

REVISED
**PALOMAS PARK SUBDIVISION
DRAINAGE REPORT**

PREPARED FOR:

**BROWN AND ASSOCIATES, INC.
3411 CANDELARIA N.E.
ALBUQUERQUE, NEW MEXICO 87108**

PREPARED BY:

**BOHANNAN-HUSTON, INC.
7500 JEFFERSON N.E.
ALBUQUERQUE, NEW MEXICO 87109**

ENGINEER: JAMES TOPMILLER, P.E. 9354

JUNE 1992

JOB NO. 91181.05



The church site, at the southeast corner of the site, retains its developed condition runoff. Review of the approved drainage report for the church site, in City files, indicates that the existing retention pond is to be removed with development of the property to the west (the site of this report).

Infrastructure

The Domingo Baca Channel (concrete-lined channel) project, only recently completed, constructed two storm drain stubouts from the channel to the site. One, a 36" RCP pipe, was installed at the old Rancho de Palomas right-of-way, or approximately midway along the site's north boundary line. A second pipe, a 60" diameter RCP stubout, was constructed at the site's northwest corner.

Flowrates

The undeveloped site (including the existing park site, generates approximately 21 cfs in the 10-year storm event and 67 cfs in the 100-year storm event.

The church site in its existing developed condition is anticipated to generate approximately 23.43 cfs in the 100-year storm.

PROPOSED (DEVELOPED) HYDROLOGIC AND HYDRAULIC CONDITIONS

Proposed Development

The site is proposed to be developed into a single-family residential subdivision of 171 lots, called Palomas Park Subdivision. All infrastructure, except for a single backyard channel and retaining walls, will be public. The existing park site is to be reconfigured and will be partially developed by the subdivision. Additionally, the site's south boundary line, common with the church and near Wyoming Boulevard will be slightly replatted to conform with a previous zone change letter of conditions.

Please note that, due to a late change, two lots are labeled 10-A and 11-A. This explains why the highest lot number is only 169 when there are a total of 171 lots.

Drainage Management Concept

Drainage from the developed site will be diverted northward to the new Domingo Baca Channel. Due to the need to balance earthwork across the site, only the 60" RCP stubout will be utilized to pass flows to the channel. The 36" stubout is too high to utilize and meet earthwork needs for the site. Streets and stormdrains will carry stormwater generated by the site to the 60" RCP. The existing retention pond of the church will be removed by agreement with the church and its flows passed onto the site. Flows will also be accepted from the proposed park site and passed through the site. Tract D will be dedicated to the City as right-of-way. With development of Phase 1-A (the second development phase), a final grading/drainage plan for that phase will identify surface improvements to the Tract D.

PURPOSE OF REPORT

The purpose of this report is to present the existing and proposed hydrological conditions of the proposed Palomas Park Subdivision (formerly Santa Barbara South Subdivision). Preliminary grading and hydraulic concepts are also submitted.

This drainage report is submitted to support preliminary plat approval, Phase 1 final plat, Phase 1 building permit and rough grading approvals. Final grading and other construction drawings will be submitted in the near future prior to requesting building permit approvals for future. The Preliminary Plat is enclosed for reference. The Final Plat for Phase 1 is also enclosed.

METHODOLOGIES

The Development Process Manual, Chapter 22, as recently revised (August 1991), is used for the hydrological and hydraulic analyses of this report.

SITE DESCRIPTION AND CHARACTERISTICS

The roughly 30-acre site is located immediately west of Wyoming Blvd. and immediately south of the recently constructed, concrete-lined Domingo Baca Channel. A Site Vicinity map is provided on Sheet 1 of 3, enclosed in the rear pocket of this report.

The site is bounded on the west by a large developed mobile home park and on the south by a developed single family residential subdivision. A church is located at the site's southeast corner. An existing, undeveloped 1.9-acre park site is located in the northeast corner of the site.

The site's existing ground slope is approximately 2-3% sloping downward in a westerly direction. Soils across the site are sandy-gravelly soils and are specifically identified by the Soils Map shown on Sheet 2 of 3 enclosed in the rear pocket of this report.

Floodplains, as defined by FEMA Floodway Maps, do not occur on the property but are confined to the Domingo Baca Channel near the north boundary of the site.

EXISTING HYDROLOGIC AND SITE DRAINAGE CONDITIONS

Onsite and Offsite Watershed Conditions

Existing site drainage is limited to that generated within the boundaries of the property being studied. No offsite drainage watersheds contribute to onsite flows. Wyoming Boulevard to the east diverts flow from upstream and transfers it either north to the Domingo Baca or south along the Wyoming Boulevard corridor. Flows from the areas north, south and west of the site are also non-contributing. Existing topography, confirming the statements above, can be reviewed on Sheet 1 of 3. Due to the simplicity of the existing drainage patterns of the property, no separate drainage sheet is provided solely for the existing, undeveloped site condition.

The flows from the site drain in a primarily sheet-flow fashion to the west boundary line. Ponding against an earthen berm of varying height occurs at this boundary. Overflow of the berm appears to occur at a point midway along the west boundary. The overflow passes into the mobile home park.

Phasing

The site's platting and construction is proposed to be phased. Approximately five or six phases are anticipated. Phases 1 and 1-A are identified on the preliminary plat (DRB-91-174) enclosed. Along with the overall ultimate site development requirements, only the drainage plan for Phase 1 is described in detail in this report. Future phases will require submittals of final grades and drainage details similar to that shown on Sheet 3 of 3 for Phase 1.

The extent and scope of each future phase will determine the required infrastructure. Of particular note, the existing retention pond of the church will be removed under a future phase and only upon planned development of the phase immediately adjacent to the pond.

Hydrology

Sheet 1 of 3 identifies the drainage basins of the developed site. The basins are drawn such to determine key flowrate information for site analysis. Tables 1, 2 and 3, provided at the rear of the text, provide a tabular presentation of key hydrological design information and flowrates for the developed condition. Table 1 is basin hydrology information.

Under ultimate, fully developed conditions, the site generates approximately 98.5 cfs in the 10-year storm event and 148.8 cfs in the 100-year storm event.

Street Hydraulics (Ultimate Development)

Table 2 identifies analysis point information, including flow depth in streets and the identification of the type of curb needed for each street reach. All street flows are confined vertically to the top of curb. Where mountable curb depth is exceeded, standard curb is used. Please reference the plans for locations of each.

Table 3 analyzes critical intersections for velocity, depth and hydraulic jump data. Slopes in the reaches/intersections analyzed are 1% or less resulting in subcritical flow for the flowrates entering them. Accordingly, no hydraulic jumps will occur at these intersections and flow will remain within the curb.

Storm Drain System

The storm drainage infrastructure is concentrated in or adjacent to Storrie Place because of its flat slopes and lot fronts on only one side. As a final precaution, Tract D is designed as an outlet for any street overflows in the event of complete storm drain system failure.

To collect site flows, storm drain inlets are placed along Storrie Place intersections with incoming streets. All upstream inlets are Type "A" inlets while downstream easements are double Type "c"s. See the Appendix for hydraulic calculations and Sheet 1 of 3 for the design of and approximate locations of these inlets. Final construction drawings will place these inlets exactly so as to avoid conflicts with other utilities and driveways.

A public underground storm drain system will transfer flow from the inlets to the existing 60" RCP storm drain. See the Appendix and Sheet 1 of 3 for the flows, design and approximate locations of this system. As stated, Tract D will be dedicated as right-of-way to the City and will act as a

spillway for any potential storm drain system failure.

In Basin L, private backyard ponds will be required to retain rear-yard flows. The existing utility easement on the west property line will be vacated by plat. The calculations for sizing this pond and a construction detail are provided in the Appendix and on Sheet 2 of 3.

Upon development of lots immediately adjacent to the church site, the retention pond will be filled and paved over. Flows from the church site (Basin A) will be directed to the planned emergency access drive and passed to the site.

Preliminary Grading Plan

Sheet 1 of 3 identifies proposed preliminary grading of the site in order to accomplish the goals of the drainage management plans provided in this report. The proposed grading also provides for a roughly balanced site in terms of anticipated earthwork.

PHASE 1 DEVELOPMENT

Hydrology and Hydraulics

Sheet 3 of 3 identifies the Phase 1 development drainage management plan. Temporary drainage improvements are required to affect the drainage plan. Temporary retention ponds are to be constructed at the termini of Palomas Park Place and Laster Avenue. The north retention pond is anticipated to remain in service until construction of permanent facilities in Phase 1-A, immediately east of Phase 1. The ponds are sized for 2 - 100-year (6-hour) storm events volume (see Appendix) from Basins F (1.82 ac-ft) and B-1 (0.82 ac-ft).

Preliminary Grading Plan

Preliminary grades for Phase 1 streets and lots are shown on Sheet 3 of 3. The public retention ponds are also identified on this plan.

EROSION CONTROL

An erosion control berm is supplied at each lot on its downstream perimeter boundaries. Please reference the detail shown on the Sheet 2 of 3 enclosed in the rear pockets of this report.

APPROVALS SOUGHT BY THIS SUBMITTAL

Ultimate Development:

Preliminary Plat

Phase 1:

Final Plat
Rough Grading
Building Permit

CONCLUSION

This report has presented a drainage management plan for the proposed Palomas Park Subdivision. The plan provides safe and adequate drainage protection for the proposed development. It is recommended that this plan be approved as requested.

HYDRO CALCULATIONS - PALOMAS PARK

BASIN	AREA (AC)	TREAT B (AC)	TREAT C (AC)	TREAT D (AC)	Q ₁₀ (CFS)	Q ₁₀₀ (CFS)
A	5.00	0.4	0.45	4.15	15.62	23.43
* B	5.555	1.0277	1.0277	3.4997	15.18	23.70
C	0.57	0.0777	0.0777	0.4233	1.72	2.57
D	2.38	0.4293	0.4293	1.5264	6.55	10.23
E	0.17	0.02	0.02	0.13	0.51	0.77
F	5.28	2.4426	0.78	2.0621	12.46	18.69
G	0.36	0.17	0.02	0.17	0.91	1.36
* H	4.94	0.914	0.914	3.112	13.5	21.08
I	2.25	0.42	0.42	1.42	6.17	9.64
J	2.48	0.4468	0.4468	1.5887	7.12	10.68
* K	0.87	0.161	0.161	0.5481	2.42	3.71
* L	1.02	0.1887	0.1887	0.6426	2.79	4.35
M	0.50	0.0925	0.0925	0.315	1.40	2.10
* H-1	2.41	0.4459	0.4459	1.5183	6.59	10.28
* H-2	2.57	0.4755	0.4755	1.6191	7.02	10.97
TOTALS					99.96	153.56

TABLE # 1



BOHANNAN-HUSTON INC.

PROJECT NAME PALOMAS PARK

SHEET 1 OF 1

PROJECT NO. _____ BY K. PATTON DATE 6-17-92

SUBJECT HYDRO CALCULATIONS

CH'D _____ DATE _____

TABLE #2

ANALYSIS POINT	CONTRIBUTING BASIN(S)	Q ₁₀₀ (cfs)	Q ₁₀ cfs	STREET SLOPE	(FT) STREET WIDTH	(CFS) STREET CAPACITY		(FPS)	(FT)	(FPS)	(26.5)	REMARKS
						8" curb	4" curb	100 YR FLOW DEPTH	10 YR FLOW DEPTH	10 YR VELOCITY	10 YEAR V x D	
AP-1	A (church)	23.43	15.62	2.4%	26'	121.9	23.82	0.328	0.284	3.84	1.09	OK MTB CURB
AP-2	H-2	10.97	7.02	1.0%	26'	78.7	15.38	0.294	0.253	2.22	0.562	OK MTB CURB
AP-3	D	10.23	6.55	2.3%	26'	119.3	23.34	0.25	0.21	2.9	0.609	OK MTB CURB
AP-4	B, C, D, E	37.27	23.96	2.2%	26'	116.7	22.82	0.400	0.336	4.40	1.478	OK STD CURB
AP-5	AP-6, G	20.05	13.37	2.66%	26'	128.3	25.06	0.305	0.265	3.74	0.991	OK MTB CURB
AP-6	F	18.69	12.46	3.2%	28'	147.3	27.26	0.290	0.253	3.94	0.997	OK MTB CURB
AP-7	AP-4, I	46.91	30.13	1.0%	26'	78.7	15.38	0.524	0.431	3.85	1.659	OK STD CURB
* AP-10	AP-15R, H-1, K, AP-2R, AP-7R AP-11R			0.5%	26'	55.6	10.84					
AP-11	AP-5, J	30.73	20.49	1.0%	26'	78.7	15.38	0.435	0.368	3.28	1.207	OK STD CURB
AP-12	PIPE FLOW	147.11	95.77	0.3%	Ø=60" RGP							
AP-15	AP-1, H	44.51	29.12	2.1%	26'	114.0	22.3	0.435	0.366	4.72	1.728	OK STD CURB
AP-9	H-1, AP-2R AP-15R, AP-7R	50.77		0.5%	26'	55.6	10.84	0.640				STD CURB
AP-8	AP-9, K	54.48		0.5%	26'	55.6	10.84	0.663				STD CURB

* THE R DESIGNATION FOLLOWING AN "AP" POINT REFERS TO ITS RESIDUAL AFTER CROSSING AN INLET.

PROJECT NAME Phonms Park SHEET OF
 PROJECT NO. C9118104 BY K. Patton DATE
 SUBJECT STREET FLOW CHARACTERISTICS CHD DATE

BOHANNAN-HUSTON INC.

TABLE #3

INTERSECTION FLOW ANALYSIS
(CRITICAL INTERSECTIONS)

POINT DESIGNATION INTERSECTION	Q	STREET WIDTH	SLOPE	DEPTH	VELOCITY	FN	CRITICAL DEPTH	CRITICAL VELOCITY	JUMP DEPTH	FLOW CHARACTERISTICS	REMARKS
AP-2R # 1	19.62	26	0.01	0.362	3.22	0.94313	0.34818	3.34781	N/A	SUB-CRITICAL FLOW	MAX. DEPTH = 0.472'
STORRIE-Upstream	6.68	26	0.005	0.278	1.72	0.57488	0.19224	2.48736	N/A	SUB-CRITICAL FLOW	
STORRIE-Downstream	26.3	26	0.005	0.472	2.93	0.75157	0.39021	3.54417	N/A	SUB-CRITICAL FLOW	
AP-7R # 2	14.19	26	0.01	0.321	2.81	0.87403	0.29348	3.07352	N/A	SUB-CRITICAL FLOW	MAX. DEPTH = 0.472'
STORRIE-Upstream	26.3	26	0.005	0.472	2.93	0.75157	0.39021	3.54417	N/A	SUB-CRITICAL FLOW	
AP-9	50.77	26	0.005	0.64	3.84	0.84589	0.57246	4.29304	N/A	SUB-CRITICAL FLOW	
AP-11R # 3	13.59	26	0.01	0.316	2.76	0.86524	0.28697	3.03923	N/A	SUB-CRITICAL FLOW	
AP-8R	14.63	26	0.005	0.37	2.41	0.69821	0.29124	3.06176	N/A	SUB-CRITICAL FLOW	

Maximum
Depth of Flow in
intersection is
equal to depth of
downstream flow depth.

Intersection #1
Capitan & Storrie

Intersection #2
Cardiff and Storrie

Intersection #3
Lester and Storrie

NOTE: The intersection of Palomas Park / Cardiff,
as all of the 0.5% slopes shown in
the above Table, has subcritical
flows. No jump will occur and flow
will remain confined to curbs.

