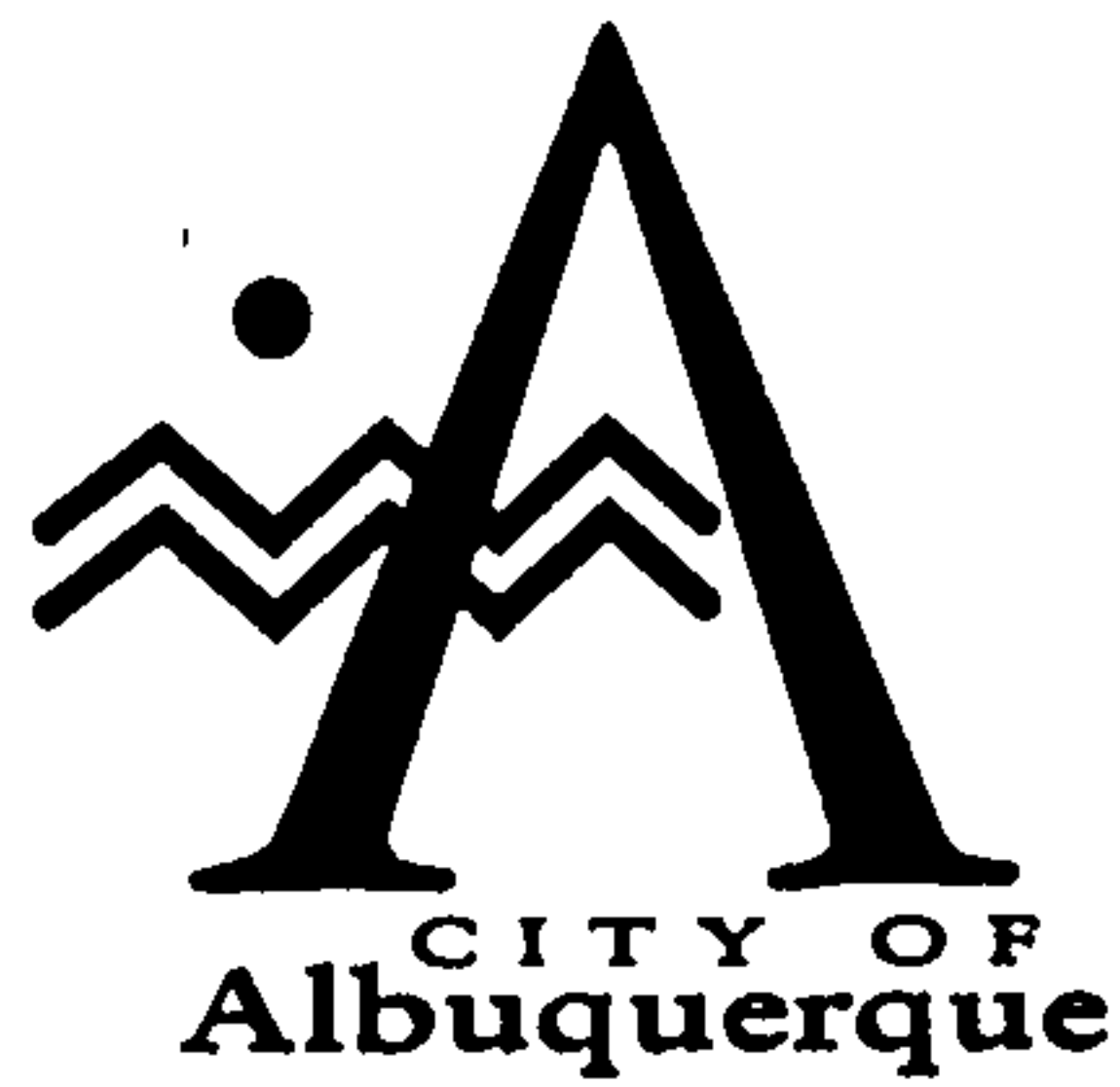




July 2, 1998

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

***RE: Grading and Drainage Certification for Solterra Subdivision Unit 2, (E23/D3J)
Engineer's Certification Stamp Dated 3/20/97.***

Dear Mr. Patton:

The above referenced Certification done by Tamara K. Morgan, P.E. is adequate to satisfy the Certification requirement for the release of Financial Guarantees for Unit 2 of Solterra Subdivision, per the Infrastructure List dated April 2, 1996, last amended on August 5, 1997.

If I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, DRB 95-457
File

Good for You, Albuquerque!





Martin J. Chávez, Mayor

Robert E. Gurulé, Director

May 1, 1997

Tamara K. Morgan
Bohannon & Huston Inc.
7500 Jefferson NE
Albuquerque, New Mexico 87109

RE: REVISED ENGINEER CERTIFICATION FOR SOLTERRA SUBDIVISION UNIT 1
(E23-D3J) CERTIFICATION STATEMENT DATED 3/20/97 WO 5411.81

Dear Ms. Morgan:

Based on the information provided on your April 22, 1997 resubmittal, Engineer Certification for Financial Guarantee release and Subdivision Certification is acceptable.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
Terri Martin

File

File

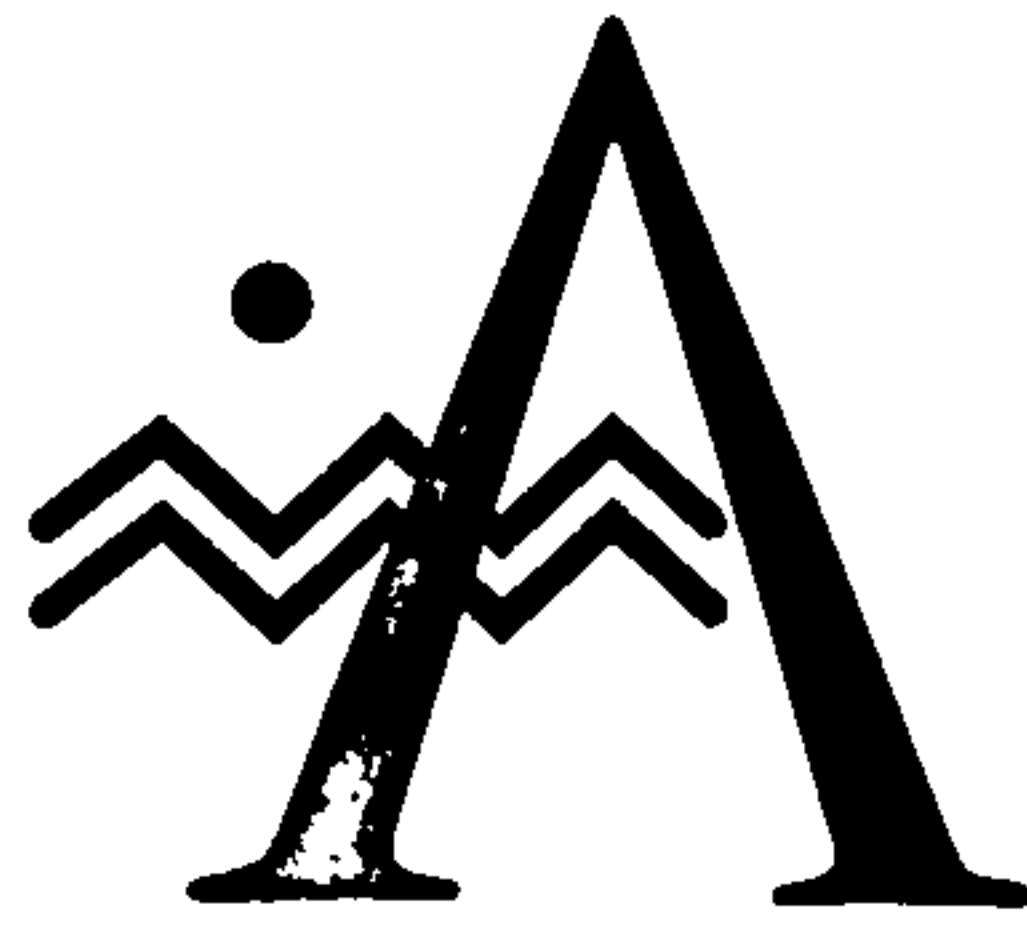
Sincerely

Bernie J. Montoya CE
Associate Engineer

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103





**CITY OF
Albuquerque**

P.O. Box 1293 Albuquerque, NM 87103

May 10, 1996

Martin J. Chávez, Mayor

**Tamara K. Morgan, PE
Bohannon-Huston Inc
7500 Jefferson NE
Albuquerque, NM 87109**

**RE: GRADING PLAN FOR SOLTERRA SUBDIVISION (E-23/D3J)
RECEIVED APRIL 24, 1996 FOR FINAL PLAT & WORK ORDER
ENGINEER'S STAMP DATED 4/11/96**

Dear Ms. Morgan:

Based on the information included in the submittal referenced above, City Hydrology accepts the grading plan for Final Plat and Work Order. Submit the amended grading plan to DRB for their approval.

Engineer's Certification of grading & drainage per DPM checklist must be accepted by City Hydrology before the Financial Guaranty will be released.

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,

**John P. Curtin, P.E.
Civil Engineer, Hydrology**

**c: Andrew Garcia
Fred Aguirre, DRB 95-457
Norm Gregory, Centex, 5111 Juan Tabo NE 87111**

Good for You, Albuquerque!



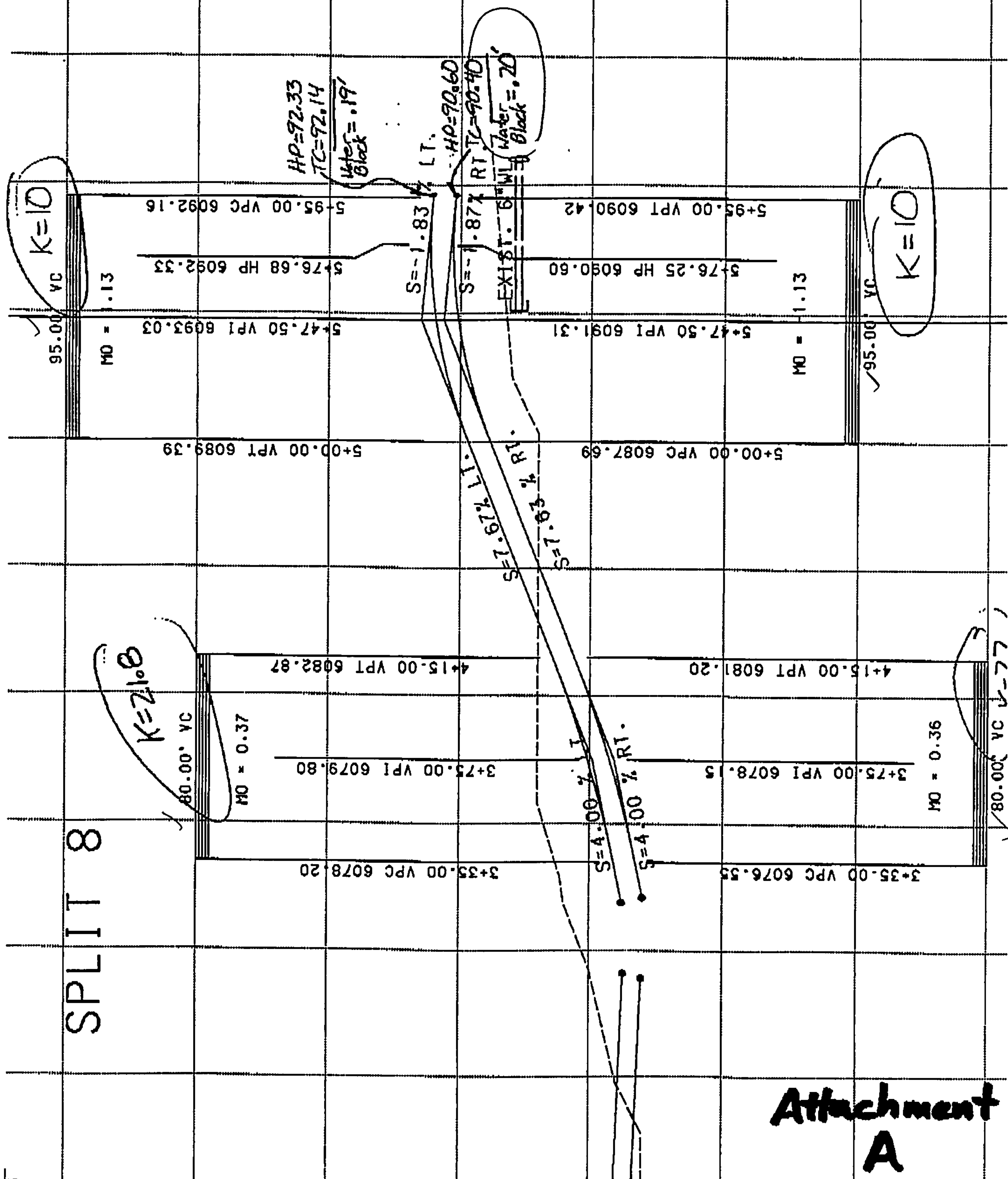
Solterra Place Revised Grades
Version #2 COA# 541181 By MSJ
Date: 4

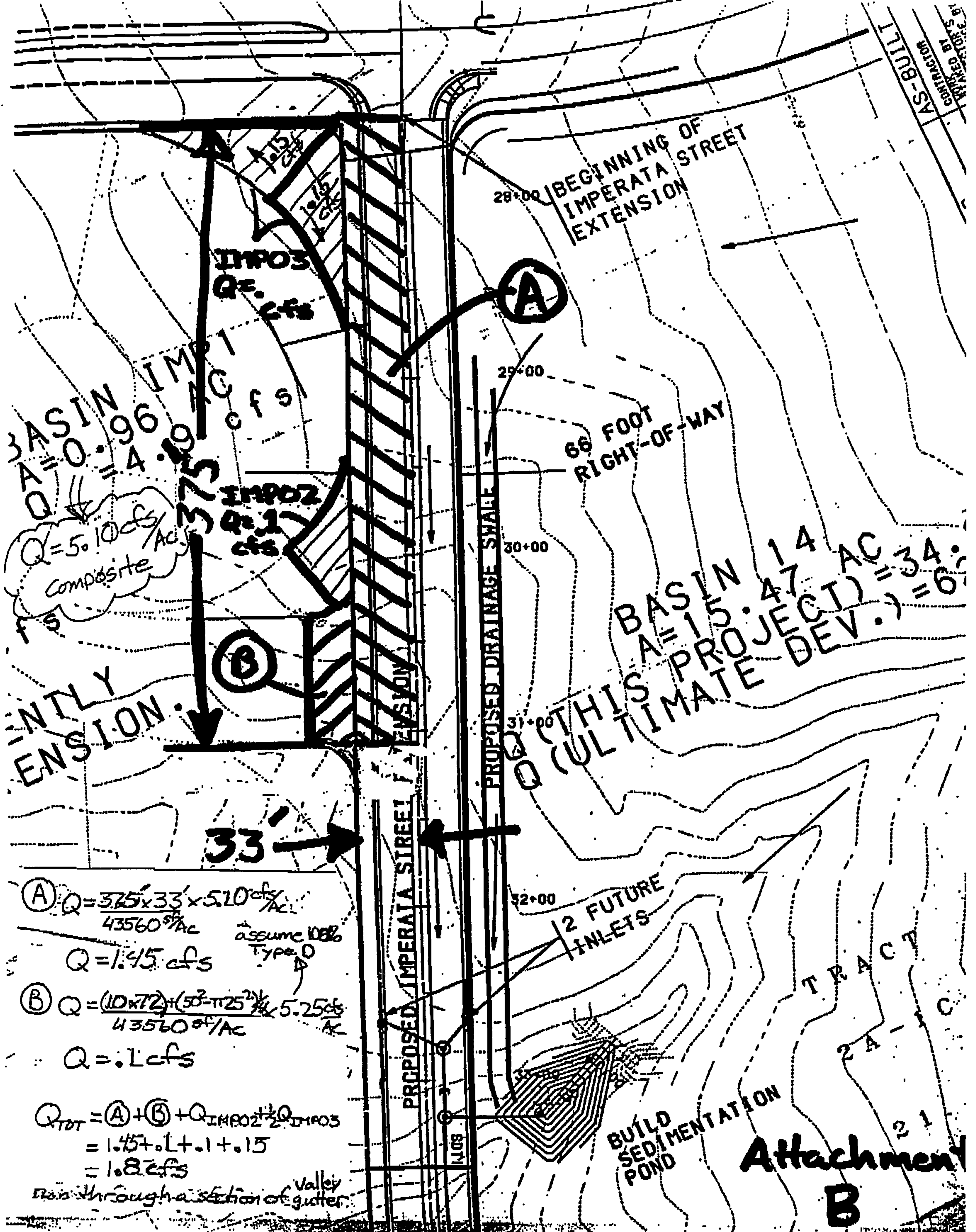
Version #2

COA# 541181

By MSJ@BHI
Date: 4/5/96

Date: 4/5/96





valley gutter section

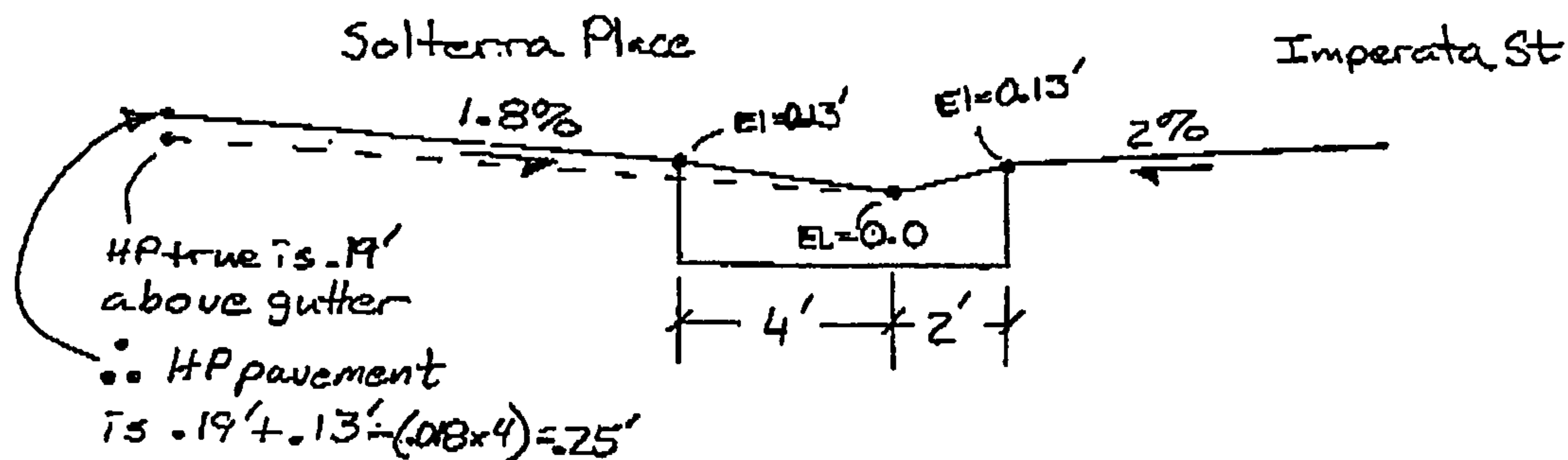
MANNING'S N = .0170

SLOPE = .0335

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.33	3	14.00	0.00	5	26.00	0.33
2	10.00	0.13	4	16.00	0.13			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.01	0.01	0.0	0.0	0.5	0.5	0.48
0.02	0.02	0.0	0.0	1.0	0.7	0.96
0.03	0.03	0.0	0.0	1.4	1.0	1.44
0.04	0.04	0.0	0.0	1.9	1.2	1.92
0.05	0.05	0.1	0.1	2.4	1.4	2.40
0.06	0.06	0.1	0.1	2.9	1.5	2.88
0.07	0.07	0.1	0.2	3.4	1.7	3.36
0.08	0.08	0.2	0.3	3.8	1.9	3.84
0.09	0.09	0.2	0.4	4.3	2.0	4.32
0.10	0.10	0.2	0.5	4.8	2.2	4.80
0.11	0.11	0.3	0.7	5.3	2.3	5.28
0.12	0.12	0.3	0.8	5.8	2.5	5.76
0.13	0.13	0.4	1.0	6.5	2.5	6.49
0.14	0.14	0.5	1.2	7.5	2.6	7.46
0.15	0.15	0.6	1.4	8.4	2.6	8.44
0.16	0.16	0.6	1.7	9.4	2.7	9.41
0.17	0.17	0.7	2.1	10.4	2.8	10.39
0.18	0.18	0.9	2.4	11.4	2.8	11.37
0.19	0.19	1.0	2.9	12.3	2.9	12.34
0.20	0.20	1.1	3.3	13.3	3.0	13.32
0.21	0.21	1.2	3.9	14.3	3.1	14.29
0.22	0.22	1.4	4.5	15.3	3.2	15.27
0.23	0.23	1.5	5.1	16.3	3.3	16.24
0.24	0.24	1.7	5.9	17.2	3.4	17.22
0.25	0.25	1.9	6.7	18.2	3.5	18.20
0.26	0.26	2.1	7.5	19.2	3.6	19.17
0.27	0.27	2.3	8.5	20.2	3.7	20.15
0.28	0.28	2.5	9.5	21.1	3.8	21.12
0.29	0.29	2.7	10.6	22.1	3.9	22.10
0.30	0.30	2.9	11.8	23.1	4.0	23.07
0.31	0.31	3.2	13.0	24.1	4.1	24.05
0.32	0.32	3.4	14.4	25.0	4.2	25.02
0.33	0.33	3.7	15.8	26.0	4.3	26.00

$D_N = .16'$
 $\rightarrow$
 @
 $Q = 1.08$
 cfs



$D_N = .16' \leq .19' \therefore \text{O.K.}$
 $\leq .25' \therefore \text{O.K.}$

Attachment
 C

valley gutter at gutter line of Solterra

MANNING'S N = .0170

SLOPE = .0335

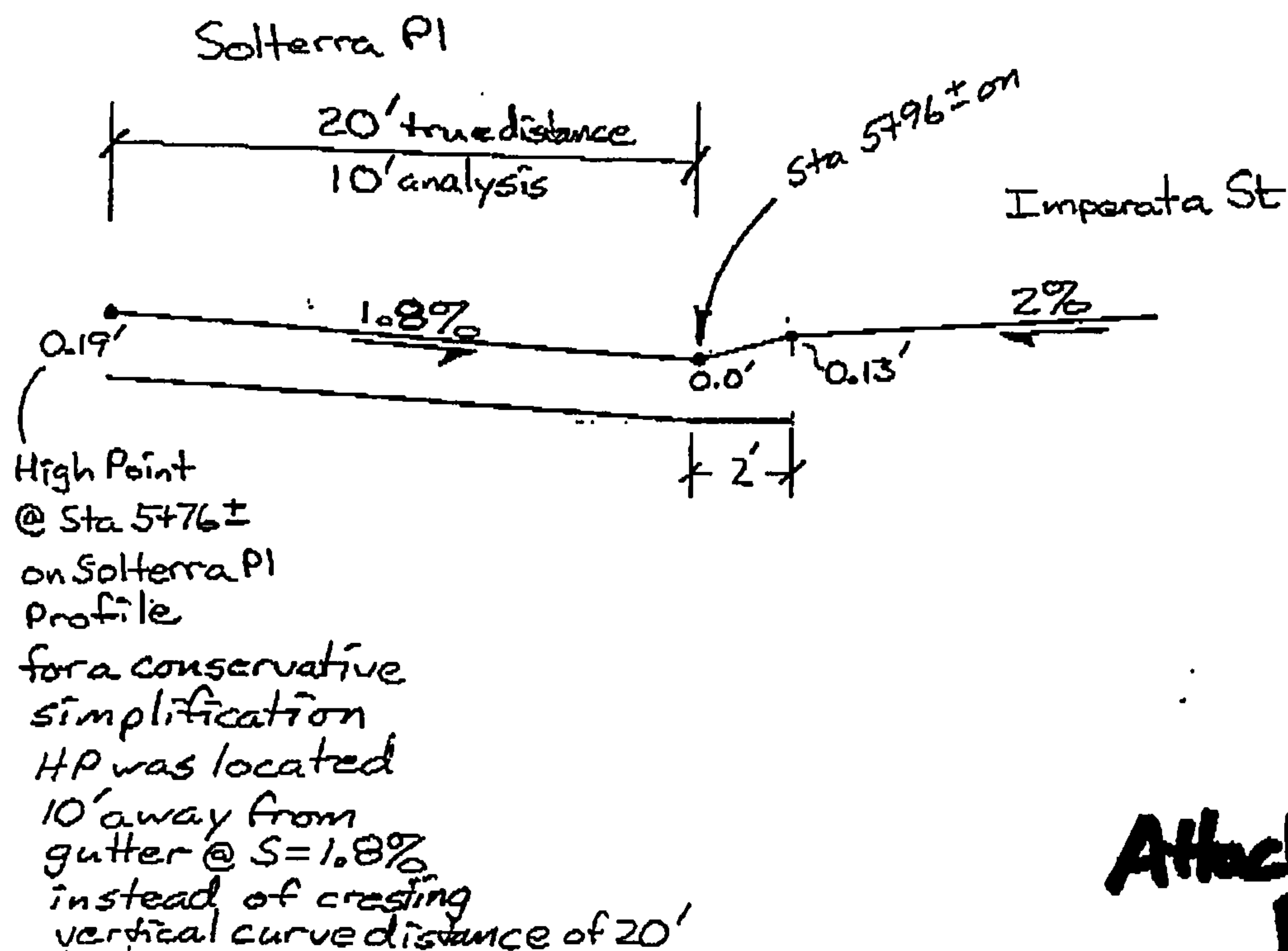
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.19	3	12.00	0.13			
2	10.00	0.00	4	22.00	0.33			

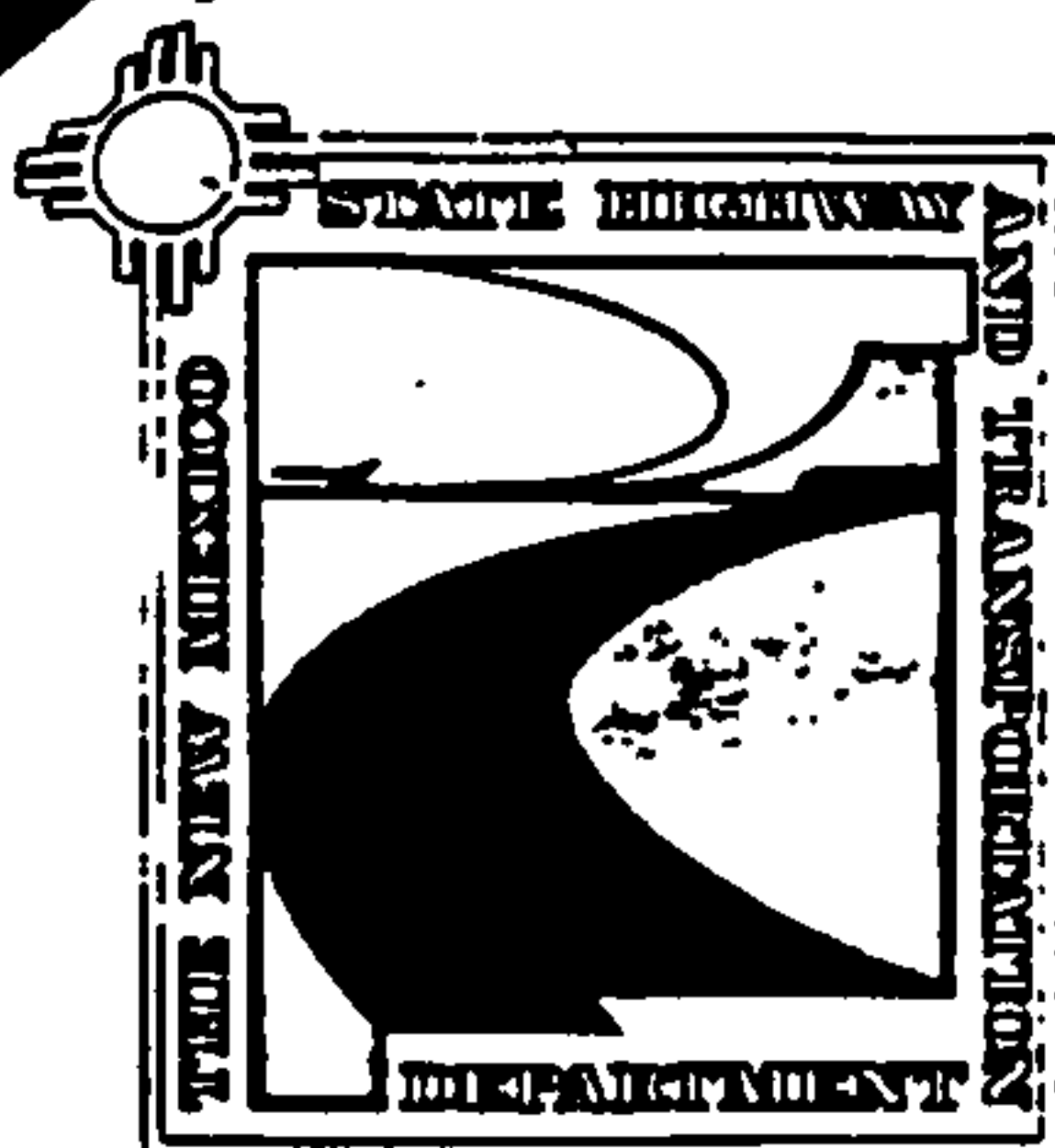
WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.01	0.01	0.0	0.0	0.7	0.5	0.68
0.02	0.02	0.0	0.0	1.4	0.7	1.36
0.03	0.03	0.0	0.0	2.0	1.0	2.04
0.04	0.04	0.1	0.1	2.7	1.2	2.72
0.05	0.05	0.1	0.1	3.4	1.4	3.40
0.06	0.06	0.1	0.2	4.1	1.5	4.08
0.07	0.07	0.2	0.3	4.8	1.7	4.76
0.08	0.08	0.2	0.4	5.4	1.9	5.44
0.09	0.09	0.3	0.6	6.1	2.0	6.12
0.10	0.10	0.3	0.7	6.8	2.2	6.80
0.11	0.11	0.4	1.0	7.5	2.3	7.48
0.12	0.12	0.5	1.2	8.2	2.5	8.16
0.13	0.13	0.6	1.5	8.8	2.6	8.84
0.14	0.14	0.7	1.8	9.9	2.7	9.87
0.15	0.15	0.8	2.1	10.9	2.7	10.89
0.16	0.16	0.9	2.5	11.9	2.8	11.92
0.17	0.17	1.0	3.0	13.0	2.9	12.95
0.18	0.18	1.1	3.5	14.0	3.0	13.97
0.19	0.19	1.3	4.0	15.0	3.1	15.00

$D_N = .14$
 @ $\rightarrow$
 $Q = 1.8$
 cfs

$\rightarrow$

$$D_N = .14' \leq .19' \therefore \text{OK.}$$





NEW MEXICO STATE HIGHWAY
AND TRANSPORTATION DEPARTMENT.
AN EQUAL OPPORTUNITY EMPLOYER

IMPERATA EXTENSION
DRAINAGE REPORT

January 10, 1994

BRUCE KING
GOVERNOR

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Chairman, Stanley

J. V. "Rip" Curtis
Vice-Chairman, Clovis

Dr. Quentin Ford, P.E.
Secretary, Las Cruces

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Secretary
Louis J. Medrano

General Office
P.O. Box 1149
Santa Fe, N.M.
87504-1149
505-827-5100

District One Office
P.O. Box 231
Deming, N.M.
88031-0231
505-546-2603

District Two Office
P.O. Box 1457
Roswell, N.M.
88202-1457
505-624-3300

District Three Office
P.O. Box 91750
Albuquerque, N.M.
87199-1750
505-841-2700

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505-425-7527

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P.O. Box 4127
Coronado Station
Santa Fe, N.M.
87502-4127
505-827-9500

District Six Office
P.O. Box 2159
Milan, N.M.
87021
505-285-6623

Mr. Craig W. Hoover
Community Development and Planning
Bohannon-Huston Inc.
7500 Jefferson Street, N.E.
Albuquerque, New Mexico 87109

Subject: High Desert Subdivision Drainage
Submittal

Dear Craig:

I have reviewed the Construction Plans and drainage calculations of the proposed Concrete Box Culvert Connection to the existing drainage structures crossing Tramway Boulevard north of Spain.

