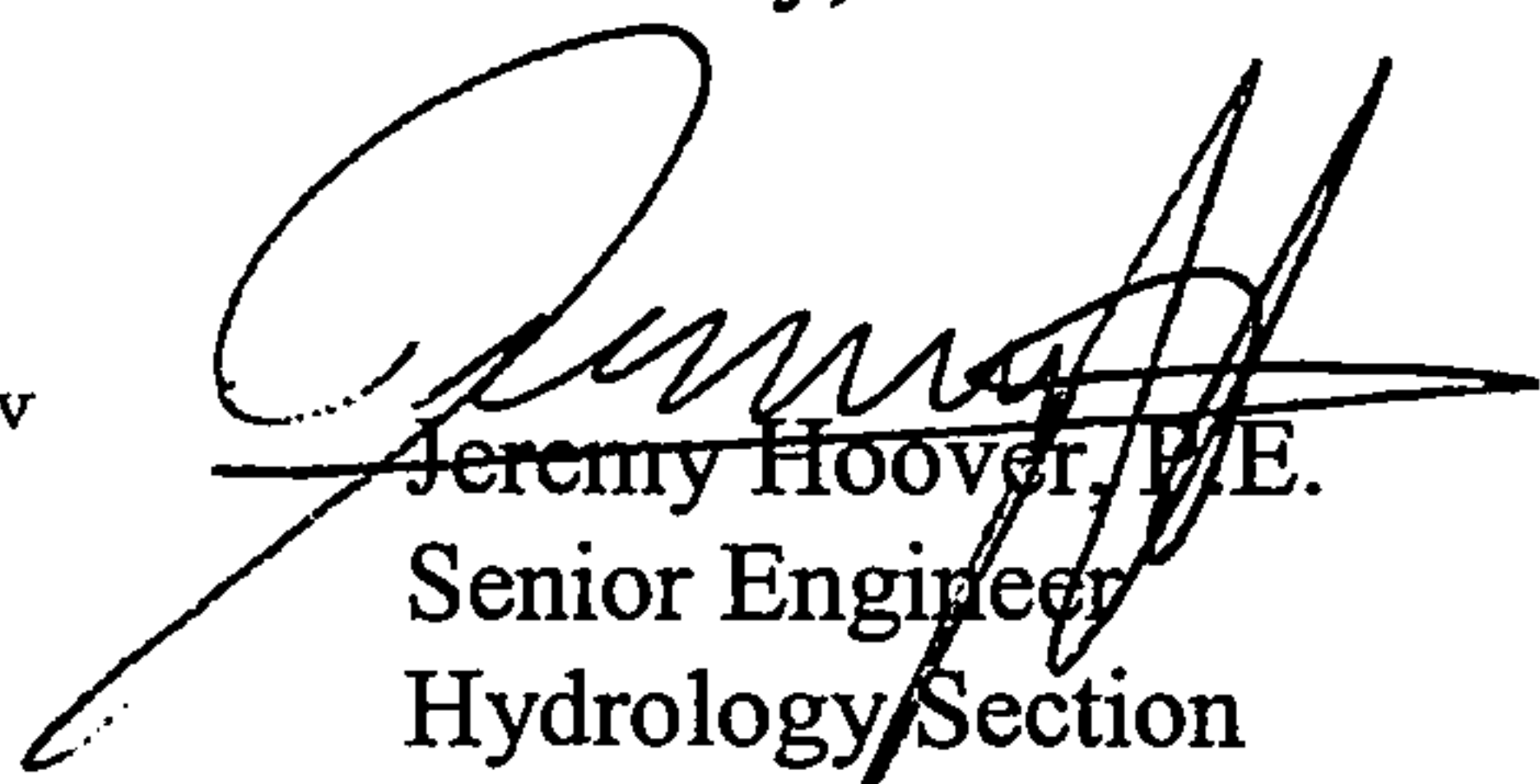
Dear Mr. Toletie,

Based on the information contained in your revised calculations received on March 12, 2007, the above referenced plan is approved for DRB action on the proposed Site Plan for Building Permit and Building Permit. Once the plan has been approved by the DRB, please submit a mylar copy to me in order to obtain rough grading approval. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

An SO-19 permit will be required for the construction of the proposed sidewalk culverts. In order to obtain this permit, please submit two (2) copies of the plan with the appropriate construction notes and signature block. A copy of this approval letter must be on hand when applying for the excavation permit. This project will also require a National Pollutant Discharge Elimination System (NPDES) permit. Inquiries regarding this permit should be directed to Sertil Kandar at 768-3645.

