

SUPPLEMENTAL DRAINAGE INFORMATION
ON-SITE FLOW CALCULATIONS

RUNOFF CALCULATIONS

Precipitation Zone No 1

DRAINAGE AREA	DEVELOPMENT	LAND CONDITION (Ac)			100 YR RUNOFF (cfs)
		A	C	D	
Total Site	Existing	20			26
I ¹	Developed		.1	.2	1
G ²	"		.8		2
C ³	"		.8		2
O ₁ ⁴	"		4.9	7.7	48
O ₂ ⁵	"		2.1	3.4	21
T-O ₃ ⁶	Existing	4.2			5
Total Site	Developed	10	87	11.3	74

- 1 Flows to Irving Blvd
- 2 Flows to Golf Course Rd
- 3 Flows to Calabacillas Arroyo
- 4 On-Site flows from Phase 1 development
- 5 On-Site flows from Phase 2 development
- 6 Off-Site flow tributary to west boundary (See Sheet 6)

ISAACSON & ARFMAN, P.A.

SUBJECT Arroyo Villas JOB NO. _____
BY T01 DATE 3/3/94 SHEET NO. 1 OF 13

ARROYO VILLAS ~ OFF-SITE FLOW ANALYSIS

Tributary off-site flow areas are shown on Sheet 3. Upstream flows in Irving are scheduled to be intercepted and diverted to the Calabacillos Arroyo by storm drains to be constructed in conjunction with the development of two subdivisions - ~~Paradise Meadows~~ and ~~Paradise Greens~~. The area draining to the Irving - Golf Course Road intersection is shown on Sheet 2 and has an area of 41 acres (excluding scheduled Irving Blvd interception).

Q₁₀₀ at Irving + Golf Course Road = 140 cfs. In addition there may be additional flows from the Paradise Hills Golf Course (there is a drainage easement through Paradise Greens Subdivision but flows physically go to the drainage basin to the south). For planning purposes an additional 16 cfs is included as an allowance from the Golf Course bringing the total flow to 160 cfs. See Calculations Sheet 4.

Off-Site drainage improvements are shown on Sheet 5. Inlets and laterals will intercept flows at the northwest quadrant of the street intersection. The storm drain main will be sized to accept all flows. The storm drain outlet will discharge into the AMAFCA Golf Course Road Grade Control Structure, an existing soil-cement grade control and energy dissipator structure located at the east side of the existing bridge.