I found the drainage connection to be acceptable and my concerns have been addressed. Since, the estimated velocity at the channel is non-erosive and the outfall is lined with wire enclosed riprap, I concur that there is no anticipated erosion; as well as the existing box culverts crossing Spain and the Tramway channel are adequate to handle the additional flows, as shown on your calculations.

I have no further comments and, therefore, the proposed drainage connection is approved.

If I can be of further assistance, please call 827-5323.

Sincerely,

Raymunda A. Van Hoven
Raymunda A. Van Hoven
Drainage Engineer

/RVH

xc: C. V. Trujillo
A. Lopez, DO#3
C. Vigil

**STORM DRAIN CAPACITY ANALYSIS
SOLTERRA SUBDIVISION @ HIGH DESERT**

Manhole #	SD RCP Size (in)	SD RCP Slope (%)	Distance between (ft)	Max Gravity Flow for Pipe (cfs)	Q(100-YR) DEVELOPED (cfs)	Friction Slope Sp %	Pressure Flow or Gravity Flow	HGL (ft)
Tramway CBC existing 1	72	3.17	395.00	754.03	688.40	2.64	G	in pipe
existing 2	48	2.19	174.00	212.57	241.20	2.82	P	1.09 (above pipe)
clara vista sub 3	48	3.84	69.00	281.48	209.60	2.13	G	in pipe
clara vista sub 4	48	1.00	46.30	143.64	193.80	1.82	P	0.38 (above pipe)
clara vista sub 5	48	7.19	200.00	385.16	193.80	1.82	G	in pipe
clara vista sub 6	48	1.37	142.22	168.13	178.00	1.54	P	0.24 (above pipe)
cortaderia st 7	42	3.40	40.00	185.51	178.00	3.13	G	in pipe
cortaderia st 8	42	3.40	68.54	185.51	167.10	2.76	G	in pipe
golden aster rd 9	42	4.65	154.97	216.95	165.10	2.69	G	in pipe
golder aster rd 10	36	3.59	24.54	126.37	84.20	0.70	G	in pipe

Notes: The above analysis indicates that the main storm drain system can accept the additional 6.8 cfs from Solterra Subdivision which was not provided for in the Imperata Extension Report.
The above manhole rim elevation are greater than 4.0 ft above the top of the storm drain pipes that connect to it.

Please refer to the enclosed exhibit for storm drain alignment.

SOLTEERRA
SUBDIVISION

42" SD

CORTADERIA
STREET

60" SD

CLARA VISTA
SUBDIVISION

MH#10

MH#9

MH#8

MH#7

MH#6

MH#5

48" SD

MH#4

MH#3

MH#2

48" SD

72" SD

72" SD

MH#1

AP12

72" SD

SD

CLARA VISTA
ROAD

TIERZ DEL
OSO
SUBDIVISION

TRACT 3B

TRACT 2D
HIGH DESERT
OPEN SPACE

— PRESSURE FLOW

— GRAVITY FLOW

TRAMWAY

CRC

TRAMWAY
BLVD

S

North
No SCALE

**DRAINAGE REPORT FOR
FOR
HIGH DESERT TRACT 2A-1C-1
PROPOSED SOLTERRA SUBDIVISION, UNITS I & II**

FEBRUARY 1996

Prepared by:

**BOHANNAN-HUSTON INC.
COURTYARD I, 7500 JEFFERSON STREET N.E.
ALBUQUERQUE, NM 97109**

Prepared for:

**CENTEX HOMES
5111 JUAN TABO BOULEVARD NE
ALBUQUERQUE, NM 87111**

PREPARED BY:

Michael Jeffords 2/14/96
Michael Jeffords, E.I. Date

UNDER THE SUPERVISION OF:

Tamara Morgan 2/14/96
Tamara Morgan, P.E. Date
Reviewed
3/14/96 *AKM*



I:\CDP\95364\A2420\DRAINAGE.RPT-3/14/96

I. PURPOSE

The purpose of this report is to present historic and proposed drainage conditions for the proposed development of High Desert Tract 2A-1C-1. Consideration has been given to previous drainage studies on the site to insure agreement.

The plan has been prepared in accordance with the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993. The site conditions are analyzed for the 10-year and 100-year 6-hour storm event.

II. SITE LOCATION AND CHARACTERISTICS

Please refer to the SITE VICINITY MAP (PLATE 1) enclosed with this report.

The tract is bounded by Cortaderia Street on the west and Imperata Street on the east. Spain Road and a proposed New Road respectively form the northern and southern boundaries. At this time, Spain Road is existing and Cortaderia and Imperata Street roadways have been graded. The proposed site consists of approximately 20 acres. The construction of New Road and Imperata Extension are covered in a separate drainage report submitted by Bohannon-Huston - High Desert - Imperata Street Extension, January 1996. The construction of Cortaderia Street is addressed in High Desert - Cortaderia Street Extension, November 1995. These reports are referenced where applicable. (See Appendix C and PLATE 5)

Existing vegetation consists primarily of prairie grasses. Slopes in the project site range from 4% to 8%, with the majority of the project sloping at 6% to the west. The Soil Conservation Service has classified the soils in this site area as Embudo-Tijeras complex, Embudo gravelly fine sandy loam, and Tijeras gravelly fine sandy loam, all of which correspond to a common hydrological soil group classification of B.

III. EXISTING HYDROLOGIC AND SITE DRAINAGE CONDITIONS

The existing conditions are a result of the High Desert Cortaderia Street and Imperata Street Extensions. These improvements greatly simplify the existing conditions. No offsite flows impact the site. The entire undeveloped tract has land treatment designation of A. Using the rational method outlined in the DPM, an undeveloped flow rate of 44.6 cfs is generated onsite.

Please reference applicable calculations in Appendix A.

FEMA Floodplain

According to the latest FEMA floodplain maps, there are no existing floodplains within the site. The closest FEMA floodplains lie to the south in the Bear Canyon Arroyo and north in the Bear Arroyo, north of Spain.

IV. PROPOSED (DEVELOPED) HYDROLOGIC AND HYDRAULIC CONDITIONS

Please refer to the proposed drainage BASIN MAP (PLATE 2) enclosed with this report.

The proposed tract is divided into several drainage basins. The basins are defined by their contribution to adjacent street flow. Basin designation and land treatments are listed in Appendix B. The total flow generated onsite is 85.0 cfs. The boundary streets receive a total of 6.7 cfs. The remaining flows (78.3 cfs) are conveyed from lot to street via common side yard swales and rear yard ribbon channels. Once in the street, flows are picked up by drop inlets and conveyed through storm drains ranging from 18"(connection pipes) to 42"(outfall connection at New Road).

The storm drain in New Road has been designed with sufficient capacity to accept developed flows from tract 2A-1C-1. Due to the steep slopes associated with this site a special street section will be used for the main route through the site. The section will utilize a 4" difference between curb height and R/W. Similar measures have been used elsewhere in High Desert, the sidewalk will be sloped at 2% and the

landscape buffer will be sloped at 5%. All applicable street hydraulic calculations utilize this section.

Eleven storm drain inlets are proposed. A summary sheet in Appendix D lists the capacities and placement of the inlets. The excess capacity of the inlets provides a 43% clogging factor for the street flow into the sump. The storm drain will contain 78.3 cfs at capacity and enter an existing 42" R.C.P. on New Road. The Storm Drain was designed to accept 80.0 cfs from 2A-1C-1 at this point. Therefore, proposed flows are acceptable.

The difference in elevation between some pads is 10 ft or more, creating 3:1 (maximum) rear yard slopes. Ribbon Channels will be utilized to collect flows from upper level lots and convey them to the street. Ribbon Channel dimensions are 1 foot wide by 0.67 feet high and have a maximum flow of 2.3 cfs. An alternative landscaped channel section has also been included. Please reference the calculations in Appendix E.

The site will be mass graded at one time but constructed in two separate units. Desiltation structures will be constructed at future street connections to Unit II, insuring that clean water will enter Unit I. The desiltation structures are designed to retain the sediment yield from the 2-year event. Standpipes discharge to the street flowline. Dewatering holes are not used in the standpipe because of the infiltration capacity of the soil. In High Desert, other desiltation structures have been designed under the same assumption. In a 100-year event, excess flow will pass over an emergency spillway.

V. CONCLUSION

This report presents a workable drainage management plan for the proposed development on Tract 2A-1C-1. The plan provides safe and adequate drainage protection and is consistent with the previous High Desert - Cortaderia Street Extension and the High Desert - Imperata Street Extension. It is recommended this plan be approved as presented.

Part A Compatibility between the current Imperata Street Extension Report and the current Solterra Subdivision Drainage Report.

Imperata Information

Master Plan Basin 15

$$A = 25.89 \text{ Ac}$$

$$N = 3.4 \text{ Du/Ac (assumed)}$$

$$\% D = 37.4\% = 7\sqrt{N^2 + 5N} = \% D = 37.0\%$$

$$\% D_{\text{IMP}} \approx \% D_{\text{IMP}}$$

$$\therefore \text{cfs/Ac} \approx \text{cfs/Ac}$$

$$Q_{\text{TOT BASIN 15}} = 106.8 \text{ cfs}$$

$$\frac{106.8 \text{ cfs}}{25.89 \text{ Ac}} = \frac{Q}{20.3}$$

$$Q = 83.7 \text{ cfs}$$

VS

$$Q = 85.0 \text{ cfs Solterra Report Total}$$

$$+ 2.7 \text{ cfs} \Rightarrow Q_{\text{ADD from Part D}}$$

$$87.7 \text{ cfs } Q_{\text{Solterra TOTAL}}$$



$$81.0 \text{ cfs } Q_{\text{INTERNAL DISCHARGE TO 42" PIPE IN GOLDEN ASTER}}$$

Discharge From Basin 15A accounted for in Storm Drain Analysis @ 42" PIPE In Golden Aster = 80.9 cfs

$$+ 6.7 \text{ cfs discharge offsite}$$

- (.4 cfs discharged to Spain This is insignificant
- * 2.7 cfs discharged to Imperata & Golden Aster
- * 3.6 cfs discharged to Cortaderia

* See the following page for Compatibility
BOHANNAN-HUSTON INC.



Part A: Offsite Flow Compatibility with Imperata Extension and Cortaderia Extension Reports.

The Imperata Street Extension Drainage Report addresses offsite flows from surrounding tracts in the Street Capacity design & inlet grate capacity design for inlets on Imperata & Golden Aster Rd. It allows for an additional *5 cfs on both roads for a total of *10 cfs. Solterra basins that drain directly to these roads are as follows:

$$\left. \begin{array}{l} Q_{IMPO} = 0.2 \text{ cfs} \\ Q_{IMPO1} = 0.1 \text{ cfs} \\ Q_{IMPO2} = 0.1 \text{ cfs} \\ \frac{1}{2} Q_{IMPO3} = \frac{1}{2}(0.3) \text{ cfs} \end{array} \right\} \text{Discharge to Imperata}$$
$$\left. \begin{array}{l} Q_{NRO} = 1.9 \text{ cfs} \\ Q_{NRO2} = 0.2 \text{ cfs} \end{array} \right\} \text{Discharge to Golden Aster}$$

$$Q_{OFF} = 2.7 \text{ cfs} \approx \frac{1}{4} \text{ of allowed } \therefore \text{O.K.}$$

7.3 cfs can discharge ^{directly} from tracts East and South of Tract 2A-1C-1A

With an additional *10 cfs discharge to these streets only 0.1 cfs residual make it to Cortaderia.

⇒ Cortaderia Street Extension Drainage report showed a basin YARDS Q=2.9 cfs which was replaced by Solterra basins CORTO and NRO1

$Q_{TOT} = 3.6 \text{ cfs}$. The 0.7 cfs difference has been shown previously to work in the

February 1996 submittal of the Solterra Drainage Report. See Appendix C of that Report.

* See the following pages for reference.



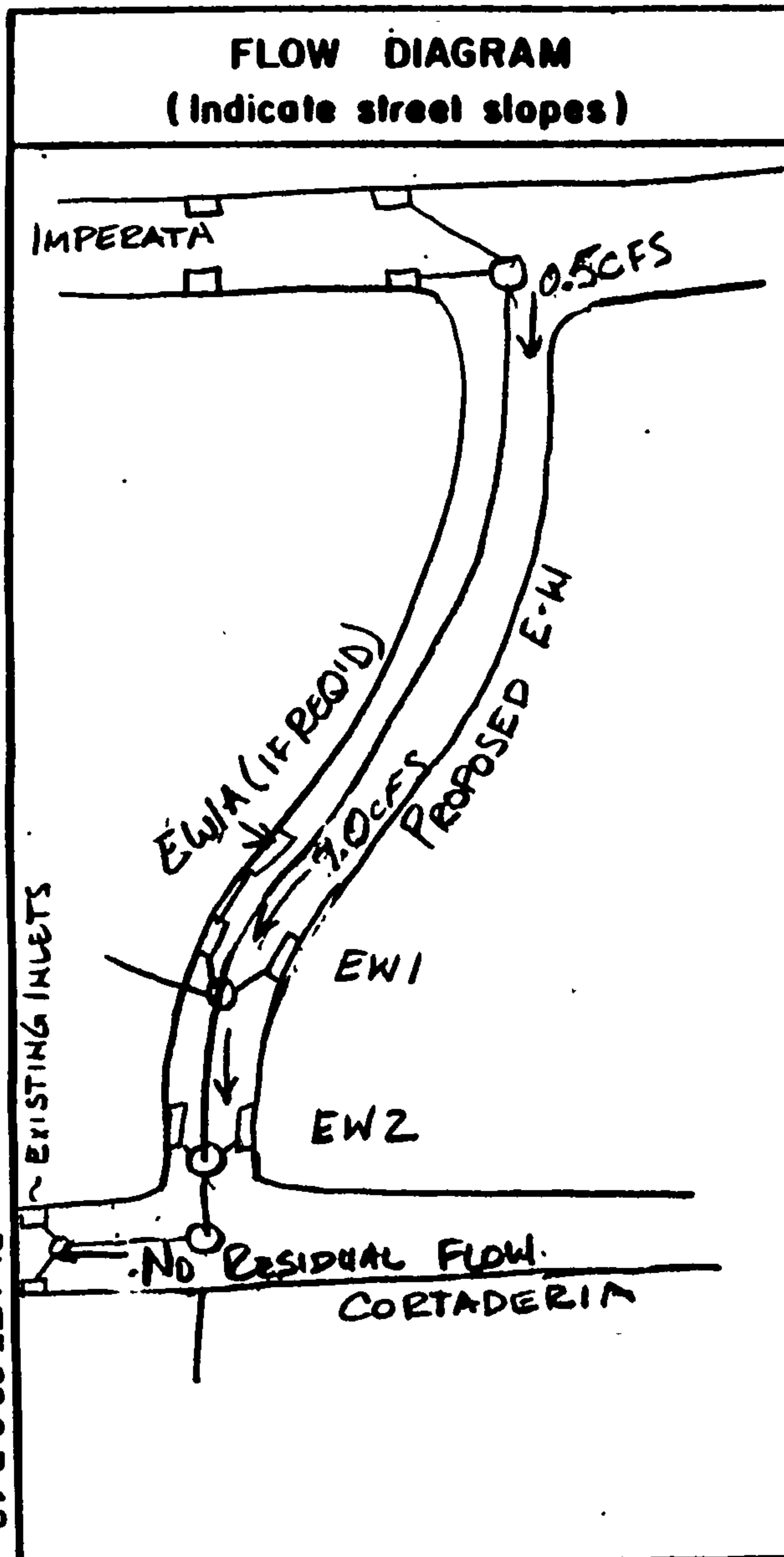
BOHANNAN-HUSTON INC.

PROJECT NAME Solterra Subdivision SHEET A-2 OF _____
PROJECT NO. Drainage Report BY _____ DATE _____
SUBJECT Part A - Addendum #1 CH'D _____ DATE _____

Taken From:

PROJECT IMPERATA EXTENSION
DESIGN FREQUENCY 100-YR

CALCULATED BY PR
DATE 12/14/95



Sym.	Drain. Area	Q		Cap. of $\frac{1}{2}$ Street	Gutter "d"	C.B.		Connector Pipe			V Depth
		Total	Inter.			No.	Size	Head	L	Dia.	
EW1		7.0	2x25 5.0		0.21	2	NEENAH D			18"	4'
EW2		2.0	2x1.3 2.0		0.14	2	NEENAH D			18"	4'
RESID. = 0.1 CFS											
NOTE: CATCH BASINS ARE CAPABLE OF ACCEPTING AN ADDITIONAL 5 CFS OF STREET FLOW ON IMPERMEABLE AND 5 CFS OF STREET FLOW FROM E-W STREET, IF INLET EW1A IS ADDED - SEE ANALYSIS NEXT PAGE.											
NOTE: IN ORDER TO ADDRESS CLOGGING FACTOR OF 50%, THE UPSTREAM INLETS (IMP1, EW1) WILL BE INCREASED TO A DOUBLE GRATE INLET.											

22.3

A-3 ~~D-2~~

Shl of

PROJECT IMPERATA EXTENSION

CALCULATED BY PR

DESIGN FREQUENCY $\frac{100-\sqrt{R}}{100}$

DATE 3/6/96

FLOW DIAGRAM (Indicate street slopes)										Sym.		Drain. Area	Q		Cap. of Street	Gutter "d"	C.B.		Connector Pipe		V	
													Total	Inter.			No.	Size	Head	L	Dia.	Depth
* STREET 10 CFS ADD'L SCFS FROM ADJACENT USES IMP1 IMP2 EW1A EW1 EW2 STREET * INCLUDES SCFS FROM ADJACENT LAND USES. CORTADERIA										IMP1	IMP1	10.0	2x30		.26							
										IMP2	IMP2	6.6	4.4		.27							
										EW1A		13.7	3.6		.26							
										EW1		10.1	6.4		.24							
										EW2		3.7	3.6		.17							
																				RESID = 0.1 CFS		

Part B:

SUMMARY OF STREET SECTION HYDRAULICS

X-SECTION	LOCATION	AVERAGE SLOPE(%)	WIDTH F-F/ROW	Q(100) (CFS)	NORMAL DEPTH	ENERGY	
1	STREET A	5.50	32'/50'	12.0	0.31	0.68	0.68'<1'--OK
2	STREET A	7.00	32'/50'	15.1	0.32	0.82	0.82'<1'--OK
 3	STREET A	* 4.2% 4.86	32'/50'	** 37.6 34.4	0.44 0.42	0.98 0.99	0.98 0.99'<1'--OK
4	STREET A	6.35	32'/50'	23.7	0.37	0.94	0.94'<1'--OK
5	STREET A	1.00	32'/50'	39.2	0.56	0.81	0.81' 0.79'<1'--OK
6	STREET A	1.00	32'/50'	14.1	0.41	0.52	0.52' 0.50'<1'--OK
 7	STREET C NORTH	* 0.90% 1.00	28'/46'	** 9.1 7.8	0.54 0.45	0.69 0.60	0.69 0.60'<0.87'--OK
 8	STREET C SOUTH	* 0.90% 2.50	28'/46'	** 12.0 10.7	0.60 0.43	0.79 0.79	0.79' 0.79'<0.87'--OK
9	STREET B NORTH	1.00	28'/46'	10.3	0.45	0.61	0.61'<0.87'--OK
 10	STREET B SOUTH	* 2.12% 2.50	28'/46'	** 18.0 16.8	0.53' 0.45	0.87 0.84	0.87' 0.84'<0.87'--OK

* Slopes have been fixed as better information has been developed for road grades since February 1996.

** Flows increase on typical controlling sections based on additional impervious area not accounted for (see part D for more information) and a diversion of impervious area flows from the rear yard ribbon channels to the street. The worst cases were examined all were found to work. °° OK

 Revised for Addendum #1 by MSJ 3/11/96

Part B: Street Section Analysis based on additional flow from previous Rear Yard Drainage and additional impervious area flows from Part D $Q_{add} = 2.7 \text{ cfs}$

Street C - North (Valerian Place)
 $Q_{orig} = 7.6 \text{ cfs}$
 $+ \frac{9}{68}(2.7) \Rightarrow \text{grad of } Q_{add} \text{ based on lots}$
 $+ \frac{1}{2}(2.3) \Rightarrow \text{assume } \frac{1}{2} \text{ of Basin C-1 to front (impervious area to front)}$
 $Q_{revised} = 9.1 \text{ cfs (This is conservative)}$

$D_N = .54'$
 $E = .69' < .87' : \text{OK}$) SEE SHEET B-2

No Adverse Effect

Street A - West of Valerian Section 3-3 (Chitalpa Place)
 $Q_{orig} = 34.4 \text{ cfs}$
 $+ \frac{30}{68}(2.7 \text{ cfs}) \Rightarrow \text{grad of } Q_{add} \text{ based on lots}$
 $+ \frac{1}{2}(2.3 \text{ cfs}) \Rightarrow \text{Assume } \frac{1}{2} \text{ of basin C-1 to front (impervious area)}$
 $Q_{revised} = 37.6 \text{ cfs}$

$D_N = .44'$
 $E = .98' < 1.0' : \text{OK. No Adverse Effect}$

Street B - South (Mariola Place)
 $Q_{orig} = 16.5 \text{ cfs}$
 $+ \frac{14}{68}(2.7 \text{ cfs})$
 $+ \frac{1}{2}(1.8 \text{ cfs})$
 $Q_{revised} = 18.0 \text{ cfs}$
 $D_N = .53'$
 $E = .87' < .87' : \text{OK}$

These were the three worst cases. All still work. : OK.

STREET C (VALERIAN PLACE) S=0.9%

MANNING'S N = .0170

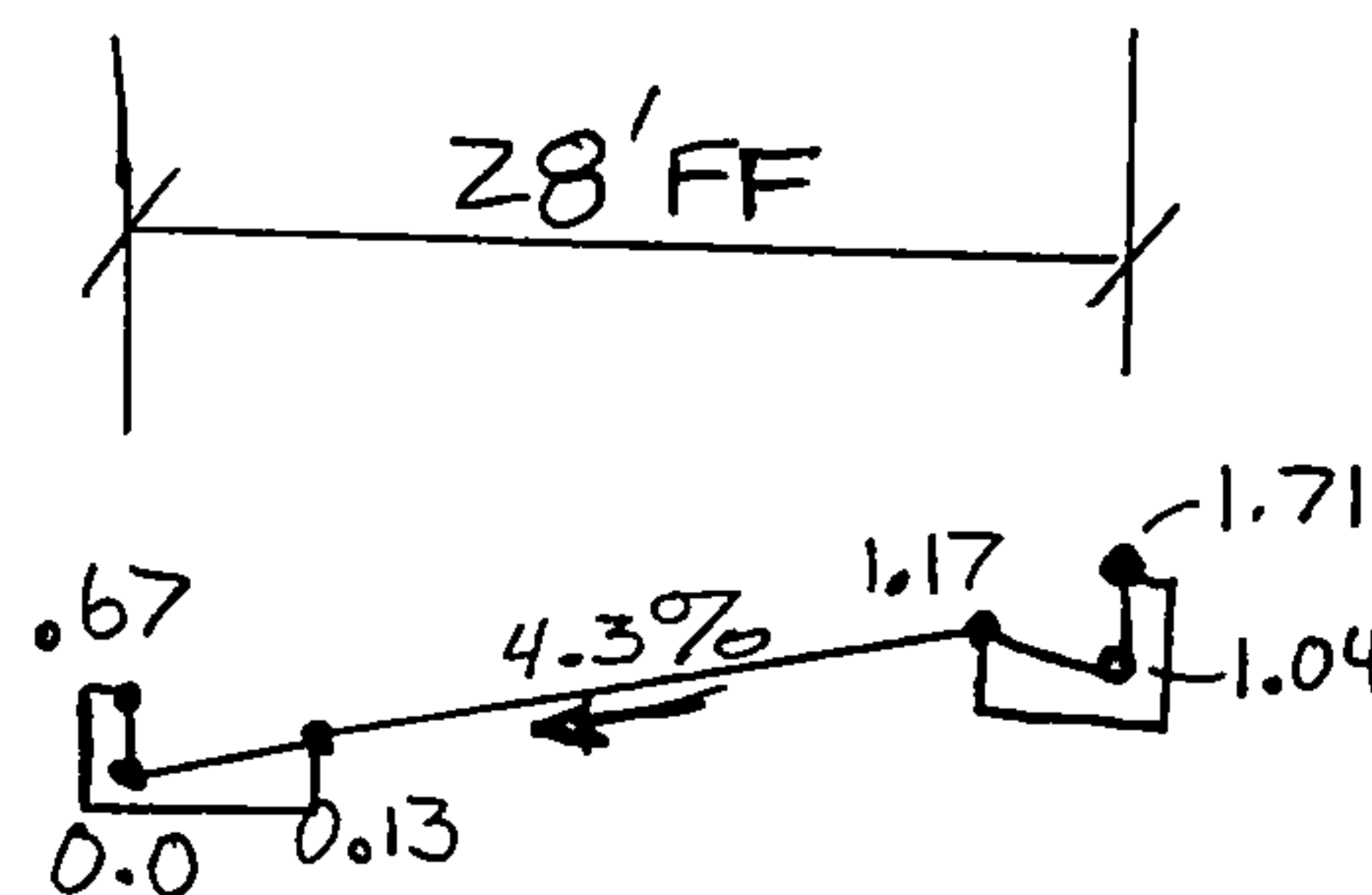
SLOPE = .0090

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	2.00	0.13	5	28.00	1.04
2	0.00	0.00	4	26.00	1.17	6	28.00	1.71

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	0.8	0.7	0.77
0.10	0.10	0.1	0.1	1.6	1.1	1.54
0.15	0.15	0.2	0.2	2.6	1.4	2.46
0.20	0.20	0.3	0.5	3.8	1.6	3.62
0.25	0.25	0.5	1.0	5.0	1.9	4.77
0.30	0.30	0.8	1.7	6.2	2.1	5.92
0.35	0.35	1.1	2.7	7.4	2.4	7.08
0.40	0.40	1.5	3.9	8.6	2.6	8.23
0.45	0.45	2.0	5.5	9.8	2.8	9.38
0.50	0.50	2.4	7.4	11.1	3.0	10.54
0.55	0.55	3.0	9.8	12.3	3.2	11.69
0.60	0.60	3.6	12.5	13.5	3.5	12.85
0.65	0.65	4.3	15.7	14.7	3.7	14.00
0.67	0.67	4.6	17.1	15.1	3.7	14.46

North
Q = 9.1 cfs
D_N = 0.54'

E = 0.69' ≤ 0.87' ∴ OK



South

Q_{orig} = 10.7 cfs
+ 1/68 (2.7 cfs)
+ 1/2 (1.8 cfs)

Q_{revised} = 12.0 cfs

D_N = 0.60'

E = 0.79' ≤ 0.87' ∴ OK

Addendum #1
B-2

STREET A (CHITALPA PLACE) S=4.2%

MANNING'S N = .0170

SLOPE = .0420

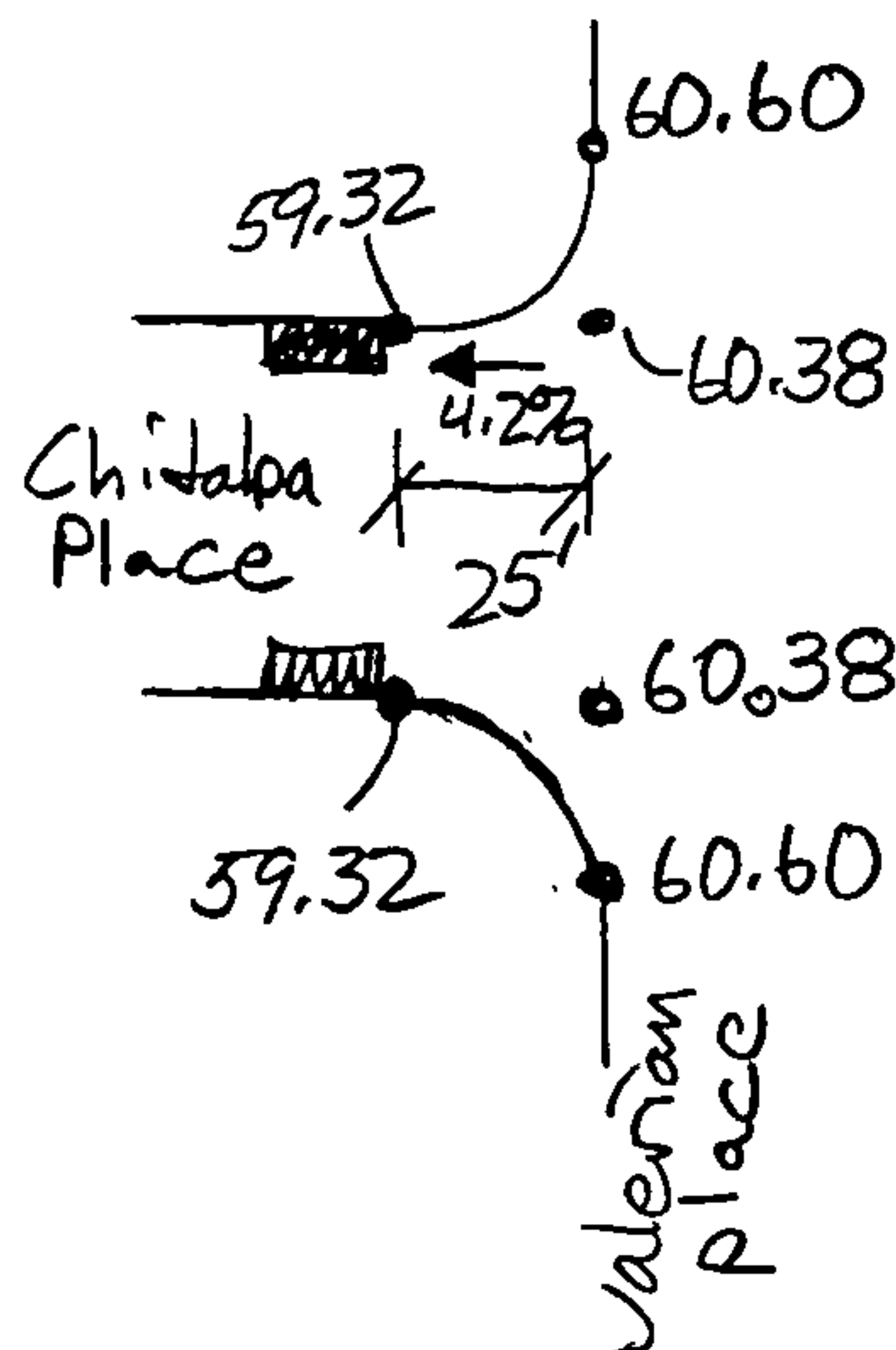
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	41.00	0.00
2	9.00	0.67	5	25.00	0.40	8	41.00	0.67
3	9.00	0.00	6	39.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.6	1.5	1.54
0.10	0.10	0.2	0.4	3.3	2.3	3.08
0.15	0.15	0.4	1.0	6.4	2.6	6.07
0.20	0.20	0.8	2.4	11.7	3.0	11.26
0.25	0.25	1.5	5.3	17.0	3.5	16.44
0.30	0.30	2.4	10.0	22.2	4.1	21.63
0.35	0.35	3.6	17.0	27.5	4.7	26.81
0.40	0.40	5.1	26.6	32.8	5.2	32.00
0.45	0.45	6.7	41.7	32.9	6.2	32.00
0.50	0.50	8.3	59.5	33.0	7.1	32.00
0.55	0.55	9.9	79.6	33.1	8.0	32.00
0.60	0.60	11.5	101.9	33.2	8.8	32.00
0.65	0.65	13.1	126.3	33.3	9.6	32.00
0.70	0.70	14.7	148.3	35.1	10.1	33.64
0.75	0.75	16.5	169.8	37.9	10.3	36.36
0.80	0.80	18.4	193.8	40.7	10.5	39.09
0.85	0.85	20.4	220.5	43.5	10.8	41.82
0.90	0.90	22.6	250.1	46.4	11.1	44.55
0.95	0.95	24.9	282.5	49.2	11.4	47.27
1.00	1.00	27.3	318.0	52.0	11.7	50.00

$$Q = 37.6$$

$$D_N = .44$$

$$E = 0.98 \leq 1.0' \text{ OK}$$



$$\frac{60.38 - 59.32}{25'} = 4.2\%$$

Addendum #1
B-3

STREET B (MARIOLA PLACE) S=2.12%

MANNING'S N = .0170

SLOPE = .0212

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	2.00	0.13	5	28.00	0.67
2	0.00	0.00	4	26.00	0.80	6	28.00	1.34