After project completion, please submit an as-built certification for our records. If you have any questions, you can contact me at 924-3990.

Sincerely,


Jeremy Hoover, P.E.
Senior Engineer
Hydrology Section
Development and Building Services

cc: file E16/D27

P.O. Box 1293

Albuquerque

New Mexico 87103

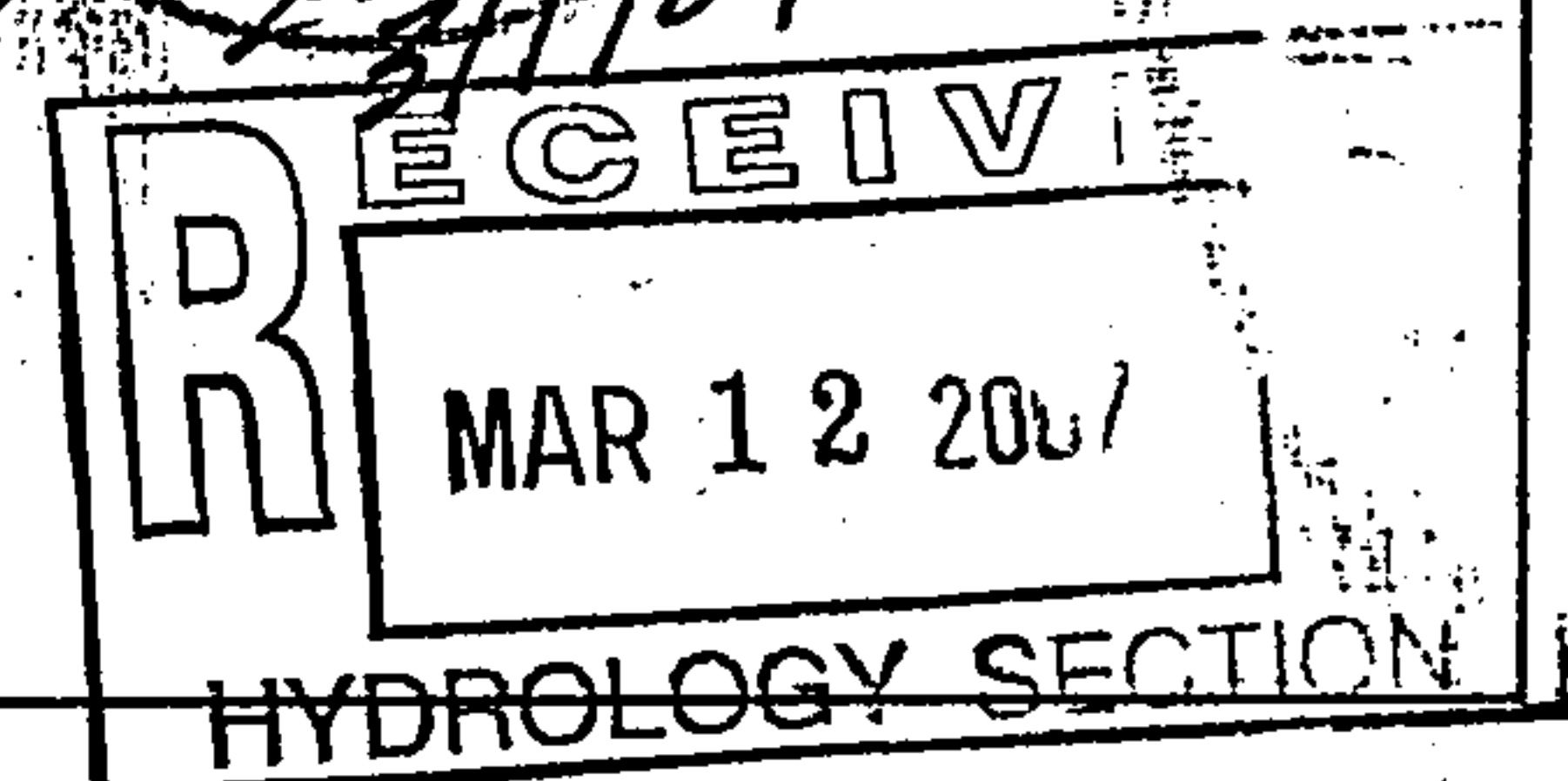
www.cabq.gov

DRAINAGE CALCULATIONS
for
BERNARDO TRAILS CITY PARK

Prepared by

*Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199
(505) 828-2200*

March 2007



D. MARK GOODWIN & ASSOCIATES

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = F:\PAVAN\AHYMOI~1\VISTAD~1.DOC

- VERSION: 1997.02d

RUN DATE (MON/DAY/YR) =03/12/2007
USER NO.= AHYMO-I-9702dGoodwinM-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S	AHYMO_97 MODEL FOR: VISTA DEL NORTE PARK DRAINAGE REPORT									
*S	PREPARED FOR: CITY									
*S	PREPARED BY: MARK GOODWIN & ASSOCIATES									
*S	MODEL DESCRIPTION -									
*S	1. 100-YEAR 6-HOUR RAINFALL EVENT									
*S	2. THIS MODEL ASSUMES DEVELOPED AND EXISTING CONDITIONS									
*S	START									
									TIME=	.00
*S*****	AHYMO -Bernardo Trails City Park. DAT									