SHEET 1 of 2

SUMMARY OF HYDRAULIC CALCULATIONS

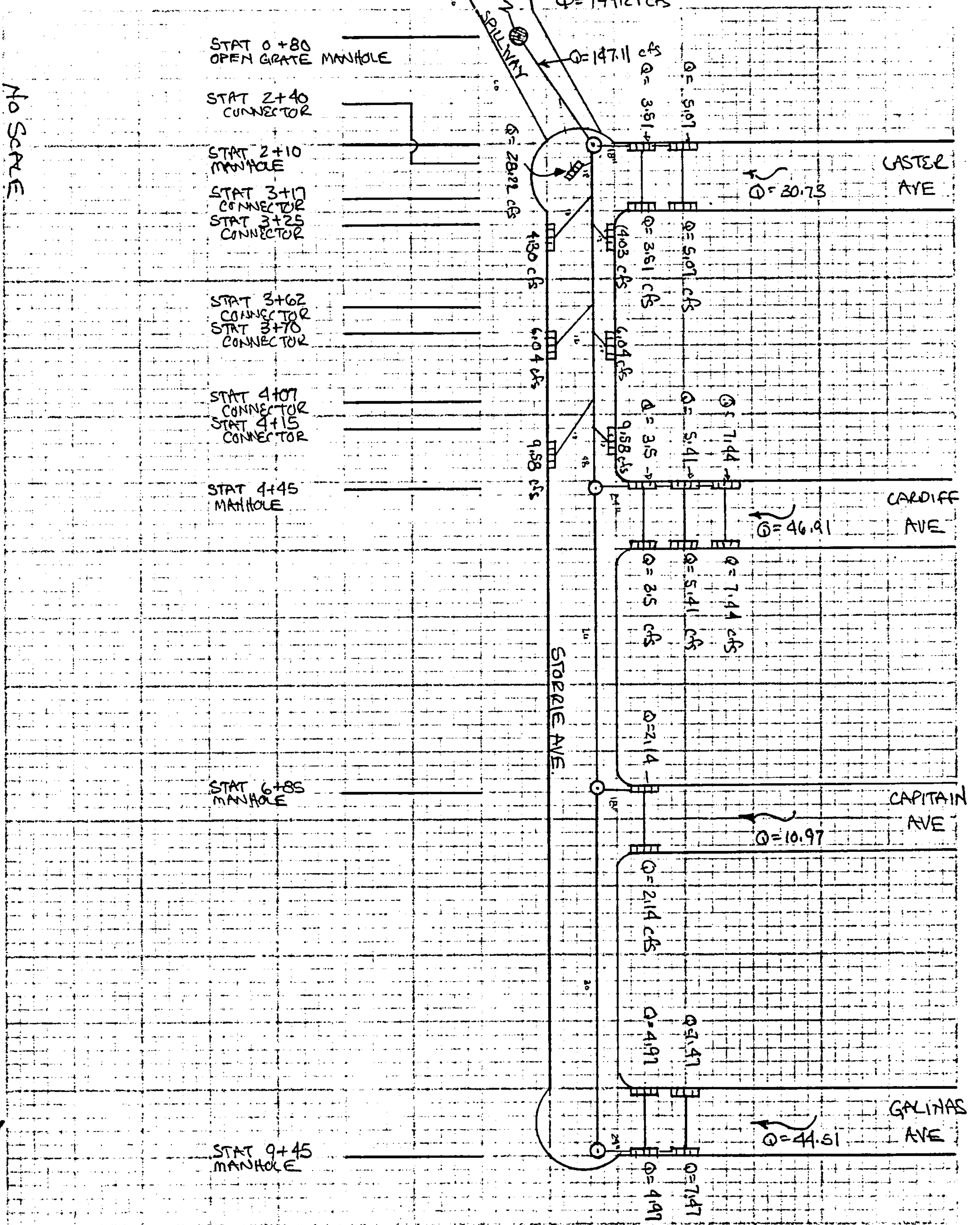
Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	Dia.	Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV
0+00	CHANNEL											0.00	0.00	0.00	0.00	0.00		5339.28		0.81
		60	149.2	19.63	7.60	2603	0.0033	80.00			0.26					0.26				
0+80	MANHOLE								60	15		0.07	0.00	0.00	0.00	0.07	5339.54	5339.55		0.87
		60	147.1	19.63	7.49	2604	0.0032	130.00			0.41					0.41				
2+10	MANHOLE								60	45		0.17	0.79	0.00	0.03	0.99	5339.97	5340.17		1.66
		48	130.0	12.57	10.34	1436	0.0082	30.00			0.25					0.25				
2+40	CONNECTOR								48	0		0.00	-0.12	0.00	0.00	-0.12	5340.41	5340.94		1.02
		48	101.7	12.57	8.10	1436	0.0050	77.00			0.39					0.39				
3+17	CONNECTOR								48	0		0.00	0.08	0.00	0.00	0.08	5341.32	5341.49		0.93
		48	97.4	12.57	7.75	1436	0.0046	8.00			0.04					0.04				
3+25	CONNECTOR								48	0		0.00	-0.03	0.00	0.00	-0.03	5341.53	5341.69		0.75
		48	93.1	12.57	7.41	1436	0.0042	37.00			0.16					0.16				
3+62	CONNECTOR								48	0		0.00	0.09	0.00	0.00	0.09	5341.85	5342.04		0.65
		48	87.1	12.57	6.93	1436	0.0037	8.00			0.03					0.03				
3+70	CONNECTOR								48	0		0.00	0.08	0.00	0.00	0.08	5342.07	5342.14		0.65
		48	81.0	12.57	6.45	1436	0.0032	37.00			0.12					0.12				
4+07	CONNECTOR								48	0		0.00	0.06	0.00	0.00	0.06	5342.26	5342.46		0.5
		48	71.4	12.57	5.69	1436	0.0025	8.00			0.02					0.02				
4+15	CONNECTOR								48	0		0.00	-0.08	0.00	0.00	-0.08	5342.48	5342.53		0.38
		48	61.9	12.57	4.92	1436	0.0019	30.00			0.06					0.06				
4+45	MANHOLE								48	0		0.00	0.65	0.00	0.00	0.66	5342.58	5343.06		0.55
		30	29.2	4.91	5.94	410	0.0051	240.00			1.21					1.21				
6+85	MANHOLE								30	0		0.00	0.00	0.00	0.03	0.03	5344.28	5343.88		0.98
		24	24.9	3.14	7.93	226	0.0121	260.00			3.15					3.15				
9+45	MANHOLE								24	0		0.00		0.00		0.00	5347.03	5347.03		0.98
		24	24.9	3.14	7.92	226	0.0121	70.00			0.85					0.85				
10+15	INLET								24	90		0.19		0.00		0.19	5347.87			0.97

SUMMARY OF HYDRAULIC CALCULATIONS

SHEET 2 OF 2

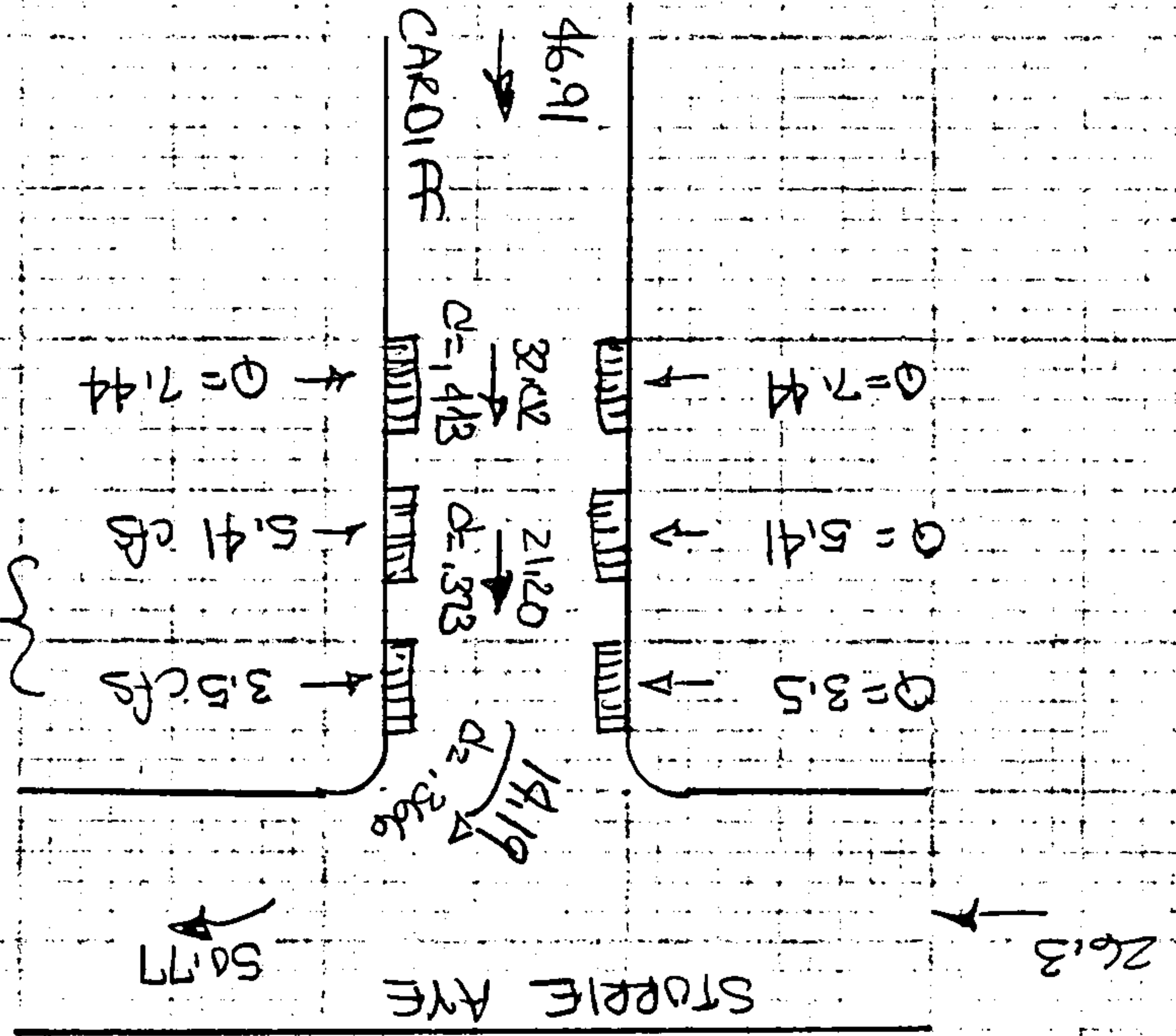
Station	Structure	Diam.	EGL(dn)	EGL(up)	Dia. 3	Dia. 3 area	Dia. 1&2 (hidden)	Angle	Hj	Ht(inc.)	Ht(dec.)	Actual Slope	Depth
0+00	CHANNEL		5340.09	5340.09	0.00	0.00		0.00	0	0.0000	0.0000		0
		60											0.00
0+80	MANHOLE		5340.35	5340.43	0.00	0.00		0.00	0	0.0000	0.0000		0.00
		60											0.00
2+10	MANHOLE		5340.84	5341.83	18.00	1.77		45.00	-0.6649	0.0000	0.0252		0.00
		48											0.00
2+40	CONNECTOR		5342.07	5341.96	18.00	1.77		45.00	0.52467	0.0000	0.0000		0.00
		48											0.00
3+17	CONNECTOR		5342.34	5342.43	18.00	1.77		41.00	0.16814	0.0000	0.0000		0.00
		48											0.00
3+25	CONNECTOR		5342.46	5342.44	18.00	1.77		45.00	0.16131	0.0000	0.0000		0.00
		48											0.00
3+62	CONNECTOR		5342.59	5342.68	18.00	1.77		41.00	0.19125	0.0000	0.0000		0.00
		48											0.00
3+70	CONNECTOR		5342.71	5342.79	18.00	1.77		45.00	0.17729	0.0000	0.0000		0.00
		48											0.00
4+07	CONNECTOR		5342.91	5342.97	18.00	1.77		41.00	0.20168	0.0000	0.0000		0.00
		48											0.00
4+15	CONNECTOR		5342.99	5342.90	18.00	1.77		45.00	0.18543	0.0000	0.0000		0.00
		48											0.00
4+45	MANHOLE		5342.96	5343.61	24.00	3.14		90.00	0.48047	0.0000	0.0032		0.00
		30											0.00
6+85	MANHOLE		5344.83	5344.85	18.00	1.77		90.00	-0.171	0.0000	0.0280		0.00
		24											0.00
9+45	MANHOLE		5348.00	5348.00	24.00	3.14		90.00	0.01523	0.0000	0.0122		0.00
		24											0.00
10+15	INLET		5348.85		24.00	3.14		90.00					

BOHANNAN-HUSTON INC.
 STAT 0+00





AP-7
 $Q_{100} = 46.91 \text{ cfs}$
 Flow depth = 0.524
 Slope = 1.0 %



AP-9
 $Q_{100} = (AP-2R + AP-5R + AP-7E) + \text{Basin H-1} = 40.49 + 10.28 = 50.77 \text{ cfs}$

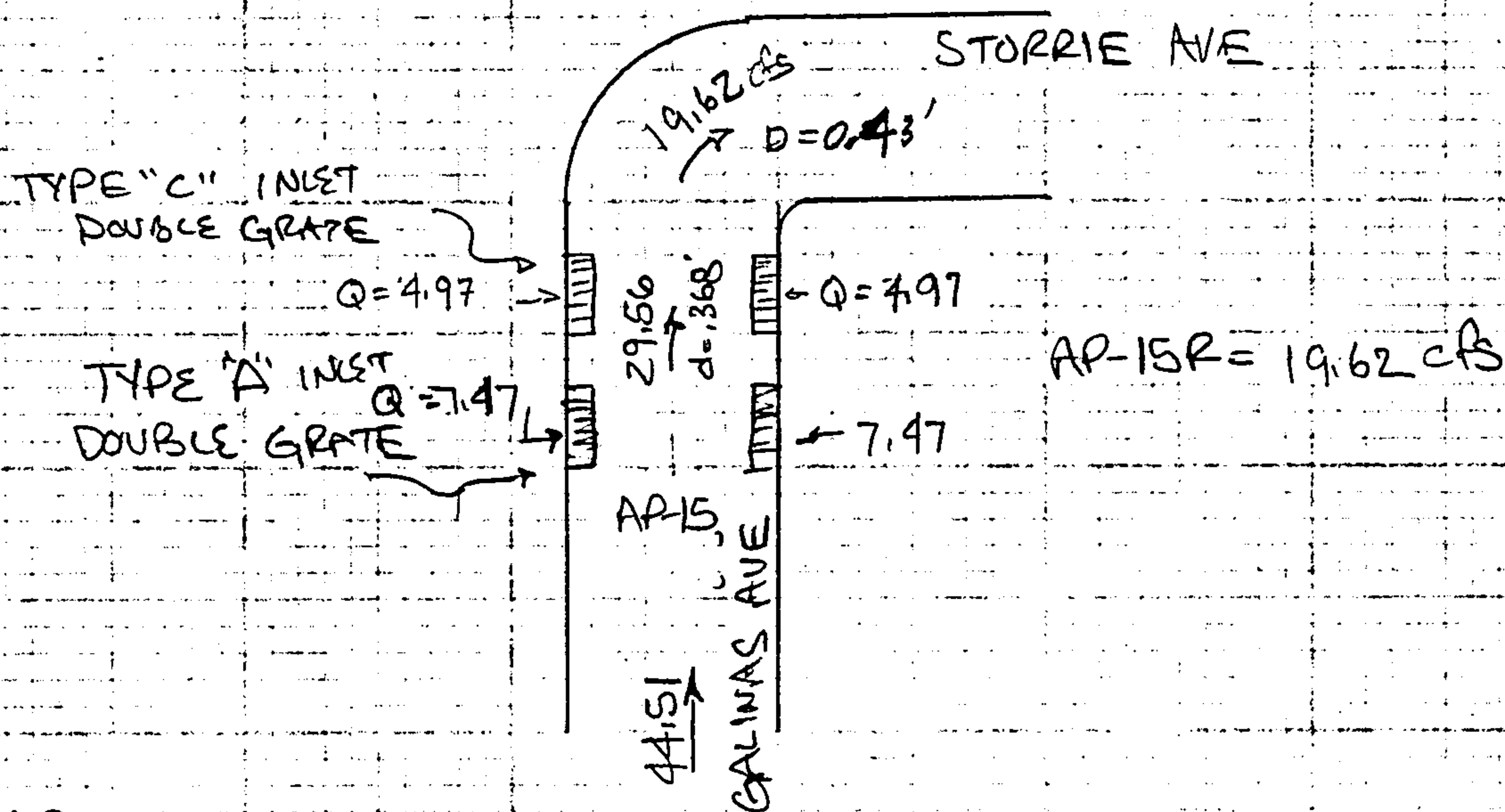
AP-8
 $Q_{100} = (AP-9) + \text{Basin K} = 50.77 + 3.71 = 54.48 \text{ cfs}$
 Flow depth = 0.663
 Slope = 0.6 %