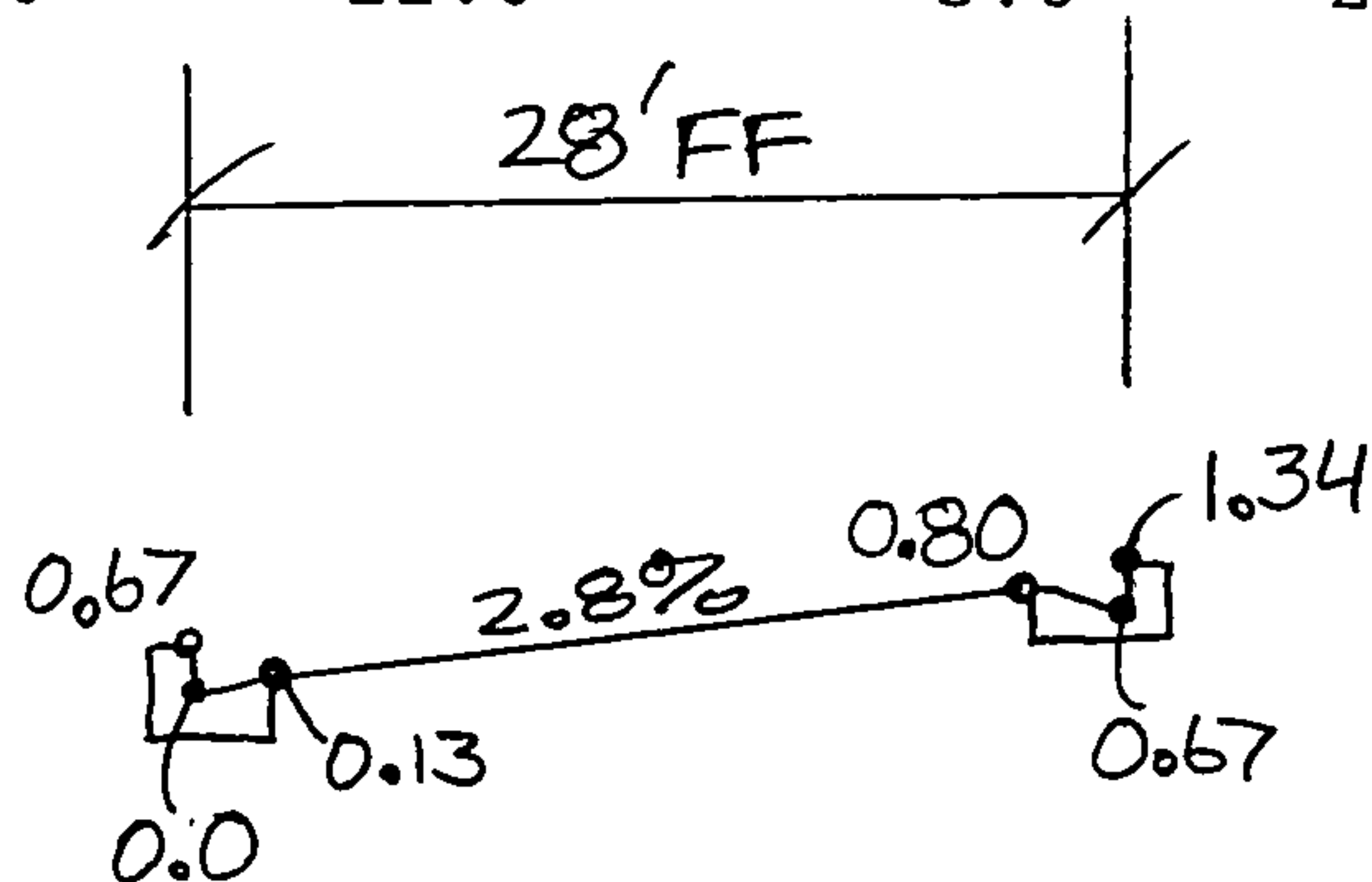
WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	0.8	1.0	0.77
0.10	0.10	0.1	0.1	1.6	1.7	1.54
0.15	0.15	0.2	0.4	2.9	2.0	2.72
0.20	0.20	0.4	0.8	4.7	2.3	4.51
0.25	0.25	0.6	1.7	6.6	2.7	6.30
0.30	0.30	1.0	3.0	8.4	3.1	8.09
0.35	0.35	1.4	4.9	10.2	3.4	9.88
0.40	0.40	2.0	7.5	12.1	3.8	11.67
0.45	0.45	2.6	10.8	13.9	4.2	13.46
0.50	0.50	3.3	15.0	15.8	4.5	15.25
0.55	0.55	4.1	20.0	17.6	4.8	17.04
0.60	0.60	5.0	26.0	19.4	5.2	18.84
0.65	0.65	6.0	32.9	21.3	5.5	20.63
0.67	0.67	6.4	36.0	22.0	5.6	21.34

South

$$Q = 18.0 \text{ cfs}$$

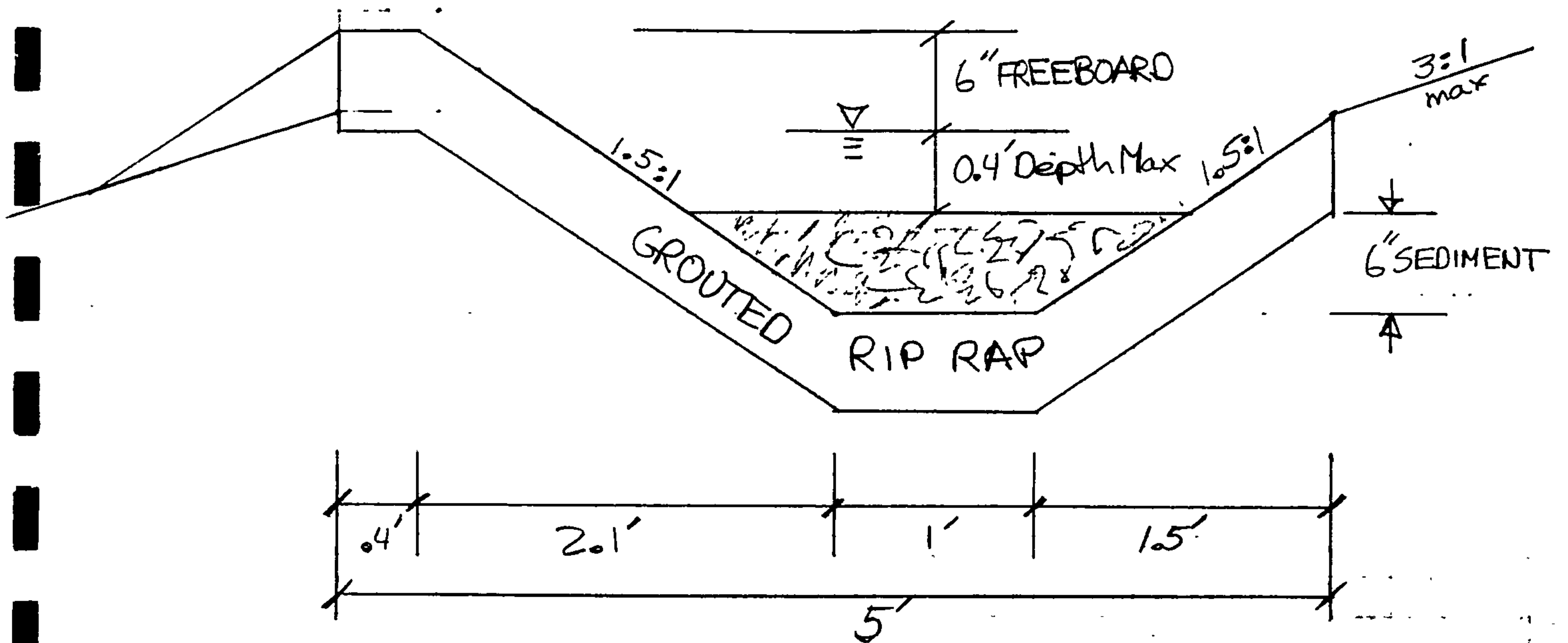
$$D_N = .53'$$

$$E = .87' \leq .87' \therefore \text{OK}$$



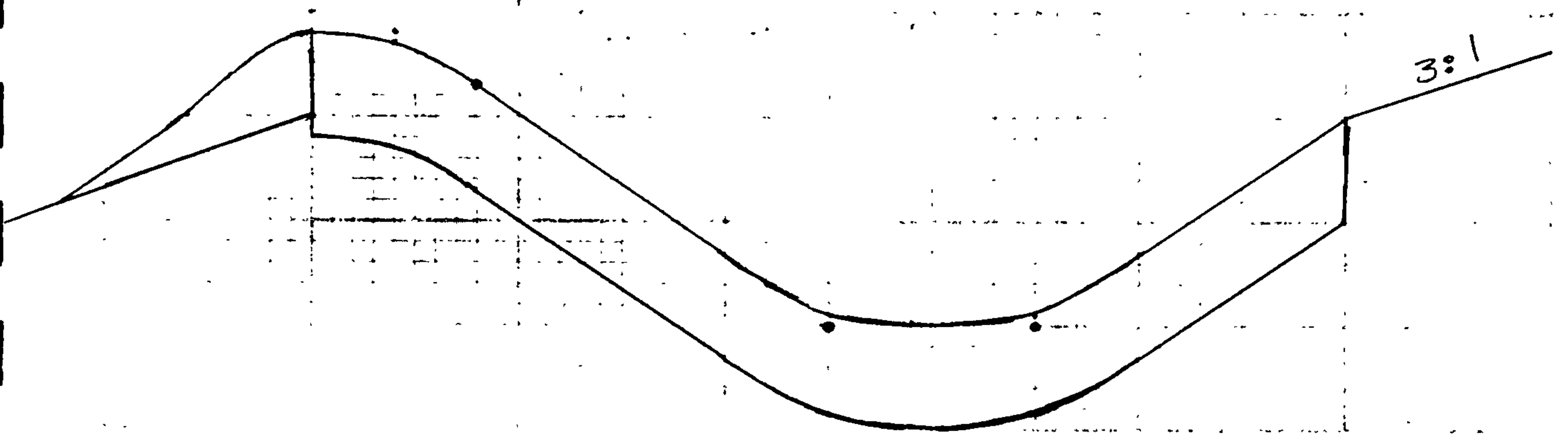
Addendum #1
B-4

Part C: Revised Ribbon Channel Hydraulics



@ Minimum Slope = 0.5%
 $Q_{0.5\%} = 2.2 \text{ cfs}$

This section Replaces both sections previously designed
 It is most similar to the Alternate land scaped section
 The edges of this section may be softened as shown
 below without affecting hydraulics



BOHANNAN-HUSTON INC.

PROJECT NAME Drainage Report for SHEET C-1 OF
 PROJECT NO. Solterra Subdivision BY MSJ DATE
 SUBJECT Part C - Addendum #1 CH'D DATE

GROUTED RIPRAP RIBBON CHANNEL S=0.5%

MANNING'S N = .0450

SLOPE = .0050

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	2.50	-1.00	5	5.00	0.00
2	0.25	0.50	4	3.50	-1.00			

SEDIMENT LEVEL	WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
	-0.95	0.05	0.1	0.0	1.2	0.3	1.15
	-0.90	0.10	0.1	0.1	1.4	0.4	1.30
	-0.85	0.15	0.2	0.1	1.5	0.6	1.45
	-0.80	0.20	0.3	0.2	1.7	0.7	1.60
	-0.75	0.25	0.3	0.3	1.9	0.7	1.75
	-0.70	0.30	0.4	0.4	2.1	0.8	1.90
	-0.65	0.35	0.5	0.5	2.3	0.9	2.05
	-0.60	0.40	0.6	0.6	2.4	1.0	2.20
	-0.55	0.45	0.8	0.8	2.6	1.0	2.35
	-0.50	0.50	0.9	0.9	2.8	1.1	2.50
	-0.45	0.55	1.0	1.1	3.0	1.1	2.65
	-0.40	0.60	1.1	1.3	3.2	1.2	2.80
	-0.35	0.65	1.3	1.6	3.3	1.2	2.95
	-0.30	0.70	1.4	1.8	3.5	1.3	3.10
	-0.25	0.75	1.6	2.1	3.7	1.3	3.25
	-0.20	0.80	1.8	2.4	3.9	1.4	3.40
	-0.15	0.85	1.9	2.8	4.1	1.4	3.55
	-0.10	0.90	2.1	3.1	4.2	1.5	3.70
	-0.05	0.95	2.3	3.5	4.4	1.5	3.85
	0.00	1.00	2.5	3.9	4.6	1.6	4.00

$$Q = 3.1 - 0.9 = 2.2 \text{ cfs}$$

$$D_N = 0.9 = 6'' \text{ SED} + 0.4' \text{ FLOW}$$

Addendum #1
C-2

GROUTED RIPRAP RIBBON CHANNEL S=1.0%

MANNING'S N = .0450

SLOPE = .0100

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	2.50	-1.00	5	5.00	0.00
2	0.25	0.50	4	3.50	-1.00			

	WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
SEDIMENT LEVEL	-0.95	0.05	0.1	0.0	1.2	0.4	1.15
	-0.90	0.10	0.1	0.1	1.4	0.6	1.30
	-0.85	0.15	0.2	0.1	1.5	0.8	1.45
	-0.80	0.20	0.3	0.2	1.7	0.9	1.60
	-0.75	0.25	0.3	0.4	1.9	1.1	1.75
	-0.70	0.30	0.4	0.5	2.1	1.2	1.90
	-0.65	0.35	0.5	0.7	2.3	1.3	2.05
	-0.60	0.40	0.6	0.9	2.4	1.4	2.20
	-0.55	0.45	0.8	1.1	2.6	1.4	2.35
	-0.50	0.50	0.9	1.3	2.8	1.5	2.50
	-0.45	0.55	1.0	1.6	3.0	1.6	2.65
	-0.40	0.60	1.1	1.9	3.2	1.7	2.80
	-0.35	0.65	1.3	2.2	3.3	1.7	2.95
	-0.30	0.70	1.4	2.6	3.5	1.8	3.10
	-0.25	0.75	1.6	3.0	3.7	1.9	3.25
	-0.20	0.80	1.8	3.4	3.9	1.9	3.40
	-0.15	0.85	1.9	3.9	4.1	2.0	3.55
	-0.10	0.90	2.1	4.4	4.2	2.1	3.70
	-0.05	0.95	2.3	4.9	4.4	2.1	3.85
	0.00	1.00	2.5	5.5	4.6	2.2	4.00

$$Q = 4.4 - 1.3 = 3.1 \text{ cfs max}$$

Addendum #
C-3

GROUTED RIPRAP RIBBON CHANNEL S=2.0%

MANNING'S N = .0450

SLOPE = .0200

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	2.50	-1.00	5	5.00	0.00
2	0.25	0.50	4	3.50	-1.00			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
-0.95	0.05	0.1	0.0	1.2	0.6	1.15
-0.90	0.10	0.1	0.1	1.4	0.9	1.30
-0.85	0.15	0.2	0.2	1.5	1.1	1.45
-0.80	0.20	0.3	0.3	1.7	1.3	1.60
-0.75	0.25	0.3	0.5	1.9	1.5	1.75
-0.70	0.30	0.4	0.7	2.1	1.6	1.90
-0.65	0.35	0.5	1.0	2.3	1.8	2.05
-0.60	0.40	0.6	1.2	2.4	1.9	2.20
-0.55	0.45	0.8	1.5	2.6	2.0	2.35
-0.50	0.50	0.9	1.9	2.8	2.1	2.50
-0.45	0.55	1.0	2.3	3.0	2.3	2.65
-0.40	0.60	1.1	2.7	3.2	2.4	2.80
-0.35	0.65	1.3	3.2	3.3	2.5	2.95
-0.30	0.70	1.4	3.7	3.5	2.6	3.10
-0.25	0.75	1.6	4.2	3.7	2.7	3.25
-0.20	0.80	1.8	4.8	3.9	2.8	3.40
-0.15	0.85	1.9	5.5	4.1	2.8	3.55
-0.10	0.90	2.1	6.2	4.2	2.9	3.70
-0.05	0.95	2.3	7.0	4.4	3.0	3.85
0.00	1.00	2.5	7.8	4.6	3.1	4.00

$$Q = 6.2 - 1.9 = 4.3 \text{ cfs max}$$

Addendum #1
C-4

GROUTED RIPRAP RIBBON CHANNEL S=4.0%

MANNING'S N = .0450

SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	2.50	-1.00	5	5.00	0.00
2	0.25	0.50	4	3.50	-1.00			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
-0.95	0.05	0.1	0.0	1.2	0.8	1.15
-0.90	0.10	0.1	0.1	1.4	1.3	1.30
-0.85	0.15	0.2	0.3	1.5	1.6	1.45
-0.80	0.20	0.3	0.5	1.7	1.9	1.60
-0.75	0.25	0.3	0.7	1.9	2.1	1.75
-0.70	0.30	0.4	1.0	2.1	2.3	1.90
-0.65	0.35	0.5	1.3	2.3	2.5	2.05
-0.60	0.40	0.6	1.7	2.4	2.7	2.20
-0.55	0.45	0.8	2.2	2.6	2.9	2.35
-0.50	0.50	0.9	2.7	2.8	3.0	2.50
-0.45	0.55	1.0	3.2	3.0	3.2	2.65
-0.40	0.60	1.1	3.8	3.2	3.3	2.80
-0.35	0.65	1.3	4.5	3.3	3.5	2.95
-0.30	0.70	1.4	5.2	3.5	3.6	3.10
-0.25	0.75	1.6	6.0	3.7	3.8	3.25
-0.20	0.80	1.8	6.9	3.9	3.9	3.40
-0.15	0.85	1.9	7.8	4.1	4.0	3.55
-0.10	0.90	2.1	8.8	4.2	4.2	3.70
-0.05	0.95	2.3	9.8	4.4	4.3	3.85
0.00	1.00	2.5	11.0	4.6	4.4	4.00

$$Q = 8.8 - 2.7 = 6.1 \text{ cfs max}$$

Addendum #1
C-5

Part D: Land Treatment Analysis

If %D for the site were determined based on the Single Family Residential Equation in Table A-5 OPM Section 22.2, Page A-5

$$\%D = \frac{7\sqrt{N^2 + 5N}}{N^2 + 5N}$$

where $N = D_u/A_c$

$$N = \frac{68}{20.3} = 3.35$$

$$\%D = 37.0\%$$

$$\left. \begin{array}{l} \%C = 32.0\% \\ \%B = 31.0\% \\ \%A = 0\% \end{array} \right\} \text{Assumed}$$

$$Q = 83.7 \text{ cfs}$$

this is the method used in the Imperata Report

Flow currently generated by the site is

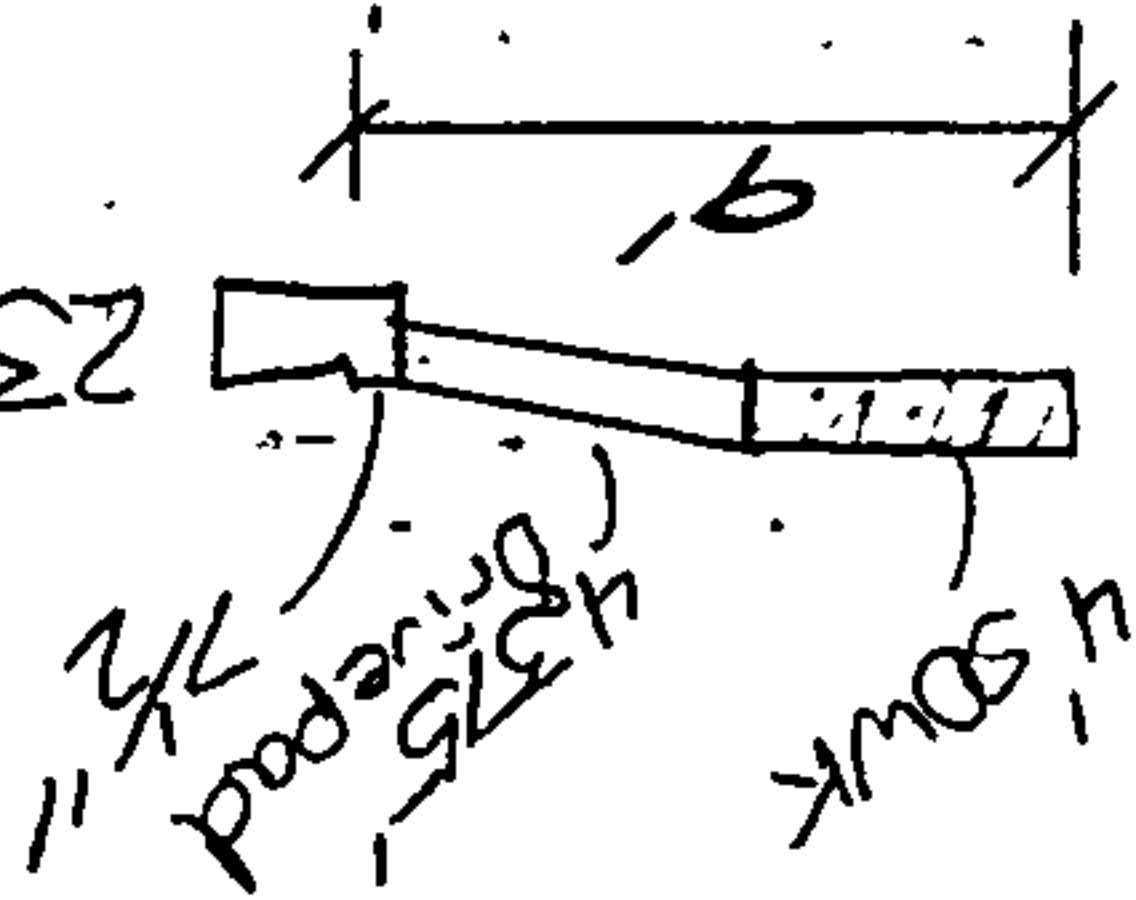
$$Q = 85.0 \text{ cfs}$$

based on our report

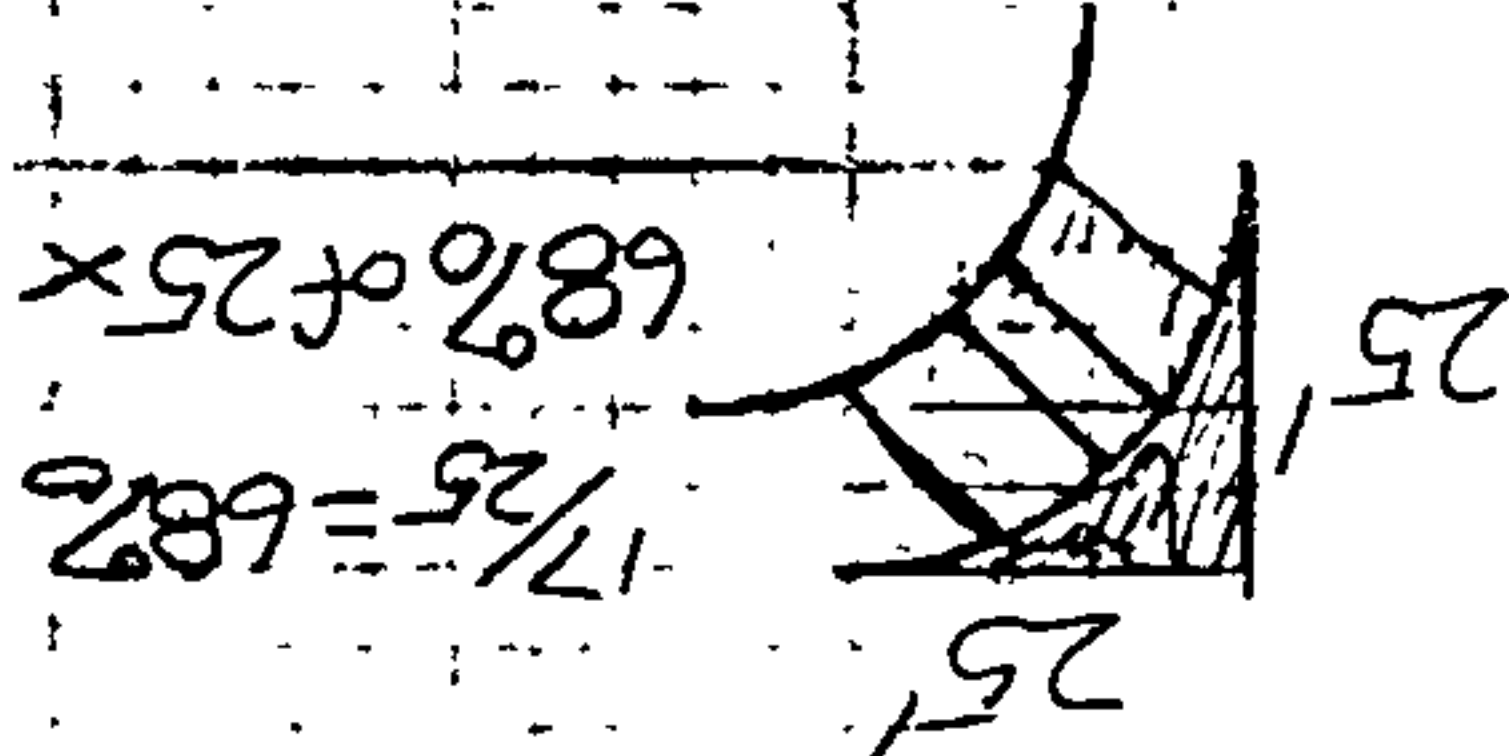
However, it is noted that certain items are not included in the analysis. They were as follows: drivepads, Wcamps,

culdesacs, knuckles, and curb width.

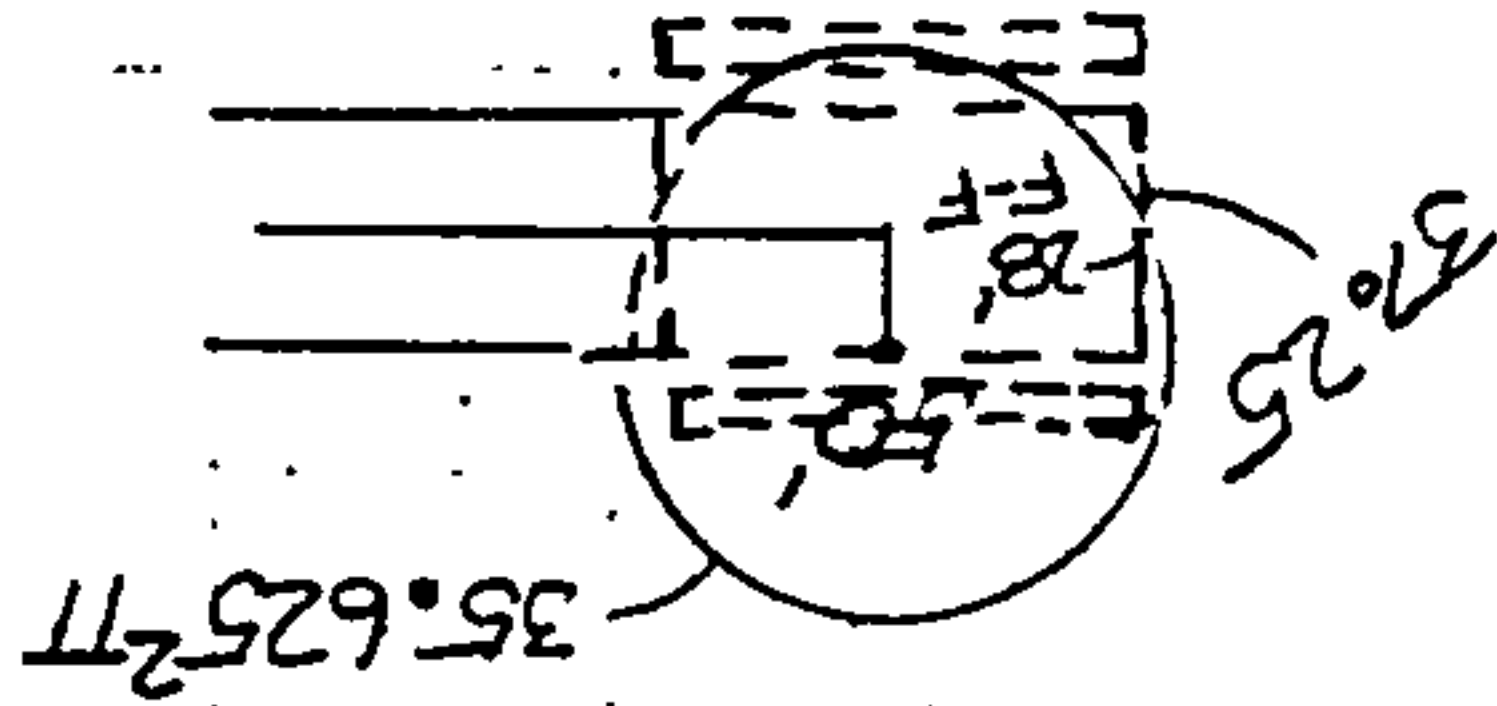
So as not to recalculate every basin we will calculate the area of the additional type D over the entire site and replace Type B with it.



$$23.4 \times 3.75 = 100.625 \text{ sf per Drivepad} \times 68 = 6843.5 \text{ sf}$$



$$68\% \text{ of } 25 \times 25 = 425 \text{ sf per Wc Ramp} \times 14 \text{ Wc Ramps} = 5950 \text{ sf}$$



$$35.625^2 - 37.25 \times 50 = 2124 \text{ sf per Culdesac} \times 7 \text{ Culdesacs} = 14868 \text{ sf}$$

BOHANNAN-HUSTON INC.

Drainage Report for

Softerra Subdivision

SHEET

D-1

OF

PROJECT NO. (TRACT 2A-1C-1A, High Desert)

BY

MST

DATE

3/11/96

CH'D

DATE

SUBJECT

Part D - Addendum #1

Part D: continued

$$3987 \text{ sf/per Culdesac} \times \frac{1}{2} \text{ culdesac per knuckle} = 1994 \text{ sf per knuckle}$$

$$\frac{7\frac{1}{2}'' \times 2 \times \text{Road Length}}{\text{ft of road}} = 1025 \text{ sf per ft of road} \times \begin{pmatrix} 1020 \text{ Chitalpa} \\ 1040 \text{ Mariola} \\ 640 \text{ Valerian} \\ 375 \text{ Solterra} \end{pmatrix} = 3844 \text{ sf}$$

Also include

$$4' \times 20' \text{ for Walkway} \times 68 \text{ Lots} = 5440 \text{ sf}$$

Total Additional type D

$$6843 + 5950 + 14868 + 1994 + 3844 + 5440 = 38,939 \text{ sf} \\ 0.89 \text{ AC}$$

$$Q_{\text{Add}} = \left(5.25 \text{ cfs/AC}_{\text{Type D}} - 2.20 \text{ cfs/AC}_{\text{Type B}} \right) \times 0.89 \text{ AC} = 2.7 \text{ cfs}$$

$$Q_{\text{TOT}} = Q_{\text{TOT ORIG}} + Q_{\text{ADD}}$$

$$Q_{\text{TOT}} = 85.0 \text{ cfs} + 2.7 \text{ cfs} = 87.7 \text{ cfs}$$

$$\frac{2.7}{85.0} = 3.2\% \text{ more flow than Solterra report originally shows}$$

$$\frac{87.7 - 83.7}{83.7} = 4.8\% \text{ more flow than shown in Imperata Report}$$



BOHANNAN-HUSTON INC.