DETERMINE Q_{100}

DevCond. w/Div

Precipitation Zone ①

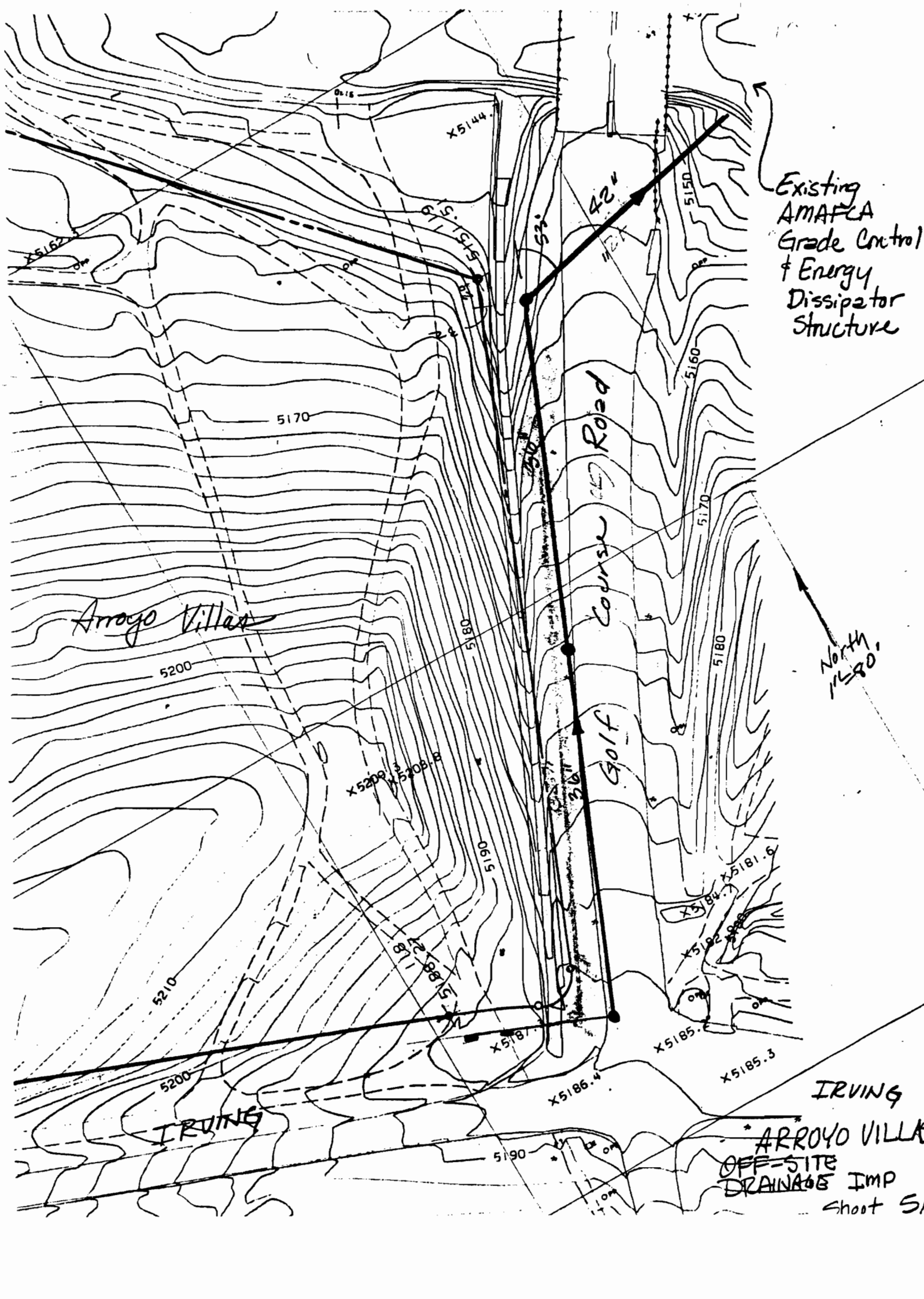
Land Treatment Determination :

Land Use	Area (Ac)	Land 'B'	Treatment (Ac) 'C'	'D'
Streets	7.5		0.7	6.8
SF Resid.	26	8.5	8.5	9
Commercial	7.5		0.7	6.8
Totals	41	8.5	9.9	22.6
		21%	24%	55%

$$Q_{100} = 8.5(2.03) + 9.9(2.87) + 22.6(4.37) = 140 \text{ cfs}$$

Plus Allowance for Possible future Golf Course Flows = 16

$$Q_{100} \text{ (for Planning)} = 160 \text{ cfs}$$



Existing
AMAFCA
Grade Control
& Energy
Dissipator
Structure

North
115° 30'

Arroyo Villas

Course Road
Golf

IRVING

IRVING

ARROYO VILLAS
OFF-SITE
DRAINAGE IMP
Shoot S

3.424445 K = .329862HR TP = .320000HR K/TP RATIO = 1.030818 SHAPE CONSTANT, N =
UNIT PEAK = 107.88 CFS UNIT VOLUME = .9999 B = 314.77 P60 = 1.8700
AREA = .109668 SQ MI IA = .54615 INCHES INF = 1.37923 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

OUTFLOW HYDROGRAPH REACH 10.00

RUNOFF VOLUME =	.89177 INCHES	=	6.6870 ACRE-FEET
PEAK DISCHARGE RATE =	115.88 CFS	AT	1.700 HOURS BASIN AREA = .1406 SQ. MI.