AP-15

$Q_{100} = 44.51 \text{ cfs}$

Flow depth 0.435 ft

Slope = 2.1%

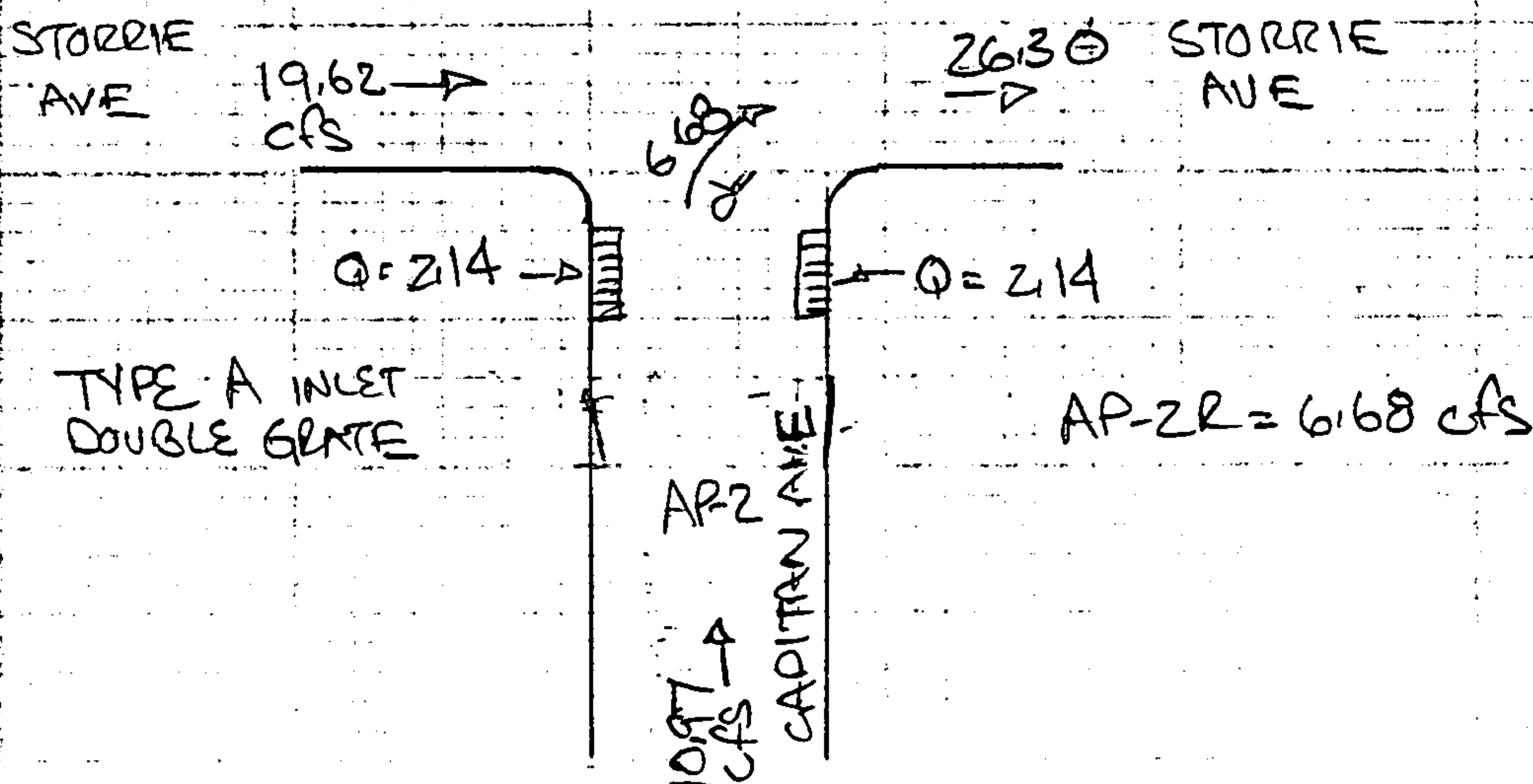


AP-2

$Q_{100} = 10.97 \text{ cfs}$

Flow depth = 0.294 ft

Slope = 1.0%



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

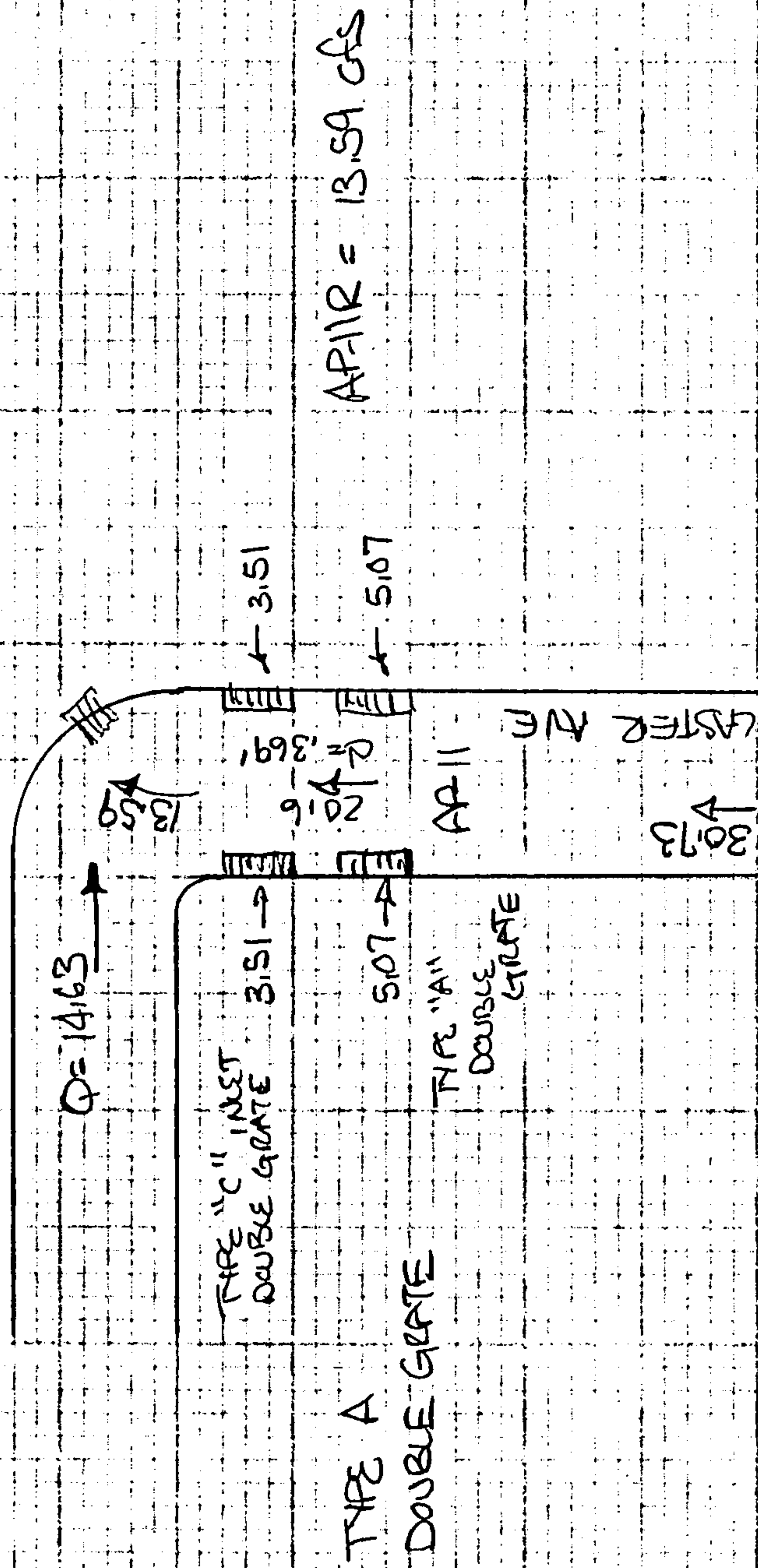
SUBJECT INLET _____ CH'D _____ DATE _____

AP-11

$Q_{100} = 30.73$

Flow depth = 0.435

Slope = 1.0%



APIIR = 13.59 cfs



BOHANNAN-HUSTON INC.

PROJECT NAME

SHEET

OF

PROJECT NO.

BY

DATE

SUBJECT

CH'D

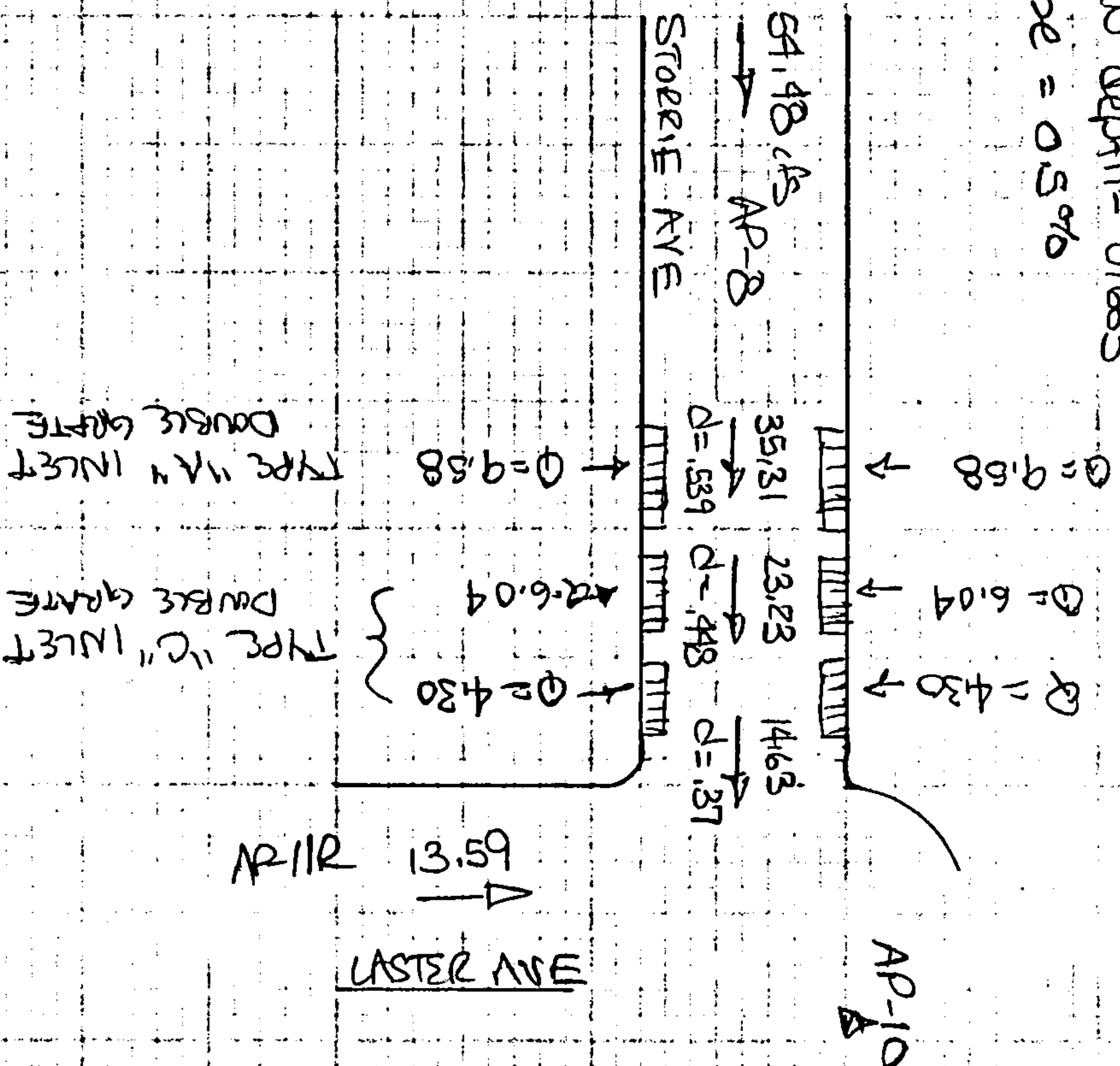
DATE

香

$Q_{100} = 54.48 \text{ cfs}$

$$\text{Flow depth} = 0.1663$$

Slope = 0.5%



7-10

$$Q_{100} = 28.22 \text{ cfs}$$

Sump condition

Assume 30% clogging factor

$Q = 36.69$ of 5

From rating curve enclosed a head of 0.8 FT is needed using a double grate Type 'D' inlet.



BOHANNAN-HUSTON INC.

PROJECT NAME

SHEET

OF

PROJECT NO.

BY _____

DATE _____

SUBJECT

$$-\text{CH}_2\text{D}$$

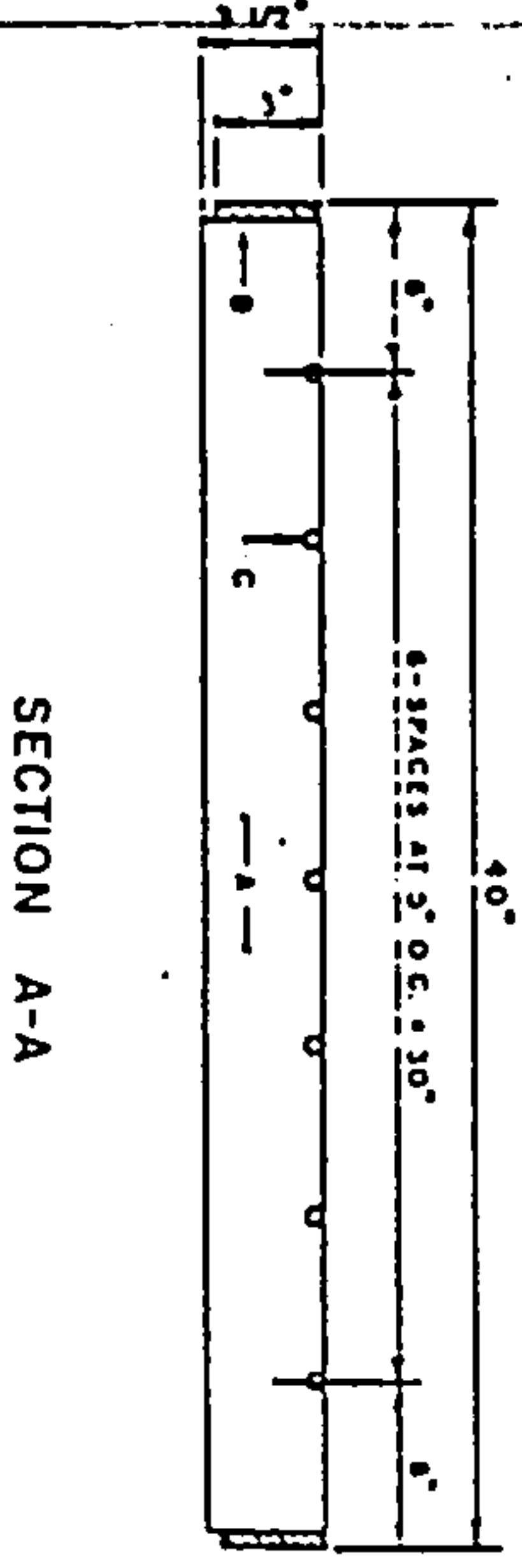
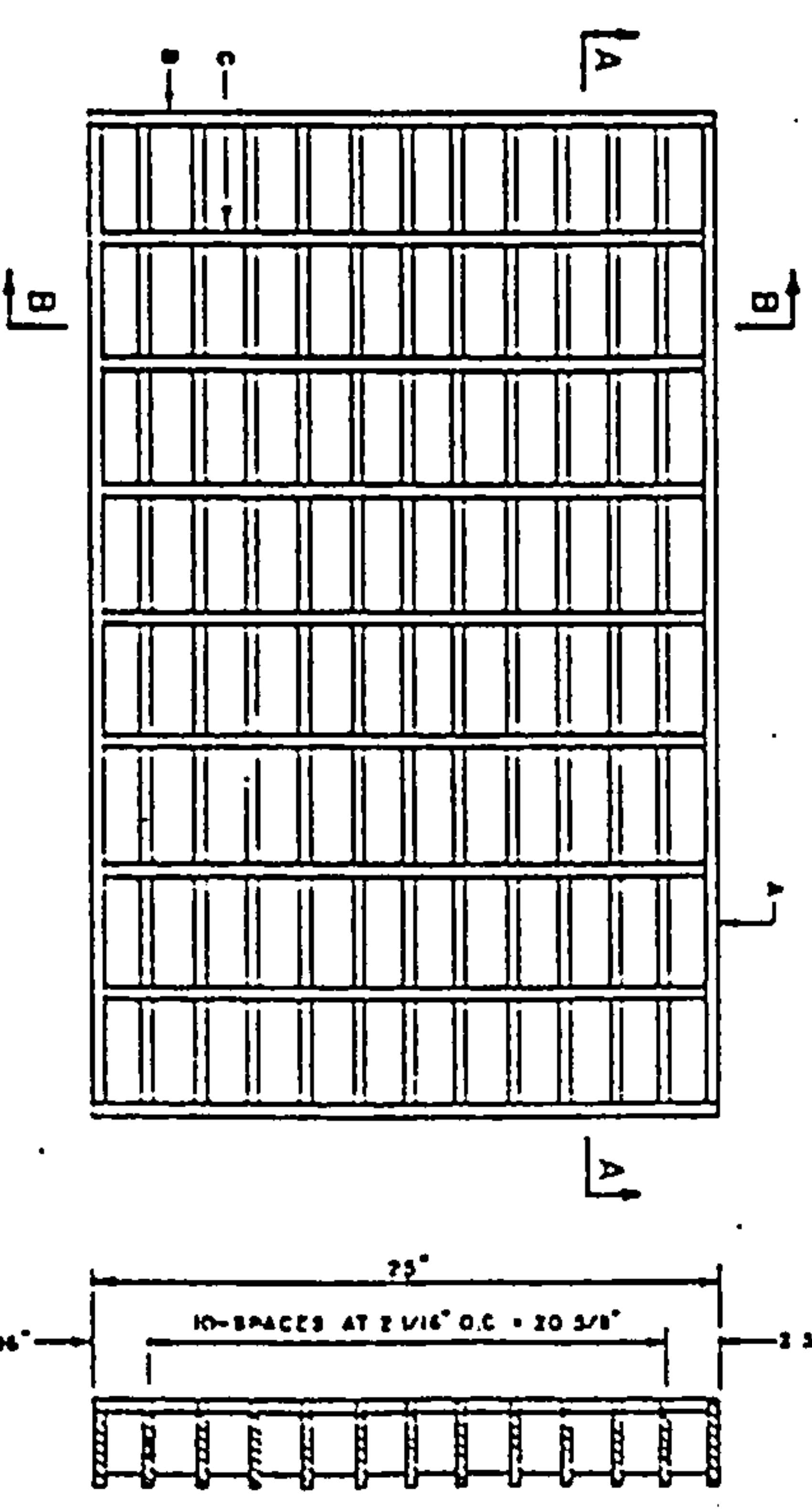
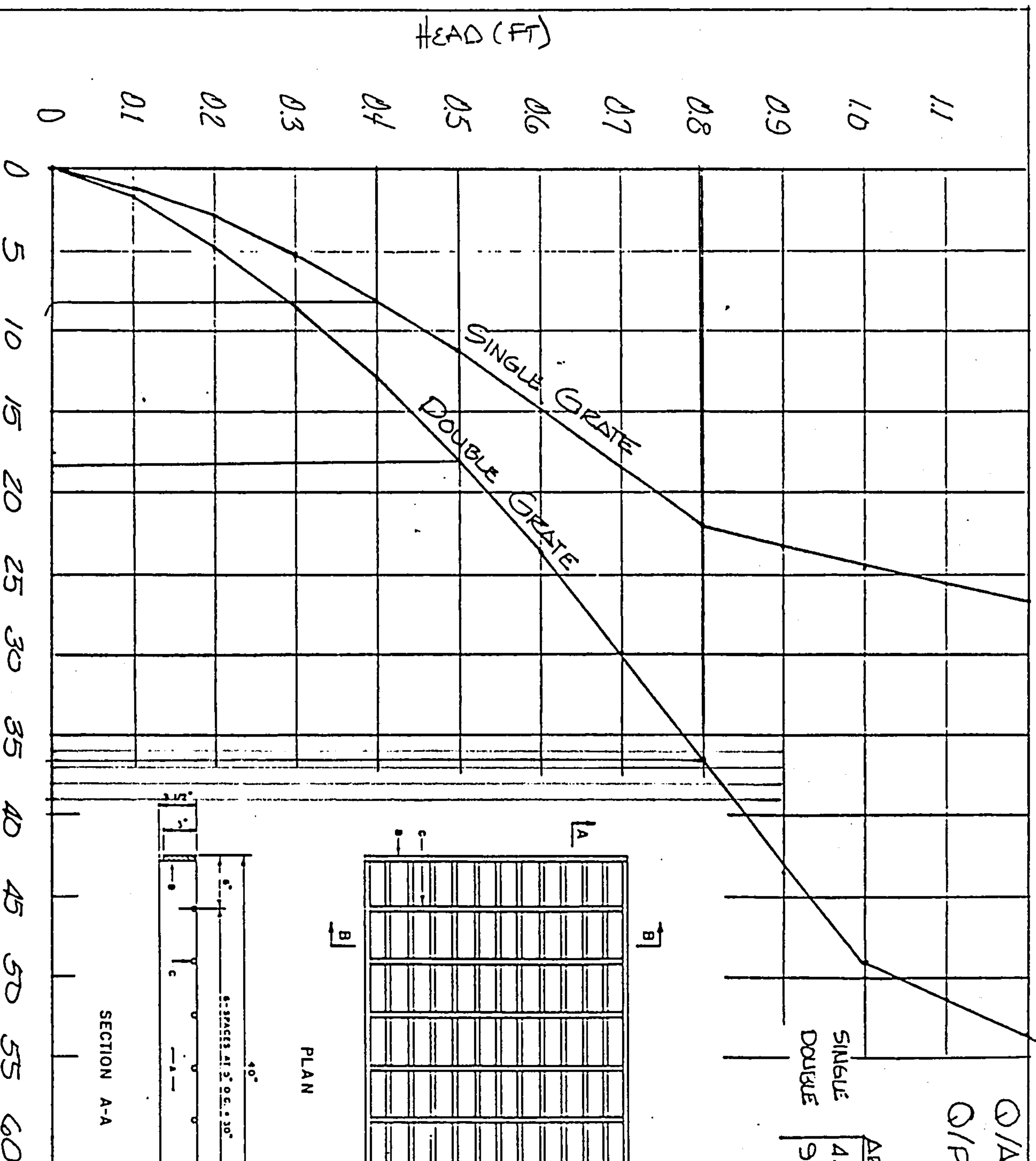
DATE _____