PROJECT NAME Drainage Report for Solterra Subdivision SHEET D-2 OF
PROJECT NO. BY MSJ DATE 3/11/96
SUBJECT Part D-Addendum #1 CH'D DATE

Part E : Calculations For Inlets In Sump

$$Q_{100 \text{ AT SUMP}} = \overset{Q_{\text{ORIG}}}{14.1 \text{ cfs}} + \overset{Q_{\text{ADD}}}{2.7 \text{ cfs}} = 16.8 \text{ cfs}$$

WORST CASE ASSUMES ALL
ADDITIONAL FLOW MAKES IT
TO THE SUMP CONDITION

ASSUMING NO EMERGENCY OUTLET CAN BE MADE
DESIGN FOR $2 \times Q_{100 \text{ AT SUMP}}$ AGAIN THIS IS THE WORST CASE

Orifice Equation

$$Q_{\text{TYPE 'C'}} = .6(4.10 \text{ SF}) \sqrt{64.4(H)} \\ = 18.0 \text{ cfs where } H = .83'$$

$$Q_{\text{Type DBLC}} = [.6(4.10 \text{ SF}) \sqrt{64.4(H)}] 2 \\ = 36.0 \text{ cfs where } H = .83'$$

Weir Equation

$$Q_{\text{TYPE 'C'}} = 2.68 \left(\frac{2(18.5') + 31.9''}{12''} \right) H^{1.5} \\ = 11.6 \text{ cfs where } H = .83'$$

$$Q_{\text{Type DBLC}} = 2.68 \left(\frac{2(18.5') + 2(31.9'')}{12} \right) H^{1.5} \\ = \underline{\underline{17.0 \text{ cfs where } H = .83'}}$$

Install 2-Type DBLC'
INLETS @ Low Pt.

$$2 \times Q_{100 \text{ AT SUMP}} = 33.6 \text{ cfs} \leq Q_{\text{CAPACITY}} = 34.0 \text{ cfs}$$

OK



BOHANNAN-HUSTON INC.

PROJECT NAME Solterra Subdivision SHEET E-1 OF
PROJECT NO. Drainage Report BY MSJ DATE 3/12/96
SUBJECT Part E: Addendum #1 CH'D DATE

Q_{ADD} (from Part D) 2.7

HYDRAULIC GRADE LINE COMPUTATIONS FOR SOLTERRA SUBDIVISION: UNIT 1 AND UNIT 2
100-YEAR DEVELOPED FLOWS DISCHARGING INTO A 42" LINE IN GOLDEN ASTER RD.
FILENAME: CDP:[95364A2440.HYDRO] HGL_SOLT.WK4

Station	Structure	Diam.	Q	Area	Vel.	K	Sl	Length	D	Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Pipe Soffit	Low Point #	HV	EGL(dn)	EGL(up)
110.00	MH1 OUT	36	81.0	7.07	11.46	667	0.0147	53.05			0.78	0.00	0.00	0.00	0.00	0.00		35.05	35.05	35.05	2.04	35.05	37.09
163.05	MH2	36	81.0	7.07	11.46	667	0.0147	62.46	6	10	0.92	0.14	0.00	0.10	0.00	0.24	35.83	36.07	35.60	41.00	2.04	37.87	38.11
225.51	MH3	36	66.9	7.07	9.46	667	0.0101	150.72	6	0	1.52	0.00	0.62	0.08	0.00	0.70	36.99	38.34	36.25	38.39	1.39	39.03	39.73
376.23	MH4	30	56.7	4.91	11.55	410	0.0191	62.54	6	5	1.20	0.08	0.68	0.09	0.14	0.98	39.86	40.16	37.79	42.45	2.07	41.25	42.23
438.77	MH5	30	45.9	4.91	9.35	410	0.0125	52.37	6	5	0.66	0.08	0.64	0.08	0.00	0.81	41.36	42.88	38.83	43.43	1.36	43.43	44.23
491.14	MH6	24	31.9	3.14	10.15	226	0.0199	175.84	4	5	3.50	0.07	0.91	0.07	0.05	1.10	43.53	44.39	39.70	43.96	1.6	44.89	45.99
666.98	MH7	24	18.3	3.14	5.83	226	0.0065	110.00	4	0	0.72	0.00	0.89	0.05	0.00	0.94	47.88	49.90	43.19	50.29	0.53	49.48	50.43
776.98	MH8	18	10.5	1.77	5.94	105	0.0100	206.27	4	45	2.06	0.08	0.27	0.03	0.00	0.38	50.62	50.98	32.00	57.16	0.55	51.15	51.53
983.25	INLET																						

VELOCITY HEAD CALCS.

ORIFICE EQUATION CALCS.

#	INLET	TC ELEV	D	Q	A	VEL	K	Sl	LENGTH CONNECTOR	Hf	1.2V ² /2g	C.F.	FREE-BOARD	MAX. ALLOW HGL IN DS MH	Vmin	H based on Vmin	Qmax from ORIFICE	H req'd based on Q	Vmin based on H	WHICH CONDITION CONTROL	Vcont
1	② MH3	40.77	30	33.6	4.91	6.84	410	0.0067	26.00	0.17	0.87	0.83	0.5	38.39	4.70	3.45	43.92	2.02	3.27	VEL HEAC	4.70
1	② MH4	44.00	18	5.1	1.77	2.89	105	0.0024	26.00	0.06	0.16	0.83	0.5	42.45	2.99	2.24	12.72	0.36	1.11	VEL HEAC	2.99
1	② MH5	45.00	18	5.4	1.77	3.06	105	0.0026	26.00	0.07	0.17	0.83	0.5	43.43	3.00	2.25	12.77	0.40	1.15	VEL HEAC	3.00
1	② MH6	45.70	18	7.0	1.77	3.96	105	0.0044	26.00	0.12	0.29	0.83	0.5	43.96	3.12	2.37	13.11	0.68	1.43	VEL HEAC	3.12
1	② MH7	52.00	18	6.8	1.77	3.85	105	0.0042	26.00	0.11	0.28	0.83	0.5	50.29	3.11	2.36	13.06	0.64	1.39	VEL HEAC	3.11
1	② MH8	59.00	18	7.8	1.77	4.41	105	0.0055	26.00	0.14	0.36	0.83	0.5	57.16	3.19	2.44	13.30	0.84	1.59	VEL HEAC	3.19

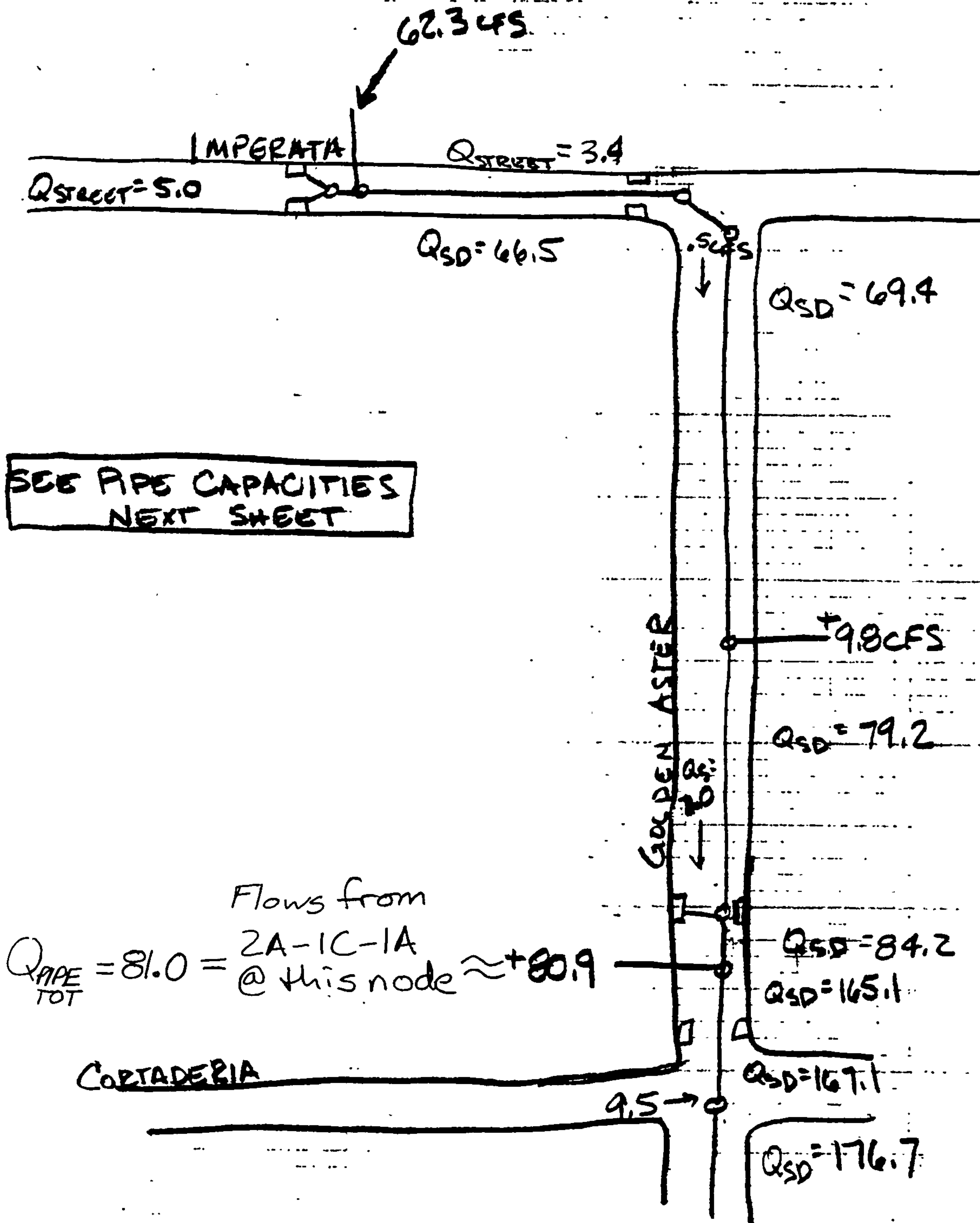
① Starting HGL = Pipe Soffit of 36" Line. Imperata Drainage Report shows that flow in the 42" Line in Golden Aster Rd is at Normal Depth. ($D_N = 27.5" < 36"$ O.K.)

② $Q_{ADD} = 2.7$ cfs the additional flow generated by previously unaccounted for Impervious Area has been added directly to all storm drain flows. This is conservative

Part E: Storm Drain Hydraulics

Addendum #1
E-2

SCHEMATIC OF STORM DRAIN:



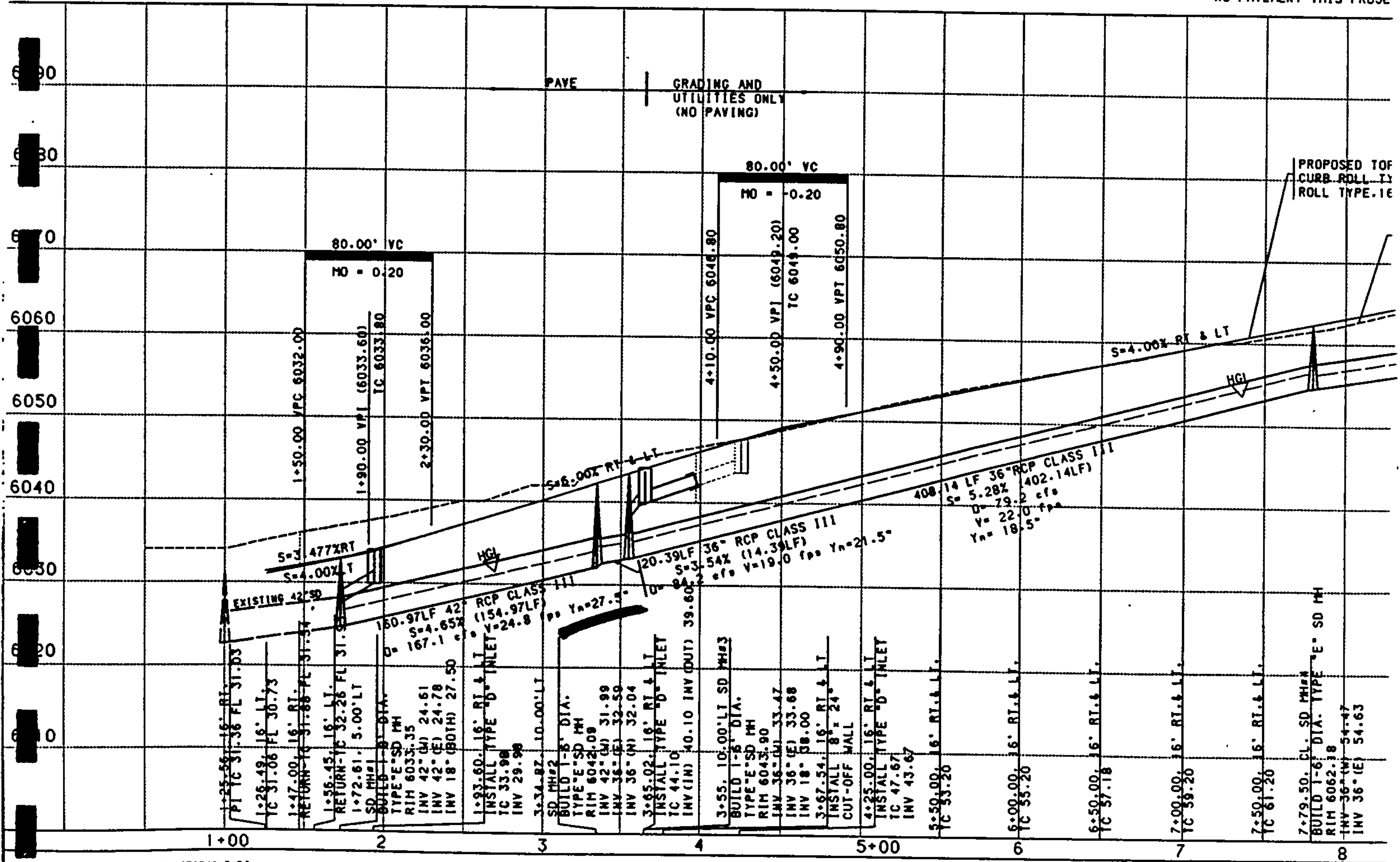
Taken From:



BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET _____ OF _____
 PROJECT NO (Drainage Report) BY PR DATE 3/6/96
 SUBJECT _____ CH'D _____ DATE 2/12

E-3



GOLDEN ASTER-42 SU

CULVERT RATING TABLE

42. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 0.50 SLOPE = 0.04650

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
0.50000	0.02114	0.04760	2.25212
1.00000	0.05957	0.21220	3.56198
10.00000	1.75567	26.97164	15.36263
10.50000	1.88094	29.71857	15.79988
11.00000	2.00821	32.58176	16.22425
11.50000	2.13737	35.55791	16.63628
12.00000	2.26829	38.64363	17.03645
12.50000	2.40086	41.83538	17.42518
13.00000	2.53496	45.12958	17.80287
13.50000	2.67050	48.52253	18.16986
14.00000	2.80736	52.01043	18.52647
14.50000	2.94545	55.58938	18.87298
15.00000	3.08467	59.25542	19.20965
15.50000	3.22493	63.00446	19.53672
16.00000	3.36612	66.83238	19.85440
16.50000	3.50817	70.73494	20.16289
17.00000	3.65099	74.70780	20.46236
17.50000	3.79447	78.74658	20.75298
18.00000	3.93854	82.84679	21.03488
18.50000	4.08312	87.00388	21.30820
19.00000	4.22811	91.21315	21.57304
19.50000	4.37343	95.46992	21.82953
20.00000	4.51900	99.76936	22.07775
20.50000	4.66474	104.10655	22.31777
21.00000	4.81056	108.47652	22.54968
21.50000	4.95638	112.87416	22.77352
22.00000	5.10211	117.29432	22.98936
22.50000	5.24768	121.73171	23.19722
23.00000	5.39301	126.18098	23.39715
23.50000	5.53800	130.63666	23.58915
24.00000	5.68257	135.09314	23.77324
24.50000	5.82664	139.54478	23.94943
25.00000	5.97013	143.98575	24.11769
25.50000	6.11294	148.41010	24.27801
26.00000	6.25499	152.81183	24.43038
26.50000	6.39619	157.18465	24.57472
27.00000	6.53645	161.52228	24.71102
27.50000	6.67567	165.81813	24.83918
28.00000	6.81376	170.06558	24.95914
28.50000	6.95062	174.25774	25.07081
29.00000	7.08616	178.38750	25.17408
29.50000	7.22026	182.44751	25.26882
30.00000	7.35283	186.43028	25.35491
30.50000	7.48375	190.32791	25.43216
31.00000	7.61291	194.13229	25.50042
31.50000	7.74018	197.83487	25.55946
32.00000	7.86546	201.42679	25.60904
32.50000	7.98859	204.89868	25.64891
33.00000	8.10945	208.24063	25.67875
33.50000	8.22790	211.44215	25.69820
34.00000	8.34377	214.49220	25.70687
34.50000	8.45690	217.37856	25.70427
35.00000	8.56712	220.08824	25.68987
35.50000	8.67423	222.60695	25.66301
36.00000	8.77803	224.91893	25.62295
36.50000	8.87828	227.00639	25.56874
37.00000	8.97472	228.84909	25.49929
37.50000	9.06708	230.42366	25.41320
38.00000	9.15503	231.70213	25.30873
38.50000	9.23818	232.65044	25.18357
39.00000	9.31609	233.22516	25.03466

Taken From:
Imperata Extension
Drainage Report
D-44
E-5

Part F: Temporary Detention Pond Design for the 10-yr Storm

Pond A: Captures flow from Basins B4, B5, B6 & C1 in the interim condition
A = 4.39 Ac.

1. Size based on settling Velocity

Design Particle: Very Fine Sand ($D = .006 \text{ mm}$)

100% Removal in 10 yr Storm

$V_s = .009 \text{ fps}$ (very fine sand)

$$\begin{aligned}\text{Surface Area}_{(\text{min})} &= SA = 1.2(Q_{10})/V_s \\ &= 1.2(8.1)/.009 \\ &= 1080 \text{ sf (min)}\end{aligned}$$

$$\text{Use } 37 \times 80 = 2960 > 1080 \\ \therefore \text{O.K.}$$

2. Pond Size based on Sediment Storage plus Detention of the 10 YR Volume

$$V_{\text{sediment}} = 158 \text{ cf} \approx 200$$

→ from USLE spreadsheet

$$V_{10} = 0.22 A \text{ cft} = 9600 \text{ cf}$$

$$V_{\text{TOTAL}} = 9800 \text{ cf required}$$

$$V_{\text{pond}} = (2960 + (37 \times 15 \times 80 \times 15)/2 \times 2.5') = 9875 \text{ cft}$$

3. Determine Spillway Length to pass Q_{100} @ $H = 0.5'$

$$Q_{\text{spillway}} = Q_{100} = 14.6 \text{ cfs (interim)} = 4.39 \text{ Ac} \times \frac{1}{2}(2.92 + 3.73 \text{ cfs/Ac})$$

$$Q = CLH^{1.5} \Rightarrow L = \frac{Q}{CH^{1.5}} = \frac{14.6 \text{ cfs}}{2.68(.5)^{1.5}} = 15.4' \approx 16.0'$$

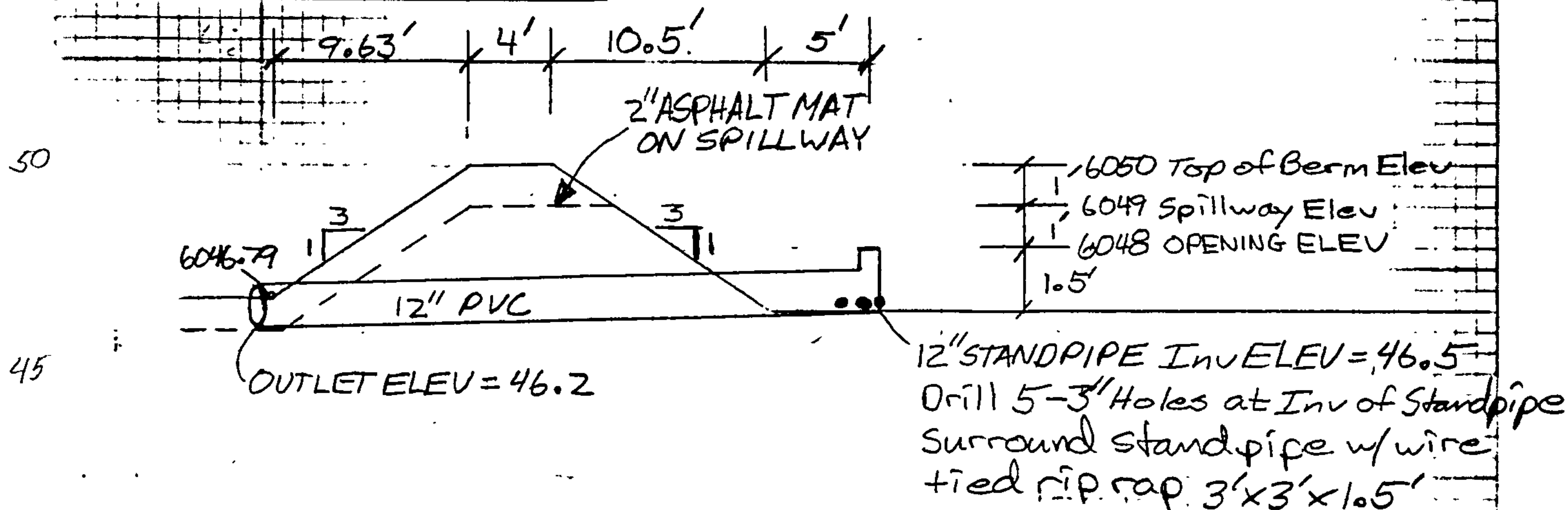


BOHANNAN-HUSTON INC.

PROJECT NAME Solterra Subdivision SHEET F-1 OF _____
PROJECT NO. Drainage Report BY _____ DATE _____
SUBJECT Part F - Addendum #1 CH'D _____ DATE _____

Part F:

Pond A (continued)



Determine Flow Capacity of 12" Standpipe $A = 0.785 \text{ sf}$

$$Q_{\text{standpipe}} = 0.6(0.785 \text{ sf}) \sqrt{64.4(1.0)} \\ @ H = 1.0' \\ = 3.8 \text{ cfs}$$

$$Q_{\text{Holes}} = 0.6(2.45 \text{ sf}) \sqrt{64.4(2.5)} \\ = 1.9 \text{ cfs}$$

$$\frac{V_{10}}{\frac{1}{4} Q_{\text{Holes}}} = T_{\text{Empty}} = \frac{9600 \text{ cf}}{(1.9 \text{ cfs})(4)} \times \frac{1 \text{ hr}}{3600 \text{ sec}} \\ = 5.6 \text{ hrs} \leq 6 \text{ hrs}; \text{ OK}$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET F-2 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT Part F-Addendum #1 CH'D _____ DATE _____

Part F:

Pond B: Captures flow from Basins D4, D5, D6 & E1 in the interim cond.

1. Size based on settling Velocity

$A = 2.77$

Design Particle: Very fine Sand ($D = .006\text{mm}$)

100% Removal in 10yr Storm

$V_s = .009\text{fps}$ (Very fine sand)

$$\text{Surface Area (min)} = SA = 1.2(Q_{10})/V_s$$

$$= 1.2(501)/.009$$

$$= 680\text{sf}$$

$$\text{Use } 37 \times 50 = 1850 > 680$$

OK

2. Pond Size based on Sediment Storage plus Detention of the 10yr Storm Volume

Sediment = 93cf $\rightarrow$ From USLE spreadsheet
 $\approx 100\text{cf}$

$$V_{10} = 0.14 A_{\text{eff}} = 6,100\text{cu ft}$$

$V_{\text{TOTAL}} = 6200\text{cu ft}$ required

$$V_{\text{pond}} = (1850 + (37+15) \times (50-15))/2 \times 2.5 = 6500\text{cf}$$

3. Determine Spillway length to pass Q_{100} @ $H = .5'$

$$Q_{\text{spillway}} = Q_{100} = 9.2\text{ cfs (interim)} = 2.77 A_c \times \frac{1}{2} (2.92 + 3.73\text{cf})$$

$$L = \frac{Q}{CH^{1.5}} = \frac{9.2}{2.68(.5)^{1.5}} = 9.7' \approx 10.0'$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____

SHEET

F3

OF _____

PROJECT NO. _____

BY _____

DATE _____

SUBJECT

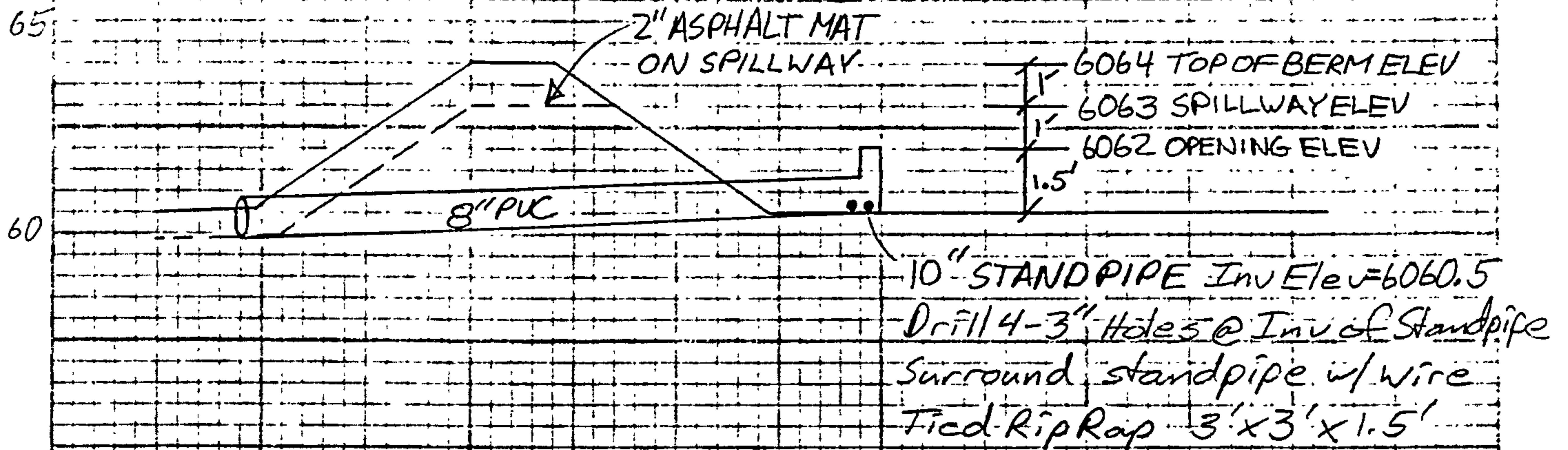
Part F - Addendum #1

CH'D _____

DATE _____

Part F:

Pond B (continued)



Determine Flow capacity of 10" Standpipe $A = .545 \text{ sf}$

$$Q_{\text{STANDPIPE}} = .6(.545 \text{ sf}) \sqrt{64.4(1.0)}$$

$$@ 1.0'$$

$$= 2.6 \text{ cfs}$$

$$Q_{\text{Holes}} = .6(.196 \text{ sf}) \sqrt{64.4(2.5)'}^2$$

$$= 1.5 \text{ cfs}$$

$$\frac{V_{10}}{Q_{\text{Holes}}} = \text{Empty} = \frac{6100}{(1.5/4)} \times \frac{1 \text{ hr}}{3600 \text{ sec}}$$

$$= 4.5 \text{ hrs} < 6 \text{ hrs}$$

OK



BOHANNAN-HUSTON INC.

PROJECT NAME Solterra Subdivision SHEET F-4 OF

PROJECT NO. Drainage Report BY DATE

SUBJECT Part F - Addendum #1 CH'D DATE

HYDROLOGIC BASIN SUMMARY DATA															
DATE: JANUARY 15, 1996															
INTERIM CONDITIONS . .															
10 YEAR, 6 HOUR EVENT															
			COMPOSITE				RATIONAL		COMPOSITE		RATIONAL				
			% LAND				METHOD		EXCESS		METHOD				
			TREATMENT				PEAK		PRECIP.		6-HR VOLUME				
							DISCHARGE		RUNOFF						
							Cf(cfs/ac)		Q-2(cfs)		E				
ONSITE FLOW															
A1			1.188	50.00	0.00	50.00	50.00	0.00	1.86	2.2	0.60	0.06			
A2			0.938		0.00	50.00	50.00	0.00	1.86	1.7	0.60	0.05			
A3			1.016		0.00	50.00	50.00	0.00	1.86	1.9	0.60	0.05	UNDEVELOPED PORTION		
B1			0.565	46.00	0.00	50.00	50.00	0.00	1.86	1.0	0.60	0.03	DURING PHASED		
B2			0.828		0.00	50.00	50.00	0.00	1.86	1.5	0.60	0.04	CONSTRUCTION		
B3			1.213		0.00	50.00	50.00	0.00	1.86	2.3	0.60	0.06	Q-10(cfs)	V-10(ac-ft)	Area
B4			0.700	46.00	0.00	50.00	50.00	0.00	1.86	1.3	0.60	0.03			
B5			1.615		0.00	50.00	50.00	0.00	1.86	3.0	0.60	0.08	POND B		
B6			1.632		0.00	50.00	50.00	0.00	1.86	3.0	0.60	0.08	5.1	0.14	2.77
C1			0.443		0.00	50.00	50.00	0.00	1.86	0.8	0.60	0.02			
C2			0.553		0.00	50.00	50.00	0.00	1.86	1.0	0.60	0.03	POND A		
D1			0.416	46.00	0.00	50.00	50.00	0.00	1.86	0.8	0.60	0.02	8.1	0.22	4.39
D2			0.464		0.00	50.00	50.00	0.00	1.86	0.9	0.60	0.02			
D3			0.892		0.00	50.00	50.00	0.00	1.86	1.7	0.60	0.04			
D4			0.447	46.00	0.00	50.00	50.00	0.00	1.86	0.8	0.60	0.02			
D5			1.162		0.00	50.00	50.00	0.00	1.86	2.2	0.60	0.06			
D6			0.963		0.00	50.00	50.00	0.00	1.86	1.8	0.60	0.05			
E1			0.193		0.00	50.00	50.00	0.00	1.86	0.4	0.60	0.01			
E2			0.428		0.00	50.00	50.00	0.00	1.86	0.8	0.60	0.02			
F1			0.163	46.00	0.00	50.00	50.00	0.00	1.86	0.3	0.60	0.01			
F2			0.894		0.00	50.00	50.00	0.00	1.86	1.7	0.60	0.04			
F3			0.182	46.00	0.00	50.00	50.00	0.00	1.86	0.3	0.60	0.01			
F4			1.023		0.00	50.00	50.00	0.00	1.86	1.9	0.60	0.05			
F5			0.390	72.00	0.00	50.00	50.00	0.00	1.86	0.7	0.60	0.02			
IMP1			0.036		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
IMP2			0.043		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
			-----							-----		-----			
SUBTOTAL			18.387							34.1		0.91			
OFFSITE FLOW															
NRO			0.510		0.00	50.00	50.00	0.00	1.86	0.9	0.60	0.03			
NRO1			0.089		0.00	50.00	50.00	0.00	1.86	0.2	0.60	0.00			
NRO2			0.051		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
IMPO			0.083		0.00	50.00	50.00	0.00	1.86	0.2	0.60	0.00			
IMPO1			0.036		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
IMPO2			0.043		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
IMPO3			0.108		0.00	50.00	50.00	0.00	1.86	0.2	0.60	0.01			
SPAINO			0.015		0.00	50.00	50.00	0.00	1.86	0.0	0.60	0.00			
SPAINO1			0.045		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
SPAINO2			0.044		0.00	50.00	50.00	0.00	1.86	0.1	0.60	0.00			
CORTO			0.878		0.00	50.00	50.00	0.00	1.86	1.6	0.60	0.04			
			-----							-----		-----			
SUBTOTAL			1.902							3.5		0.09			
TOTAL			20.288							37.6		1.01			
NOTE:															
RAINFALL DATA FOR 10-YEAR, 6-HOUR STORM															
DPM SECTION 22															
PEAK DISCHARGE (C*) IN cfs/ac BY LAND TREATMENTS															
C*I(a)= 0.87															
C*I(b)= 1.45															
C*I(c)= 2.26															
C*I(d)= 3.57															
EXCESS PRECIPITATION (E) IN inches BY LAND TREATMENTS															
E(a)= 0.28															
E(b)= 0.46															
E(c)= 0.73															
E(d)= 1.69															

TEMPORARY DESILTATION POND

UNIVERSAL SOIL LOSS EQUATION

DESCRIPTION	VARIABLE	UNIT	POND ~~X~~ β	POND ~~Z~~ A
Drainage Area	DA	Sq. Mi.	0.0041	0.0069
Slope	S	Ft/Ft	0.060	0.060
Slope Angle	THETA	Radians	0.060	0.060
	L	Feet	200.000	200.000
Rainfall	R		45.000	45.000
Soil Erodability*	K		0.100	0.100
Slope Length Factor	LS		0.950	0.950
Cover*	C		0.140	0.140
Support Practice Factor	P		1.000	1.000
Sediment Yield	A	Tons/Acre	0.599	0.599
		Tons	1.556	2.633
Estimated Soil Unit Weight		Lbs/Cf	100.000	100.000
Total Annual Sediment Yield		Cy	1.153	1.951
Adjustment Factor :			3.000	3.000
(Safety Factor)			-----	-----
Adjusted Sediment Yield		Cy	3.5	5.9
		Cf	93	158

NOTES: 1. The Universal Soil Loss Equation typically underestimates the actual sediment yield by 3 times. So a factor of 3 is applied to the total annual sediment yield.