*S*****	October 12, 2006									
*S*****	HYDROLOGY FOR VISTA DEL NORTE ONSITE DEVELOPED AND UNDEVELOPED									
	RAINFALL TYPE= 1									
									RAIN6=	2.350
*S*****	BASIN 1 -ONSITE UN DEVELOPED (2.5 ACRES)									
COMPUTE NM HYD	101.00	-	1	.00375	7.54	.226	1.12780	1.499	3.143 PER IMP=	.00
*S*****	BASIN 1 -ONSITE DEVELOPED (1.855 ACRES)									
COMPUTE NM HYD	102.00	-	2	.00280	4.44	.131	.87614	1.499	2.475 PER IMP=	6.00
*S*****	BASIN 2 - FUTURE ONSITE DEVELOPED (0.645 ACRES)									
COMPUTE NM HYD	103.00	-	3	.00097	2.45	.084	1.62156	1.499	3.949 PER IMP=	50.00
*S*****	BASIN A - ONSITE DEVELOPED FLOWS ON SOUTH SIDE (0.5876 ACRES)									
COMPUTE NM HYD	104.00	-	4	.00088	1.29	.037	.77808	1.532	2.296 PER IMP=	.00
FINISH										



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

PROJECT _____

SUBJECT _____

BY _____ DATE _____

CHECKED _____ DATE _____

SHEET _____ OF _____

EXISTING $Q = 9.02$ CFS (FROM CITY PROJECT NO 6257.81

SHEET 5 OF 15)

Developed $Q = 1.29$ CFS.

Total $= 10.31$ CFS

FROM ATTACHED SHEET: SLOPE ON STREET $= 1.25\%$ & Depth $= 0.83'$.

We have the Capacity of Sump condition $= 13$ CFS.

> 10.31 CFS $\approx$ O.K.