RATING CURVE FOR TYPE O INLET IN A SUMP

$$Q/A = 5.37 H^{1/2}$$

$$Q/P = 3.0 H^{3/2}$$

AREA	Q	PEAK Q	Q
4.56	24.9 H ^{1/2}	10.5	31.5 H ^{3/2}
9.12	49.0 H ^{1/2}	17.0	51.0 H ^{3/2}



DISCHARGE (CFS)

5/14/59

Hydrology (Retention Ponds)

To size the retention basin for phase 1

for Basin F & Basin B-1. Bernalillo County Storm Drainage Ordinance p. 8

The storms being used will be

2-100 yr-6 hr storm Back to Back or

1-100 yr-10 day storm 0

Volume no less than 1-100 yr-24 Hour storm w/o infiltration

and the greater storm will be used to size the retention basin & spillway.

Basin B-1

Area total = 2.37 Acres

w/ the following Distribution

Treatment B = 1.33 Acres

Treatment C = 0.03 Acr

Treatment D = 1.01 Ac

$$\text{Weight } E = \frac{(.92)(1.33) + (1.29)(.03) + 2.36(1.01)}{2.37 \text{ Ac}}$$

$$E = 1.538 \text{ inches}$$

$$\text{Volume (V}_{360}\text{) 6 hr storm} = \frac{1.538 \text{ inches}}{12} (2.37 \text{ Acres}) = 0.30 \text{ Ac Ft.}$$



BOHANNAN-HUSTON INC.

PROJECT NAME Santa Barbara SHEET 1 OF 4
PROJECT NO. 91181.05 BY mt DATE 6-1-92
SUBJECT Pond Volumes CH'D _____ DATE _____

Basin B-1

100-yr - 6 hr storm Back to Back w/ 2nd storm
w/o infiltration provided.

$$P_{360} = 2.60 \text{ inches}$$

$$E = 1.538 + 2.60 \text{ in} = 4.14 \text{ inches}$$

$$\text{Volume} = \frac{4.14 \text{ inches}}{12 \text{ in/ft}} (2.37) = 0.817 \text{ Ac-FT.}$$

100 yr - 10 day storm

$$\text{Volume (10 day)} = V_{360} + AD (P_{10 \text{ days}} - P_{360}) / 12 \text{ in ft}$$

$$V_{360} = .30 \text{ Ac FT.}$$

$$V = (.30) + 1.01 (4.90 - 2.60) / 12 = 0.49 \text{ Ac-FT.}$$

100 yr - 24 storm no infiltration

$$P_{24 \text{ hr}} = 3.10''$$

$$\text{Volume} = \left(\frac{3.10 \text{ in}}{12} \right) (2.37) = 0.61 \text{ Ac FT.}$$

∴ Volume of Pond for Basin B-1
1 = 2-100 yr - 6 hr storm back to back.

$$= 0.817 \text{ Ac-FT.}$$

Assume Pond depth 1.5' feet w/o Fence

$$\text{Area} = \frac{.817 (43560)}{1.5} = 23725.68 \text{ ft}^2 \text{ or } 155' \times 155'$$



PROJECT NAME Santa Barbara

PROJECT NO. 91181-05

SUBJECT Pond Volume

SHEET 2

OF 4

BY MT

DATE 6-1-92

CH'D

DATE

Basin F

$A_{\text{total}} = 5.28 \text{ Acres}$

w/ the following Distribution

treatment B = 2.44 Ac

treatment C = .78 Ac

Treatment D = 2.06 Ac

$$\text{Weight E} = \frac{(0.92)(2.44) + 1.29(.78) + 2.36(2.06)}{5.28 \text{ Ac}} \\ = 1.5365 \text{ inches}$$

$$\text{Volume (V}_{360}) = \frac{1.5365}{12} (5.28) = 0.676 \text{ Ac Ft.}$$

100 yr 6hr storm Back to Back w/ 2nd storm w/o.
no infiltration

$P_{30} = 2.60 \text{ inches}$

$$E = 1.5365 + 2.60 = 4.14 \text{ inches}$$

$$\text{Volume} = \frac{4.14}{12} (5.28) = 1.82 \text{ Ac Ft.}$$

100 yr - 10 day storm

$$\text{Volume (10 day)} = V_{360} + A_D (P_{10\text{day}} - P_{360}) / 12$$

$$V_{360} = .67 + 2.06 (4.90 - 2.60) / 12 = 1.06 \text{ Ac Ft}$$

100 yr - 24 storm no infiltration
 $P_{24H} = 3.10''$

$$\text{Volume} = \frac{3.10}{12} (5.28) = 1.36 \text{ Ac Ft}$$



PROJECT NAME Santa Barbara

PROJECT NO. 9118105

SUBJECT Pond Volume

SHEET 3

BY MA

CH'D

OF 4

DATE 6-1-92

DATE

Basin F

Volume of Pond for Basin F.
is 2-100yr -6hr storm Back to Back

$$= 1.82 \text{ Ac Ft}$$

Pond depth 1.5'

$$\text{Area} = \frac{1.82 \text{ Ac Ft} (43560)}{1.5} = 52852.80 \text{ ft}^2$$

or 230' x 230' Area



PROJECT NAME Santa Barbara

PROJECT NO. 91131.05

SUBJECT Pond Volume

SHEET 4

BY MH

CH'D

OF 4

DATE 6-1-92

DATE

Basin H

BOHANNAN-HUSTON INC.



PROJECT NAME Palomas Park SHEET 1 OF 7
PROJECT NO. BY K. PATTON DATE DATE
SUBJECT Q100 & Q10 & V360 CH'D DATE

LOCATION: Zone 3

Total Area = 4.94 acre

Treatment B = 0.914 ac (8.5%)
Treatment C = 0.914 ac (8.5%)
Treatment D = 3.112 ac (63.0%)

100 YR STORM

Excess Precipitation & Volume

WEIGHTED E - 6 hour storm

$$E_w = \frac{(0.914 \times 0.92) + (0.914 \times 1.29) + (3.112 \times 2.86)}{4.94}$$

$$E_w = 1.1896 \text{ inches}$$

Volume

$$V_{360} = (1.1896 / 12) \times 4.94 = 0.032 \text{ acre-ft}$$

$$V_{360} = 0.032 \text{ acre-ft}$$

Peak Discharge - Q100

$$Q = C I A$$

I for Zone 3 = 5.38 in/hr @ t = 12 min

$$Q_{100} = I (ZCA) = 5.38 [(0.98 \times 0.914) + (0.64 \times 0.914) + (0.93 \times 3.112)]$$

$$Q_{100} = 5.38 (3.9178) = 21.08 \text{ cfs}$$

10 YR STORM

$$E_w = \frac{(0.914 \times 0.36) + (0.914 \times 0.62) + (3.112 \times 1.5)}{4.94}$$

$$E_w = 1.1263 \text{ inches}$$

$$\text{Volume } V_{360} = (1.1263 / 12) \times 4.94 = 0.4636 \text{ acre-ft}$$

$$V_{360} = 0.464 \text{ acre-ft}$$

Basin H

10 YR STORM CONTINUED

$$Q_{10} = CIA$$

I for Zone 3 = 3.65 in/hr @ $t_c = 12$ min

$$Q_{10} = I(ECA) = 3.65[(0.914 \times 133) + (0.914 \times 55) + (3.112 \times 93)]$$

$$Q_{10} = 3.65(3,698.5) = 13,499.5 \text{ cfs}$$

$$Q_{10} = 13.5 \text{ cfs}$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 2 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

BASIN H

Basin B

Location Zone 3

Total Area = 5.555 acre

Treatment B = 1.0277 ac (8.5%)

Treatment C = 1.0277 ac (8.5%)

Treatment D = 3.4997 ac (63%)

100 YEAR STORM

Excess Precipitation & Volume

Weighted E - 6 hour storm

$$EW = \frac{(1.0277 \times 0.92) + (1.0277 \times 1.29) + (3.4997 \times 2.36)}{5.555}$$

$$E_w = 1.8957 \text{ in}$$

$$\text{Volume } V_{360} = 1.8957/12 \times 5.555 = 0.8775 \text{ ac-ft}$$

Peak Discharge

$$I = 5.38 \text{ in/hr @ } t_c = 12 \text{ min}$$

$$Q_{100} = 5.38 [(0.48 \times 1.0277) + (0.64 \times 1.0277) + (0.93 \times 3.4997)]$$

$$Q_{100} = 5.38 (4.4057) = 23.7029$$

$$Q_{100} = 23.7 \text{ cfs}$$

10 YEAR STORM

Peak Discharge

$$I = 3.65 \text{ in/hr @ } t_c = 12 \text{ min}$$

$$Q_{10} = 3.65 [(0.33 \times 1.0277) + (0.55 \times 1.0277) + (0.93 \times 3.4997)]$$

$$Q_{10} = 3.65 (4.1591) = 15.1807$$

$$Q_{10} = 15.18 \text{ cfs}$$



BOHANNAN-HUSTON INC.

BASIN B

PROJECT NAME _____ SHEET 3 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Basin K

Location Zone 3

Total Area = 0.87

Treatment B = 0.161 ac (8.6%)

Treatment C = 0.161 ac (8.5%)

Treatment D = 0.5481 ac (63.%)

100 YEAR STORM

Excess Precipitation & Volume

Weighted E - 6 hour storm

$$E_w = \frac{(0.161 \times 0.92) + (0.161 \times 1.29) + (0.5481 \times 2.36)}{0.87} = 1.8$$

$$\text{Volume } V_{300} = (1.8958 / 12) \times 0.87 = 0.1374 \text{ ac-ft}$$

Peak Discharge - Q_{100}

$I = 5.38 \text{ in/hr @ } t = 12 \text{ min}$

$$Q_{100} = 5.38 [(0.161 \times 0.48) + (0.161 \times 0.64) + (0.5481 \times 0.93)] =$$

$$Q_{100} = 5.38 (0.6901) = 3.7125 \text{ cfs}$$

$$V_{300} = 0.137 \text{ a}$$

$$Q_{100} = 3.71 \text{ cfs}$$

10 YEAR STORM

Peak Discharge - Q_{10}

$I = 3.65 \text{ in/hr}$

$$Q_{10} = 3.65 [(0.161 \times 0.33) + (0.161 \times 0.55) + (0.5481 \times 0.93)] =$$

$$Q_{10} = 3.65 (0.6514) = 2.4104 \text{ cfs}$$

$$Q_{10} = 2.42 \text{ cfs}$$



BOHANNAN-HUSTON I

BASIN K

PROJECT NAME _____ SHEET 4 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Basin L

Location Zone 3

Total Area = 1.02 acre

Treatment B = 0.1887 ac (8.5%)

Treatment C = 0.1887 ac (18.5%)

Treatment D = 0.6426 ac (63%)

100 Year Storm

Excess Precipitation & Volume
Weighted E - 6 hr storm

$$E_w = \frac{(1.92 \times 0.1887) + (1.29 \times 0.1887) + (2.36 \times 0.6426)}{1.02} = 1.8957''$$

$$\text{Volume } V_{360} = (1.8957/12) \times 1.02 = 0.161 \text{ ac-ft}$$

Peak Discharge

$$V_{360} = 0.161 \text{ ac-ft}$$

$$I = 5.38 \text{ in/hr @ } t_c = 12 \text{ min}$$

$$Q_{100} = 5.38 [(1.48 \times 0.1887) + (1.64 \times 0.1887) + (1.93 \times 0.6426)]$$

$$Q_{100} = 5.38(0.809) = 4.3522 \text{ cfs}$$

$$Q_{100} = 4.35 \text{ cfs}$$

10 Year Storm

Peak Discharge

$$I = 3.65 \text{ in/hr}$$

$$Q_{10} = 3.65 [(1.1887 \times 0.33) + (1.1887 \times 0.55) + (1.93 \times 0.6426)]$$

$$Q_{10} = 3.65(1.7637) = 2.7874 \text{ cfs}$$

$$Q_{10} = 2.79 \text{ cfs}$$



BOHANNAN-HUSTON INC.

Basin L

PROJECT NAME _____ SHEET 5 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Basin H-1

Location Zone 3

Total Area = 241 ac

Treatment B = 0.446 ac (8.5%)

Treatment C = 0.446 ac (8.5%)

Treatment D = 1.518 ac (63%)

100 Year Storm

Excess Precipitation & Volume

$$E_{ex} = \frac{(.92 \times .446) + (1.29 \times .446) + (2.36 \times 1.518)}{241} = 1.8955''$$

$$\text{Volume } V_{360} = (1.8955 / 12) \times 241 = 0.3807 \text{ ac-ft}$$

Peak Discharge

$$V_{360} = 0.381 \text{ ac-ft}$$

$$I = 5.38 \text{ in/hr @ } t_c = 12 \text{ min}$$

$$Q_{100} = 5.38 [(.48 \times .446) + (.64 \times .446) + (.93 \times 1.518)]$$

$$Q_{100} = 538 (1.9113) = 10.2826 \text{ cfs}$$

$$Q_{100} = 10.28 \text{ cfs}$$

10 YEAR STORM

Peak Discharge

$$I = 3.65 \text{ in/hr}$$

$$Q_{10} = 3.65 [(.33 \times .446) + (.55 \times .446) + (.93 \times 1.518)]$$

$$Q_{10} = 1.8042 (3.65) = 6.5854 \text{ cfs}$$

$$Q_{10} = 6.59 \text{ cfs}$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 6 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Basin H-1

Basin H-2

Location Zone 3

Total Area = 2.57

Treatment B = 0.4755 ac (8.5%)

Treatment C = 0.4755 ac (8.5%)

Treatment D = 1.6191 ac (63%)

100 Year Storm

Excess Precipitation & Volume

$$E_w = \frac{(1.92 \times 0.4755) + (1.29 \times 0.4755) + (2.36 \times 1.6191)}{2.57} = 1.8957''$$

$$\text{Volume } V_{360} = (1.8957/12) \times 2.57 = 0.406 \text{ ac-ft}$$

Peak Discharge

$$I = 5.38 \text{ in/hr}$$

$$Q_{100} = 5.38 [(1.48 \times 0.4755) + (1.64 \times 0.4755) + (1.93 \times 1.6191)]$$

$$Q_{100} = 5.38 (2.0383) = 10.9662 \text{ cfs}$$

$$Q_{100} = 10.97 \text{ cfs}$$

10 Year Storm

Peak Discharge

$$I = 3.65 \text{ in/hr}$$

$$Q_{10} = 3.65 [(1.33 \times 0.4755) + (1.55 \times 0.4755) + (1.93 \times 1.6191)]$$

$$Q_{10} = 3.65 (1.9242) = 7.0233 \text{ cfs}$$

$$Q_{10} = 7.0233 \text{ cfs}$$



BOHANNAN-HUSTON INC.