HYDROLOGIC BASIN SUMMARY DATA											
DATE: JANUARY 15, 1996											
EXISTING CONDITIONS											
100 YEAR, 6 HOUR EVENT											
				COMPOSITE			RATIONAL				
				% LAND			METHOD	RATIONAL	COMPOSITE	RATIONAL	
				TREATMENT			PEAK	METHOD	EXCESS	METHOD	
BASIN	AREA	R/W					DISCHARGE	RUNOFF	PRECIP.	6-HR VOLUME	
ID	(ACRES)	STREETS	A	B	C	D	CI(cfs/ac)	Q-100(cfs)	E	V-100(ac-ft)	
ONSITE FLOW											
A1	1.188	50.00	100.00	0.00	0.00	0.00	2.20	2.6	0.80	0.08	
A2	0.938		100.00	0.00	0.00	0.00	2.20	2.1	0.80	0.06	
A3	1.016		100.00	0.00	0.00	0.00	2.20	2.2	0.80	0.07	UNDEVELOPED PORTION
B1	0.565	46.00	100.00	0.00	0.00	0.00	2.20	1.2	0.80	0.04	DURING PHASED
B2	0.828		100.00	0.00	0.00	0.00	2.20	1.8	0.80	0.06	CONSTRUCTION
B3	1.213		100.00	0.00	0.00	0.00	2.20	2.7	0.80	0.08	Q-100(cfs) V-100(ac-ft)
B4	0.700	46.00	100.00	0.00	0.00	0.00	2.20	1.5	0.80	0.05	
B5	1.615		100.00	0.00	0.00	0.00	2.20	3.6	0.80	0.11	19.3 0.58
B6	1.632		100.00	0.00	0.00	0.00	2.20	3.6	0.80	0.11	
C1	0.443		100.00	0.00	0.00	0.00	2.20	1.0	0.80	0.03	
C2	0.553		100.00	0.00	0.00	0.00	2.20	1.2	0.80	0.04	
D1	0.416	46.00	100.00	0.00	0.00	0.00	2.20	0.9	0.80	0.03	
D2	0.464		100.00	0.00	0.00	0.00	2.20	1.0	0.80	0.03	
D3	0.892		100.00	0.00	0.00	0.00	2.20	2.0	0.80	0.06	
D4	0.447	46.00	100.00	0.00	0.00	0.00	2.20	1.0	0.80	0.03	
D5	1.162		100.00	0.00	0.00	0.00	2.20	2.6	0.80	0.08	
D6	0.963		100.00	0.00	0.00	0.00	2.20	2.1	0.80	0.06	
E1	0.193		100.00	0.00	0.00	0.00	2.20	0.4	0.80	0.01	
E2	0.428		100.00	0.00	0.00	0.00	2.20	0.9	0.80	0.03	
F1	0.163	46.00	100.00	0.00	0.00	0.00	2.20	0.4	0.80	0.01	
F2	0.894		100.00	0.00	0.00	0.00	2.20	2.0	0.80	0.06	
F3	0.182	46.00	100.00	0.00	0.00	0.00	2.20	0.4	0.80	0.01	
F4	1.023		100.00	0.00	0.00	0.00	2.20	2.3	0.80	0.07	
F5	0.390	72.00	100.00	0.00	0.00	0.00	2.20	0.9	0.80	0.03	
IMP1	0.036		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
IMP2	0.043		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	

SUBTOTAL	18.387							40.5		1.23	
OFFSITE FLOW											
NRO	0.510		100.00	0.00	0.00	0.00	2.20	1.1	0.80	0.03	
NRO1	0.089		100.00	0.00	0.00	0.00	2.20	0.2	0.80	0.01	
NRO2	0.051		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
IMPO	0.083		100.00	0.00	0.00	0.00	2.20	0.2	0.80	0.01	
IMPO1	0.036		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
IMPO2	0.043		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
IMPO3	0.108		100.00	0.00	0.00	0.00	2.20	0.2	0.80	0.01	
SPAINO	0.015		100.00	0.00	0.00	0.00	2.20	0.0	0.80	0.00	
SPAINO1	0.045		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
SPAINO2	0.044		100.00	0.00	0.00	0.00	2.20	0.1	0.80	0.00	
CORTO	0.878		100.00	0.00	0.00	0.00	2.20	1.9	0.80	0.06	

SUBTOTAL	1.902							4.2		0.13	
TOTAL	20.288							44.6		1.35	
NOTE:											
RAINFALL DATA FOR 100-YEAR, 6-HOUR STORM											
DPM SECTION 22											
PEAK DISCHARGE (C*) IN cfs/ac BY LAND TREATMENTS											
C*I(a)= 2.20											
C*I(b)= 2.92											
C*I(c)= 3.73											
C*I(d)= 5.25											
EXCESS PRECIPITATION (E) IN inches BY LAND TREATMENTS											
E(a)= 0.80											
E(b)= 1.08											
E(c)= 1.46											
E(d)= 2.64											

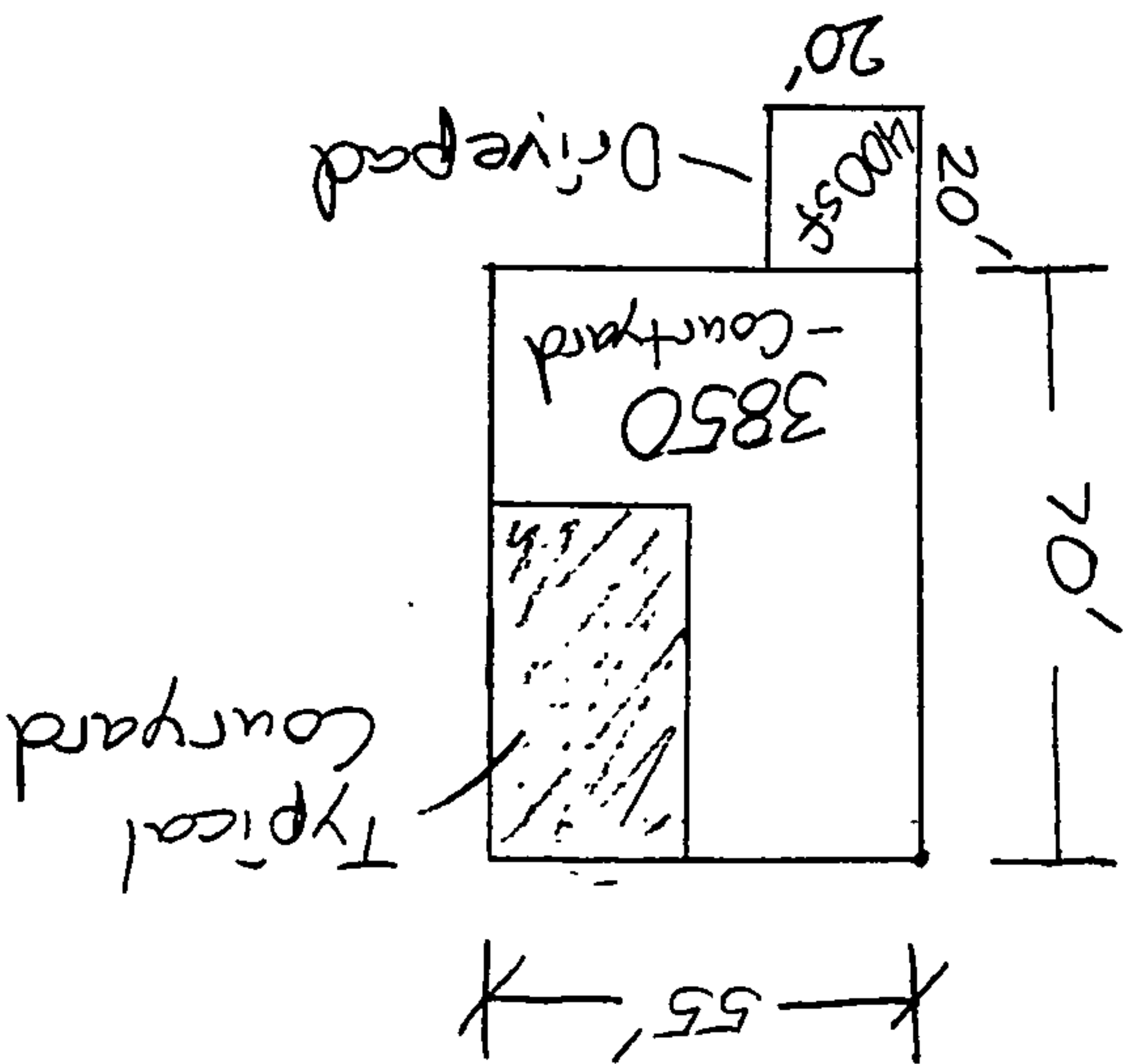
HYDROLOGIC BASIN SUMMARY DATA												
DATE: JANUARY 15, 1996												
PROPOSED CONDITIONS												
100 YEAR, 6 HOUR EVENT												
BASIN		AREA	R/W	COMPOSITE % LAND TREATMENT			RATIONAL METHOD PEAK DISCHARGE	RATIONAL METHOD RUNOFF	RUNOFF WITH 2% BULK	COMPOSITE EXCESS PRECIP.	RATIONAL METHOD 6-HR VOLUME	UNADJUSTED Q(CFS) AT VARIOUS SECTIONS ON STREET A
ID	(ACRES)	STREETS	A	B	C	D	CI(cfs/ac)	Q-100(cfs)	Qb-100(cfs)	E	V-100(ac-ft)	
ONSITE FLOW												
A1	1.188	50.00	0.00	20.00	0.00	80.00	4.78	5.7	5.8	2.33	0.23	
A2	0.938		0.00	53.67	12.30	34.03	3.81	3.6	3.6	1.66	0.13	
A3	1.016		0.00	47.30	0.00	52.70	4.15	4.2	4.3	1.90	0.16	
B1	0.565	46.00	0.00	21.74	0.00	78.26	4.74	2.7	2.7	2.30	0.11	
B2	0.828		0.00	39.34	0.00	60.66	4.33	3.6	3.7	2.03	0.14	
B3	1.213		0.00	16.91	37.30	45.79	4.29	5.2	5.3	1.94	0.20	
B4	0.700	46.00	0.00	21.74	0.00	78.26	4.74	3.3	3.4	2.30	0.13	Q AT 1-1
B5	1.615		0.00	48.81	10.30	40.89	3.96	6.4	6.5	1.76	0.24	12.0
B6	1.632		0.00	40.90	21.90	37.20	3.96	6.5	6.6	1.74	0.24	Q AT 2-2
C1	0.443		0.00	36.86	27.50	35.64	3.97	1.8	1.8	1.74	0.06	15.1
C2	0.553		0.00	26.89	36.40	36.71	4.07	2.3	2.3	1.79	0.08	Q AT 3-3
D1	0.416	46.00	0.00	21.74	0.00	78.26	4.74	2.0	2.0	2.30	0.08	34.4
D2	0.464		0.00	53.01	0.00	46.99	4.01	1.9	1.9	1.81	0.07	Q AT 4-4
D3	0.892		0.00	32.87	27.80	39.33	4.06	3.6	3.7	1.80	0.13	39.3
D4	0.447	46.00	0.00	21.74	0.00	78.26	4.74	2.1	2.2	2.30	0.09	Q AT 5-5
D5	1.162		0.00	46.48	13.10	40.42	3.97	4.6	4.7	1.76	0.17	68.4
D6	0.963		0.00	37.66	25.80	36.54	3.98	3.8	3.9	1.75	0.14	Q AT 6-6
E1	0.193		0.00	24.71	33.90	41.39	4.16	0.8	0.8	1.85	0.03	78.3
E2	0.428		0.00	50.80	26.80	22.40	3.66	1.6	1.6	1.53	0.05	
F1	0.163	46.00	0.00	21.74	0.00	78.26	4.74	0.8	0.8	2.30	0.03	
F2	0.894		0.00	52.40	12.60	35.00	3.84	3.4	3.5	1.67	0.12	
F3	0.182	46.00	0.00	21.74	0.00	78.26	4.74	0.9	0.9	2.30	0.03	
F4	1.023		0.00	39.20	26.80	34.00	3.93	4.0	4.1	1.71	0.15	
F5	0.390	72.00	0.00	13.89	0.00	86.11	4.93	1.9	2.0	2.42	0.08	
IMP1	0.036		0.00	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	
IMP2	0.043		0.00	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	

SUBTOTAL	18.387							76.8	78.3		2.91	
OFFSITE FLOW												
NRO	0.510		0.0	70.4	0.0	29.6	3.61	1.8	1.9	1.54	0.07	
NRO1	0.089		0.0	100.0	0.0	0.0	2.92	0.3	0.3	1.08	0.01	
NRO2	0.051		0.0	100.0	0.0	0.0	2.92	0.1	0.2	1.08	0.00	
IMPO	0.083		0.0	100.0	0.0	0.0	2.92	0.2	0.2	1.08	0.01	
IMPO1	0.036		0.0	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	
IMPO2	0.043		0.0	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	
IMPO3	0.108		0.0	100.0	0.0	0.0	2.92	0.3	0.3	1.08	0.01	
SPAINO	0.015		0.0	100.0	0.0	0.0	2.92	0.0	0.0	1.08	0.00	
SPAINO1	0.045		0.0	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	
SPAINO2	0.044		0.0	100.0	0.0	0.0	2.92	0.1	0.1	1.08	0.00	
CORTO	0.878		0.0	0.0	100.0	0.0	3.73	3.3	3.3	1.46	0.11	

SUBTOTAL	1.902							6.6	6.7		0.22	
TOTAL	20.288							83.4	85.0		3.13	
NOTE:												
RAINFALL DATA FOR 100-YEAR, 6-HOUR STORM												
DPM SECTION 22												
PEAK DISCHARGE (C*I) IN cfs/ac BY LAND TREATMENTS												
C*I(a)= 2.20												
C*I(b)= 2.92												
C*I(c)= 3.73												
C*I(d)= 5.25												
EXCESS PRECIPITATION (E) IN inches BY LAND TREATMENTS												
E(a)= 0.80												
E(b)= 1.08												
E(c)= 1.46												
E(d)= 2.64												

Imperious Area Calculations

Pad & Drivepad Calculations



Assume Courtyard is 30% total lot Area
 ∴ Approx 1150 sf
 Assume 2/3 of Courtyard is Type B
 Approx 770 sf
 ∴ 770 sf/pad Type B
 3480 sf/pad Type D

Basin A-2:

Total Area: 0.938 Ac

Calc 0% D

$$4(3480 \text{ sf}) = 13920 \text{ sf}$$

0.380 Ac

34% Type D

All other calculations for 0% D are typical to the above



BOHANNAN-HOUSTON INC.

PROJECT NAME

SHEET

OF

PROJECT NO.

BY

DATE

1/24/96

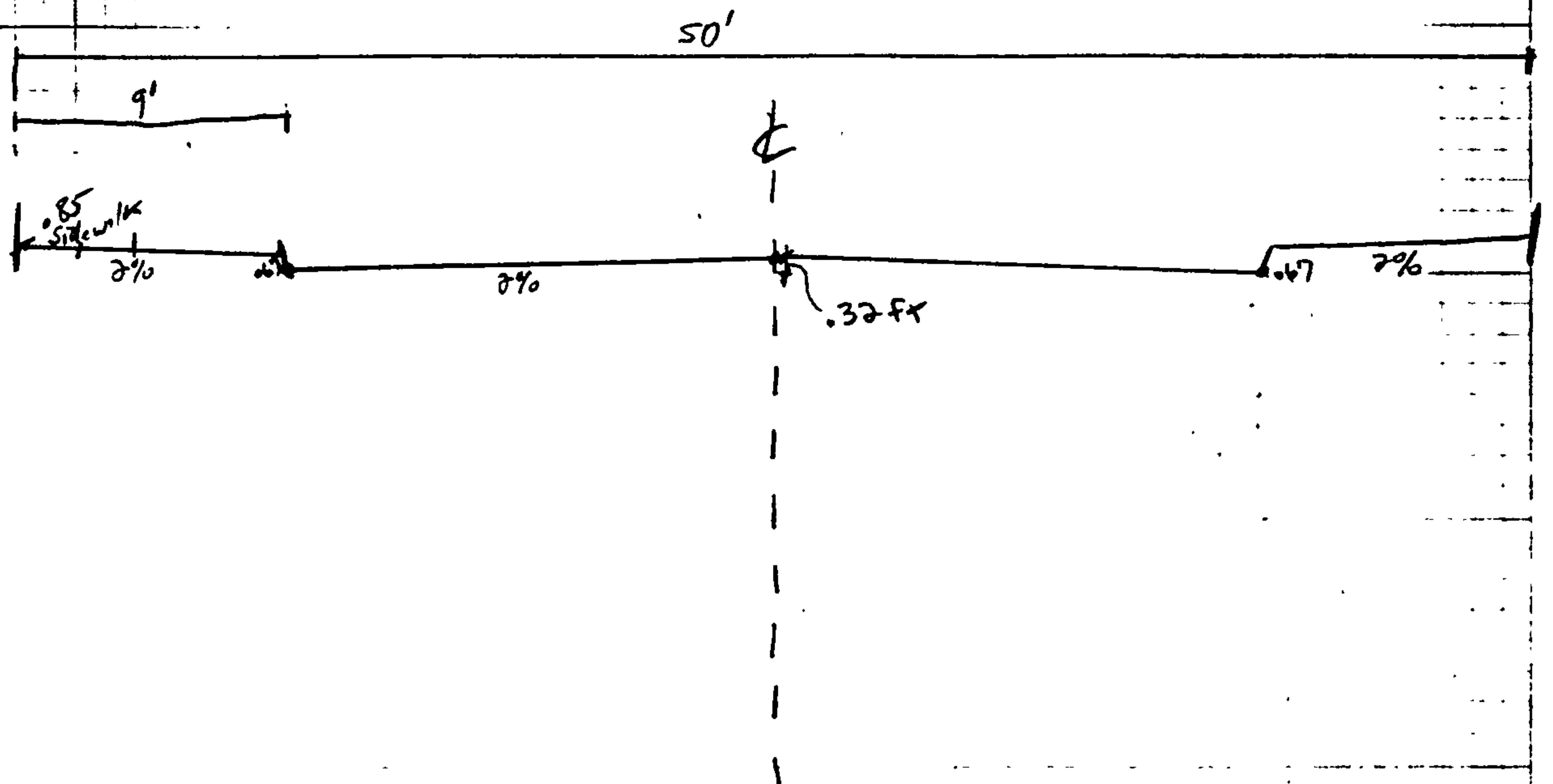
SUBJECT

CH'D

DATE

Impervious Area Calculations

Roadways: Based on Typical Street Section



% treatments per unit width

for lawns next to sidewalk

$$\frac{(5' + 5')}{R/W} \text{ type B} = \frac{10}{R/W}$$

sidewalk

$$\frac{(4' + 4')}{R/W} \text{ type D} = \frac{8}{R/W}$$

street

$$\frac{R/W - 18}{R/W} \text{ type D} = \frac{R/W - 18}{R/W}$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____
 PROJECT NO. _____ BY CM DATE 1/9/96
 SUBJECT _____ CH'D _____ DATE _____

Determination of the Hydrologic and Hydraulic Compatibility
of Tract 2A-1C-1 with calculations previously generated
In "Drainage Report for High Desert -
Imperata Street Extension"

The following comparisons can be made between basins
in the Imperata Extension Report and this report
for Tract 2A-1C-1:

<u>Tract 2A-1C-1</u>		<u>Imperata St. Extension</u>
Subtotal of Onsite Basins; $Q = 78.4 \text{ cfs}$	$\approx$	Basin 15; $Q = 77.8$
NRO ; $Q = 1.8 \text{ cfs}$ $A = .510 \text{ Ac}$	$\approx$	YARDS 1 ; $Q = 1.1 \text{ cfs}$ $A = 0.37 \text{ Ac}$
+ NRO2 ; $Q = 0.1 \text{ cfs}$	$\Rightarrow$	Minor Flow Not Accounted For
$\therefore Q = 1.9 \text{ cfs}$ ($\Delta = +0.8 \text{ cfs}$)		Add to YARDS 1. $Q_{\text{revised}} = 1.9 \text{ cfs}$

$\left. \begin{array}{l} \text{IMPO1, } Q = .1 \text{ cfs} \\ \text{IMPO2, } Q = .1 \text{ cfs} \\ \frac{1}{2} \text{IMPO3, } Q = \frac{1}{2} (.3 \text{ cfs}) \end{array} \right\} \Rightarrow$	Minor Flows Not Accounted For
$\Sigma Q = .4 \text{ cfs}$	Add to IMP 1 $Q = 5.0 \text{ cfs}$ $+ .4 \text{ cfs}$ $\underline{\hspace{1cm}}$ 5.4 cfs
IMPO, $Q = .2 \text{ cfs}$	$\Rightarrow$ Minor Flow Not Accounted For
	Add to IMP 2 $Q = 2.7 \text{ cfs}$ $+ .2 \text{ cfs}$ $\underline{\hspace{1cm}}$ 2.9 cfs

The following pages show that these additional flows
on Imperata and the New E-W Road do not have
an adverse effect on Street Hydraulics or Inlet Grate
Capacities.



BOHANNAN-HUSTON INC.

PROJECT NAME Tract 2A-1C-1 SHEET _____ OF _____
PROJECT NO. _____ BY MSJ DATE 11/23/96
SUBJECT _____ CH'D _____ DATE _____

**SUMMARY OF HYDROLOGIC DATA
CORTADERIA STREET EXTENSION BASINS
PROPOSED CONDITIONS
100-YEAR STORM**

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT				TIME OF CONCENT	RATIONAL METHOD			Q(bulked) (CFS)
			A	B	C	D		COMPOSITE C	I (IN/HR)	Q (CFS)	
14	14.00	0.0219	98.0	2.0	0.0	0.0	0.2	0.39	5.61	30.8	31.5
14(ULTIMATE)	14.00	0.0219	30.0	15.9	15.9	38.2	0.2	0.66	5.61	52.1	53.2
15	20.30	0.0317	20.0	25.0	15.0	40.0	0.2	0.68	5.61	77.8	79.3
E-W ST	1.26	0.0020	0.0	0.0	0.0	100.0	0.2	0.94	5.61	6.6	6.8
IMP1	0.96	0.0015	0.0	0.0	10.0	90.0	0.2	0.91	5.61	4.9	5.0
IMP2	0.51	0.0008	0.0	0.0	10.0	90.0	0.2	0.91	5.61	2.6	2.7
16	7.70	0.0120	46.0	13.1	6.6	34.3	0.2	0.61	5.61	26.5	27.0
CORT1	1.38	0.0022	0.0	0.0	0.0	100.0	0.2	0.94	5.61	7.3	7.4
CORT2	0.50	0.0008	0.0	20.0	5.0	75.0	0.2	0.84	5.61	2.4	2.4
47A	8.70	0.0136	40.0	17.7	8.0	34.3	0.2	0.62	5.61	30.4	31.0
YARDS1	0.37	0.0006	0.0	100.0	0.0	0.0	0.2	0.52	5.61	1.1	1.1

IMPERATA-BASIN IMP2

MANNING'S N = .0170

SLOPE = .0120

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	5.00	6	29.10	4.99	11	56.03	4.33
2	7.40	4.67	7	33.00	5.07	12	57.63	4.67
3	9.00	4.33	8	37.00	4.99	13	66.00	5.00
4	10.02	4.40	9	37.10	4.74			
5	29.00	4.74	10	55.00	4.40			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
4.34	0.01	0.0	0.0	0.4	0.3	0.39
4.35	0.02	0.0	0.0	0.8	0.4	0.77
4.36	0.03	0.0	0.0	1.2	0.6	1.16
4.37	0.04	0.0	0.0	1.6	0.7	1.55
4.38	0.05	0.0	0.0	1.9	0.8	1.93
4.39	0.06	0.1	0.1	2.3	0.9	2.32
4.40	0.07	0.1	0.1	2.7	1.0	2.71
4.41	0.08	0.1	0.1	3.9	1.0	3.89
4.42	0.09	0.2	0.2	5.1	1.0	5.07
4.43	0.10	0.2	0.2	6.3	1.1	6.24
4.44	0.11	0.3	0.3	7.5	1.1	7.42
4.45	0.12	0.4	0.4	8.6	1.2	8.60
4.46	0.13	0.5	0.6	9.8	1.3	9.78
4.47	0.14	0.6	0.8	11.0	1.3	10.96
4.48	0.15	0.7	1.0	12.2	1.4	12.14
4.49	0.16	0.8	1.2	13.4	1.5	13.32
4.50	0.17	1.0	1.5	14.5	1.6	14.50
4.51	0.18	1.1	1.8	15.7	1.6	15.67
4.52	0.19	1.3	2.2	16.9	1.7	16.85
4.53	0.20	1.4	2.6	18.1	1.8	18.03
4.54	0.21	1.6	3.0	19.3	1.8	19.21
4.55	0.22	1.8	3.5	20.4	1.9	20.39
4.56	0.23	2.0	4.0	21.6	2.0	21.57
4.57	0.24	2.3	4.6	22.8	2.0	22.75
4.58	0.25	2.5	5.3	24.0	2.1	23.93
4.59	0.26	2.7	6.0	25.2	2.2	25.10
4.60	0.27	3.0	6.7	26.3	2.2	26.28
4.61	0.28	3.3	7.5	27.5	2.3	27.46
4.83	0.50	12.2	45.7	50.1	3.7	49.85
4.84	0.51	12.7	48.5	50.6	3.8	50.33
4.85	0.52	13.2	51.4	51.1	3.9	50.82
4.86	0.53	13.7	54.4	51.6	4.0	51.30
4.87	0.54	14.2	57.5	52.1	4.0	51.79
4.88	0.55	14.8	60.6	52.6	4.1	52.28
4.89	0.56	15.3	63.9	53.1	4.2	52.76
4.90	0.57	15.8	67.2	53.6	4.2	53.25
4.91	0.58	16.4	70.6	54.1	4.3	53.73
4.92	0.59	16.9	74.0	54.6	4.4	54.22
4.93	0.60	17.4	77.6	55.1	4.4	54.71
4.94	0.61	18.0	81.2	55.6	4.5	55.19
4.95	0.62	18.5	84.9	56.1	4.6	55.68
4.96	0.63	19.1	88.7	56.6	4.6	56.16
4.97	0.64	19.7	92.6	57.1	4.7	56.65
4.98	0.65	20.2	96.5	57.6	4.8	57.14
4.99	0.66	20.8	100.5	58.1	4.8	57.62
5.00	0.67	21.4	103.6	59.5	4.8	59.09

Q(100) = 4.6 CFS

5.2 cfs (see previous page)

No Change
Q_{grate} = 1.6 cfs
2^x inlets

Q_{Remaining} = 2.0 cfs
+
Q_{E-W} = 6.8 cfs
+
Q_{VAROS1} = 1.9 cfs
revised

Q_{TOT} = 10.7 cfs

CURB HEIGHT = 0.33'

NORMAL DEPTH, d = 0.24' - 0.25'

VELOCITY, V = 2.0 FPS 2.1 cfs

TOTAL ENERGY, E = d + V²/2g = 0.30' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

From: Imperata
Extension
Drainage
Report

Revised
For Tract
2A-1C-1
Drainage
Report
Jan 1996

IMPERATA-BASIN IMP1

MANNING'S N = .0170

SLOPE = .0340

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	5.00	6	29.10	4.99	11	56.03	4.33
2	7.40	4.67	7	33.00	5.07	12	57.63	4.67
3	9.00	4.33	8	37.00	4.99	13	66.00	5.00
4	10.02	4.40	9	37.10	4.74			
5	29.00	4.74	10	55.00	4.40			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
4.34	0.01	0.0	0.0	0.4	0.5	0.39
4.35	0.02	0.0	0.0	0.8	0.7	0.77
4.36	0.03	0.0	0.0	1.2	1.0	1.16
4.37	0.04	0.0	0.0	1.6	1.2	1.55
4.38	0.05	0.0	0.1	1.9	1.4	1.93
4.39	0.06	0.1	0.1	2.3	1.5	2.32
4.40	0.07	0.1	0.2	2.7	1.7	2.71
4.41	0.08	0.1	0.2	3.9	1.6	3.89
4.42	0.09	0.2	0.3	5.1	1.7	5.07
4.43	0.10	0.2	0.4	6.3	1.8	6.24
4.44	0.11	0.3	0.6	7.5	1.9	7.42
4.45	0.12	0.4	0.8	8.6	2.0	8.60
4.46	0.13	0.5	1.0	9.8	2.1	9.78
4.47	0.14	0.6	1.3	11.0	2.2	10.96
4.48	0.15	0.7	1.6	12.2	2.4	12.14
4.49	0.16	0.8	2.0	13.4	2.5	13.32
4.50	0.17	1.0	2.5	14.5	2.6	14.50
4.51	0.18	1.1	3.0	15.7	2.7	15.67
4.52	0.19	1.3	3.6	16.9	2.9	16.85
4.53	0.20	1.4	4.3	18.1	3.0	18.03
4.54	0.21	1.6	5.1	19.3	3.1	19.21
4.55	0.22	1.8	5.9	20.4	3.2	20.39
4.56	0.23	2.0	6.8	21.6	3.3	21.57
4.57	0.24	2.3	7.8	22.8	3.5	22.75
4.58	0.25	2.5	8.9	24.0	3.6	23.93
4.59	0.26	2.7	10.1	25.2	3.7	25.10
4.60	0.27	3.0	11.3	26.3	3.8	26.28
4.61	0.28	3.3	12.7	27.5	3.9	27.46
4.62	0.29	3.5	14.2	28.7	4.0	28.64
4.63	0.30	3.8	15.7	29.9	4.1	29.82
4.64	0.31	4.1	17.4	31.1	4.2	31.00
4.86	0.53	13.7	91.6	51.6	6.7	51.30
4.87	0.54	14.2	96.8	52.1	6.8	51.79
4.88	0.55	14.8	102.1	52.6	6.9	52.28
4.89	0.56	15.3	107.5	53.1	7.0	52.76
4.90	0.57	15.8	113.1	53.6	7.1	53.25
4.91	0.58	16.4	118.8	54.1	7.3	53.73
4.92	0.59	16.9	124.6	54.6	7.4	54.22
4.93	0.60	17.4	130.6	55.1	7.5	54.71
4.94	0.61	18.0	136.7	55.6	7.6	55.19
4.95	0.62	18.5	143.0	56.1	7.7	55.68
4.96	0.63	19.1	149.3	56.6	7.8	56.16
4.97	0.64	19.7	155.8	57.1	7.9	56.65
4.98	0.65	20.2	162.5	57.6	8.0	57.14
4.99	0.66	20.8	169.2	58.1	8.1	57.62
5.00	0.67	21.4	174.3	59.5	8.1	59.09