The Height of the flow available above Normal Gutter Grade

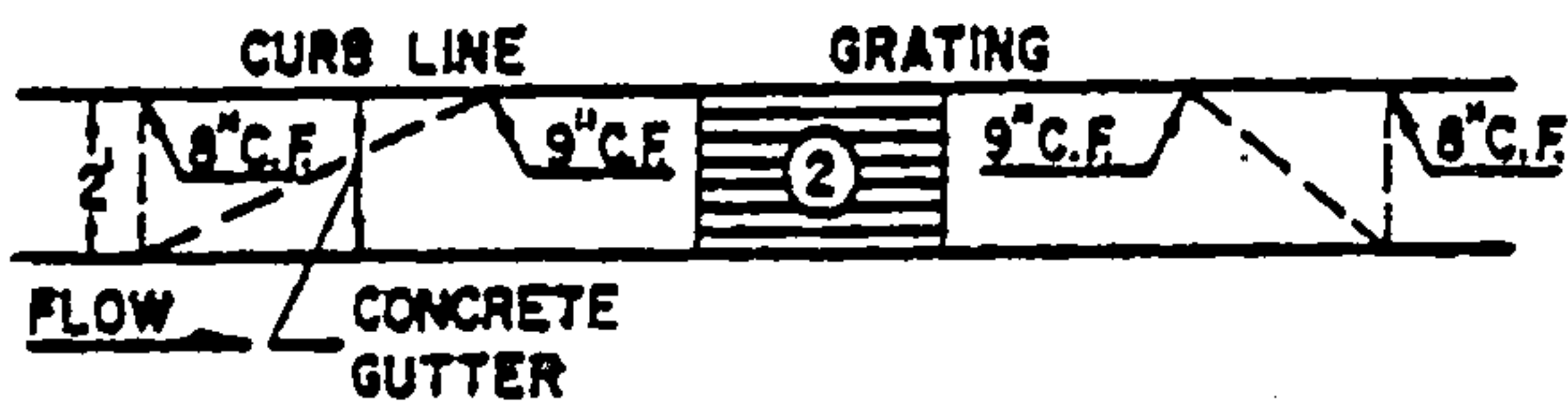
$= 0.83'$

AND WHEN DEVELOPED LOWS ARE ADDED TO STREET

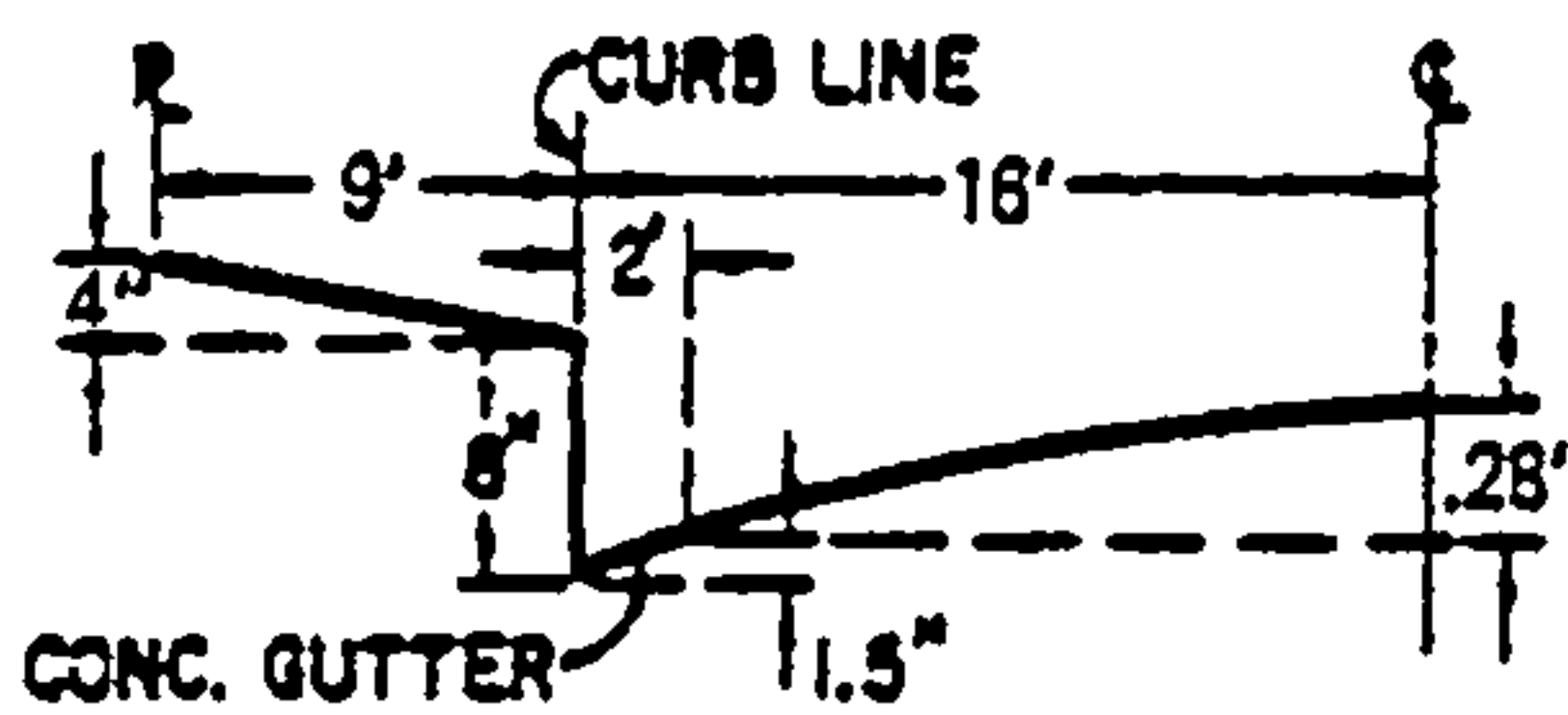
The approximate Height of flow above normal
Gutter grade will be $0.75'$ which is less than