Basin H-2

PROJECT NAME _____ SHEET 7 OF 7

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

BASIN H

Area

$$(485 \times 210) + (225 \times 460) + (390 \times 25)$$

101850

+

103500

+

9750

=

215,100 ft²

4.938 acre

BASIN H-2

Area

$$(460 \times 100) + (400 \times 145) + (.5 \times 90 \times 125) + (25 \times 90) = 111,875 \text{ ft}^2$$

2.5683 acre

BASIN L

Area

$$(35 \times 960) + (.5 \times 30 \times 45) + (315 \times 20) + (40 \times 40 \times .5)$$

$$+ (45 \times 55) + (15 \times 45 \times .5) + (10 \times 30 \times .5) = 44,337.5 \text{ ft}^2$$

1.018 acre

BASIN B

Area

$$(485 \times 160) + (.5 \times 65 \times 120) + (420 \times 95) + (45 \times 25) + (.5 \times 75 \times 25) +$$

$$(220 \times 200 \times .5) + (425 \times 200) + (115 \times 200 \times .5) = 241,962.5 \text{ ft}^2$$

5.555 acres

BASIN H-1

Area

$$(620 \times 45) - (.5 \times 45 \times 45) + (140 \times 325) + (100 \times 50) = 77,387.5 \text{ ft}^2$$

1.777 acre + 0.63 ac = 2.407 acre

BASIN K

Area

$$(50 \times 195) = 9750 \text{ ft}^2 \Rightarrow 0.2238 // \quad 0.65 + 0.22 = 0.874 \text{ acre}$$

Hydrology

Existing Conditions

Zone 3

$$Area = 35.48 \text{ Ac}$$

Intensity

$$I_{100} = 5.38 \text{ in/hr}$$

$$I_{10} = 3.65 \text{ in/hr}$$

Assume land
treatment "A"
for existing conditions
only.

Coefficient

$$\left. \begin{array}{l} I_{100} = .35 \\ I_{10} = .16 \end{array} \right\} \text{Land treatment "A"}$$

$$Q_{100} = (.35)(5.38)(35.48) = 66.81 \text{ cfs} \checkmark$$

$$Q_{10} = (.16)(3.65)(35.48) = 20.72 \text{ cfs} \checkmark$$



BOHANNAN-HUSTON INC.

Hydrology

Basin F-1 (Park Area)

$$\text{Area} = 470(150) + \frac{310(150)}{2} = 93,750 \text{ ft}^2 = 2.15 \text{ Acres}$$

100% Land treatment 'B' Zone 3

Intensity

Coefficient

$$I_{100} = 5.38 \text{ in/hr}$$

$$I_{10} = 3.65 \text{ in/hr}$$

$$C_{100} = 0.48$$

$$C_{10} = 0.33$$

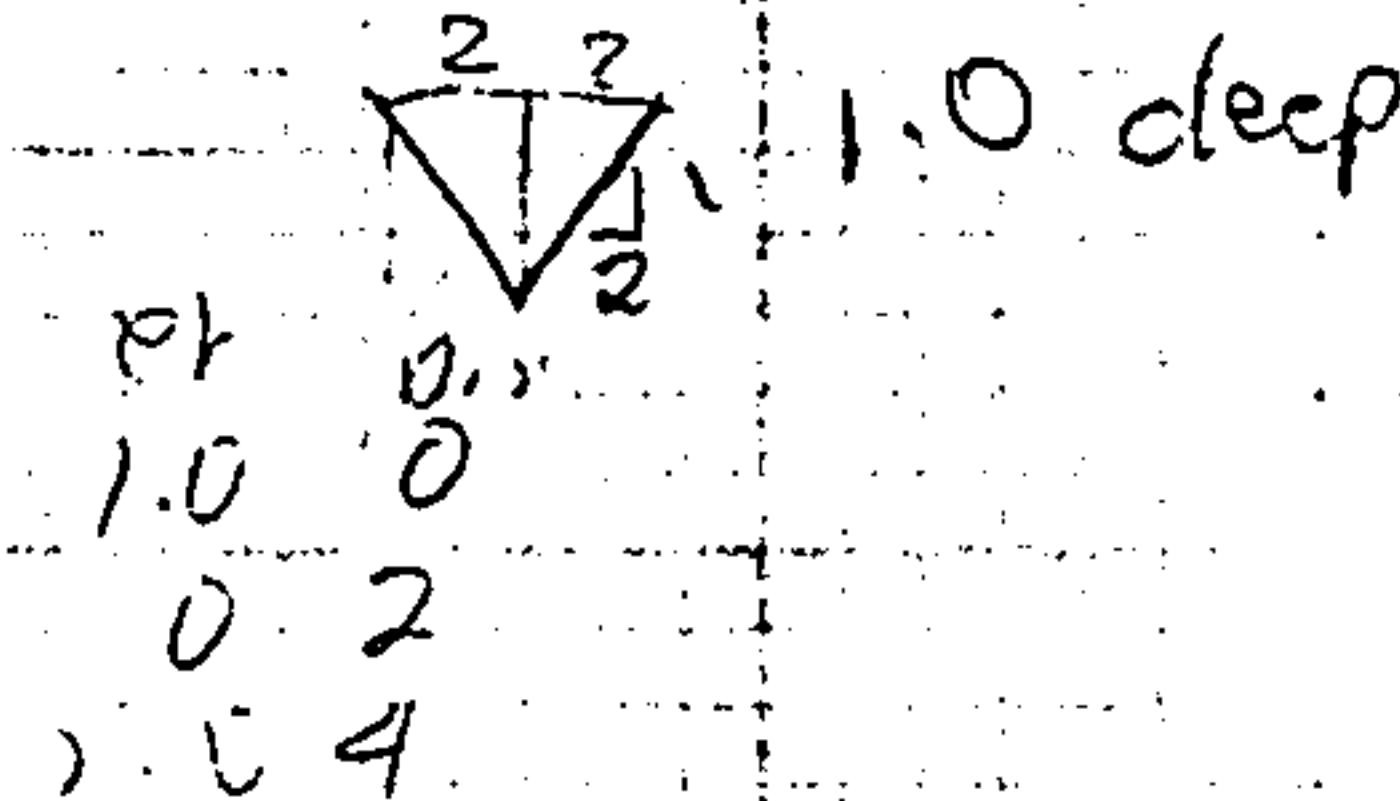
} treatment 'B'

$$Q_{100} = (.48)(5.38)(2.15) = 5.6 \text{ cfs}$$

$$Q_{10} = (.33)(3.65)(2.15) = 2.6 \text{ cfs}$$

Assume 1% slope

+ a 'V' ditch



Basin F-2

Flow from F-2 will be the remaining of the Total Basin F

$$\left. \begin{array}{l} Q_{100} = 18.7 \\ Q_{10} = 12.5 \end{array} \right\} \text{Total of Basin 'F'}$$

$$Q_{100} = 18.7 - 5.6 = 13.1 \text{ cfs}$$

$$Q_{10} = 12.5 - 2.6 = 9.9 \text{ cfs}$$



BOHANNAN-HUSTON INC.

PROJECT NAME Scale Barbara

SHEET 2 OF

PROJECT NO. 91181.05

BY mt DATE 6-92

SUBJECT Hydrology

CH'D DATE

Hydrology

Basin B-1

100yr-6 Hr storm

Planimeter Reading $41.28 (50)^2 = 103,200 = 2.37 \text{ Acres}$ (Total Area)

Park Area = 1.33 Acres - Land treatment "B"

Imperivious Area (Road) = $\frac{600(55)}{43500} = 0.76 \text{ Acres}$
Treatment "D"

(Pad) = $(45)(60) 4 = 10800 \text{ ft}^2 = .25 \text{ Acres}$

1.01 Acres

Park 1.33 'B'

Road/Pads 1.01 'D'

Remaining Area = $2.37 - 2.34 = 0.03 \text{ Acres}$ Treatment "C"

$$Q_{100} = (0.48)(5.38)(1.33) + (.64)(5.38)(.03) + (.93)(5.38)(1.01)$$

$$Q_{100} = 8.6 \text{ cfs}$$

$$Q_{10} = (0.33)(3.65)(1.33) + (.55)(3.65)(.03) + (.93)(3.65)(1.01)$$

$$Q_{10} = 5.1 \text{ cfs}$$



BOHANNAN-HUSTON INC.

PROJECT NAME Santa Barbara

SHEET 3 OF

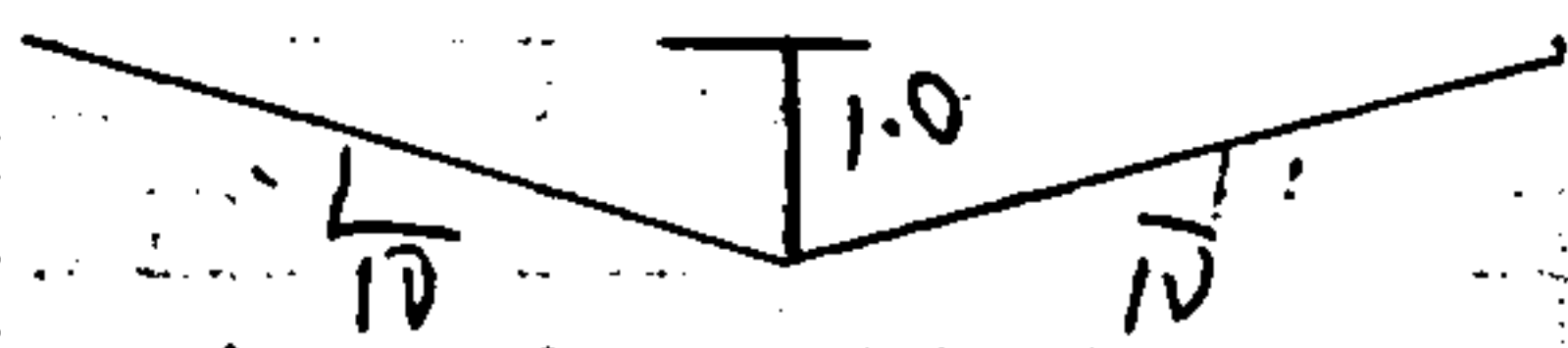
PROJECT NO. 91131.05

BY MA DATE 6-1-92

SUBJECT Hydrology

CH'D DATE

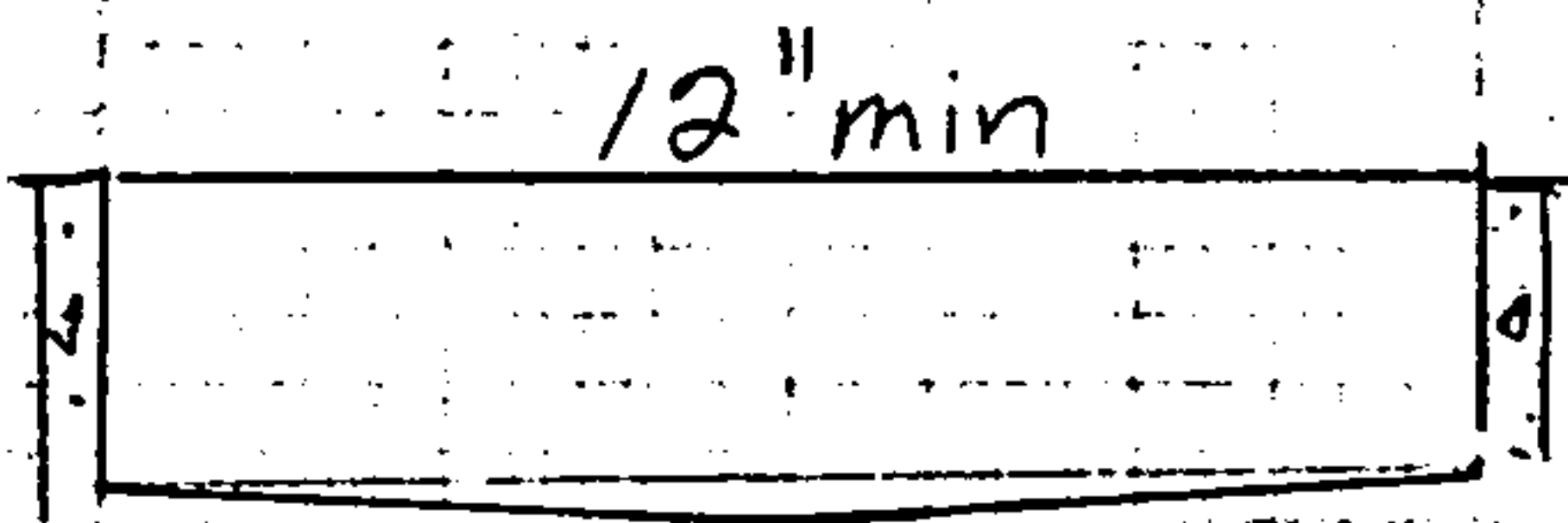
Parks Ditch Sizing



$$Q = 5.6 \text{ cfs}$$

$$n = .030$$

Mannings -
Normal depth =
0.6



Weir Eq.

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

$$C = 3.0$$

$$L = 12" = 1.0'$$

$$5.6 = (3)(1.0) H^{3/2}$$

$$H = 1.5'$$

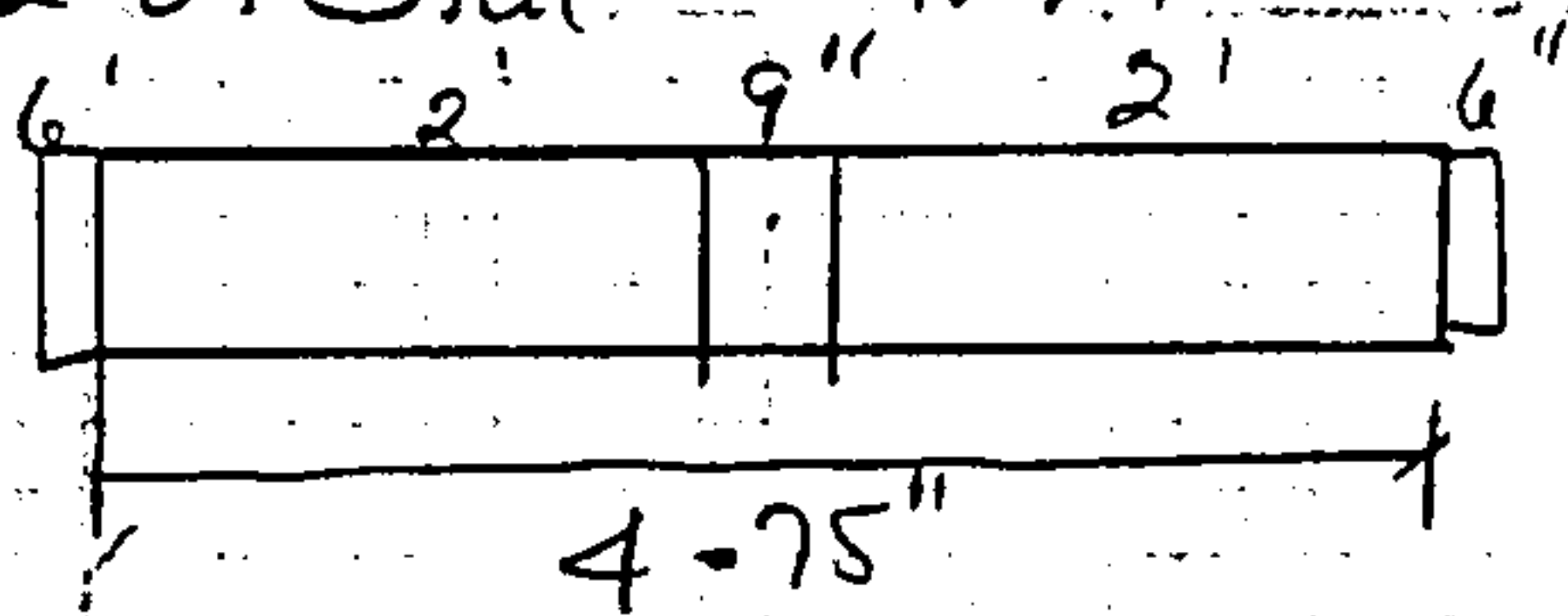
To much Head Try.

$$L = 24" = 2.0'$$

$$5.6 = (3)(2) H^{3/2}$$

$$H = 0.96' = 11.46"$$

Try 2-24" Side Culverts



$$1 \text{ Pair} = 9" = 0.75'$$

$$5.6 = (3)(4) H^{3/2}$$

$$H = .60' = 7.2" > .54 \text{ NO GOOD}$$



BOHANNAN-HUSTON INC.

PROJECT NAME Scenic Barbours

SHEET

OF

PROJECT NO. 5110105

BY

MT

DATE

6-1-92

SUBJECT Peril Sidewalk Culverts

CH'D

DATE



PROJECT NAME

PROJECT NO.

SUBJECT

SHEET

OF

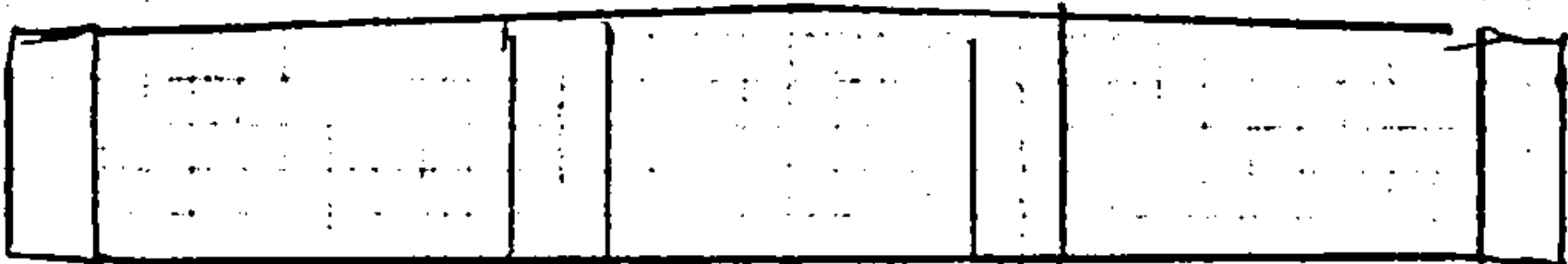
BY

DATE

CH'D

DATE

Try 3-2' sidewalk culverts



7'-6"

2 pier = 2(1.75) = 3.5

L = 6'

$Q = CLH^{3/2}$

$5.6 = (3)(6)H^{3/2}$

$H = 0.45' = 5.5" < 5.4'$ O.K.