CURB HEIGHT = 0.33'

NORMAL DEPTH, d = 0.21'

VELOCITY, V = 3.1 FPS

TOTAL ENERGY, E = d + V²/2g = 0.36' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

No Change 

From: Imperata
Extension
Drainage
Report

 Revised
For Tract 2A-1C-1
Drainage Report
Jan. 1996

Q(100) = 5.0 CFS

5.4cfs

No change

Q_{grate} = 1.55cfs
x 2 inlets

Q_{Remaining} = 2.03cfs
+

Q_{IMP2} = 2.9
w/IMPO

Q_{tot} = 5.2cfs

PROPOSED E-W STREET

MANNING'S N = .0170

SLOPE = .0600

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	5.00	4	11.00	4.46	7	40.03	4.40
2	8.38	4.73	5	25.00	4.78	8	41.63	4.73
3	9.97	4.40	6	39.00	4.46	9	50.00	5.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
4.41	0.01	0.0	0.0	0.4	0.6	0.44
4.42	0.02	0.0	0.0	0.9	1.0	0.88
4.43	0.03	0.0	0.0	1.3	1.3	1.32
4.44	0.04	0.0	0.1	1.8	1.6	1.76
4.45	0.05	0.1	0.1	2.2	1.8	2.19
4.46	0.06	0.1	0.2	2.6	2.1	2.63
4.47	0.07	0.1	0.2	3.6	2.1	3.61
4.48	0.08	0.2	0.3	4.6	2.2	4.58
4.49	0.09	0.2	0.5	5.6	2.3	5.55
4.50	0.10	0.3	0.7	6.5	2.5	6.52
4.51	0.11	0.3	0.9	7.5	2.7	7.49
4.52	0.12	0.4	1.2	8.5	2.8	8.46
4.53	0.13	0.5	1.5	9.5	3.0	9.44
4.54	0.14	0.6	1.9	10.4	3.2	10.41
4.55	0.15	0.7	2.4	11.4	3.4	11.38
4.56	0.16	0.8	2.9	12.4	3.5	12.35
4.57	0.17	1.0	3.5	13.4	3.7	13.32
4.58	0.18	1.1	4.2	14.3	3.9	14.30
4.59	0.19	1.2	5.0	15.3	4.0	15.27
4.60	0.20	1.4	5.8	16.3	4.2	16.24
4.61	0.21	1.6	6.8	17.3	4.3	17.21
4.62	0.22	1.7	7.8	18.2	4.5	18.18
4.63	0.23	1.9	8.9	19.2	4.6	19.16
4.64	0.24	2.1	10.2	20.2	4.8	20.13
4.65	0.25	2.3	11.5	21.2	4.9	21.10
4.66	0.26	2.5	12.9	22.1	5.1	22.07
4.67	0.27	2.8	14.5	23.1	5.2	23.04
4.68	0.28	3.0	16.1	24.1	5.4	24.02
4.69	0.29	3.3	17.9	25.1	5.5	24.99
4.70	0.30	3.5	19.8	26.0	5.6	25.96
4.71	0.31	3.8	21.8	27.0	5.8	26.93
4.72	0.32	4.0	23.9	28.0	5.9	27.90
4.92	0.52	11.7	101.3	45.1	8.7	45.04
4.93	0.53	12.1	107.0	45.7	8.8	45.66
4.94	0.54	12.6	112.8	46.4	9.0	46.28
4.95	0.55	13.0	118.8	47.0	9.1	46.90
4.96	0.56	13.5	124.9	47.6	9.2	47.52
4.97	0.57	14.0	131.3	48.2	9.4	48.14
4.98	0.58	14.5	137.8	48.8	9.5	48.76
4.99	0.59	15.0	144.4	49.5	9.6	49.38
5.00	0.60	15.5	151.2	50.1	9.8	50.00

CURB HEIGHT = 0.33'

NORMAL DEPTH, d = 0.24'

VELOCITY, V = 4.8 FPS

TOTAL ENERGY, E = d + V²/2g = 0.60' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

1

Q(100) = ~~3.6~~ CFS
4.9 cfs

No Change
Q(100) = ~~9.4~~ CFS
10.7

Q_{grate} = 2.9 cfs
x 2

Q_{remaining} = 4.9 cfs

Q_{grate} = 1.8 cfs
x 2

Q_{remaining} = 1.3 cfs
VS

Q_{remaining} = .8 cfs
previous

only .5 cfs
greater

Negligible
Difference

From: Imperata
Extension Drainage
Report

Revised for
Tract 2A-1C-1
Drainage Report
Jan. 1996

Determining the hydrologic & hydraulic compatibility of Tract 2A-1C-1 with calculations previously generated in "Drainage Report for High Desert - Cortaderia Street Extension"

Due to the natural slope of the land around Cortaderia the rear yards of the lots in Tract 2A-1C-1 that back up to Cortaderia will need to discharge to Cortaderia.

This was accounted for in the Cortaderia Extension report by the basin called yards. (see below)

**CORTADERIA STREET EXTENSION BASINS
PROPOSED CONDITIONS
100-YEAR STORM**

BASIN ID	AREA AC	AREA SQ. MI.	% LAND TREATMENT				TIME OF CONCENT	RATIONAL METHOD COMPOSITE C	I Q	
			A	B	C	D			(IN/HR)	(CFS)
CORT1	1.383	0.0022	0	0	0	100	0.2	0.94	5.61	7.293
CORT2	0.501	0.0008	0	20	5	75	0.2	0.842	5.61	2.367
YARDS	0.988	0.0015	0	100	0	0	0.2	0.52	5.61	2.882

The total flow from basin Yards is $Q = 2.9 \text{ cfs}$

In the development of Tract 2A-1C-1 it has been determined that Basin Yards of the Cortaderia Extension Report has been slightly undersized. In this current report two Basins (CORTO, $Q_{100} = 3.3 \text{ cfs}$; and NRO1, $Q_{100} = .3 \text{ cfs}$) discharge directly from Tract 2A-1C-1 into Cortaderia St. The total area is 0.021 Ac smaller than YARDS but contributes an additional 0.7 cfs to the east side of Cortaderia.

The difference is caused by a change in % Land Treatment; YARDS was considered 100% Type B, 2.92 cfs/AC $2.9 \text{ cfs} = Q$
CORTO is considered 100% Type C, 3.73 cfs/AC $(3.3 \text{ cfs} = Q$
 $+ .3 \text{ cfs} = Q_{\text{NRO1}}$

The following pages show that this additional flow does not have an adverse effect on Cortaderia Extension Street Hydraulics or Inlet Grate Capacities



BOHANNAN-HUSTON INC.

PROJECT NAME Tract 2A-1C-1 SHEET _____ OF _____
PROJECT NO. _____ BY MSJ DATE 1/23/96
SUBJECT _____ CH'D _____ DATE _____

CORTADERIA

MANNING'S N = .0170

SLOPE = .0068

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	5.00	5	29.00	4.57	9	62.63	4.82
2	7.38	4.82	6	41.00	4.57	10	72.00	5.00
3	9.00	4.32	7	60.00	4.38			
4	10.00	4.38	8	61.00	4.32			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
4.33	0.01	0.0	0.0	0.4	0.2	0.38
4.34	0.02	0.0	0.0	0.8	0.3	0.76
4.35	0.03	0.0	0.0	1.2	0.4	1.15
4.36	0.04	0.0	0.0	1.5	0.5	1.53
4.37	0.05	0.0	0.0	1.9	0.6	1.91
4.38	0.06	0.1	0.0	2.3	0.7	2.29
4.39	0.07	0.1	0.1	3.9	0.6	3.86
4.40	0.08	0.1	0.1	5.9	0.6	5.92
4.41	0.09	0.2	0.1	8.0	0.6	7.99
4.42	0.10	0.3	0.2	10.1	0.7	10.05
4.43	0.11	0.4	0.3	12.2	0.8	12.12
4.44	0.12	0.5	0.4	14.2	0.8	14.18
4.45	0.13	0.7	0.6	16.3	0.9	16.25
4.46	0.14	0.9	0.8	18.4	0.9	18.31
4.47	0.15	1.1	1.1	20.4	1.0	20.38
4.48	0.16	1.3	1.4	22.5	1.1	22.44
4.49	0.17	1.5	1.7	24.6	1.1	24.51
4.50	0.18	1.8	2.1	26.6	1.2	26.57
4.51	0.19	2.0	2.5	28.7	1.2	28.64
4.52	0.20	2.3	3.0	30.8	1.3	30.70
4.53	0.21	2.7	3.6	32.8	1.3	32.77
4.54	0.22	3.0	4.2	34.9	1.4	34.83
4.55	0.23	3.4	4.9	37.0	1.5	36.90
4.56	0.24	3.7	5.6	39.0	1.5	50.96
4.57	0.25	4.1	6.4	41.1	1.6	53.03
4.58	0.26	4.6	7.5	41.3	1.6	53.69
4.59	0.27	5.0	8.6	41.8	1.7	53.76
4.60	0.28	5.7	9.2	53.9	1.6	53.82
4.61	0.29	6.3	10.7	54.0	1.7	53.89
4.62	0.30	6.8	12.2	54.0	1.8	53.95
4.63	0.31	7.3	13.9	54.1	1.9	54.01
4.64	0.32	7.9	15.6	54.2	2.0	54.08
4.65	0.33	8.4	17.4	54.3	2.1	54.15
4.66	0.34	9.0	19.3	54.3	2.2	54.21
4.67	0.35	9.5	21.3	54.4	2.2	54.28
4.68	0.36	10.0	23.4	54.5	2.3	54.34
4.69	0.37	10.6	25.5	54.5	2.4	54.40
4.70	0.38	11.1	27.7	54.6	2.5	54.47
4.71	0.39	11.7	29.9	54.7	2.6	54.53
4.72	0.40	12.2	32.3	54.7	2.6	54.60
4.73	0.41	12.8	34.7	54.8	2.7	54.67
4.74	0.42	13.3	37.2	54.9	2.8	54.73
4.75	0.43	13.9	39.7	54.9	2.9	54.79
4.76	0.44	14.4	42.4	55.0	2.9	54.86
4.77	0.45	15.0	45.0	55.1	3.0	54.93
4.78	0.46	15.5	47.8	55.1	3.1	54.99
4.79	0.47	16.1	50.6	55.2	3.2	55.06
4.80	0.48	16.6	53.5	55.3	3.2	55.12
4.81	0.49	17.2	56.4	55.3	3.3	55.18
4.82	0.50	17.7	59.5	55.4	3.4	55.25
4.83	0.51	18.3	61.9	56.3	3.4	56.18
4.84	0.52	18.8	64.4	57.3	3.4	57.11
4.85	0.53	19.4	67.0	58.2	3.5	58.04
4.86	0.54	20.0	69.7	59.1	3.5	58.97
4.87	0.55	20.6	72.4	60.1	3.5	59.90
4.88	0.56	21.2	75.2	61.0	3.5	60.83
4.89	0.57	21.8	78.1	61.9	3.6	61.76

Since Cortaderia is a divided street consider all the flow from Tract 2A-1C-1 Basins CORTO, Q=3.3cfs and NRO1, Q=0.3cfs to be on the East side of Cortaderia Extension

$Q_{East} = \frac{1}{2}Q_{CORTO} + 3.3 + 0.3$
 $Q_{100} = \frac{1}{2}(7.3) + 3.3 + 0.3 = 7.25$

For Street Hydraulics double this Value
 $Q = 2 \times Q_{East} = 2 \times 7.25$
 $Q_{100} = 14.5$ cfs

$Q_{100} = 10.2$ cfs

$E = \frac{0.29 + 1.7^2}{29} = 0.33' \text{ OK}$

$E = \frac{0.32' + 2.0^2}{64.4} = 0.38' \leq 0.6'$
 O.K.

From: Cortaderia Extension Drainage Report Nov. 1995

Revised for Tract 2A-1C-1 Jan 1996

CATCH BASINS: (IN SUMP CONDITION)

INSTALL A SINGLE GRATE TYPE "D" CATCH BASIN ON EACH SIDE OF CORTADERIA @ LOW POINT - STA 77+06.09

TOTAL Q TO LOW POINT = $Q_{100} = \frac{1}{2}(7.3) = 3.65$ (WEST) } $\Sigma = 10.15$
 $Q_{100} = 3.65 + 2.9 = 6.55$ (EAST)
 $+ 3.6 = 7.25 \text{ cfs}$ Δ

SINGLE GRATE:
ORIFICE EQ'N:

$Q = 0.6 A_{\text{NET}} \sqrt{2gh}$ $h = 0.33'$
 $A_{\text{NET}} = 31(18.5) = 3.98 \text{ SF}$
 $Q = 0.6(3.98) \sqrt{2(32.2)(0.33)}$
 $= 11.0 \text{ CFS}$

WEIR EQUATION:

$Q = 2.68 P_{\text{NET}} H^{1.5}$
 $P_{\text{NET}} = [2(31) + 2(18.5)] / 12$
 $= 8.25 \text{ FT}$
 $Q = 4.2 \text{ CFS}$

$\Delta + \frac{11.0 \text{ cfs}}{7.25 \text{ cfs}} \times 100\% = 152\%$ Δ
 $\therefore \text{OK}$

DOUBLE GRATE:

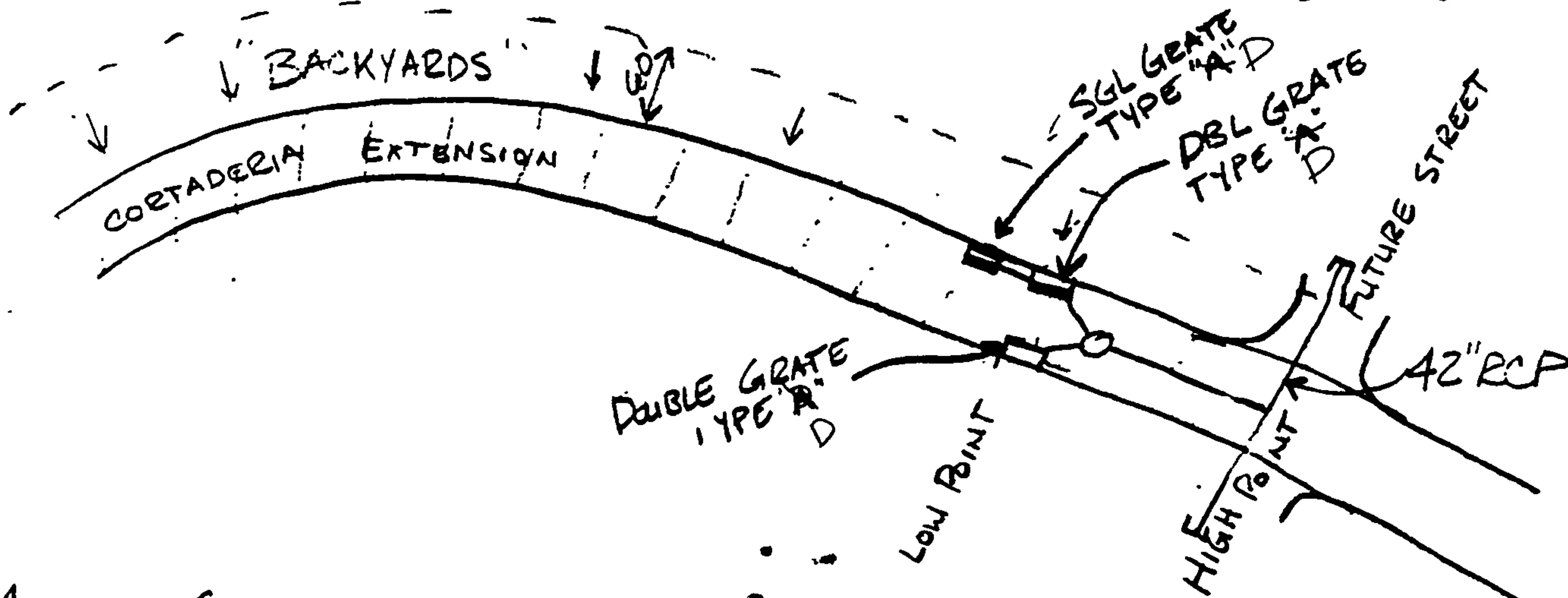
ORIFICE EQ'N:

$A_{\text{NET}} = 2(3.98) = 7.96 \text{ SF}$
 $Q = 22 \text{ CFS}$

WEIR EQUATION:

$P_{\text{NET}} = [4(31) + 2(18.5)] / 12$
 $= 13.4 \text{ FT}$
 $Q = 6.81 \text{ CFS}$

$\therefore$ NEED SINGLE GRATE "D" ON WEST SIDE AND DOUBLE GRATE "D" ON EAST SIDE OF CORTADERIA. TO ADD 50%, USE A DOUBLE "D" ON WEST AND A DOUBLE "D" AND SINGLE "D" ON EAST:



ACTUAL GRATE TO BE NEENAH GRATE FOR ROLL CURB

Δ Revised for
 Tract 2A-1C-1, 1996
 January

FROM:



BOHANNAN-HUSTON INC.

PROJECT NAME CORTADERIA EXTENSION SHEET _____ OF _____
 PROJECT NO _____ BY PR DATE 10/30/95
 SUBJECT DRAINAGE REIDET CH'D _____ DATE _____

SUMMARY OF STREET SECTION HYDRAULICS

X-SECTION	LOCATION	AVERAGE SLOPE(%)	WIDTH F-F/ROW	Q(100) (CFS)	NORMAL DEPTH	ENERGY	
1	STREET A	5.50	32'/50'	12.0	0.31	0.68	0.68'<1'--OK
2	STREET A	7.00	32'/50'	15.1	0.32	0.82	0.82'<1'--OK
3	STREET A	4.86	32'/50'	34.4	0.42	0.99	0.99'<1'--OK
4	STREET A	6.35	32'/50'	23.7	0.37	0.94	0.94'<1'--OK
5	STREET A	1.00	32'/50'	39.2	0.56	0.81	0.79'<1'--OK
6	STREET A	1.00	32'/50'	14.1	0.41	0.52	0.50'<1'--OK
7	STREET C NORTH	1.00	28'/46'	7.6	0.45	0.60	0.60'<0.87'--OK
8	STREET C SOUTH	2.50	28'/46'	10.7	0.43	0.79	0.79'<0.87'--OK
9	STREET B NORTH	1.00	28'/46'	10.3	0.45	0.61	0.61'<0.87'--OK
10	STREET B SOUTH	2.50	28'/46'	16.6	0.45	0.84	0.84'<0.87'--OK

SUMMARY OF INLET GRATE CAPACITIES

STREET SECTION*	INLET TYPE/ STATION	INLET CAPACITY	NUMBER OF INLETS	CUMULATIVE INLET Q(cfs)	Q(cfs) STREET	AVERAGE SLOPE	EGL	WSEL	NOTES
1-1					12.0	5.50	0.68	0.31	BEFORE INLETS
2-2					15.1	7.00	0.82	0.32	BEFORE INLETS
3-3	A(8+00)	7.80	2	15.60	34.4 18.8	4.86	0.99 0.75	0.42 0.35	BEFORE INLETS AFTER INLETS
4-4	A(6+85)	6.80	2	29.20	23.7 10.1	6.35	0.94 0.64	0.37 0.28	BEFORE INLETS AFTER INLETS
5-5	A(5+20)	7.00	2	43.20	39.2 25.2	1.00	0.81 0.67	0.56 0.49	BEFORE INLETS AFTER INLETS
	C(4+50)	5.40	2	54.00	25.2 14.4	1.75	0.73 0.54	0.46 0.38	BEFORE INLETS AFTER INLETS
	A(4+00)	5.10	2	64.20	14.4 4.2	2.5	0.58 0.37	0.36 0.25	BEFORE INLETS AFTER INLETS
6-6	DBL D LEFT (2+35)	20.16	1	78.30	14.1 -6.1	1.00 SUMP	0.52	0.41	BEFORE INLETS AFTER INLET
					or 43%				
* These are cross-sections of Street A only.					clogging factor on DBL D				

Depth
on

SUMMARY OF INLET GRATE CAPACITIES
 ALTERNATE SOLUTION (EMERGENCY OUTLET DOES NOT EXIST)

STREET SECTION*	INLET TYPE/ STATION	INLET CAPACITY	NUMBER OF INLETS	CUMULATIVE INLET Q(cfs)	Q(cfs) STREET	AVERAGE SLOPE	EGL	WSEL	NOTES
1-1					12.0	5.50	0.68	0.31	BEFORE INLETS
2-2					15.1	7.00	0.82	0.32	BEFORE INLETS
3-3	A(8+00)	7.80	2	15.60	34.4 18.8	4.86	0.99 0.75	0.42 0.35	BEFORE INLETS AFTER INLETS
4-4	A(6+85)	6.80	2	29.20	23.7 10.1	6.35	0.94 0.64	0.37 0.28	BEFORE INLETS AFTER INLETS
5-5	A(5+20)	7.00	2	43.20	39.2 25.2	1.00	0.81 0.67	0.56 0.49	BEFORE INLETS AFTER INLETS
	C(4+50)	5.40	2	54.00	25.2 14.4	1.75	0.73 0.54	0.46 0.38	BEFORE INLETS AFTER INLETS
	A(4+00)	5.10	2	64.20	14.4 4.2	2.5	0.58 0.37	0.36 0.25	BEFORE INLETS AFTER INLETS
6-6	^C DBL ~~Ø~~ LEFT (2+35)	20.16	1	78.30	14.1 -6.1	1.00 SUMP	0.52	0.41	BEFORE INLETS AFTER INLET
	^C ~~Ø~~ (CUL-DE-SAC)	12.34	1	90.64	-18.4	SUMP			AFTER INLET

* These are cross-sections of Street A only.

or
 231%
 clogging factor
 on D

PRELIMINARY HYDRAULIC GRADE LINE COMPUTATIONS FOR
100-YEAR DEVELOPED FLOWS
HIGH DESERT - TRACT 2A-1C-1

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	Dia.	Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Pipe Soffit	Low Point #	HV	EGL(dn)	EGL(up)
100.00	OUTLET																	37.50	37.50	40.83	1.03	37.50	38.53
230.00	MH 6	42	78.3	9.62	8.14	1006	0.0061	130.00	6	0	0.79	0.00	0.30	0.04	0.00	0.34	38.29	38.96	36.57	39.15	0.69	39.32	39.65
400.00	MH 5	42	64.2	9.62	6.67	1006	0.0041	170.00	6	0	0.69	0.00	1.19	0.06	0.24	1.49	39.66	39.95	36.74	42.51	1.88	40.35	41.83
450.00	MH 4	30	54.0	4.91	11.00	410	0.0173	50.00	4	0	0.87	0.00	0.64	0.08	0.00	0.71	40.82	42.21	37.36	43.50	1.2	42.70	43.41
520.00	MH 3	30	43.2	4.91	8.80	410	0.0111	70.00	4	0	0.78	0.00	0.89	0.06	0.03	0.98	42.98	43.83	38.16	44.08	1.34	44.19	45.17
685.00	MH 2	24	29.2	3.14	9.29	226	0.0167	165.00	4	0	2.75	0.00	0.86	0.04	0.00	0.90	46.58	48.43	43.72	50.39	0.38	47.92	48.82
800.00	MH 1	24	15.6	3.14	4.97	226	0.0048	115.00	4	0	0.55	0.00	0.14	0.02	0.00	0.22	48.98	49.28	50.61	57.31	0.3	49.36	49.59
870.00	INLET	18	7.8	1.77	4.41	105	0.0055	70.00	4	78.56	0.39	0.06	0.14	0.02	0.00	0.22	48.98	49.28	50.61	57.31	0.3	49.36	49.59

VELOCITY HEAD CALCS.

ORIFICE EQUATION CALCS.

#	INLET	TC ELEV	D	Q	A	VEL	K	Sf	LENGTH CONNECTOR	Hf	1.2V ² / 2g	C.F.	FREE- BOARD	MAX. ALLOW HGL IN DS MH	Vmin	H based on Vmin	Qmax from ORIFICE	H req'd based on Q	Vmin based on H
CENTEX @ HIGH DESERT - TRACT 2A-1C-1																			
1	C-2	40.70	24	14.1	3.14	4.49	226	0.0039	25.00	0.00	0.38	0.67	0.5	39.15	3.55	2.55	24.13	0.87	1.87
1	C-2	44.00	18	5.1	1.77	2.89	105	0.0024	26.00	0.00	0.16	0.83	0.5	42.51	2.99	2.24	12.72	0.36	1.11
1	C-2	45.00	18	5.4	1.77	3.06	105	0.0026	26.00	0.00	0.17	0.83	0.5	43.50	3.00	2.25	12.77	0.40	1.15
1	C-4	45.70	18	7.0	1.77	3.96	105	0.0044	26.00	0.00	0.29	0.83	0.5	44.08	3.12	2.37	13.11	0.68	1.43
1	C-4	52.00	18	6.8	1.77	3.85	105	0.0042	26.00	0.00	0.28	0.83	0.5	50.39	3.11	2.36	13.06	0.64	1.39
1	C-5	59.00	18	7.8	1.77	4.41	105	0.0055	26.00	0.00	0.36	0.83	0.5	57.31	3.19	2.44	13.30	0.84	1.59

NOTE: Starting HGL is equal to the soffit of New E-W Road Storm Drain @ outfall of Tract 2A-1C-1 storm drain.
This will be conservative since the flow in the New E-W Road SD is at Normal Depth.

1-1

STREET A
SLOPE = 5.5%

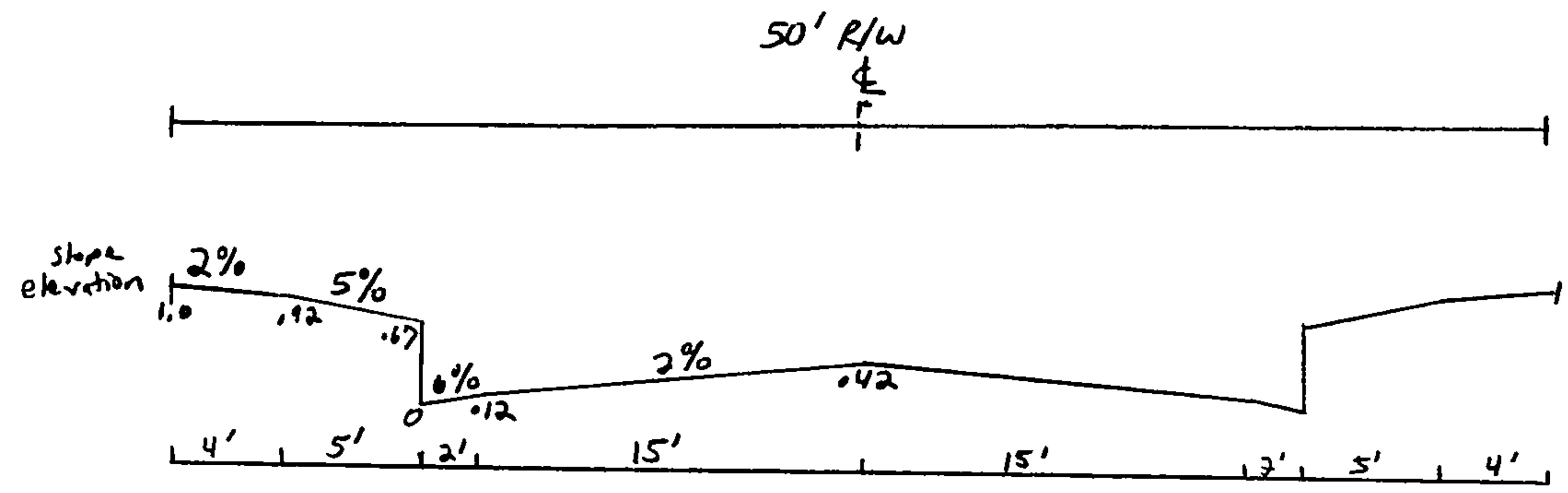
♂ MANNING'S N= .017 SLOPE= .055

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
0.26	0.26	1.70	7.2	18.03	4.25	17.50	0.28	0.54
0.27	0.27	1.88	8.2	19.05	4.38	18.50	0.30	0.57
0.28	0.28	2.07	9.3	20.07	4.51	19.50	0.32	0.60
0.29	0.29	2.27	10.5	21.09	4.64	20.50	0.33	0.62
0.30	0.30	2.48	11.8	22.11	4.77	21.50	0.35	0.65
0.31	0.31	2.70	13.2	23.13	4.90	22.50	0.37	0.68
0.32	0.32	2.93	14.7	24.15	5.03	23.50	0.39	0.71
0.33	0.33	3.17	16.3	25.17	5.15	24.50	0.41	0.74
0.34	0.34	3.42	18.1	26.19	5.28	25.50	0.43	0.77

Q=12.00

EGH = .68 < 1.0 ∴ OK

Street A Cross - Section



Sect 1-2

Street A
Slope = 7%

♂ MANNING'S N= .017 SLOPE= .07

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.25	0.25	1.53	7.1	17.01	4.65	16.50	0.34	0.59
0.26	0.26	1.70	8.2	18.03	4.79	17.50	0.36	0.62
0.27	0.27	1.88	9.3	19.05	4.94	18.50	0.38	0.65
0.28	0.28	2.07	10.5	20.07	5.09	19.50	0.40	0.68
0.29	0.29	2.27	11.9	21.09	5.23	20.50	0.43	0.72
0.30	0.30	2.48	13.4	22.11	5.38	21.50	0.45	0.75
0.31	0.31	2.70	14.9	23.13	5.53	22.50	0.47	0.78
0.32	0.32	2.93	16.6	24.15	5.67	23.50	0.50	0.82
0.33	0.33	3.17	18.4	25.17	5.81	24.50	0.52	0.85
0.34	0.34	3.42	20.4	26.19	5.95	25.50	0.55	0.89
0.35	0.35	3.68	22.4	27.21	6.09	26.50	0.58	0.93
0.36	0.36	3.95	24.6	28.23	6.23	27.50	0.60	0.96
0.37	0.37	4.23	27.0	29.25	6.37	28.50	0.63	1.00

Q=15.1
cfs

EGL = .82 < 1.0 ∴ OK

3-3

Street A
Slope = 4.86%

♂ MANNING'S N= .017 SLOPE= .0486

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	-0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
♀ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.32	0.32	2.93	13.8	24.15	4.72	23.50	0.35	0.67
0.33	0.33	3.17	15.4	25.17	4.84	24.50	0.36	0.69
0.34	0.34	3.42	17.0	26.19	4.96	25.50	0.38	0.72
0.35	0.35	3.68	18.7	27.21	5.08	26.50	0.40	0.75
0.36	0.36	3.95	20.5	28.23	5.19	27.50	0.42	0.78
0.37	0.37	4.23	22.5	29.25	5.31	28.50	0.44	0.81
0.38	0.38	4.52	24.5	30.27	5.42	29.50	0.46	0.84
0.39	0.39	4.82	26.7	31.29	5.54	30.50	0.48	0.87
0.40	0.40	5.13	29.0	32.31	5.65	31.50	0.50	0.90
0.41	0.41	5.45	31.7	32.83	5.82	32.00	0.53	0.94
0.42	0.42	5.77	34.9	32.85	6.04	32.00	0.57	0.99
0.43	0.43	6.09	38.1	32.87	6.26	32.00	0.61	1.04
0.44	0.44	6.41	41.5	32.89	6.48	32.00	0.65	1.09