$0.83 \approx$ O.K.

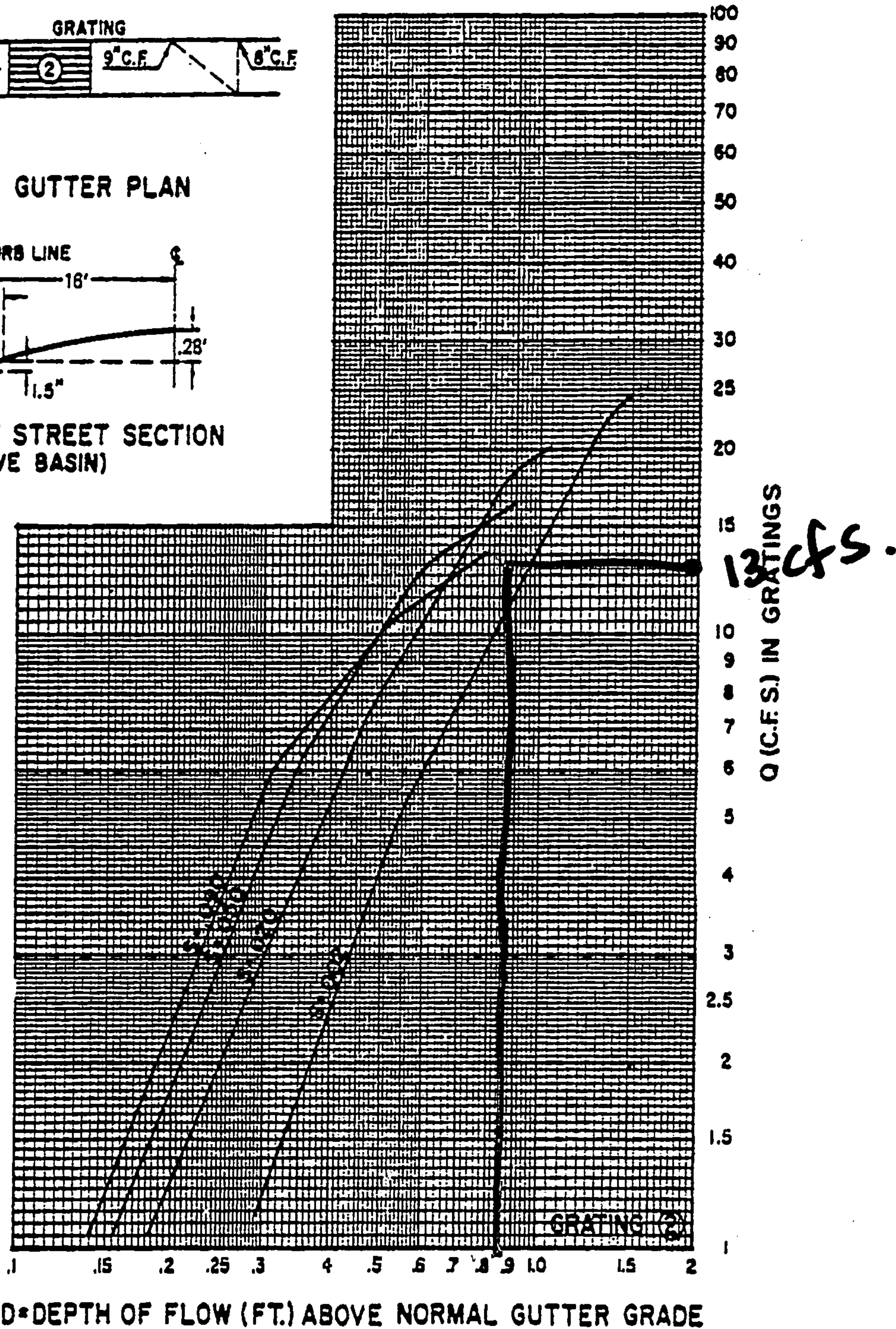
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)