∴ Use 3-2' wide sidewalk culvert

UTILITY corridor

between lots 169 and lot 1

Scale 1"=8' (vert. & hor.)

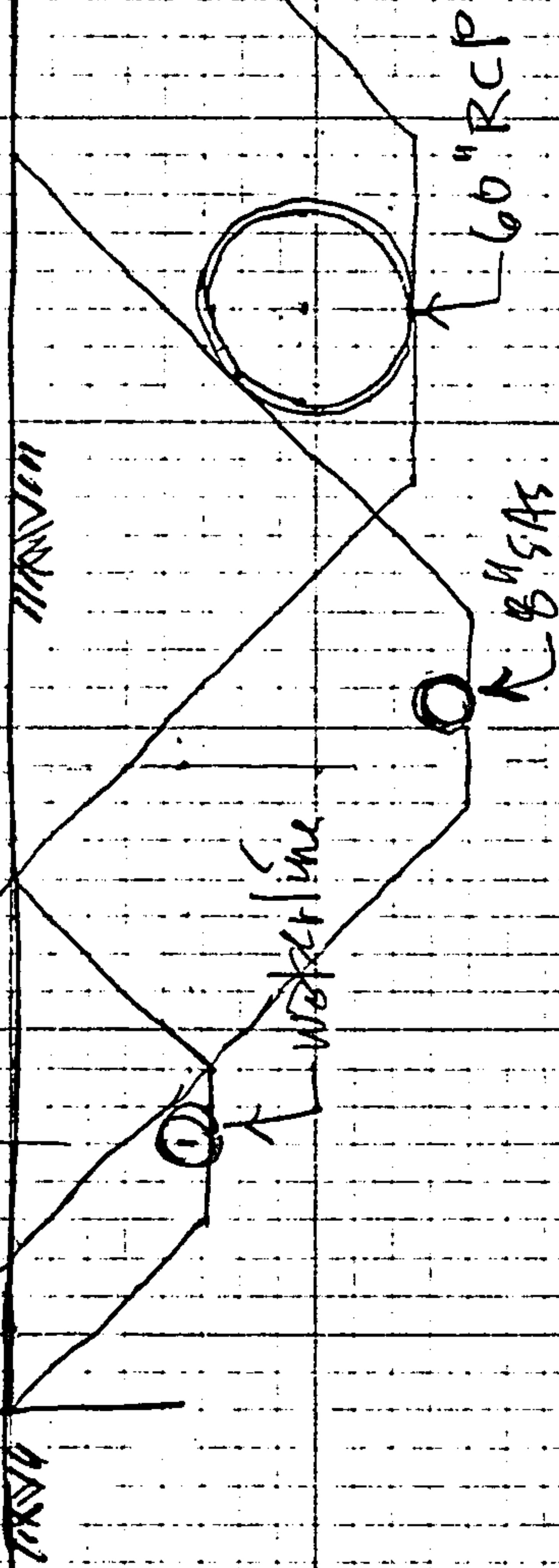
South
flow of
sewerage
line

7' 11.5' 10.5' 44' min.

Lot
169

Lot
1

Elev. 45.0'



Exposure width (top)
= [2 X Depth] + dia. + 4'



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

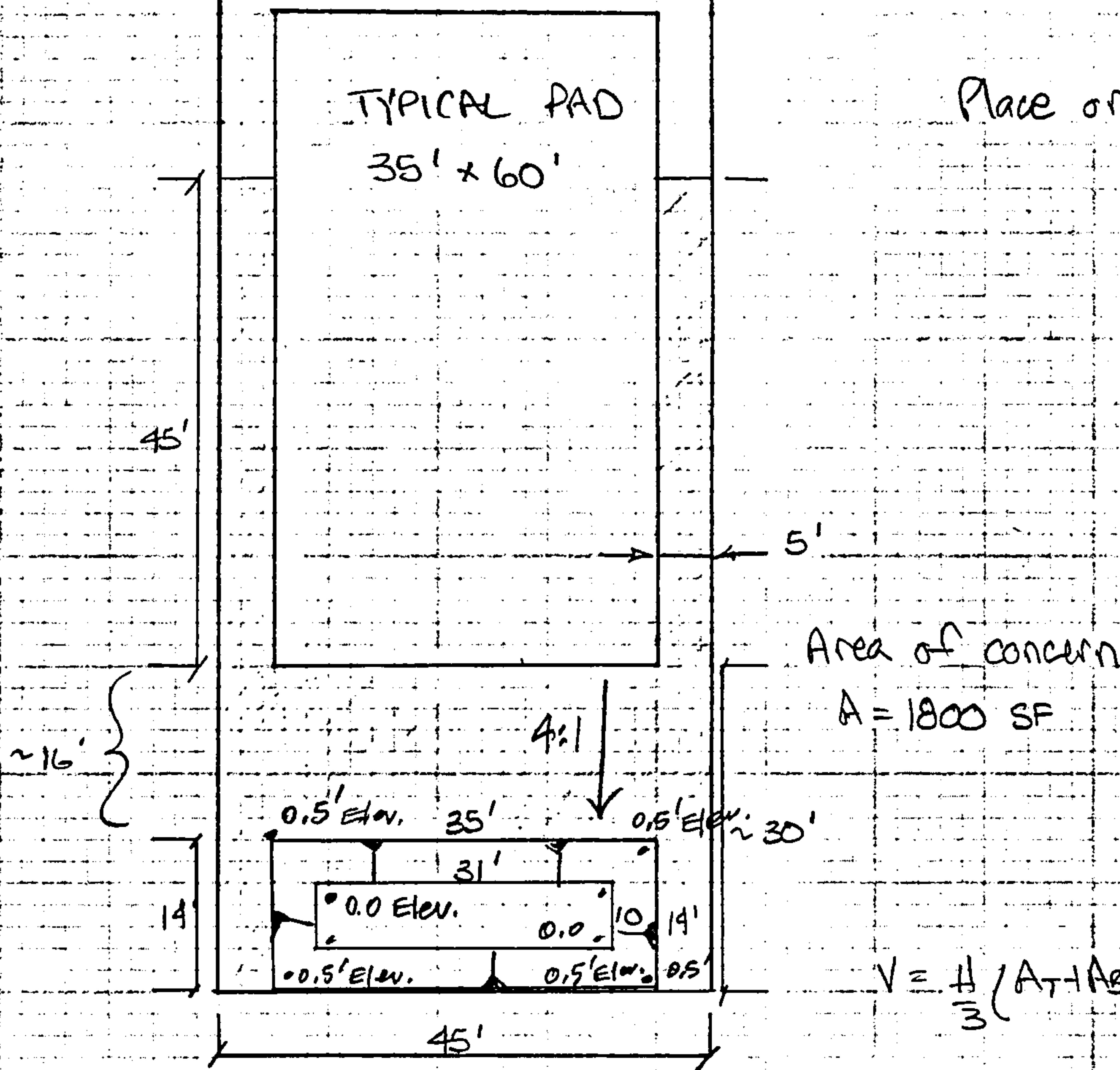
PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

BACKYARD PONDING

BASIN L

Place on sheet 2 of 3



$$V = \frac{1}{3} (A_T + A_B + (A_T + A_B)^{1/2})$$

VOLUME FOR PONDING CONDITION

	TOP WIDTH	TOP LENGTH	BOTTOM WIDTH	BOTTOM LENGTH	AREA SF	AREA SF	HEIGHT FT	VOLUME CF	REMARKS
* ①	14	35	10	31	490	310	0.5'	198.29	OK
②	13	35	9	31	455	279	0.5'	181.72	NG
③	13	35	9	31	455	279	1.0'	363.43	OK

VOLUME NEEDED

Assume 100% of the area considered is treatment c in zone 3

$$E = 1.29 \text{ in}$$

$$V = (1.29 / 12) \times 1800 = 193.5 \text{ CF} \quad \text{use ①}$$



BOHANNAN-HUSTON INC.

PROJECT NAME PALOMAS PARK SHEET OF

PROJECT NO. BY K. PATTON DATE

SUBJECT BACKYARD PONDING CH'D DATE



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 9, 1993

James Topmiller, P.E.
Bohannon-Huston Inc.
7500 Jefferson Street NE
Albuquerque, New Mexico 87109

RE: ENGINEER'S CERTIFICATION FOR PALOMAS PARK SUBDIVISION, PHASE II,
(D-19/D1B), WITH ENGINEER'S STAMP DATED NOVEMBER 29, 1993.

Dear Mr. Topmiller:

Based on the information provided on the above referenced submittal received December 7, 1993 the plan is acceptable for Engineer's Certification approval. Please be advised that future submittals will require more as-built elevations along the side yard and back yard.

If you should have any questions please do not hesitate to call me at 768-2650.

Cordially,

Gilbert Aldaz, P.E. & P.S.
Civil Engineer/Hydrology

xc: ~~File~~

wp+3409

PUBLIC WORKS DEPARTMENT

93017108

D19/D1B

Hydro Files

PRIVATE FACILITY
DRAINAGE COVENANT

0006363

This Drainage Covenant, between [state the name of the present real property owner exactly as shown on the real estate document conveying title to the present owner and state the legal status of the owner, for example, "single person," "husband and wife," "corporation of the State of _____," "partnership":] Brown and Associates, Inc.

whose address is 3411 Candelaria NE, Albuquerque, NM ("Owner"), and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P. O. Box 1293, Albuquerque, New Mexico 87103, is made in Albuquerque, Bernalillo County, New Mexico and is entered into as of the date Owner signs this Covenant.

1. Recital. The Owner is the owner of the following described real property located at [give legal description, and street address:] "Palomas Park Subdivision (Phase 2)"

in Bernalillo County, New Mexico (the "Property").

Pursuant to City ordinances, regulations and other applicable laws, the Owner is required to construct and maintain certain drainage facilities on the Property, and the parties wish to enter into this Covenant to establish the obligations and responsibilities of the parties.

2. Description and Construction of Drainage Facility. The Owner shall construct the following "Drainage Facility" within the Property at the Owner's sole expense in accordance with the standards, plans and specifications approved by the City: Drainage File No. D19/D1B; Two Temporary earthen retention ponds; one is west of Storrie Place and one is south of Palomas Park Ave. One temporary earthen swale along the southern boundary of Phase 2.

The Drainage Facility is more particularly described in Exhibit A attached hereto and made a part hereof.

3. Maintenance of Drainage Facility. The Owner shall maintain the Drainage Facility at the Owner's sole cost in accordance with the approved Drainage Report and plans.

4. Benefit to Property. The Owner acknowledges and understands that the Drainage Facility required herein to be constructed on the Owner's property is for the private benefit

0006364

and protection of the Owner's property and that failure to maintain such facility could result in damage or loss to the Property.

5. Inspection of Drainage Facility. The City shall have no duty or obligation whatsoever to perform any inspection, maintenance or repair of the Drainage Facility, it being the duty of the Owner, its heirs, successors and assigns to construct and maintain the facility in accordance with approved plans and specifications.

6. Liability of City. The Owner understands and agrees that the City shall not be liable to the Owner, its heirs, successors or assigns, or to any third parties for any damages resulting from the Owner's failure to construct, maintain or repair the Drainage Facility.

7. Indemnification. The Owner owns and controls the Drainage Facility and shall not permit the Drainage Facility to constitute a hazard to the health or safety of the general public. The Owner agrees to indemnify, defend and hold harmless the City, its officials, agents and employees, from any claims, actions, suits or other proceedings arising from or out of the negligent acts or omissions of the Owner, its agents, representatives, contractors or subcontractors or arising from the failure of the Owner, its agents, representatives, contractors or subcontractors to perform any act or duty required of the Owner herein; provided, however, to the extent, if at all, Section 56-7-1 NMSA 1978 is applicable to this Agreement, this Agreement to indemnify will not extend to liability, claims, damages, losses or expenses, including attorney's fees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the respective indemnitee, or the agents or employees of the respective indemnitee; or (2) the giving of or the failure to give direction or instructions by the respective indemnitee, where such giving or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property.

8. Assessment. Nothing in this Covenant shall be construed to relieve the Owner, its heirs, assigns and successors from an assessment against the Owner's Property for improvements to the Property under a duly authorized and approved Special Assessment District. The parties specifically agree that the value of the Drainage Facility will not reduce the amount assessed by the City.

9. Binding on Owner's Property. The covenants and obligations of the Owner set forth herein shall be binding on the Owner, its heirs, assigns and successors and on the Owner's Property and constitute covenants running with the Owner's

0006365

Property until released by the City. This Covenant can only be released by the City's Chief Administrative Officer with the concurrence of the City Engineer.

10. Entire Covenant. This Covenant contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.

11. Changes to Covenant. Changes to this Covenant are not binding unless made in writing, signed by both parties.

12. Effective Date of Covenant. This Covenant shall be effective as of the date of signature of the Owner.

OWNER: BROWN & ASSOCIATES, Inc.

By: Robert M. Adams
Its: VICE PRESIDENT
Dated: 1/15/93

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

The foregoing instrument was acknowledged before me this 15th day of January, 1993, by [name of person signing:] ROBERT M. ADAMS, [title or capacity, for instance, "President" or "Owner":] Vice President of [name of the entity which owns the Property if other than the individual signing, for instance, the name of the corporation, partnership, or joint venture:] BROWN & ASSOCIATES, INC., a New Mexico Corporation

J. Rose Derieg
Notary Public
J. Rose Derieg

My Commission Expires:
May 5, 1993

CITY OF ALBUQUERQUE:

Accepted:

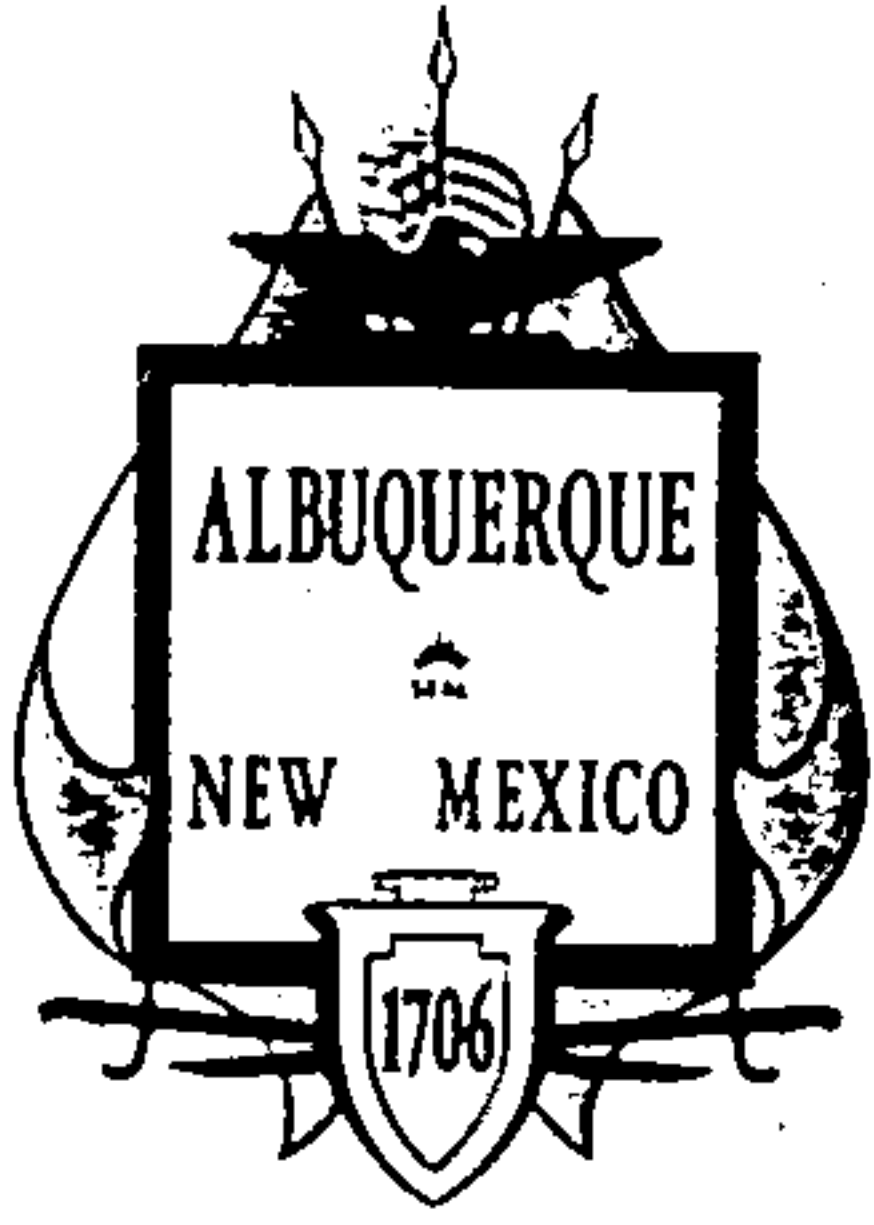
By: Frank J. Cooper
Title: For the City Engineer
Dated: 2/8/93

[EXHIBIT A ATTACHED]

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD

93 FEB 19 PM 1:54

By 6243-6365
J. Rose Derieg
NOTARY PUBLIC
COUNTY OF BERNALILLO
STATE OF NEW MEXICO



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 1, 1994

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Mr. Mike Adams
Brown & Associates, Inc.
3411 Candelaria N.E.
Albuquerque, NM 87110

RE: PROJECT NO. 4510.88, PALOMAS PARK - PHASE IV (MAP NO. D-19)

Dear Mr. Adams:

This is to certify that the City of Albuquerque accepts Project No. 4510.88 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion and acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- Construction of water, water services, sanitary sewer, sewer services, and curb and gutter, and paving on Capitan Ave. between Palomas Park Ave, and Storrie Place and on Storrie Place from 100 ft. north of Capitan Ave. to 144 ft. south of Capitan Ave.
- Constructed with this project were storm sewer mains, laterals and inlets in Capitan Ave. from 72 ft. east of Storrie Place to Storrie Place. Also, constructed with this project were waterline revisions on Laster Ave., and surrounding area and on Palomas Park and Galinas Aves. as shown on sheets 11 thru 18 of the City approved project plans.