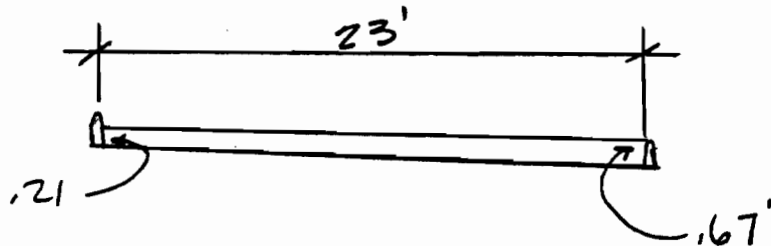
FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 16:03:25

DETERMINE Q_{100} ESCAPING DIVERSION TO
CALABACILLAS ON IRVING EAST OF LYONS BLVD

EXISTING STREET SECTION:



$$A = \left(\frac{.67 + .21}{2} \right) 23 = 10.1 \text{ ft}^2$$

$$WP = .21 + 23 + .67 = 23.88$$

$$R = A / WP = 10.1 / 23.88 = .42$$

$$n = .017$$

$$S = .017$$

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

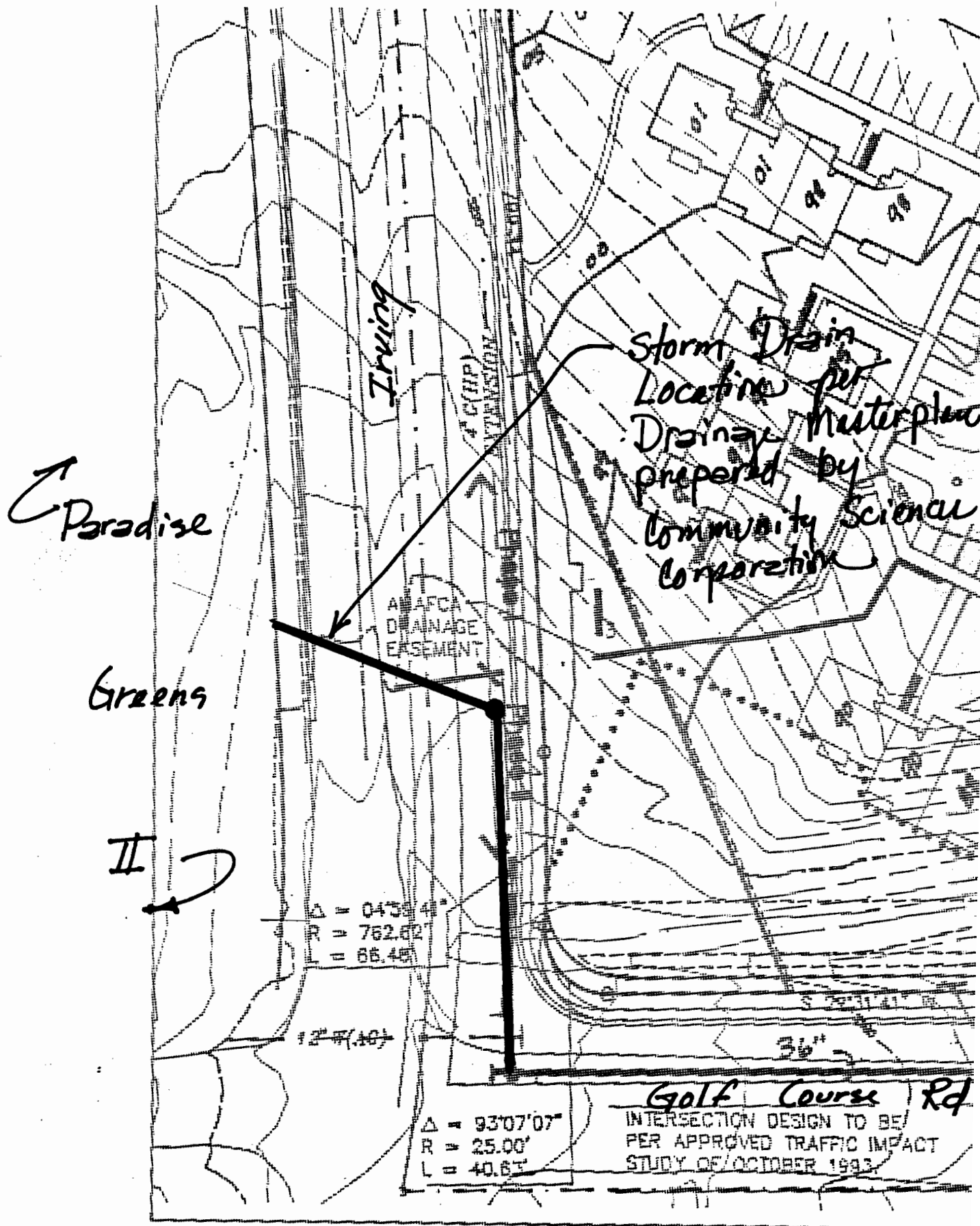
$$= \frac{1.486}{.017} 10.1 \times .42^{2/3} \times .017^{1/2}$$