Q = 18.8 cfs
After
inlets
EGL < 1.0.00

Q = 34.4 c
Before
inlets
EGL < 1.0.00

Q taken off of street = 15.60 cfs

Q remaining = 18.76 cfs

4-4

Street A
Slope = 6.35%

♂ MANNING'S N= .017 SLOPE= .0635

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.24	0.24	1.37	5.9	15.99	4.28	15.50	0.28	0.52
0.25	0.25	1.53	6.8	17.01	4.42	16.50	0.30	0.55
0.26	0.26	1.70	7.8	18.03	4.57	17.50	0.32	0.58
0.27	0.27	1.88	8.9	19.05	4.71	18.50	0.34	0.61
0.28	0.28	2.07	10.0	20.07	4.85	19.50	0.36	0.64
0.29	0.29	2.27	11.3	21.09	4.99	20.50	0.39	0.68
0.30	0.30	2.48	12.7	22.11	5.12	21.50	0.41	0.71
0.31	0.31	2.70	14.2	23.13	5.26	22.50	0.43	0.74
0.32	0.32	2.93	15.8	24.15	5.40	23.50	0.45	0.77
0.33	0.33	3.17	17.6	25.17	5.54	24.50	0.48	0.81
0.34	0.34	3.42	19.4	26.19	5.67	25.50	0.50	0.84
0.35	0.35	3.68	21.4	27.21	5.80	26.50	0.52	0.87
0.36	0.36	3.95	23.5	28.23	5.94	27.50	0.55	0.91
0.37	0.37	4.23	25.7	29.25	6.07	28.50	0.57	0.94
0.38	0.38	4.52	28.0	30.27	6.20	29.50	0.60	0.98
0.39	0.39	4.82	30.5	31.29	6.33	30.50	0.62	1.01
0.40	0.40	5.13	33.1	32.31	6.46	31.50	0.65	1.05
0.41	0.41	5.45	36.3	32.83	6.65	32.00	0.69	1.10
0.42	0.42	5.77	39.9	32.85	6.91	32.00	0.74	1.16
0.43	0.43	6.09	43.6	32.87	7.16	32.00	0.80	1.23
0.44	0.44	6.41	47.5	32.89	7.40	32.00	0.85	1.29

Q = 10.1 cfs
after 1-14

Q = 23.7 cfs
before 1-14

EGL's < 1.0' .'. OK

Q taken from street = 13.6 cfs

Q remaining = 10.08 cfs

5-5 \$ 6-0

Street A
Slope = 1%

♂ MANNING'S N= .017 SLOPE= .01

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
*0.34	0.34	3.42	7.7	26.19	2.25	25.50	0.08	0.42
0.35	0.35	3.68	8.5	27.21	2.30	26.50	0.08	0.43
0.36	0.36	3.95	9.3	28.23	2.36	27.50	0.09	0.45
0.37	0.37	4.23	10.2	29.25	2.41	28.50	0.09	0.46
0.38	0.38	4.52	11.1	30.27	2.46	29.50	0.09	0.47
0.39	0.39	4.82	12.1	31.29	2.51	30.50	0.10	0.49
0.40	0.40	5.13	13.2	32.31	2.56	31.50	0.10	0.50
0.41	0.41	5.45	14.4	32.83	2.64	32.00	0.11	0.52
0.42	0.42	5.77	15.8	32.85	2.74	32.00	0.12	0.54
0.43	0.43	6.09	17.3	32.87	2.84	32.00	0.13	0.56
0.44	0.44	6.41	18.8	32.89	2.94	32.00	0.13	0.57
0.46	0.46	7.05	22.1	32.93	3.13	32.00	0.15	0.61
0.47	0.47	7.37	23.7	32.95	3.22	32.00	0.16	0.63
0.48	0.48	7.69	25.5	32.97	3.31	32.00	0.17	0.65
0.49	0.49	8.01	27.2	32.99	3.40	32.00	0.18	0.67
0.50	0.50	8.33	29.1	33.01	3.49	32.00	0.19	0.69
0.51	0.51	8.65	30.9	33.03	3.58	32.00	0.20	0.71
0.52	0.52	8.97	32.9	33.05	3.66	32.00	0.21	0.73
0.53	0.53	9.29	34.8	33.07	3.75	32.00	0.22	0.75
0.54	0.54	9.61	36.8	33.09	3.83	32.00	0.23	0.77
0.55	0.55	9.93	38.9	33.11	3.92	32.00	0.24	0.79
0.56	0.56	10.25	41.0	33.13	4.00	32.00	0.25	0.81
0.57	0.57	10.57	43.1	33.15	4.08	32.00	0.26	0.83
0.58	0.58	10.89	45.3	33.17	4.16	32.00	0.27	0.85
0.59	0.59	11.21	47.5	33.19	4.24	32.00	0.28	0.87
0.60	0.60	11.53	49.8	33.21	4.32	32.00	0.29	0.89
0.61	0.61	11.85	52.1	33.23	4.40	32.00	0.30	0.91
0.62	0.62	12.17	54.4	33.25	4.47	32.00	0.31	0.93
0.63	0.63	12.49	56.8	33.27	4.55	32.00	0.32	0.95
0.64	0.64	12.81	59.2	33.29	4.62	32.00	0.33	0.97
0.65	0.65	13.13	61.7	33.31	4.70	32.00	0.34	0.99
0.66	0.66	13.45	64.2	33.33	4.77	32.00	0.35	1.01
0.67	0.67	13.77	66.7	33.35	4.85	32.00	0.36	1.03

Q = 25.2 cfs
After inlets

Q = 39.2 cfs
before inlets

EGL's < 1.0 ∴ OK

Q taken from street = 14.0 cfs

Q remaining = 25.2 cfs

Street A
Slope = 1.75%

♂ MANNING'S N= .017 SLOPE= .0175

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00

♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.34	0.32	0.32	0.00	0.01
0.02	0.02	0.01	0.0	0.68	0.51	0.64	0.00	0.02
0.03	0.03	0.01	0.0	1.02	0.67	0.96	0.01	0.04
0.29	0.29	2.27	5.9	21.09	2.62	20.50	0.11	0.40
0.30	0.30	2.48	6.7	22.11	2.69	21.50	0.11	0.41
0.31	0.31	2.70	7.5	23.13	2.76	22.50	0.12	0.43
0.32	0.32	2.93	8.3	24.15	2.83	23.50	0.12	0.44
0.33	0.33	3.17	9.2	25.17	2.91	24.50	0.13	0.46
0.34	0.34	3.42	10.2	26.19	2.98	25.50	0.14	0.48
0.35	0.35	3.68	11.2	27.21	3.05	26.50	0.14	0.49
0.36	0.36	3.95	12.3	28.23	3.12	27.50	0.15	0.51
0.37	0.37	4.23	13.5	29.25	3.19	28.50	0.16	0.53
0.38	0.38	4.52	14.7	30.27	3.26	29.50	0.16	0.54
0.39	0.39	4.82	16.0	31.29	3.32	30.50	0.17	0.56
0.40	0.40	5.13	17.4	32.31	3.39	31.50	0.18	0.58
0.41	0.41	5.45	19.0	32.83	3.49	32.00	0.19	0.60
0.42	0.42	5.77	20.9	32.85	3.63	32.00	0.20	0.62
0.43	0.43	6.09	22.9	32.87	3.76	32.00	0.22	0.65
0.44	0.44	6.41	24.9	32.89	3.89	32.00	0.23	0.67
0.46	0.46	7.05	29.2	32.93	4.14	32.00	0.27	0.73
0.47	0.47	7.37	31.4	32.95	4.26	32.00	0.28	0.75
0.48	0.48	7.69	33.7	32.97	4.38	32.00	0.30	0.78
0.49	0.49	8.01	36.0	32.99	4.50	32.00	0.31	0.80
0.50	0.50	8.33	38.5	33.01	4.62	32.00	0.33	0.83
0.51	0.51	8.65	40.9	33.03	4.73	32.00	0.35	0.86
0.52	0.52	8.97	43.5	33.05	4.85	32.00	0.36	0.88

Q = 14.4 cfs
after
inlets

Q = 25.2 cfs
before
inlets

EGL's < 1.0 ∴ OK

Q removed = 10.8 cfs

Q remaining = 14.4 cfs

Street A
Slope = 2.5%

♂ MANNING'S N= .017 SLOPE= .025

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.34	0.39	0.32	0.00	0.01
0.02	0.02	0.01	0.0	0.68	0.62	0.64	0.01	0.03
0.19	0.19	0.72	1.6	10.89	2.26	10.50	0.08	0.27
0.20	0.20	0.83	1.9	11.91	2.34	11.50	0.09	0.29
0.21	0.21	0.95	2.3	12.93	2.43	12.50	0.09	0.30
0.22	0.22	1.08	2.7	13.95	2.51	13.50	0.10	0.32
0.23	0.23	1.22	3.2	14.97	2.60	14.50	0.10	0.33
0.24	0.24	1.37	3.7	15.99	2.69	15.50	0.11	0.35
0.25	0.25	1.53	4.3	17.01	2.78	16.50	0.12	0.37
0.26	0.26	1.70	4.9	18.03	2.86	17.50	0.13	0.39
0.27	0.27	1.88	5.6	19.05	2.95	18.50	0.14	0.41
0.28	0.28	2.07	6.3	20.07	3.04	19.50	0.14	0.42
0.29	0.29	2.27	7.1	21.09	3.13	20.50	0.15	0.44
0.30	0.30	2.48	8.0	22.11	3.22	21.50	0.16	0.46
0.31	0.31	2.70	8.9	23.13	3.30	22.50	0.17	0.48
0.32	0.32	2.93	9.9	24.15	3.39	23.50	0.18	0.50
0.33	0.33	3.17	11.0	25.17	3.47	24.50	0.19	0.52
0.34	0.34	3.42	12.2	26.19	3.56	25.50	0.20	0.54
0.35	0.35	3.68	13.4	27.21	3.64	26.50	0.21	0.56
0.36	0.36	3.95	14.7	28.23	3.73	27.50	0.22	0.58
0.37	0.37	4.23	16.1	29.25	3.81	28.50	0.23	0.60
0.38	0.38	4.52	17.6	30.27	3.89	29.50	0.24	0.62
0.39	0.39	4.82	19.2	31.29	3.97	30.50	0.24	0.63
0.40	0.40	5.13	20.8	32.31	4.05	31.50	0.26	0.66
0.41	0.41	5.45	22.8	32.83	4.17	32.00	0.27	0.68
0.42	0.42	5.77	25.0	32.85	4.33	32.00	0.29	0.71

Q = 4.2 cfs
After
inlets

Q = 14.4 cfs
Before
inlets

Q removed = 10.2 cfs
Q remaining = 14.4 cfs

EGL's < 1.0 ∴ OK

Street A
Slope = 1%

♂ MANNING'S N= .017 SLOPE= .01

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	16.00	0.41	7	32.00	0.67
2	0.00	0.00	5	30.00	0.13	8	0.00	0.00
3	2.00	0.13	6	32.00	0.00	9	0.00	0.00
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.34	0.34	3.42	7.7	26.19	2.25	25.50	0.08	0.42
0.35	0.35	3.68	8.5	27.21	2.30	26.50	0.08	0.43
0.36	0.36	3.95	9.3	28.23	2.36	27.50	0.09	0.45
0.37	0.37	4.23	10.2	29.25	2.41	28.50	0.09	0.46
0.38	0.38	4.52	11.1	30.27	2.46	29.50	0.09	0.47
0.39	0.39	4.82	12.1	31.29	2.51	30.50	0.10	0.49
0.40	0.40	5.13	13.2	32.31	2.56	31.50	0.10	0.50
0.41	0.41	5.45	14.4	32.83	2.64	32.00	0.11	0.52
0.42	0.42	5.77	15.8	32.85	2.74	32.00	0.12	0.54
0.43	0.43	6.09	17.3	32.87	2.84	32.00	0.13	0.56
0.44	0.44	6.41	18.8	32.89	2.94	32.00	0.13	0.57
0.46	0.46	7.05	22.1	32.93	3.13	32.00	0.15	0.61
0.47	0.47	7.37	23.7	32.95	3.22	32.00	0.16	0.63
0.48	0.48	7.69	25.5	32.97	3.31	32.00	0.17	0.65
0.49	0.49	8.01	27.2	32.99	3.40	32.00	0.18	0.67
0.50	0.50	8.33	29.1	33.01	3.49	32.00	0.19	0.69
0.51	0.51	8.65	30.9	33.03	3.58	32.00	0.20	0.71
0.52	0.52	8.97	32.9	33.05	3.66	32.00	0.21	0.73
0.53	0.53	9.29	34.8	33.07	3.75	32.00	0.22	0.75
0.54	0.54	9.61	36.8	33.09	3.83	32.00	0.23	0.77
0.55	0.55	9.93	38.9	33.11	3.92	32.00	0.24	0.79
0.56	0.56	10.25	41.0	33.13	4.00	32.00	0.25	0.81
0.57	0.57	10.57	43.1	33.15	4.08	32.00	0.26	0.83
0.58	0.58	10.89	45.3	33.17	4.16	32.00	0.27	0.85
0.59	0.59	11.21	47.5	33.19	4.24	32.00	0.28	0.87
0.60	0.60	11.53	49.8	33.21	4.32	32.00	0.29	0.89
0.61	0.61	11.85	52.1	33.23	4.40	32.00	0.30	0.91
0.62	0.62	12.17	54.4	33.25	4.47	32.00	0.31	0.93
0.63	0.63	12.49	56.8	33.27	4.55	32.00	0.32	0.95
0.64	0.64	12.81	59.2	33.29	4.62	32.00	0.33	0.97
0.65	0.65	13.13	61.7	33.31	4.70	32.00	0.34	0.99
0.66	0.66	13.45	64.2	33.33	4.77	32.00	0.35	1.01
0.67	0.67	13.77	66.7	33.35	4.85	32.00	0.36	1.03

*Q = 14.1 cfs
before inlet in
sump*

EGL < 1.0 ∴ OK

Q removed = 14.1 cfs

*Q remaining = 0.0 cfs allowing for a 43% clogging factor
on Double D grate.*

Street B - South
Slope = 2.5%

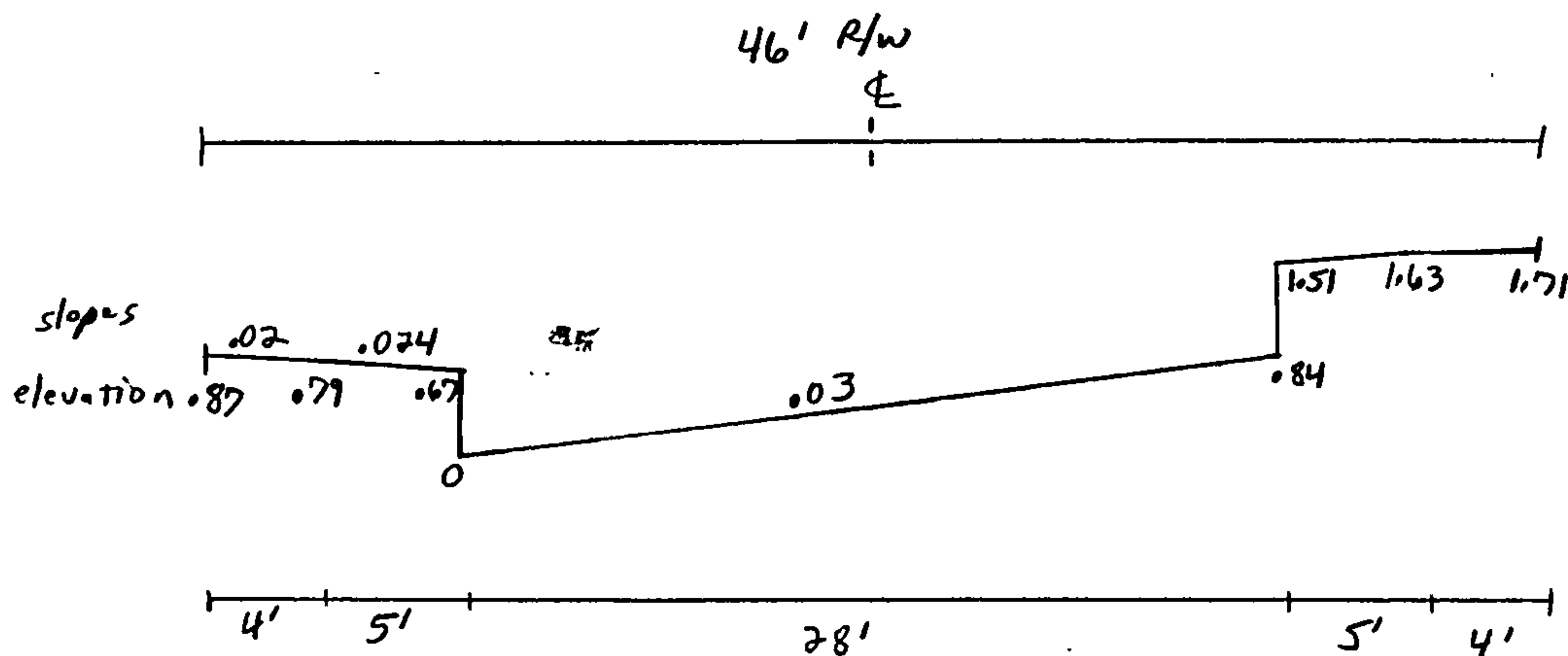
♂ MANNING'S N= .017 SLOPE= .025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	28.00	0.84			
2	0.00	0.00	4	28.00	1.51			
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
0.40	0.40	2.67	12.4	13.74	4.63	13.33	0.33	0.73
0.41	0.41	2.80	13.2	14.08	4.71	13.67	0.34	0.75
0.42	0.42	2.94	14.1	14.43	4.79	14.00	0.36	0.78
0.43	0.43	3.08	15.0	14.77	4.86	14.33	0.37	0.80
0.44	0.44	3.23	15.9	15.11	4.94	14.67	0.38	0.82
0.45	0.45	3.37	16.9	15.46	5.01	15.00	0.39	0.84
0.47	0.47	3.68	19.0	16.14	5.16	15.67	0.41	0.88
0.48	0.48	3.84	20.1	16.49	5.23	16.00	0.43	0.91
0.49	0.49	4.00	21.2	16.83	5.30	16.33	0.44	0.93
0.50	0.50	4.17	22.4	17.17	5.38	16.67	0.45	0.95
0.51	0.51	4.33	23.6	17.52	5.45	17.00	0.46	0.97

Q=16.5
cfs

.84 < .87 ∴ OK

Cross - Section



Street B - North
Slope = 1%

♂ MANNING'S N= .017 SLOPE= .01

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	28.00	0.84			
2	0.00	0.00	4	28.00	1.51			
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.40	0.40	2.67	7.8	13.74	2.93	13.33	0.13	0.53
0.41	0.41	2.80	8.3	14.08	2.98	13.67	0.14	0.55
0.42	0.42	2.94	8.9	14.43	3.03	14.00	0.14	0.56
0.43	0.43	3.08	9.5	14.77	3.07	14.33	0.15	0.58
0.44	0.44	3.23	10.1	15.11	3.12	14.67	0.15	0.59
0.45	0.45	3.37	10.7	15.46	3.17	15.00	0.16	0.61
0.47	0.47	3.68	12.0	16.14	3.26	15.67	0.17	0.64
0.48	0.48	3.84	12.7	16.49	3.31	16.00	0.17	0.65
0.49	0.49	4.00	13.4	16.83	3.35	16.33	0.17	0.66
0.50	0.50	4.17	14.2	17.17	3.40	16.67	0.18	0.68

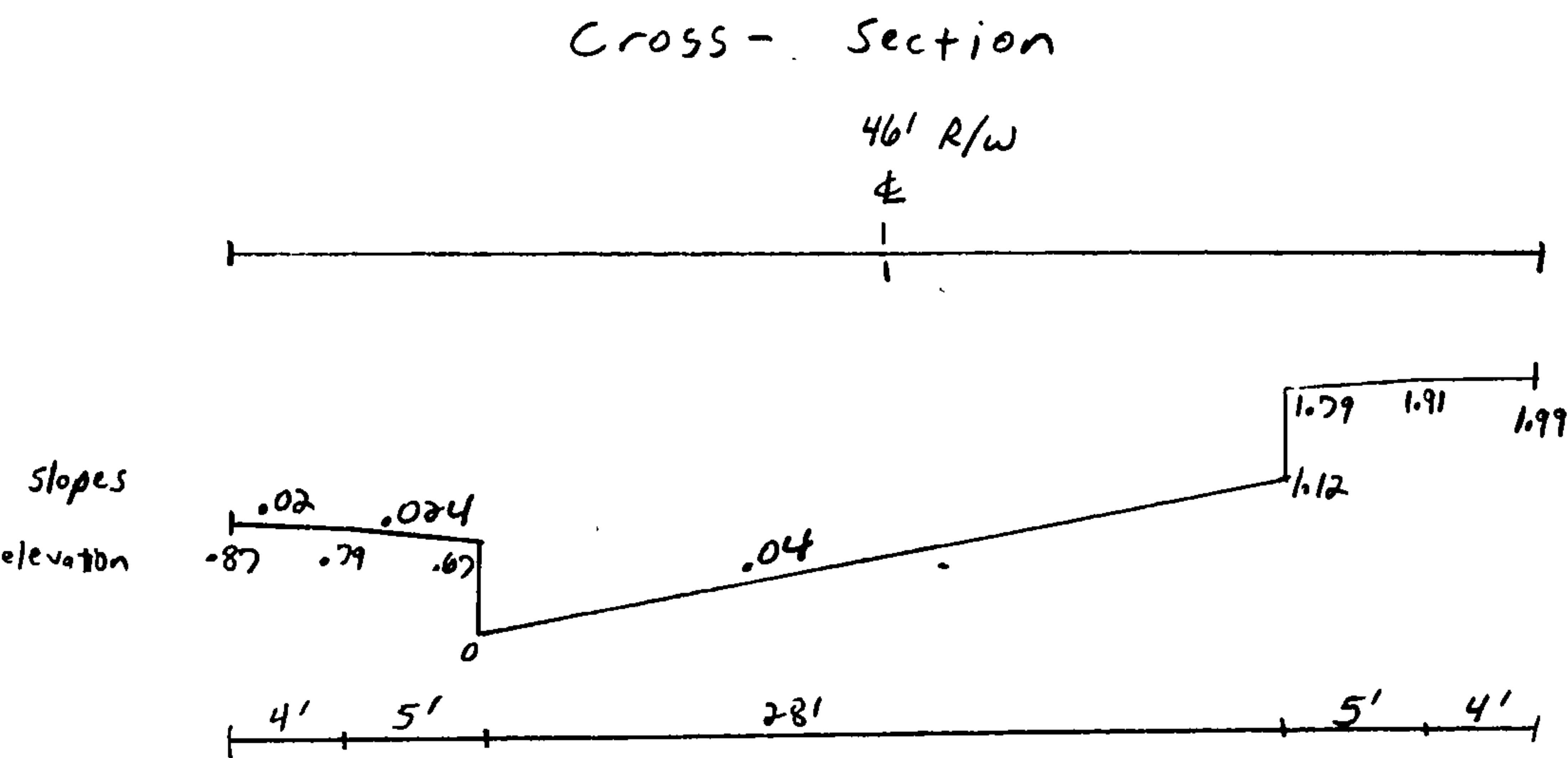
*Q = 10.30 cfs
.61 < .87 ∴
OK*

Cross - Section is the same as Street B - South.

Street C - South
Slope = 2.5%

♂ MANNING'S N= .017 SLOPE= .025								
♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	28.00	1.12			
2	0.00	0.00	4	28.00	1.79			
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.38	0.38	1.80	8.0	9.89	4.45	9.50	0.31	0.69
0.39	0.39	1.90	8.6	10.15	4.53	9.75	0.32	0.71
0.40	0.40	2.00	9.2	10.41	4.60	10.00	0.33	0.73
0.41	0.41	2.10	9.8	10.67	4.68	10.25	0.34	0.75
0.42	0.42	2.20	10.5	10.93	4.75	10.50	0.35	0.77
0.43	0.43	2.31	11.2	11.19	4.83	10.75	0.36	0.79
0.44	0.44	2.42	11.9	11.45	4.90	11.00	0.37	0.81
0.45	0.45	2.53	12.6	11.71	4.98	11.25	0.38	0.83

*Q = 10.7c
0.71c.85
∴ OK*



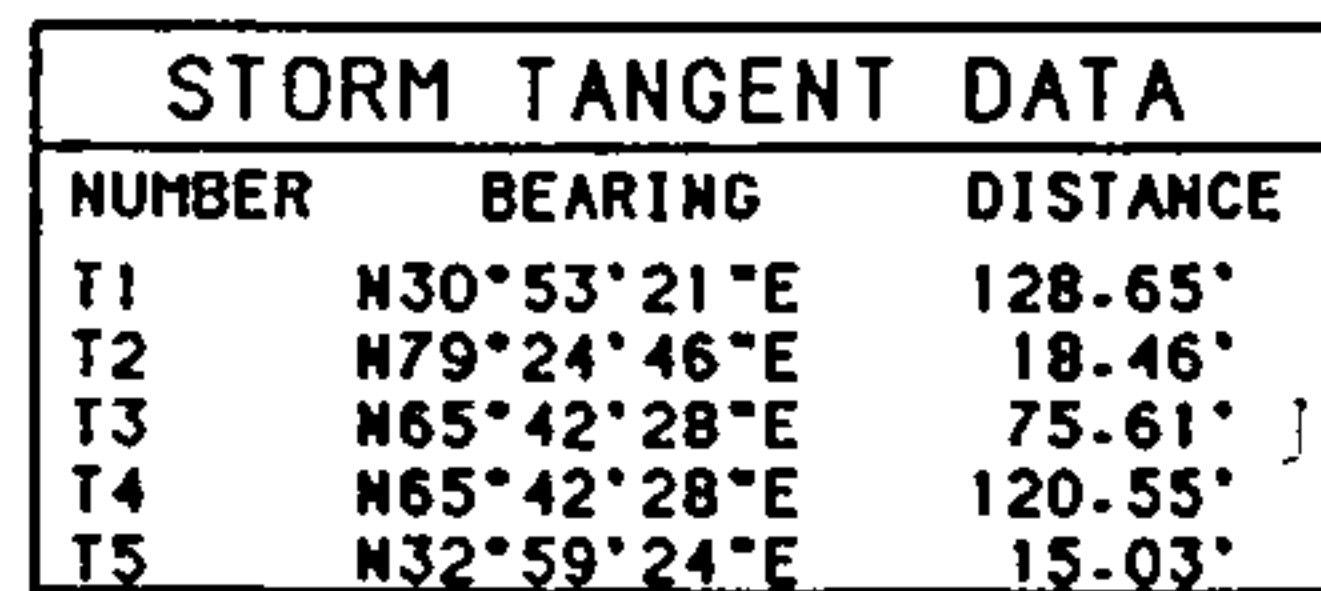
Street C - North
Slope = 1%

♂ MANNING'S N= .017 SLOPE= .01

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	28.00	1.12			
2	0.00	0.00	4	28.00	1.79			
♂ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.41	0.41	2.10	6.2	10.67	2.96	10.25	0.14	0.55
0.42	0.42	2.20	6.6	10.93	3.01	10.50	0.14	0.56
0.43	0.43	2.31	7.1	11.19	3.05	10.75	0.14	0.57
0.44	0.44	2.42	7.5	11.45	3.10	11.00	0.15	0.59
0.45	0.45	2.53	8.0	11.71	3.15	11.25	0.15	0.60
0.47	0.47	2.76	8.9	12.23	3.24	11.75	0.16	0.63
0.48	0.48	2.88	9.5	12.49	3.29	12.00	0.17	0.65
0.49	0.49	3.00	10.0	12.75	3.33	12.25	0.17	0.66

Q=7.61 cfs
.604.87
OK

Cross - Section is The same as Street C - South.



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NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. ALL CURB RETURN RADII SHALL BE 25' TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.
3. ALL CURVE DATA AND DIMENSIONS REFER TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.
4. GRADE ELEVATIONS, WHERE NOTED, ARE FOR TOP OF STANDARD CURB UNLESS OTHERWISE SPECIFIED.
5. CONTRACTOR IS TO INSTALL A 4"x4"x5" POST AND END AT THE END OF EACH SANITARY SEWER SERVICE.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ALL UTILITY CONDUITS AND EXISTING LINES.
7. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
8. CONTRACTOR SHALL PROVIDE THE INSPECTORS, (CITY AND PRIVATE) WITH THE PROPOSED HYDROSTATIC TESTING PLAN. THE PLAN MUST BE APPROVED BEFORE TESTING OPERATIONS BEGIN.
9. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.
10. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.
11. REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).
12. WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED PRIOR TO ACCEPTANCE OF CURB AND GUTTER.

RECEIVED
APR 24 1996

CITY PROJECT NO.	541181	ZONE MAP NO.	E23 & F23	SHEET	13	OF	20
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BHE JOB NO. 95364A244

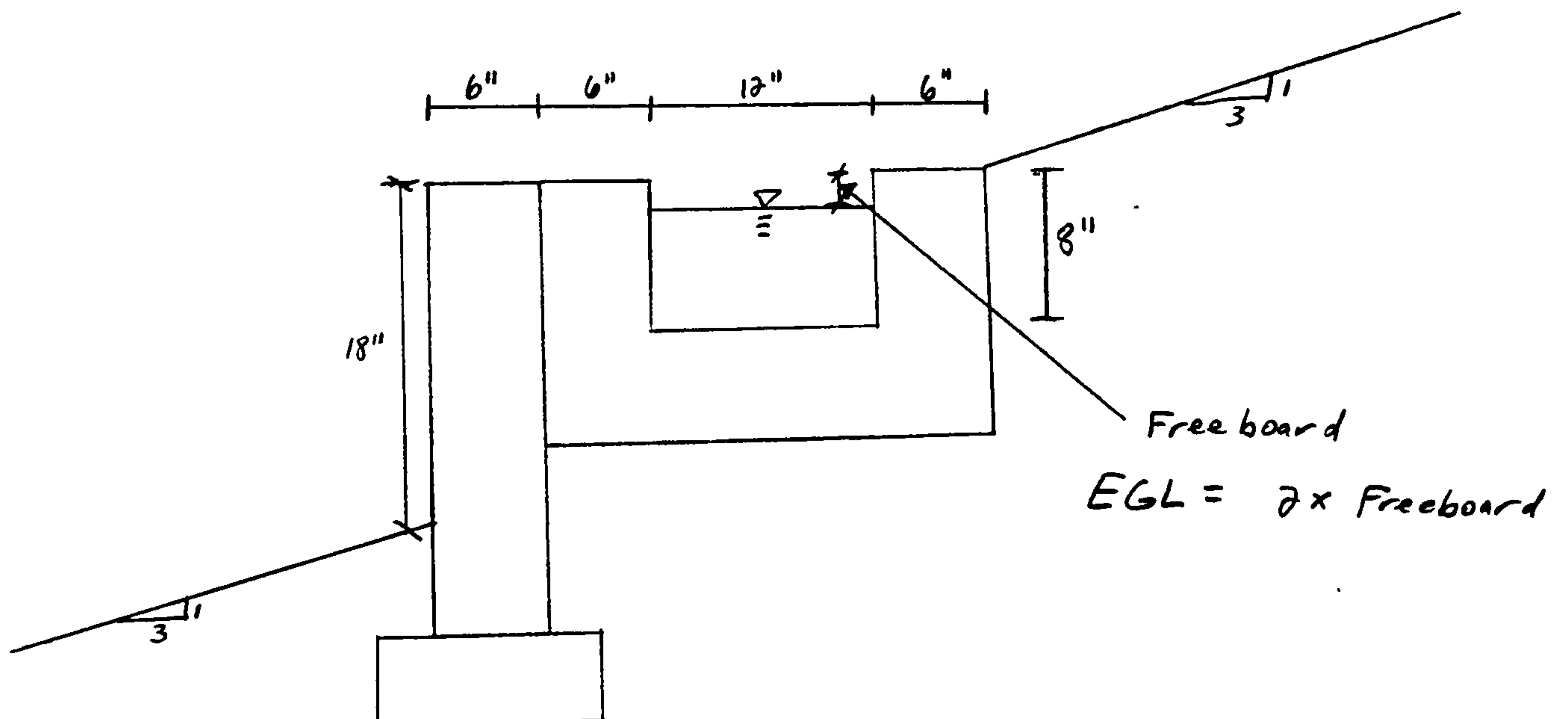
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DATE:

RIBBON CHANNEL HYDRAULICS

BASIN ID	WIDTH (FEET)	FLOW Q(100) (CFS)	SLOPE	WSEL (FEET)	EGL (FEET)	ALLOWABLE EGL* (FEET)
C1	1	1.8	0.04	0.26	1.03	1.08 >1.03-OK
C2	1	2.3	0.02	0.39	0.93	0.95 >0.93-OK
E2	1	1.6	0.04	0.24	0.96	1.1 >0.96-OK
E1	1	0.8	0.01	0.24	0.42	1.1 >.42--OK
NRO	1	1.8	0.02	0.33	0.8	1.01 >.80--OK

*The assumption is that the EGL can be twice the existing freeboard.