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 9, 1993

James Topmiller, P.E.
Bohannon-Huston Inc.
7500 Jefferson Street NE
Albuquerque, New Mexico 87109

RE: ROUGH GRADING PLAN FOR PALOMAS PARK SUBDIVISION, PHASE IV,
(D-19/D1B), ENGINEER'S STAMP DATED OCTOBER 29, 1993.

Dear Mr. Topmiller:

Based on the information provided on the above referenced submittal received November 2, 1993, the plan is acceptable for Rough Grading permit approval.

Please be advised that a top soil disturbance permit is required prior to the Contractor commencing his grading operations.

If you should have any questions please do not hesitate to call me at 768-2650.

Cordially,

Gilbert Aldaz, P.E. & P.S.
Civil Engineer/Hydrology

xc: ~~File~~

GA/wp+3409

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 21, 1994

James Topmiller
Bohannon-Huston
7500 Jefferson ST. NE
Albuquerque, NM 87109

RE: REVISED ENGINEER CERTIFICATION FOR PALOMAS PARK SUBDIVISION
PHASE III FINANCIAL GUARANTEE RELEASE FOR HYDROLOGY (D19-D1B)
REVISED CERTIFICATION STATEMENT DATED 9/7/94 (W.O. 4510.92).

Dear Mr. Topmiller:

Based on the information provided on your September 8, 1994 resubmittal,
Engineer Certification for Financial Guarantee release is acceptable.

If I can be of further assistance, please feel free to call me at 768-2667.

Sincerely,

Bernie J. Montoya

Bernie J. Montoya, CE
Engineering Associate

BJM/d1/WPHYD/7709

c: Andrew Garcia
LyndaMichelle DeVanti
File



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 12, 1994

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Mr. Mike Adams
Brown & Associates, Inc.
3411 Candelaria N.E.
Albuquerque, NM 87110

RE: PROJECT NO. 4510.86, PALOMAS PARK - PHASE III (MAP NO. D-19)

Dear Mr. Adams:

This is to certify that the City of Albuquerque accepts Project No. 4510.86 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion and acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- Installation of water, water services, sewer & services, curbing and pavement on: Palomas Park Avenue between Capitan Avenue and Laster Avenue, El Morrow Place, Adele Place and Galinas Avenue from Adele Place to the east terminus.

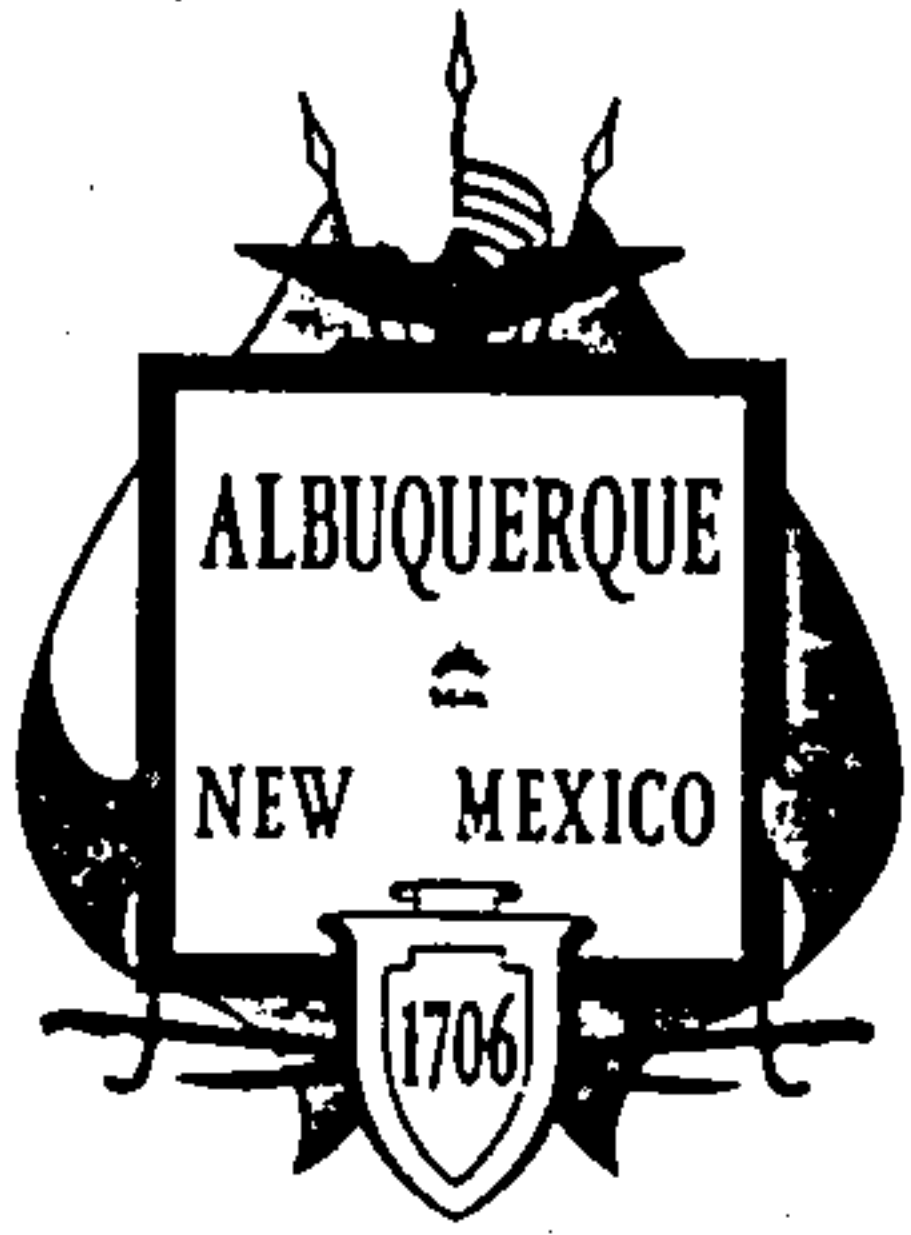
The contractor's correction period begins the date of this letter and will be effective for a period of one (1) year.

Sincerely,

Rick Roybal, PE
City Engineer,
Engineering Group
Public Works Department

Sincerely,

Russell B. Givler, PE
Chief Construction Engineer,
Engineering Group
Public Works Department



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 20, 1993

James Topmiller, P.E.
Bohannon-Huston, Inc.
7500 Jefferson Street NE
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT FOR PALOMAS PARK SUBDIVISION PHASE III, (D-19/D1B),
ENGINEER'S STAMP DATED MARCH 30, 1993

Dear Mr. Topmiller:

Based on the information provided on the referenced plan received March 31, 1993, the plan is acceptable for Rough Grading Permit Approval.

If you should have any questions please do not hesitate to call me at 768-2650.

Cordially,

Gilbert Aldaz, P.E. & P.S.
Civil Engineer/Hydrology

GA/wp+3409

xc: Larry Caudill
File

PUBLIC WORKS DEPARTMENT

DRAINAGE CALCULATIONS

Lot 100/convert V-channel
and what the change to
street
patrons park subdivision

A. determine total flow rate

- assume 1/2 of lot 99 & 100 drain to
Galinas Avenue (conservative)

- lot 99 = 0.11 ac. (total)

lot 100 = 0.13 ac

$0.24 \text{ ac} \times 0.12 \text{ ac. (drainage)}$
total area

- assume 1/2 of basin @ treatment "B"
and 1/2 @ treatment "B", then:

$0.12/2 (5.02) = 0.6 \text{ cfs}$

$0.12/2 (2.6) = 0.16 \text{ cfs}$

$0.76 \text{ cfs} = \text{total flow rate (100-yr storm)}$
6-hr

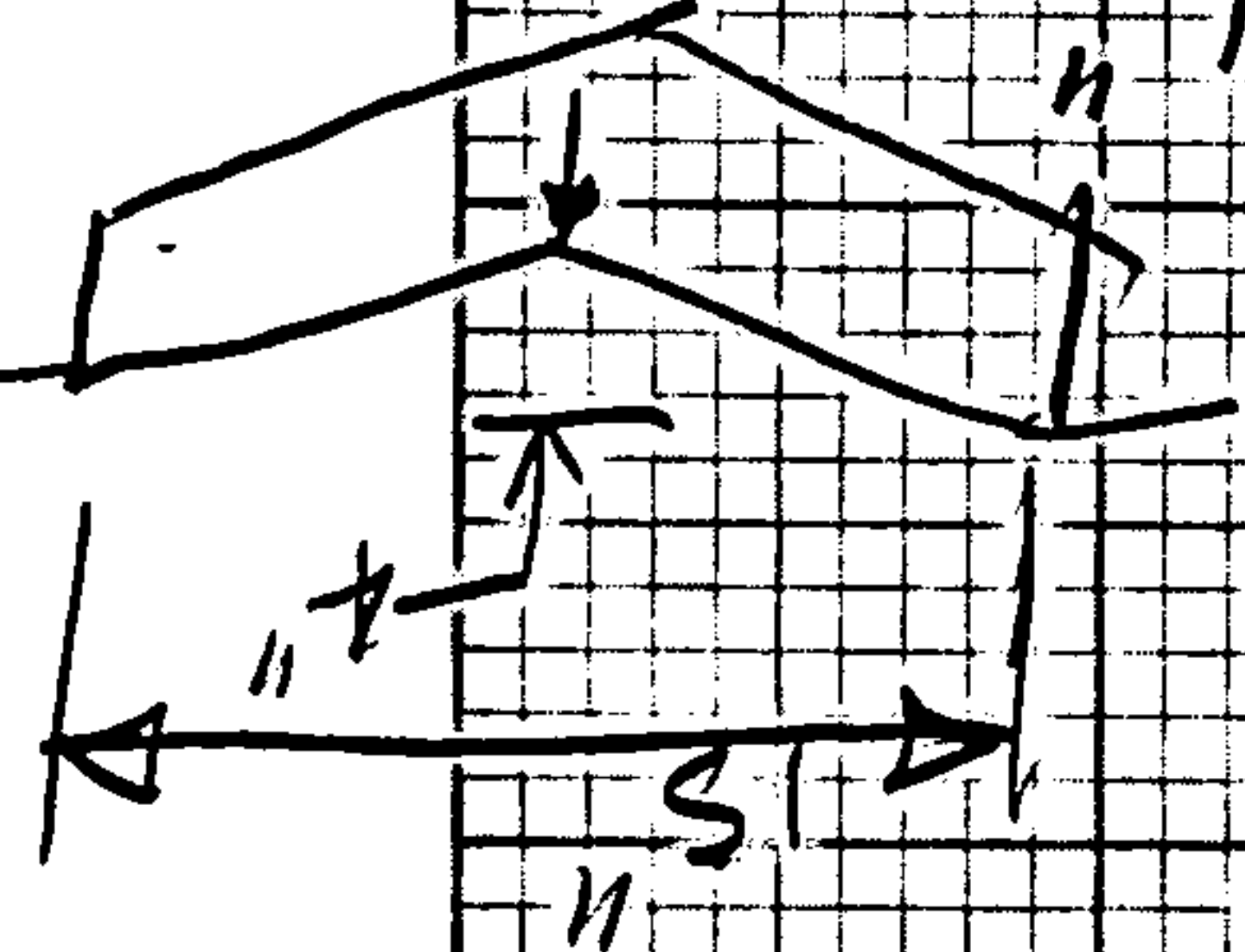
B. convert V-channel to lot 100

- calculate channel dimensions @
 $Q = 0.76 \text{ cfs}$, 15" wide @ 4" deep

- see attached sheet

1 sheet "conc. V-channel capacity"

$\text{cap.} = 0.8 \text{ cfs} > 0.76 \text{ cfs}$, OK



BOHANNAN-HUSTON INC.

SEP - 8 1994

SHEET

OF

2

BY J. J. J. DATE 7-23-94

CH/D DATE

PROJECT NAME

PROJECT NO.

SUBJECT

C. Required Open Area for
Manhole Grate

- use Orifice equation,

$$Q = C A \sqrt{2gh} \text{ or}$$

$$A = \frac{Q}{C \sqrt{2gh}}, \text{ if } h = 0.5' \\ C = 0.6$$

$$A = \frac{0.76}{(0.6 \sqrt{2g(0.5)})} = 0.22 \text{ sq. ft.}, \text{ ~~required~~ grate open area}$$

X 1.3 (for clogging)

0.28 sq. ft. ~~USE~~

D. Head required to push
0.76 cfs into 4" pipe (assuming 100')

$$h = \frac{\left(\frac{Q}{CA} \right)^2}{2g} = \frac{\left(\frac{0.76}{0.6(1.087)} \right)^2}{2(32.2)} = 3.3' < 3.4' \text{ OK}$$

Note: An emergency overflow is
also available for flows
to run east along the
retaining wall, then out
to the street.



BOHANNAN-HUSTON INC.

PROJECT NAME SEP - 8 1994

SHEET 2 OF 2

PROJECT NO.

BY J. J. J. DATE

SUBJECT

CH'D DATE

conc. v-channel capacity

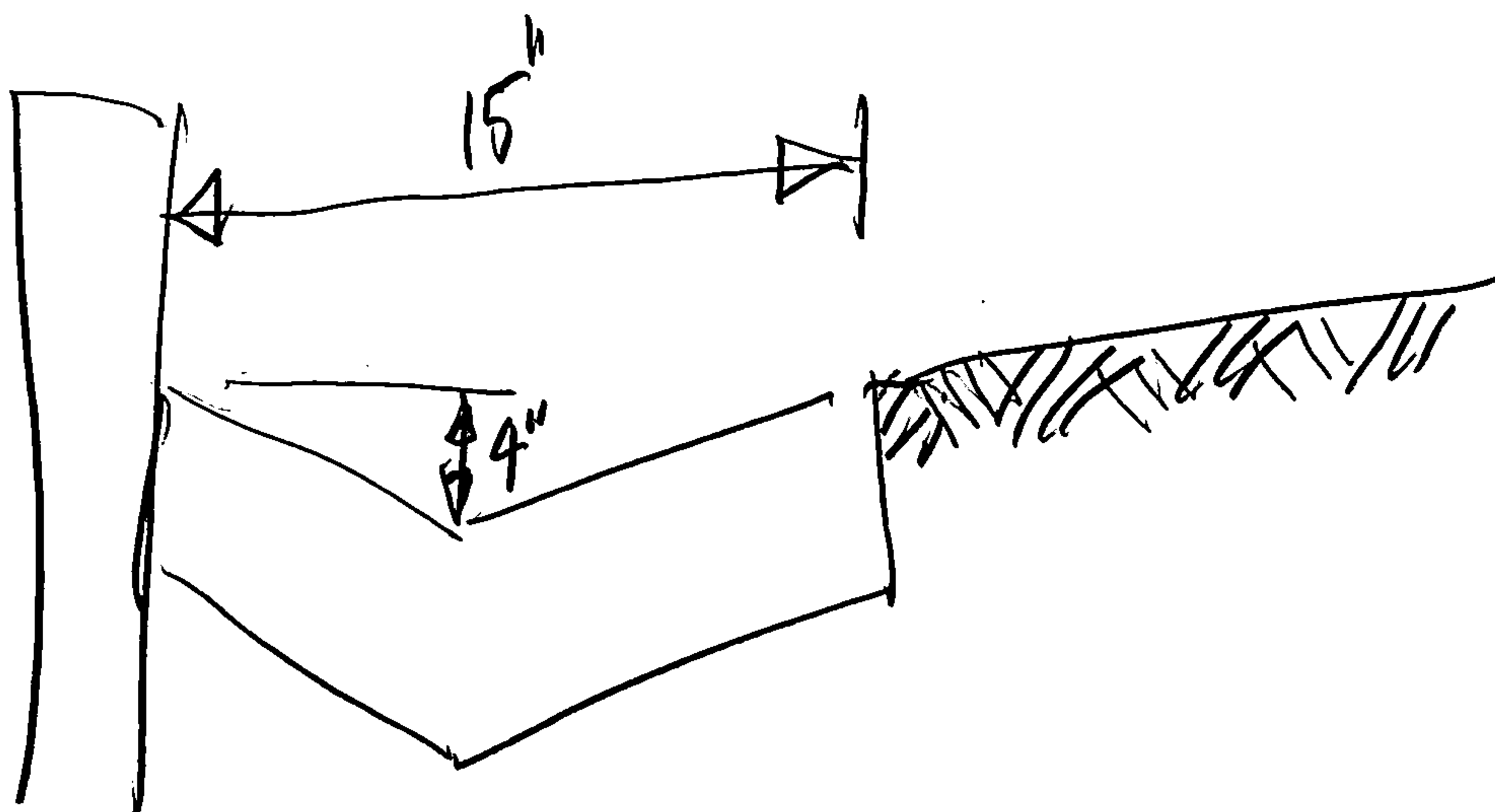
MANNING'S N = .0130

SLOPE = .0150

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.33	2	0.62	0.00	3	1.25	0.33

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.10	0.10	0.0	0.0	0.4	1.8	0.38
0.20	0.20	0.1	0.2	0.9	2.8	0.76
0.30	0.30	0.2	0.6	1.3	3.6	1.14
0.33	0.33	0.2	0.8	1.4	3.9	1.25