D. Mark Goodwin & Associates, P.A.
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(505) 828-2200 FAX 797-9539

PROJECT CHANNEL CAN

SUBJECT _____

BY _____ DATE _____

CHECKED _____ DATE _____

SHEET _____ OF _____

$$Q = \frac{1.49}{n} \cdot A (R)^{2/3} \sqrt{S}$$

$n = 0.020$ FOR GRASS

$$A = \frac{1}{2} \times 10 \times 0.5' = 2.5$$

$$R = \left(\frac{2.5}{10.05} \right)^{2/3} = 0.40$$

$$S = \sqrt{0.005} = 0.071$$

$$Q = \frac{1.49}{0.02} \times 2.5 \times 0.40 \times 0.071$$

$$= 5.215 \text{ CFS} > 4.6 \text{ CFS AT CONCRETE TILL OUT FALL}$$

AT THE OUTLET/OUTFALL DEPTH IS 0.8'

$$A = \frac{1}{2} \times 10 \times 0.8 = 4$$

$$R = \left(\frac{4}{10.05} \right)^{2/3} = 0.54$$

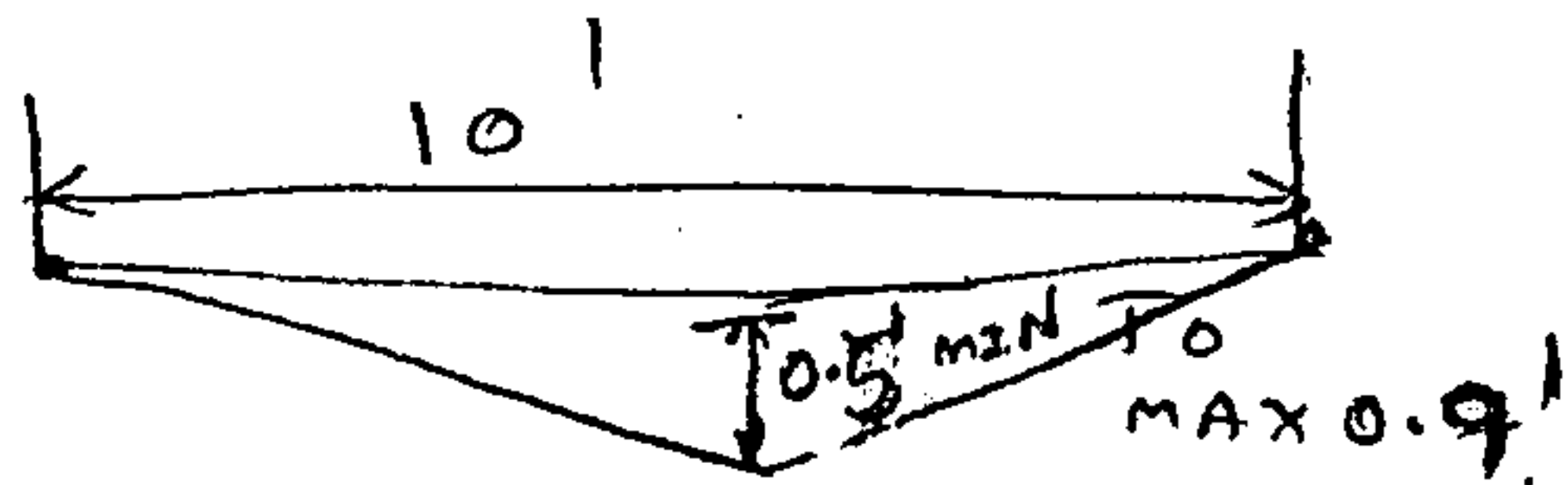
$$S = 0.07$$

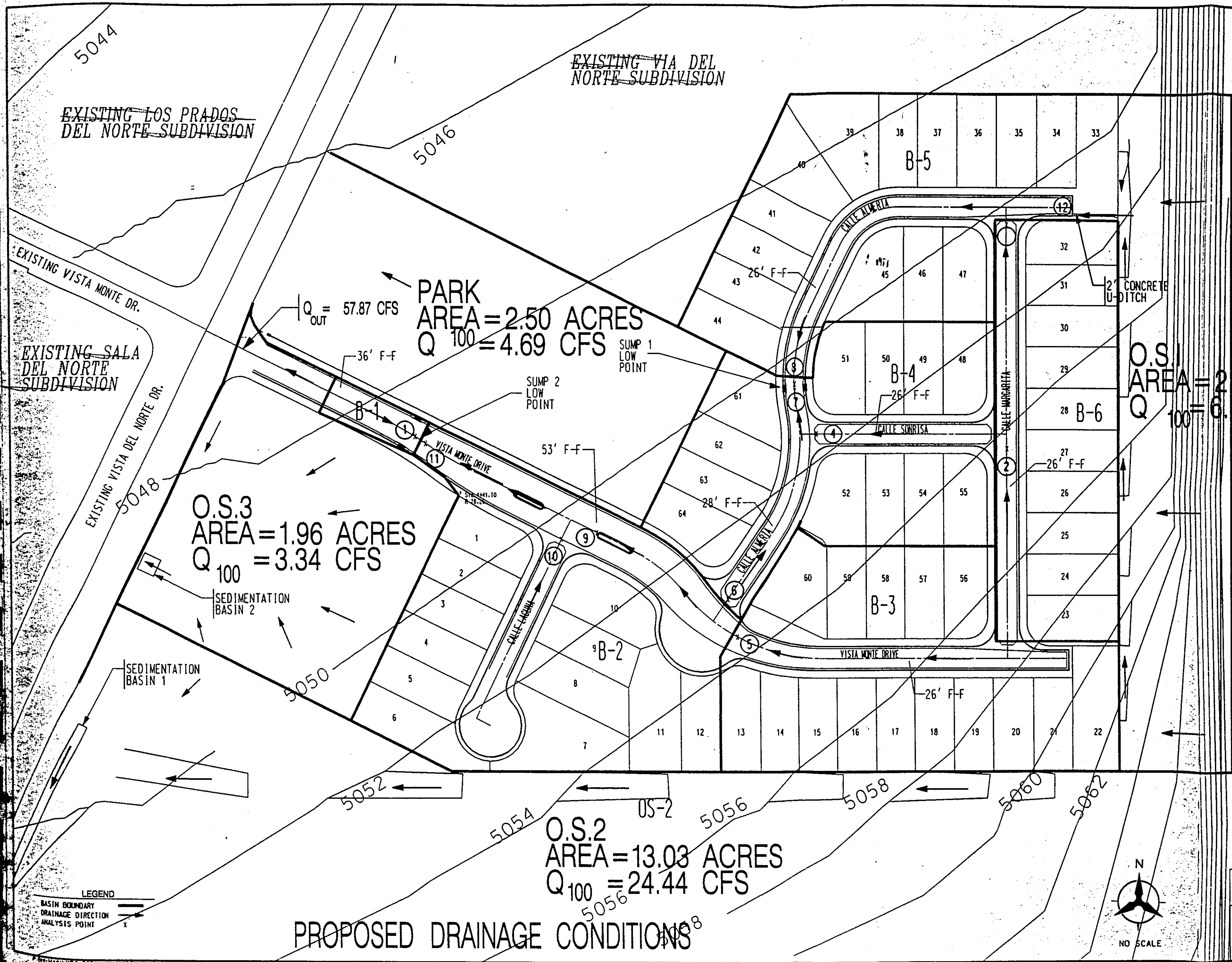
$$Q = \frac{1.49}{0.02} \times 4 \times 0.54 \times 0.07 = 10.98 \text{ CFS} > 5.6 \text{ CFS}$$