$$= 65 \text{ cfs (Continue east on Irving)}$$

Q_{100} existing @ Irving & Golf Course

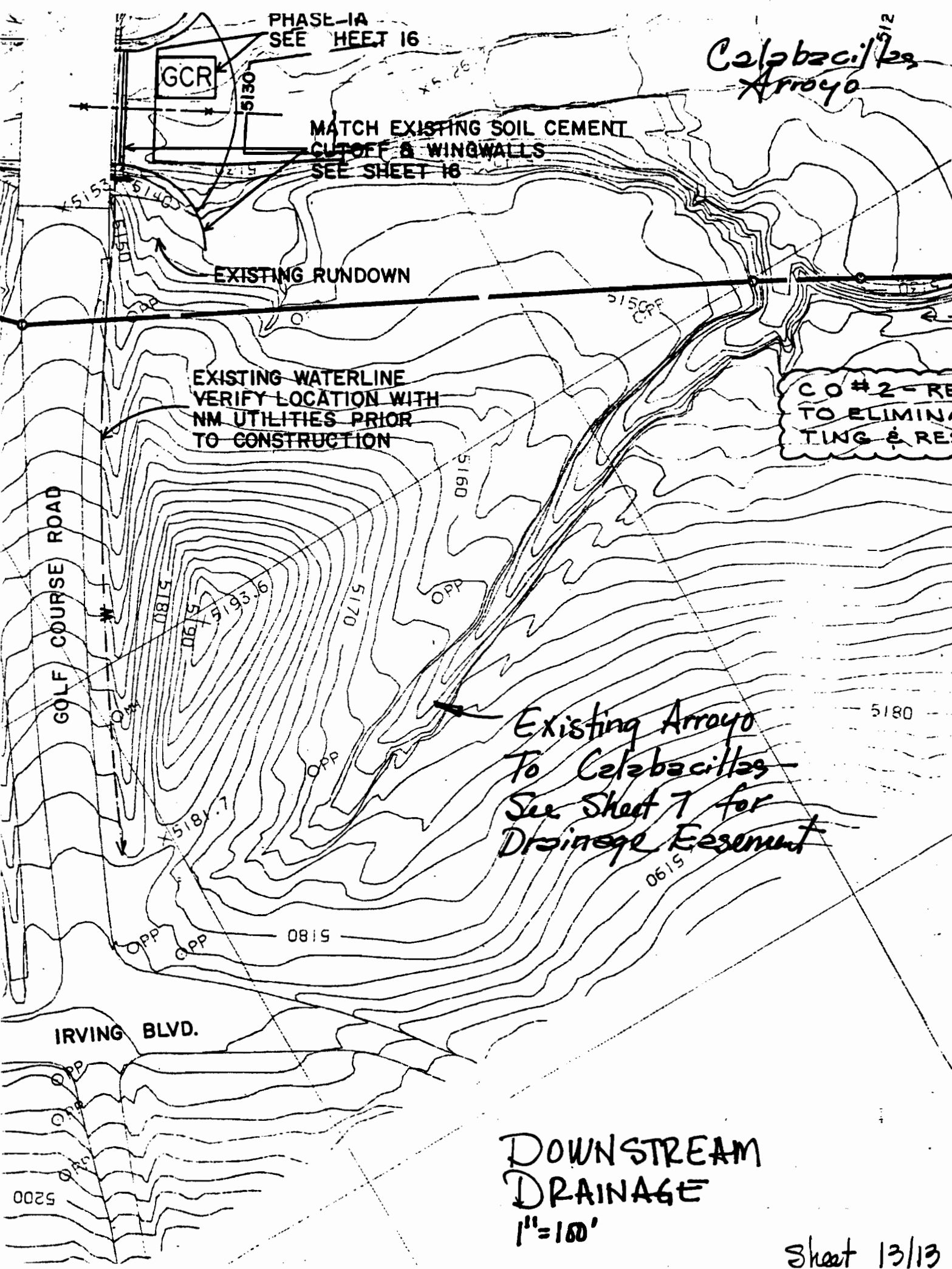
$$= 116 + 65$$

$$= \underline{\underline{181 \text{ cfs}}}$$



CONNECTION TO PARADISE
GREENS II
 1" = 50'