4"



SEP - 8 1994

X 94069564

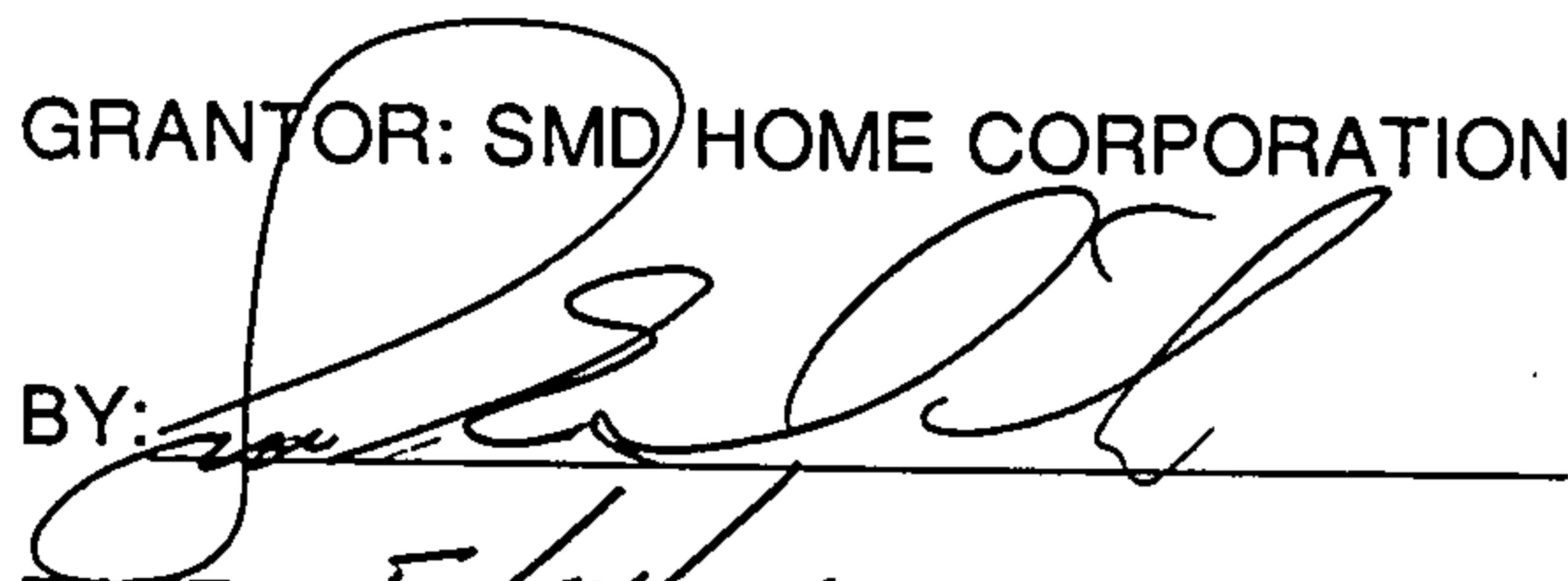
PRIVATE DRAINAGE EASEMENT

Grant of Permanent Private Drainage Easement (storm and landscaping irrigation), between SMD Home Corporation, Owner of Lot 100, Palomas Park Subdivision, Phase III ("Grantor") whose address is 12700 San Rafael N.E., Albuquerque, New Mexico 87122 and current and future Owners of Lot 99, Palomas Park Subdivision, Phase III ("Grantee"), which address is 7605 La Mariposa N.E., Albuquerque, New Mexico.

Grantor grants to Grantee an exclusive permanent 3' wide private drainage easement ("Easement") in, over, upon and across the westerly 3' of Lot 100, Palomas Park Subdivision, Phase III, as depicted on Exhibit "A" attached hereto for the acceptance of lot storm/irrigation drainage from Grantee. The construction, installation, maintenance, repair, modification, replacement and operation of a private drainage easement together with the right to remove and/or replace landscaping shall be the responsibility of Lot 100, Palomas Park Subdivision, Phase III.

The grant and other provisions of this Easement constitute covenants running with the land for the benefit of future owners as shown on the plat of Palomas Park Subdivision, Unit III, its successors and assigns until terminated by Grantee.

GRANTOR: SMD HOME CORPORATION (Current Owner of Lot 100)

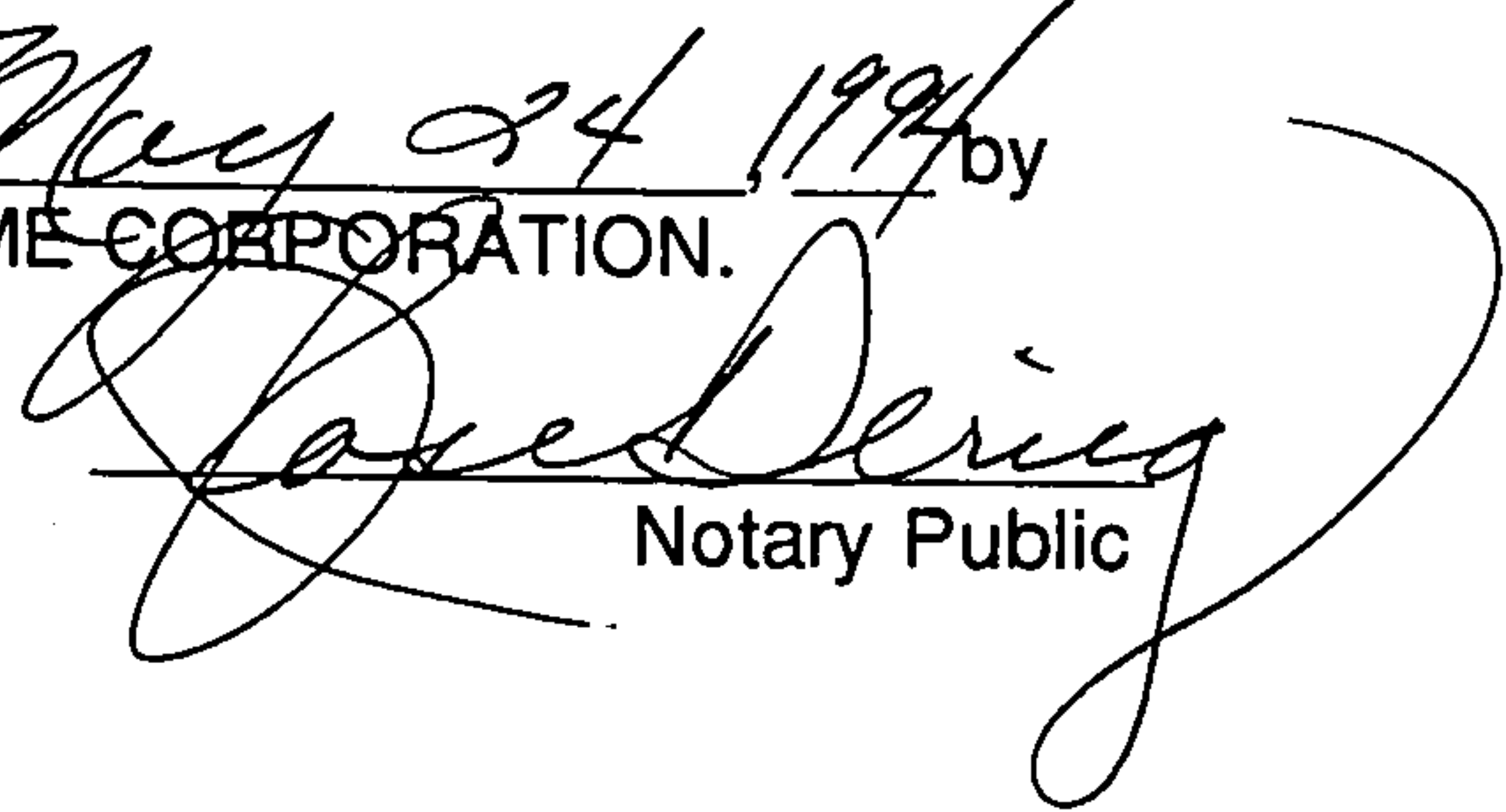
BY: 

DATE: 5/24/94

STATE OF NEW MEXICO)
SS
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on May 24, 1994 by
SCOTT DIRKSCHNEIDER, PRESIDENT OF SMD HOME CORPORATION.

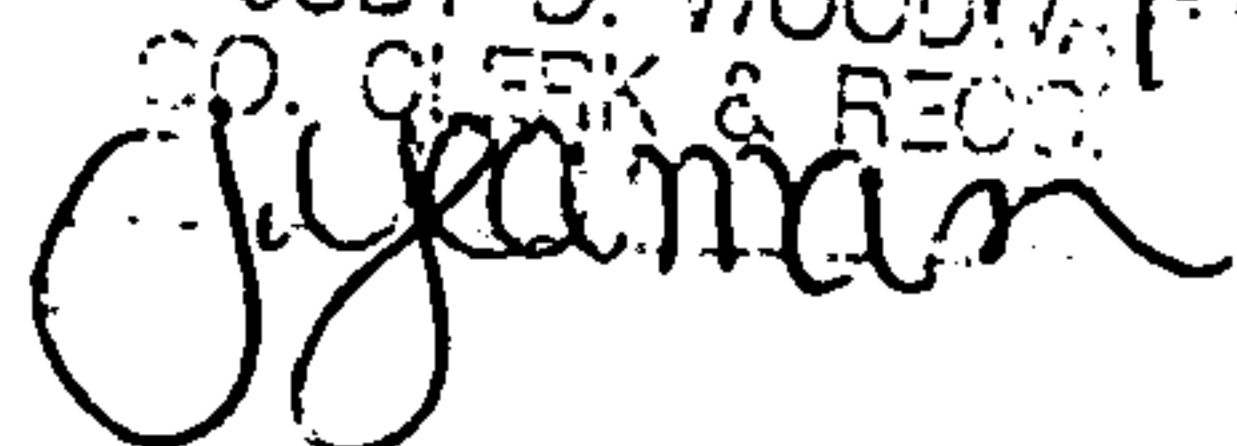
My Commission Expires: June 8, 1997


Notary Public

JUN - 3 1994

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD

1994 MAY 26 PM 2:40

94-167794-
JUDY D. WOODMAN
CO. CLERK & REC.




City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 9, 1993

James Topmiller, P.E.
Bohannon-Huston Inc.
7500 Jefferson Street NE
Albuquerque, New Mexico 87109

RE: ENGINEER'S CERTIFICATION FOR PALOMAS PARK SUBDIVISION, PHASE I & IA,
(D-19/D1B), WITH ENGINEER'S STAMP DATED AUGUST 12, AND DECEMBER 2,
1993.

Dear Mr. Topmiller:

Based on the information provided on the above referenced submittal received August 12, 1993 and December 6, 1993 the plan is acceptable for partial Certification plan approval. Please be advised that prior to Final Plat approval for Phase IV or the rainy season, whichever is first, the wall needs to be completed and certified.

If you should have any questions please do not hesitate to call me at 768-2650.

Cordially,

Gilbert Aldaz, P.E. & P.S.
Civil Engineer/Hydrology

xc: File

GA/wp+3409

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

phase

April 22, 1993

James Topmiller, P.E.
Bohannon-Huston, Inc.
7500 Jefferson St. NE
Albuquerque, NM 87109

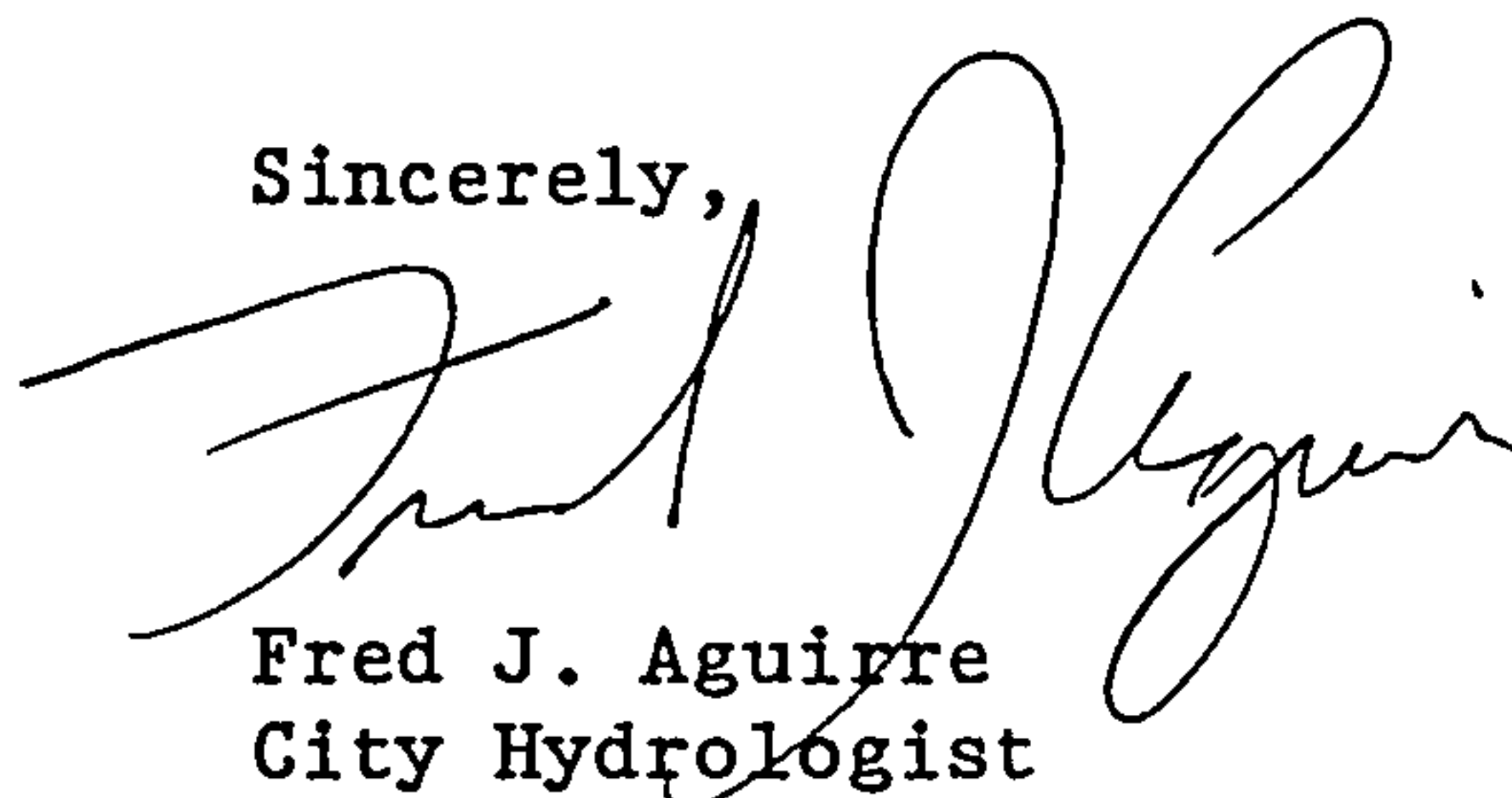
RE: PALOMAS PARK SUBDIVISION, PHASES 1 AND 1A, GRADING CERTIFICATION
(D19-D1B).

Dear Mr. Topmiller:

In reference to your letter dated 4/22/93 regarding your certification
submittal for Palomas Park Subdivision, Phases 1 and 1a, I will tentatively
approve your certification so that the financial guarantees can be released.

It is understood that you will resubmit the revised certifications per our
discussion and the D.P.M. checklist within three (3) weeks.

Sincerely,



Fred J. Aguirre
City Hydrologist

FJA/d1/WPHYD/7709

xc: LyndaMichelle Devanti
File

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 29, 1992

James Topmiller, P.E.
Bohannon-Huston, Inc.
7500 Jefferson Street, NE
Albuquerque, New Mexico 87109

RE: DRAINAGE REPORT FOR PALOMAS PARK SUBDIVISION, (D-19/D1B),
ENGINEER'S STAMP DATED JUNE 24, 1992

Dear Mr. Topmiller:

Based on the information provided on the referenced plan, the drainage report is approved for the overall subdivision.

As for the grading plans submitted, they are only approved for Phase I and IA. Future phases will require detailed grading plans.

Be advised that Phase I cannot be accepted by the City until Phase IA construction is complete.

If you should have any questions please do not hesitate to call me at 768-2650.

Cordially,

Gilbert Aldaz, P.E. & P.S.
Civil Engineer/Hydrology

GA

xc: Roger Green, DRC Chairman
Peter Chang, Construction

wp+3409 **FILE**

PUBLIC WORKS DEPARTMENT