SSS. Velocity THROUGH CHANNEL = $V = \frac{Q}{A} = \frac{5.6}{4}$

$$= 1.36 \text{ FPS}$$

Since the channel is grasslined and having little velocity and min slope it does not require any protection at outlet.





DEVELOPED FLOWS

BASIN	AREA	Q ₁₀₀ (cfs)
B-1	0.14 ac.	0.53
B-2	2.54 ac.	9.82
B-3	2.23 ac.	8.50
B-4	2.05 ac.	7.78
B-5	2.37 ac.	9.05
B-6	1.53 ac.	5.82
PARK	2.5 ACRES	4.69 CFS
OS-1	2.08 ACRES	6.50 CFS
OS-2	13.03 ACRES	24.44 CFS
OS-3	1.96 ACRES	3.34 CFS

ANALYSIS POINTS

#	Q ₁₀₀ (cfs)
1	0.53
2	2.31
3	5.82
4	5.19
5	8.50
6	2.85
7	10.63
8	21.37
SUMP 1	32.00
9	7.00
10	8.18
11	13.75
SUMP 2	14.28

PARK
AREA = 2.50 ACRES
Q₁₀₀ = 4.69 CFS

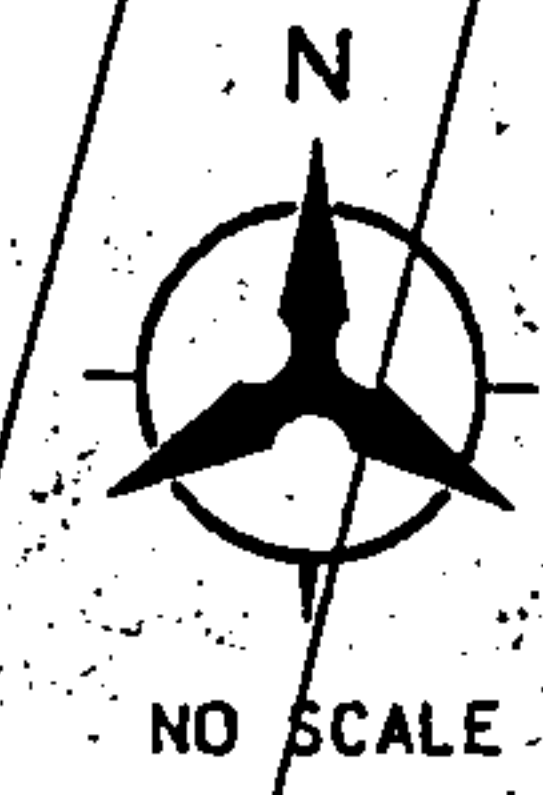
O.S.3
AREA = 1.96 ACRES
Q₁₀₀ = 3.34 CFS

O.S. AREA = 2.08 ACRES
Q₁₀₀ = 6.50 CFS

O.S.2
AREA = 13.03 ACRES
Q₁₀₀ = 24.44 CFS

PROPOSED DRAINAGE CONDITIONS

LEGEND
BASIN BOUNDARY
DRAINAGE DIRECTION
ANALYSIS POINT



Bohannon Huston
 Courtyard One 7500 JEFFERSON NE Albuquerque NEW MEXICO 87109
 ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

CITY OF ALBUQUERQUE
 PUBLIC WORKS DEPARTMENT
 ENGINEERING DEVELOPMENT GROUP
DESCONSADO DEL NORTE SUBDIVISION
 PROPOSED CONDITIONS
 BASIN MAP
 COPYRIGHT BOHANNON HUSTON 1999
 DATE: MAY, 1999