Sheet 12/13



Colapacillas Arroyo

GCR

PHASE-1A
SEE SHEET 16

MATCH EXISTING SOIL CEMENT
CUT OFF & WING WALLS
SEE SHEET 16

EXISTING RUNDOWN

EXISTING WATERLINE
VERIFY LOCATION WITH
NM UTILITIES PRIOR
TO CONSTRUCTION

CO #2 - RE
TO ELIMINA
TING & RES

GOLF COURSE ROAD

IRVING BLVD.

Existing Arroyo
To Colapacillas
See Sheet 7 for
Drainage Easement

DOWNSTREAM
DRAINAGE
1"=100'

Sheet 13/13

FINAL REPORT



**CALABACILLAS ARROYO PRUDENT LINE STUDY
AND RELATED WORK**

***EVALUATION OF EXISTING EROSION-RISK LIMITS
BETWEEN COORS ROAD
AND SWINBURNE DAM***

Prepared for



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Prepared by

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December 1998

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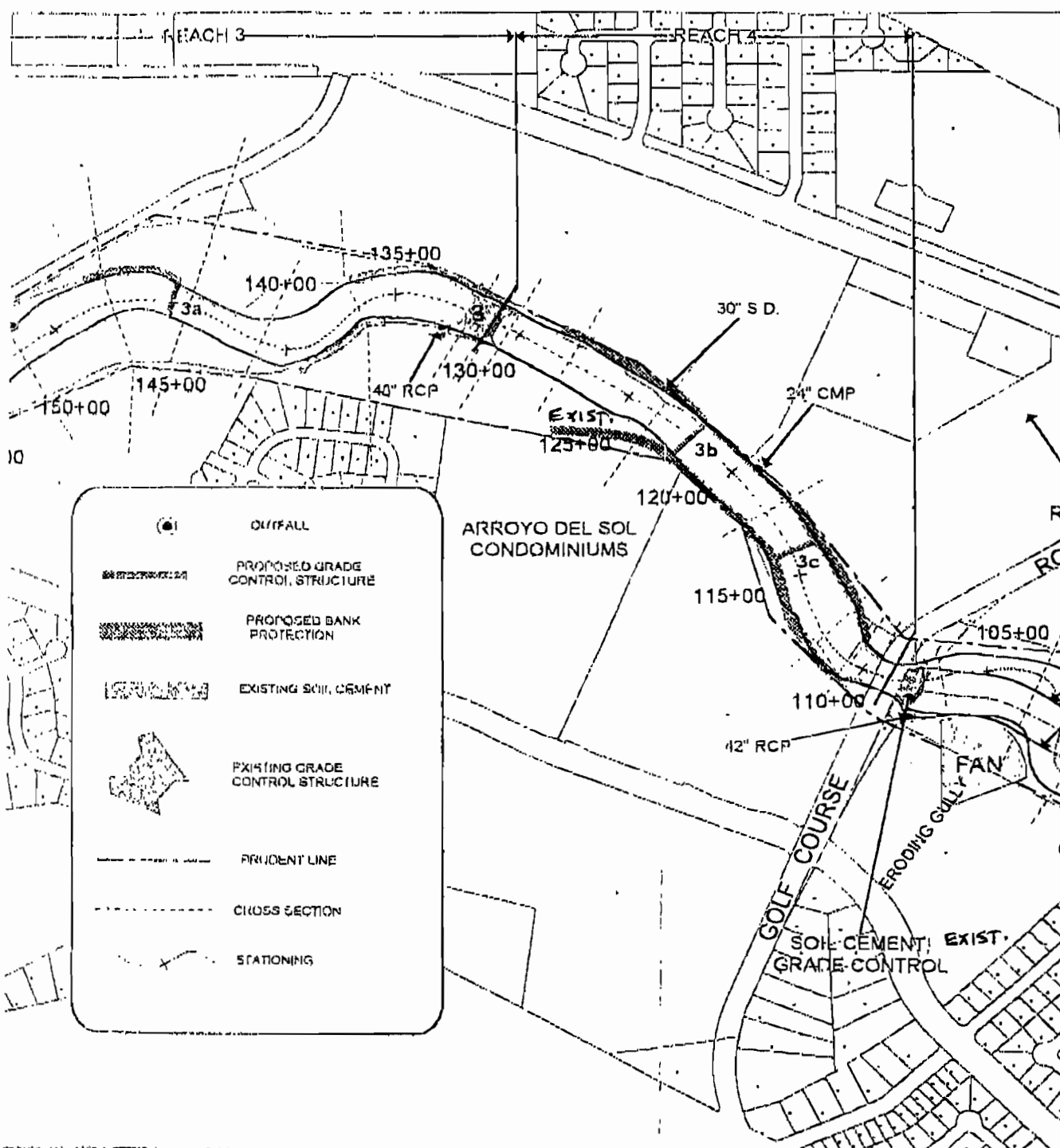
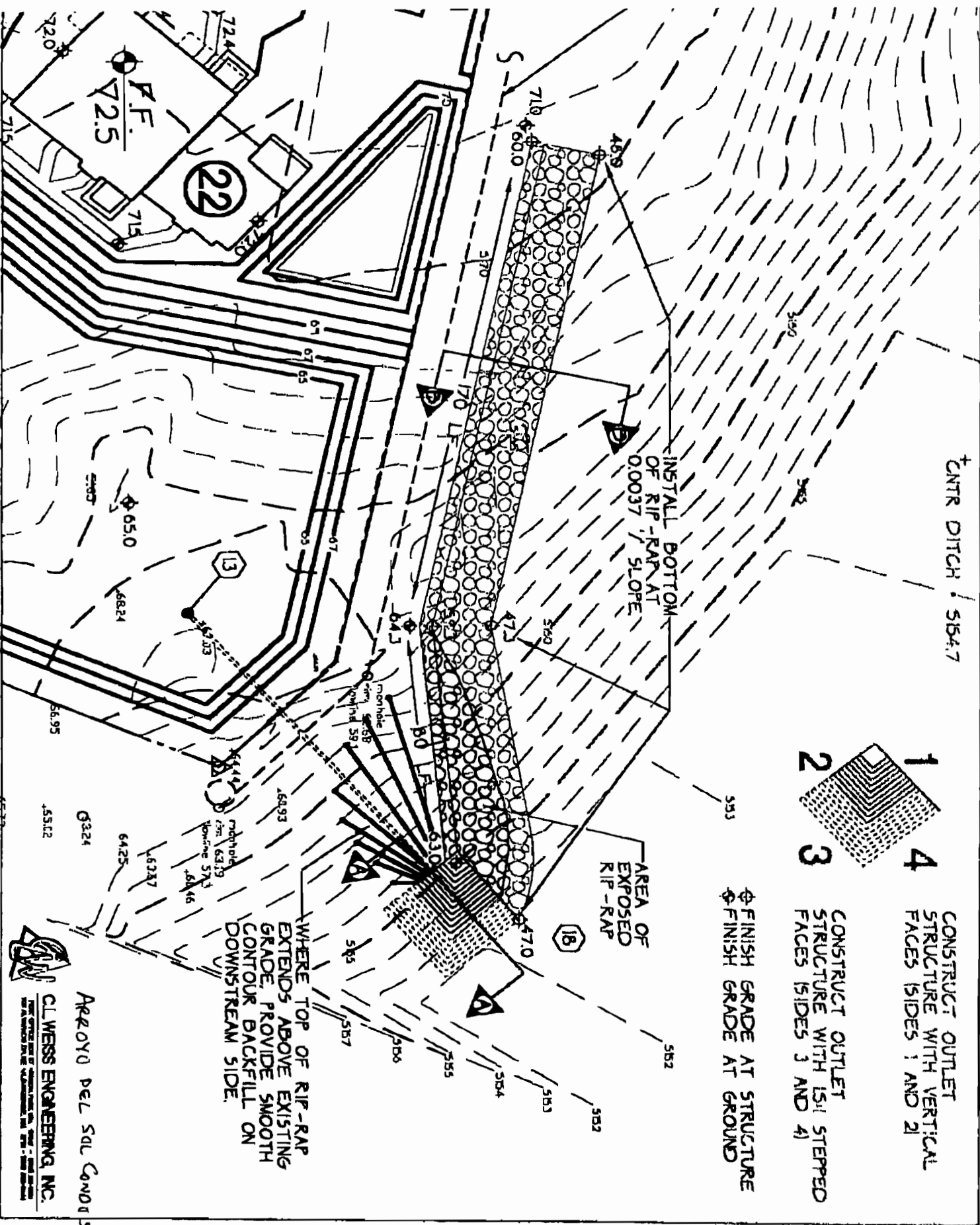