Cross - Section



Ribbon Channel Hydraulics

Slope = 2%

♂ MANNING'S N= .013 SLOPE= .02

♂ POINT	DIST	ELEV	POINT	DIST	ELEV			
1	0.00	0.67	3	1.00	0.00			
2	0.00	0.00	4	1.00	0.67			
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.02	0.02	0.02	0.0	1.04	1.16	1.00	0.02	0.04
0.04	0.04	0.04	0.1	1.08	1.80	1.00	0.05	0.09
0.06	0.06	0.06	0.1	1.12	2.30	1.00	0.08	0.14
0.08	0.08	0.08	0.2	1.16	2.72	1.00	0.11	0.19
0.10	0.10	0.10	0.3	1.20	3.08	1.00	0.15	0.25
0.12	0.12	0.12	0.4	1.24	3.41	1.00	0.18	0.30
0.14	0.14	0.14	0.5	1.28	3.70	1.00	0.21	0.35
0.16	0.16	0.16	0.6	1.32	3.96	1.00	0.24	0.40
0.18	0.18	0.18	0.8	1.36	4.20	1.00	0.27	0.45
0.20	0.20	0.20	0.9	1.40	4.42	1.00	0.30	0.50
0.22	0.22	0.22	1.0	1.44	4.62	1.00	0.33	0.55
0.24	0.24	0.24	1.2	1.48	4.81	1.00	0.36	0.60
0.26	0.26	0.26	1.3	1.52	4.98	1.00	0.39	0.65
0.28	0.28	0.28	1.4	1.56	5.14	1.00	0.41	0.69
0.30	0.30	0.30	1.6	1.60	5.30	1.00	0.44	0.74
0.32	0.32	0.32	1.7	1.64	5.44	1.00	0.46	0.78
0.34	0.34	0.34	1.9	1.68	5.57	1.00	0.48	0.82
0.36	0.36	0.36	2.1	1.72	5.70	1.00	0.50	0.86
0.38	0.38	0.38	2.2	1.76	5.82	1.00	0.53	0.91
0.40	0.40	0.40	2.4	1.80	5.93	1.00	0.55	0.95
0.42	0.42	0.42	2.5	1.84	6.04	1.00	0.57	0.99
0.44	0.44	0.44	2.7	1.88	6.14	1.00	0.59	1.03
0.46	0.46	0.46	2.9	1.92	6.24	1.00	0.60	1.06
0.48	0.48	0.48	3.0	1.96	6.33	1.00	0.62	1.10
0.50	0.50	0.50	3.2	2.00	6.42	1.00	0.64	1.14
0.52	0.52	0.52	3.4	2.04	6.50	1.00	0.66	1.18
0.54	0.54	0.54	3.6	2.08	6.58	1.00	0.67	1.21
0.56	0.56	0.56	3.7	2.12	6.66	1.00	0.69	1.25
0.58	0.58	0.58	3.9	2.16	6.73	1.00	0.70	1.28
0.60	0.60	0.60	4.1	2.20	6.80	1.00	0.72	1.32
0.62	0.62	0.62	4.3	2.24	6.87	1.00	0.73	1.35
0.64	0.64	0.64	4.4	2.28	6.93	1.00	0.75	1.39
0.66	0.66	0.66	4.6	2.32	6.99	1.00	0.76	1.42
0.67	0.67	0.67	4.7	2.34	7.02	1.00	0.77	1.44

Q = 2.3 cfs
EGL = .93 f
WSEL = .39

The allowable EGL can be twice the existing Freeboard.

$$\text{Allowable EGL} = (.67 - .39) * 2 + .39 = .95' > .93f + \therefore \text{OK}$$

Ribbon Channel Hydraulics

Slope = 4%

♂ MANNING'S N= .013 SLOPE= .04

♂ POINT	DIST	ELEV	POINT	DIST	ELEV			
1	0.00	0.67	3	1.00	0.00			
2	0.00	0.00	4	1.00	0.67			
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.02	0.02	0.02	0.0	1.04	1.64	1.00	0.04	0.06
0.04	0.04	0.04	0.1	1.08	2.54	1.00	0.10	0.14
0.06	0.06	0.06	0.2	1.12	3.25	1.00	0.16	0.22
0.08	0.08	0.08	0.3	1.16	3.84	1.00	0.23	0.31
0.10	0.10	0.10	0.4	1.20	4.36	1.00	0.30	0.40
0.12	0.12	0.12	0.6	1.24	4.82	1.00	0.36	0.48
0.14	0.14	0.14	0.7	1.28	5.23	1.00	0.42	0.56
0.16	0.16	0.16	0.9	1.32	5.60	1.00	0.49	0.65
0.18	0.18	0.18	1.1	1.36	5.94	1.00	0.55	0.73
0.20	0.20	0.20	1.2	1.40	6.25	1.00	0.61	0.81
0.22	0.22	0.22	1.4	1.44	6.53	1.00	0.66	0.88
0.24	0.24	0.24	1.6	1.48	6.80	1.00	0.72	0.96
0.26	0.26	0.26	1.8	1.52	7.04	1.00	0.77	1.03
0.28	0.28	0.28	2.0	1.56	7.27	1.00	0.82	1.10
0.30	0.30	0.30	2.2	1.60	7.49	1.00	0.87	1.17
0.32	0.32	0.32	2.5	1.64	7.69	1.00	0.92	1.24
0.34	0.34	0.34	2.7	1.68	7.88	1.00	0.96	1.30
0.36	0.36	0.36	2.9	1.72	8.06	1.00	1.01	1.37
0.38	0.38	0.38	3.1	1.76	8.23	1.00	1.05	1.43
0.40	0.40	0.40	3.4	1.80	8.39	1.00	1.09	1.49
0.42	0.42	0.42	3.6	1.84	8.54	1.00	1.13	1.55
0.44	0.44	0.44	3.8	1.88	8.68	1.00	1.17	1.61
0.46	0.46	0.46	4.1	1.92	8.82	1.00	1.21	1.67
0.48	0.48	0.48	4.3	1.96	8.95	1.00	1.24	1.72
0.50	0.50	0.50	4.5	2.00	9.07	1.00	1.28	1.78
0.52	0.52	0.52	4.8	2.04	9.19	1.00	1.31	1.83
0.54	0.54	0.54	5.0	2.08	9.30	1.00	1.34	1.88
0.56	0.56	0.56	5.3	2.12	9.41	1.00	1.38	1.94
0.58	0.58	0.58	5.5	2.16	9.52	1.00	1.41	1.99
0.60	0.60	0.60	5.8	2.20	9.61	1.00	1.44	2.04
0.62	0.62	0.62	6.0	2.24	9.71	1.00	1.46	2.08
0.64	0.64	0.64	6.3	2.28	9.80	1.00	1.49	2.13
0.66	0.66	0.66	6.5	2.32	9.89	1.00	1.52	2.18
0.67	0.67	0.67	6.7	2.34	9.93	1.00	1.53	2.20

Q= 1.6c.
Q= 1.8

Allowable EGL calculations
are on the summary sheet.

Ribbon Channel Hydraulics
Slope = 1%

♂ MANNING'S N= .013 SLOPE= .01

♂ POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	3	1.00	0.00			
2	0.00	0.00	4	1.00	0.67			
⊗ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)		(FT)	(FT)
0.02	0.02	0.02	0.0	1.04	0.82	1.00	0.01	0.03
0.04	0.04	0.04	0.1	1.08	1.27	1.00	0.03	0.07
0.06	0.06	0.06	0.1	1.12	1.62	1.00	0.04	0.10
0.08	0.08	0.08	0.2	1.16	1.92	1.00	0.06	0.14
0.10	0.10	0.10	0.2	1.20	2.18	1.00	0.07	0.17
0.12	0.12	0.12	0.3	1.24	2.41	1.00	0.09	0.21
0.14	0.14	0.14	0.4	1.28	2.61	1.00	0.11	0.25
0.16	0.16	0.16	0.4	1.32	2.80	1.00	0.12	0.28
0.18	0.18	0.18	0.5	1.36	2.97	1.00	0.14	0.32
0.20	0.20	0.20	0.6	1.40	3.12	1.00	0.15	0.35
0.22	0.22	0.22	0.7	1.44	3.27	1.00	0.17	0.39
0.24	0.24	0.24	0.8	1.48	3.40	1.00	0.18	0.42
0.26	0.26	0.26	0.9	1.52	3.52	1.00	0.19	0.45
0.28	0.28	0.28	1.0	1.56	3.64	1.00	0.21	0.49
0.30	0.30	0.30	1.1	1.60	3.74	1.00	0.22	0.52
0.32	0.32	0.32	1.2	1.64	3.85	1.00	0.23	0.55
0.34	0.34	0.34	1.3	1.68	3.94	1.00	0.24	0.58
0.36	0.36	0.36	1.5	1.72	4.03	1.00	0.25	0.61
0.38	0.38	0.38	1.6	1.76	4.11	1.00	0.26	0.64
0.40	0.40	0.40	1.7	1.80	4.19	1.00	0.27	0.67

Q=.84

Allowable EGL calculations
are on the summary sheet.

Alternate Ribbon Channel Section

PC PROGRAM STREAM

SLOPE = 2%

N = .045

♂ MANNING'S N= .045 SLOPE= .02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.02	0.02	0.00	0.0	0.18	0.21	0.18	0.00	0.02
0.48	0.48	0.84	1.6	3.08	1.96	2.91	0.06	0.54
0.50	0.50	0.89	1.8	3.16	2.01	2.97	0.06	0.56
0.52	0.52	0.95	2.0	3.23	2.07	3.03	0.07	0.59
0.54	0.54	1.02	2.2	3.30	2.13	3.09	0.07	0.61
0.56	0.56	1.08	2.4	3.38	2.18	3.16	0.07	0.63
0.58	0.58	1.14	2.5	3.45	2.23	3.22	0.08	0.66
0.60	0.60	1.21	2.8	3.53	2.28	3.28	0.08	0.68
0.62	0.62	1.27	3.0	3.60	2.34	3.34	0.08	0.70
0.64	0.64	1.34	3.2	3.67	2.38	3.40	0.09	0.73

Q = 2.3 cfs
EGL = .62

PC PROGRAM STREAM

SLOPE = 2%

N = .030

♂ MANNING'S N= .03 SLOPE= .02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.38	0.38	0.56	1.4	2.68	2.47	2.56	0.09	0.47
0.40	0.40	0.61	1.6	2.79	2.55	2.66	0.10	0.50
0.42	0.42	0.67	1.8	2.86	2.65	2.72	0.11	0.53
0.44	0.44	0.72	2.0	2.94	2.75	2.78	0.12	0.56
0.46	0.46	0.78	2.2	3.01	2.84	2.85	0.13	0.59
0.48	0.48	0.84	2.5	3.08	2.93	2.91	0.13	0.61
0.50	0.50	0.89	2.7	3.16	3.02	2.97	0.14	0.64
0.52	0.52	0.95	3.0	3.23	3.11	3.03	0.15	0.67
0.54	0.54	1.02	3.2	3.30	3.19	3.09	0.16	0.70
0.56	0.56	1.08	3.5	3.38	3.27	3.16	0.17	0.73

Q = 2.3 cfs
EGL = .60

Alternate Ribbon Channel Section

PC PROGRAM STREAM

SLOPE = 4%

N = .030

♂ MANNING'S N= .03 SLOPE= .04

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.34	0.34	0.46	1.5	2.47	3.23	2.37	0.16	0.50
0.36	0.36	0.51	1.7	2.58	3.36	2.47	0.18	0.54
0.38	0.38	0.56	2.0	2.68	3.49	2.56	0.19	0.57
0.40	0.40	0.61	2.2	2.79	3.61	2.66	0.20	0.60
0.42	0.42	0.67	2.5	2.86	3.75	2.72	0.22	0.64
0.44	0.44	0.72	2.8	2.94	3.89	2.78	0.23	0.67
0.46	0.46	0.78	3.1	3.01	4.02	2.85	0.25	0.71
0.48	0.48	0.84	3.5	3.08	4.15	2.91	0.27	0.75
0.50	0.50	0.89	3.8	3.16	4.27	2.97	0.28	0.78
0.52	0.52	0.95	4.2	3.23	4.39	3.03	0.30	0.82

Q = 2.3 cfs
EGL = .61

PC PROGRAM STREAM

SLOPE = 4%

N = .045

♂ MANNING'S N= .045 SLOPE= .04

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.42	0.42	0.67	1.7	2.86	2.50	2.72	0.10	0.52
0.44	0.44	0.72	1.9	2.94	2.59	2.78	0.10	0.54
0.46	0.46	0.78	2.1	3.01	2.68	2.85	0.11	0.57
0.48	0.48	0.84	2.3	3.08	2.77	2.91	0.12	0.60
0.50	0.50	0.89	2.5	3.16	2.85	2.97	0.13	0.63
0.52	0.52	0.95	2.8	3.23	2.93	3.03	0.13	0.65
0.54	0.54	1.02	3.1	3.30	3.01	3.09	0.14	0.68
0.56	0.56	1.08	3.3	3.38	3.08	3.16	0.15	0.71
0.58	0.58	1.14	3.6	3.45	3.16	3.22	0.15	0.73
0.60	0.60	1.21	3.9	3.53	3.23	3.28	0.16	0.76

Q = 2.3 cfs
EGL = .60

Alternate Ribbon Channel Section

PC PROGRAM STREAM

SLOPE = 0.5%

N = .030

♂ MANNING'S N= .03 SLOPE= .005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.54	0.54	1.02	1.6	3.30	1.59	3.09	0.04	0.58
0.56	0.56	1.08	1.8	3.38	1.64	3.16	0.04	0.60
0.58	0.58	1.14	1.9	3.45	1.67	3.22	0.04	0.62
0.60	0.60	1.21	2.1	3.53	1.71	3.28	0.05	0.65
0.62	0.62	1.27	2.2	3.60	1.75	3.34	0.05	0.67
0.64	0.64	1.34	2.4	3.67	1.79	3.40	0.05	0.69
0.66	0.66	1.41	2.6	3.75	1.82	3.47	0.05	0.71
0.68	0.68	1.48	2.8	3.82	1.86	3.53	0.05	0.73
0.70	0.70	1.55	2.9	3.89	1.90	3.58	0.06	0.76
0.72	0.72	1.62	3.1	3.95	1.94	3.63	0.06	0.78

Q = 2.3 cfs
EGL = .68

PC PROGRAM STREAM

SLOPE = 0.5%

N = .045

♂ MANNING'S N= .045 SLOPE= .005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.24	5	1.87	0.18	9	4.45	0.69
2	0.45	1.07	6	2.67	0.00	10	4.89	1.07
3	0.89	0.69	7	3.47	0.18	11	5.34	1.24
4	1.34	0.40	8	4.00	0.40	12	0.00	0.00
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.68	0.68	1.48	1.8	3.82	1.24	3.53	0.02	0.70
0.70	0.70	1.55	2.0	3.89	1.26	3.58	0.02	0.72
0.72	0.72	1.62	2.1	3.95	1.29	3.63	0.03	0.75
0.74	0.74	1.70	2.2	4.01	1.32	3.68	0.03	0.77
0.76	0.76	1.77	2.4	4.07	1.34	3.72	0.03	0.79
0.78	0.78	1.84	2.5	4.13	1.36	3.77	0.03	0.81
0.80	0.80	1.92	2.7	4.19	1.39	3.81	0.03	0.83
0.82	0.82	2.00	2.8	4.26	1.41	3.86	0.03	0.85
0.84	0.84	2.07	3.0	4.32	1.43	3.91	0.03	0.87
0.86	0.86	2.15	3.1	4.38	1.45	3.95	0.03	0.89

Q = 2.3 cfs
EGL = .78

POND A SIZING

1. Area of pond based on settling velocity.

Design particle - very fine sand $D = .06 \text{ mm}$

settling velocity = $.009 \text{ ft/s}$

$$Q_2 = 3.0 \text{ cfs}$$

$$Q_{100} = 5.6 \text{ cfs}$$

$$\text{minimum surface area} = A_s = \frac{1.2 Q_2}{V_s}$$

$$A_s = \frac{1.2 (3.0 \text{ ft}^3/\text{s})}{.009 \text{ ft/s}} = 400 \text{ ft}^2$$

2. POND VOLUME Is based on sediment storage

volume. From USLE spreadsheet volume = 158 ft^3

use trapezoidal pond shape

$$\text{Volume} = \left(\frac{A_1 + A_2}{2} \right) h$$

$$A_1 = L * w$$

$$A_2 = (L + 6h)(w + 6h)$$

$$L = 28'$$

$$A_1 = 28w$$

$$A_2 = (28 + 6h)(w + 6h)$$

$$28w = 400 \text{ ft}^2$$

$$w = 15 \text{ ft}$$

volume of sediment $\Rightarrow$ solve for depth

$$158 \text{ ft}^3 = \left(\frac{28(15) + (28 + 6h)(15 + 6h)}{2} \right) h$$

$$h = .339'$$

Using 12" standpipe calculate necessary head to pass $Q = 3.0 \text{ cfs}$
orifice weir

$$Q = .6 A \sqrt{64.4h}$$

$$3.0 = .6 \cdot \frac{\pi (12/2)^2}{4} \sqrt{64.4h}$$

$$h = 0.63 \text{ ft}$$

$$Q = CLH^{3/2} \quad c = 2.68$$

$$3.0 = 2.68 (12/2) H^{3/2}$$

$$H = 1.08 \text{ ft} \quad \text{OK}$$

weir controls



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 3 OF 4
PROJECT NO. _____ BY CM DATE 1/29/96
SUBJECT _____ CH'D _____ DATE _____

POND A SIZING CONTINUED

depth of sediment = .339'

head required to pass $Q = 3.0 \text{ cfs} = 1.08 \text{ ft}$

BOTTOM OF POND ELEV = 46.5

TOP OF BERM ELEV = 50.0

6' wide spillway elev = 49.0

10" PVC standpipe

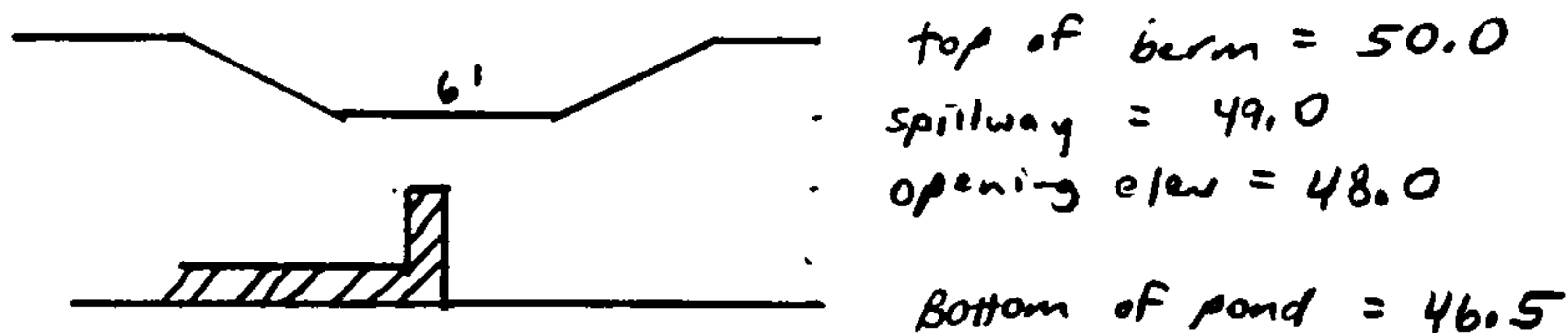
OUTLET ELEV = 46.2

INV ELEV = 46.5

OPENING ELEV = 48.0

Bottom of POND dimensions = 15' x 28'

3:1 side slopes



settling depth = $1.5' - .339' = 1.16'$

Free board = $50.0 - (48.0 + 1.3') = 0.7'$

Calculate width of spillway to pass 100 yr event

$Q_{100} = 5.6 \text{ cfs}$

Weir $\Rightarrow Q = CLH^{3/2}$ $C = 2.68$

$5.6 = 2.68(6')(h)^{3/2}$

$H = .49'$

Free board = $1' - .49' = .51'$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 4 OF 4
 PROJECT NO. _____ BY CM DATE 1/29/96
 SUBJECT _____ CH'D _____ DATE _____

POND B Sizing

1. Area of pond based on settling velocity.
Design Particle - Very Fine sand $D = .06 \text{ mm}$

$$\text{Settling velocity} = .009 \text{ ft/s}$$

$$Q_2 = 1.77 \text{ cfs}$$

$$\text{minimum surface area} = A_s = \frac{1.2 Q_2}{V_s}$$

$$A_s = \frac{1.2 (1.77 \frac{\text{ft}^3}{\text{s}})}{.009 \text{ ft/s}} = 236 \text{ ft}^2$$

2. POND VOLUME IS based on sediment storage volume.

From USLE spreadsheet volume of sediment = 93 ft^3

3:1 side slopes if unlined (AMAFCA)

$$\frac{\text{length}}{\text{width}} = \frac{3}{1}$$

use a trapezoidal pond shape

$$\text{Volume} = \frac{(A_1 + A_2)}{2} h$$

$$A_1 = L * W = 3W^2$$

$$A_2 = (L + 6h)(W + 6h) = 3W^2 + 24hW + 36h^2$$

volume of sediment - solve for depth

$$\text{Area} = 236 \text{ ft}^2 = 3W^2 \rightarrow W = 8.86 \text{ use } 9'$$

$$L = 3W = 28'$$

$$93 \text{ ft}^3 = \left(\frac{3(9)^2 + 3(9)^2 + 24h(9) + 36h^2}{2} \right) h$$

$$\text{solve for } h, \quad h = .331 \text{ ft}$$

using ~~orifice~~ standpipe calculate amount of head necessary

$$\text{orifice } Q = .6 A \sqrt{2gh}$$

$$1.77 \text{ cfs} = .6 \left(\frac{19}{2} \right)^2 \pi \sqrt{64.4h}$$

$$h = .454 \text{ ft}$$

$$\text{weir } Q = CLH^{3/2} \quad C = 2.68$$

$$1.77 = 2.68 \left(\frac{19}{2} \right) H^{3/2}$$

$$H = .399 \text{ ft}$$

Orifice controls



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 1 OF _____

PROJECT NO. _____ BY _____ DATE 1/26/96

SUBJECT _____ CH'D _____ DATE _____

POND SIZING CONTINUED

POND B

depth of sediment = .331 ft

head required to pass 1.77 cfs = .454 ft

BOTTOM OF POND ELEV = 60.5

TOP OF BERM ELEV = 64.0

4' WIDE SPILLWAY ELEV = 63.0

10" PVC STANDPIPE

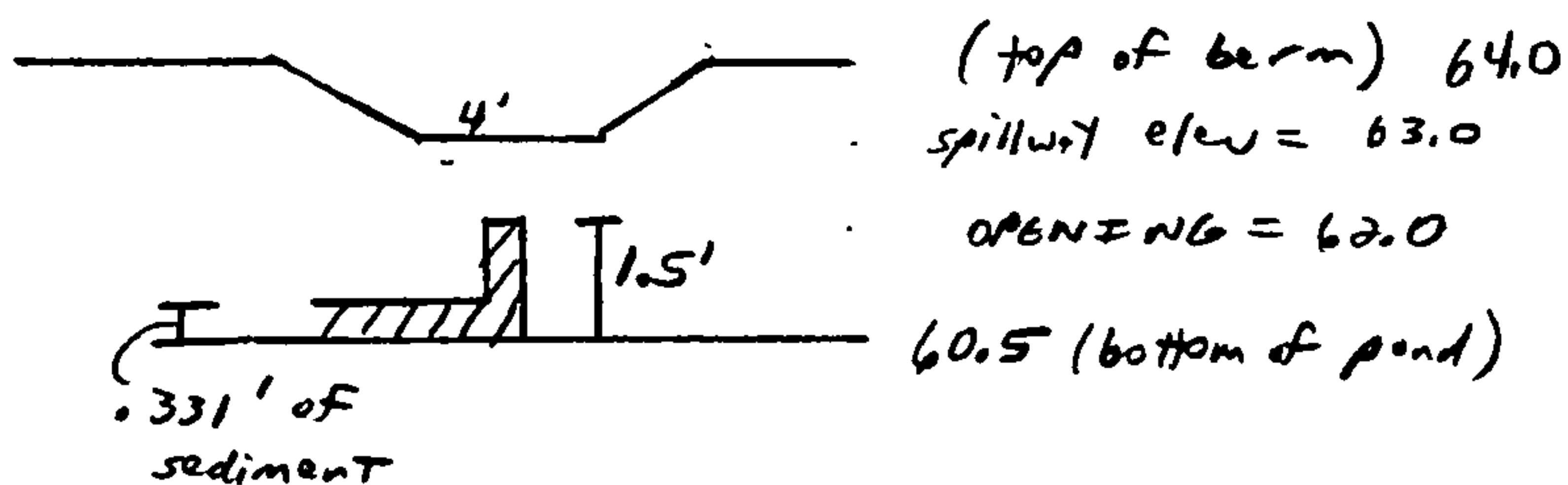
OUTLET ELEV = 60.0

INV ELEV = 60.5

OPENING ELEV = 62.0

Bottom of pond dimensions = 28' x 9'

3:1 side slopes



$$\text{Settling depth} = 1.5' - .331' = 1.17'$$

$$\text{Freeboard} = 64.0 - (62.0 + .454') = 1.5'$$

calculate width of spillway to pass 100 yr event

$$Q_{100} = 3.1 \text{ cfs}$$

$$\text{Weir} \Rightarrow Q = CLH^{3/2} \quad C = 2.68$$

$$3.1 = 2.68(4')(H)^{3/2}$$

$$H = .437 \text{ ft}$$

$$\text{Freeboard} = 1.0 - .437 = .56 \text{ ft}$$



BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 2 OF 4
 PROJECT NO. _____ BY CM DATE 1/29/96
 SUBJECT _____ CH'D _____ DATE _____

HYDROLOGIC BASIN SUMMARY DATA											
DATE: JANUARY 15, 1996											
EXISTING CONDITIONS INTERIM *											
2 YEAR, 6 HOUR EVENT											
			COMPOSITE				RATIONAL				
			% LAND				METHOD	RATIONAL	COMPOSITE	RATIONAL	
BASIN	AREA	R/W	TREATMENT				PEAK	METHOD	EXCESS	METHOD	
ID	(ACRES)	STREETS	A	B	C	D	DISCHARGE	RUNOFF	PRECIP.	6-HR VOLUME	
							CI(cfs/ac)	Q-10(cfs)	E	V-10(ac-ft)	
ONSITE FLOW											
A1	1.188	50.00	0.00	50.00	50.00	0.00	0.69	0.8	0.19	0.02	
A2	0.938		0.00	50.00	50.00	0.00	0.69	0.6	0.19	0.01	
A3	1.016		0.00	50.00	50.00	0.00	0.69	0.7	0.19	0.02	UNDEVELOPED PORTION
B1	0.565	46.00	0.00	50.00	50.00	0.00	0.69	0.4	0.19	0.01	DURING PHASED
B2	0.828		0.00	50.00	50.00	0.00	0.69	0.6	0.19	0.01	CONSTRUCTION
B3	1.213		0.00	50.00	50.00	0.00	0.69	0.8	0.19	0.02	Q-10(cfs) V-10(ac-ft)
B4	0.700	46.00	0.00	50.00	50.00	0.00	0.69	0.5	0.19	0.01	2 2
B5	1.615		0.00	50.00	50.00	0.00	0.69	1.1	0.19	0.03	POND B
B6	1.632		0.00	50.00	50.00	0.00	0.69	1.1	0.19	0.03	1.77 0.04
C1	0.443		0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	
C2	0.553		0.00	50.00	50.00	0.00	0.69	0.4	0.19	0.01	POND A
D1	0.416	46.00	0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	3.03 0.07
D2	0.464		0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	
D3	0.892		0.00	50.00	50.00	0.00	0.69	0.6	0.19	0.01	
D4	0.447	46.00	0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	
D5	1.162		0.00	50.00	50.00	0.00	0.69	0.8	0.19	0.02	
D6	0.963		0.00	50.00	50.00	0.00	0.69	0.7	0.19	0.02	
E1	0.193		0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
E2	0.428		0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	
F1	0.163	46.00	0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
F2	0.894		0.00	50.00	50.00	0.00	0.69	0.6	0.19	0.01	
F3	0.182	46.00	0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
F4	1.023		0.00	50.00	50.00	0.00	0.69	0.7	0.19	0.02	
F5	0.390	72.00	0.00	50.00	50.00	0.00	0.69	0.3	0.19	0.01	
IMP1	0.036		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
IMP2	0.043		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
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SUBTOTAL	18.387							12.7		0.29	
OFFSITE FLOW											
NRO	0.510		0.00	50.00	50.00	0.00	0.69	0.4	0.19	0.01	
NRO1	0.089		0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
NRO2	0.051		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
IMPO	0.083		0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
IMPO1	0.036		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
IMPO2	0.043		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
IMPO3	0.108		0.00	50.00	50.00	0.00	0.69	0.1	0.19	0.00	
SPAINO	0.015		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
SPAINO1	0.045		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
SPAINO2	0.044		0.00	50.00	50.00	0.00	0.69	0.0	0.19	0.00	
CORTO	0.878		0.00	50.00	50.00	0.00	0.69	0.6	0.19	0.01	
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SUBTOTAL	1.902							1.3		0.03	
TOTAL	20.288							14.0		0.32	
NOTE:											
RAINFALL DATA FOR 2 YEAR, 6 HOUR STORM											
DPM SECTION 22											
PEAK DISCHARGE (C*) IN cfs/ac BY LAND TREATMENTS											
			C*I(a)=	0.05							
			C*I(b)=	0.38							
			C*I(c)=	1.00							
			C*I(d)=	2.17							
EXCESS PRECIPITATION (E) IN inches BY LAND TREATMENTS											
			E(a)=	0.02							
			E(b)=	0.11							
			E(c)=	0.27							
			E(d)=	1.01							

* UNIT II GRADED BUT NOT DEVELOPED

TEMPORARY DESILTATION POND

UNIVERSAL SOIL LOSS EQUATION

DESCRIPTION	VARIABLE	UNIT	POND β	POND β
Drainage Area	DA	Sq. Mi.	0.0041	0.0069
Slope	S	Ft/Ft	0.060	0.060
Slope Angle	THETA	Radians	0.060	0.060
	L	Feet	200.000	200.000
Rainfall	R		45.000	45.000
Soil Erodability*	K		0.100	0.100
Slope Length Factor	LS		0.950	0.950
Cover*	C		0.140	0.140
Support Practice Factor	P		1.000	1.000
Sediment Yield	A	Tons/Acre	0.599	0.599
		Tons	1.556	2.633
Estimated Soil Unit Weight		Lbs/Cf	100.000	100.000
Total Annual Sediment Yield		Cy	1.153	1.951
Adjustment Factor :			3.000	3.000
(Safety Factor)			-----	-----
Adjusted Sediment Yield		Cy	3.5	5.9
		Cf	93	158

NOTES: 1. The Universal Soil Loss Equation typically underestimates the actual sediment yield by 3 times. So a factor of 3 is applied to the total annual sediment yield.