Figure 5.1b. Map of the project reach showing the location of existing and recommended channel protection measures, Golf Course Road to Swinburne Dam.



CL WESS ENGINEERING, INC.

APPROVED DEL SAL CONDOS

RUNOFF CALCULATION RESULTS

BASIN	AREA (SF)	AREA (AC)	AREA (MI ²)
OFFSITE - A*	39459.03	0.9059	0.001415
OFFSITE - B*	4859.11	0.1115	0.000174
ON-SITE A	98761.38	2.2672	0.003543
ON-SITE B	281528.43	6.4630	0.010098
OVERALL ON-SITE	380289.81	8.7303	0.013641
RUNOFF FROM ARROYO VILLAS APARTMENTS VIA 24" SD PIPE	482636.34	11.0798	0.017312

* FROM ARROYO VILLAS APARTMENTS

OVERALL ON-SITE / OFFSITE	862886.47	19.8091	0.030952
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EXISTING

BASIN	Q-100 CFS	Q-10 CFS
OFFSITE - A	3.45	2.14
OFFSITE - B	0.44	0.27
ON-SITE (OVERALL)	12.51	2.86

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS
ON-SITE (OVERALL)	34.79	22.10
ON-SITE A	9.05	5.75
ON-SITE B	25.76	16.36

OVERALL

BASIN	Q-100 CFS
OVERALL ON-SITE / OFFSITE (RABADI COMPLEX & ARROYO VILLAS APT.)	78.92

SUMMARY OUTPUT FILE

OVERALL ON-SITE / OFFSITE

(ARROYO VILLAS APT. & RABADI SITE)

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - -
 INPUT FILE = 200359OV

- VERSION: 1997.02d RUN DATE (MON/DAY/YR) = 09/15/2004
 USER NO. = AHYMO-I-9702c01000R31-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 =
START										1
RAINFALL TYPE= 1										
COMPUTE NM HYD	103.10	-	1	.03095	78.92	2.865	1.73552	1.500	3.984 PER IMP=	
FINISH										

TIME= .00
 RAIN6= 2.200

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 200359

Comment: EXISTIING 42" PIPE FLOW CAPACITY

Solve For Actual Depth

Given Input Data:

Diameter.....	3.50 ft
Slope.....	0.0821 ft/ft
Manning's n.....	0.012
Discharge.....	240.68 cfs

Computed Results:

Depth.....	2.31 ft
Velocity.....	35.81 fps
Flow Area.....	6.72 sf
Critical Depth....	3.48 ft
Critical Slope....	0.0459 ft/ft
Percent Full.....	65.86 %
Full Capacity.....	312.30 cfs
QMAX @.94D.....	335.94 cfs
Froude Number.....	4.44 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 200359

Comment: PROPOSED 36" PIPE FLOW CAPACITY

Solve For Actual Depth

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0316 ft/ft
Manning's n.....	0.012
Discharge.....	78.92 cfs

Computed Results:

Depth.....	1.70 ft
Velocity.....	19.10 fps
Flow Area.....	4.13 sf
Critical Depth....	2.76 ft
Critical Slope....	0.0104 ft/ft
Percent Full.....	56.66 %
Full Capacity.....	128.45 cfs
QMAX @.94D.....	138.17 cfs
Froude Number.....	2.85 (flow is Supercritical)