CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

January 16, 1997

Kevin Patton
Bohannan Huston
7500 Jefferson NE
Albuquerque, NM 87109

RE: *IMPERATA STREET EXTENSION SOUTH (E23-D3). ENGINEER'S CERTIFICATION FOR RELEASE OF FINANCIAL GUARANTEES. ENGINEER'S CERTIFICATION DATED JANUARY 13, 1997.*

Dear Mr. Patton:

Based on the information provided on your January 14, 1999 submittal, City Hydrology accepts the Engineer's Certification of grading and drainage for the above reference projec.

If I can be of further assistance, please feel free to contact me at 924-3984.

Singerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Terri Martin`
Andrew Garcia
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 28, 1996

Kevin Patton
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

RE: DRAINAGE REPORT FOR IMPERATA EXTENSION (E-23/D3)
RECEIVED MARCH 11, 1996 FOR WORK ORDER
ENGINEER'S STAMP DATED 3/8/96

Dear Mr. Patton:

Based on the information included in the submittal referenced above, City Hydrology accepts the Drainage Report for Work Order.

Based on the unique criteria hammered out by Dan Hogan & Michial Emery on 2-16-94 (see letter of same date), at third inlet will be required at IMP 1, IMP 2, EW 1 & EW 2. Because of the maintenance problems that the City has had with Type "D" inlets, the City requires that Type "A" inlets be installed instead of Type "D".

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
Dan Hogan
Jack Eichorn, High Desert Investment Corp, 13000 Academy Rd.. NE 87111

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

RECEIVED JAN. 12 1994

IMPERATA EXTENSION
DRAINAGE REPORT

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

January 10, 1994

BRUCE KING
GOVERNOR

COMMISSION

Joe M. Anaya
Chairman, Stanley

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

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

Peter T. Mocho, Sr.
Member, Albuquerque

Albert N. Sanchez
Member, Santa Rosa

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Member, Gallup

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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

District Four Office
P.O. Box 30
Las Vegas, N.M.
87701-0030
505-425-7527

District Five Office
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
Bohannan-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

New Mexico DRUG FREE "It's a State of Mind"

TRAMWAY CHANNEL

MANNING'S N = .0300 SLOPE = .0015

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	6.00	3	69.00	0.00			
2	18.00	0.00	4	87.00	6.00			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.2	0.2	10.3	6.7	52.3	0.7	52.2
0.4	0.4	20.9	21.4	53.5	1.0	53.4
0.6	0.6	31.7	42.2	54.8	1.3	54.6
0.8	0.8	42.7	68.4	56.1	1.6	55.8
1.0	1.0	54.0	99.5	57.3	1.8	57.0
1.2	1.2	65.5	135.4	58.6	2.1	58.2
1.4	1.4	77.3	175.8	59.9	2.3	59.4
1.6	1.6	89.3	220.5	61.1	2.5	60.6
1.8	1.8	101.5	269.5	62.4	2.7	61.8
2.0	2.0	114.0	322.5	63.6	2.8	63.0
2.2	2.2	126.7	379.7	64.9	3.0	64.2
2.4	2.4	139.7	440.9	66.2	3.2	65.4
2.6	2.6	152.9	506.1	67.4	3.3	66.6
2.8	2.8	166.3	575.2	68.7	3.5	67.8
3.0	3.0	180.0	648.3	70.0	3.6	69.0
3.2	3.2	193.9	725.3	71.2	3.7	70.2
3.4	3.4	208.1	806.2	72.5	3.9	71.4
3.6	3.6	222.5	890.9	73.8	4.0	72.6
3.8	3.8	237.1	979.6	75.0	4.1	73.8
4.0	4.0	252.0	1072.2	76.3	4.3	75.0
4.2	4.2	267.1	1168.6	77.6	4.4	76.2
4.4	4.4	282.5	1269.0	78.8	4.5	77.4
4.6	4.6	298.1	1373.3	80.1	4.6	78.6
4.8	4.8	313.9	1481.5	81.4	4.7	79.8
5.0	5.0	330.0	1593.7	82.6	4.8	81.0
5.2	5.2	346.3	1709.8	83.9	4.9	82.2
5.4	5.4	362.9	1829.9	85.2	5.0	83.4
5.6	5.6	379.7	1953.9	86.4	5.1	84.6
5.8	5.8	396.7	2082.0	87.7	5.2	85.8
6.0	6.0	414.0	2214.1	88.9	5.3	87.0

1993 ANALYSIS

→829 CFS

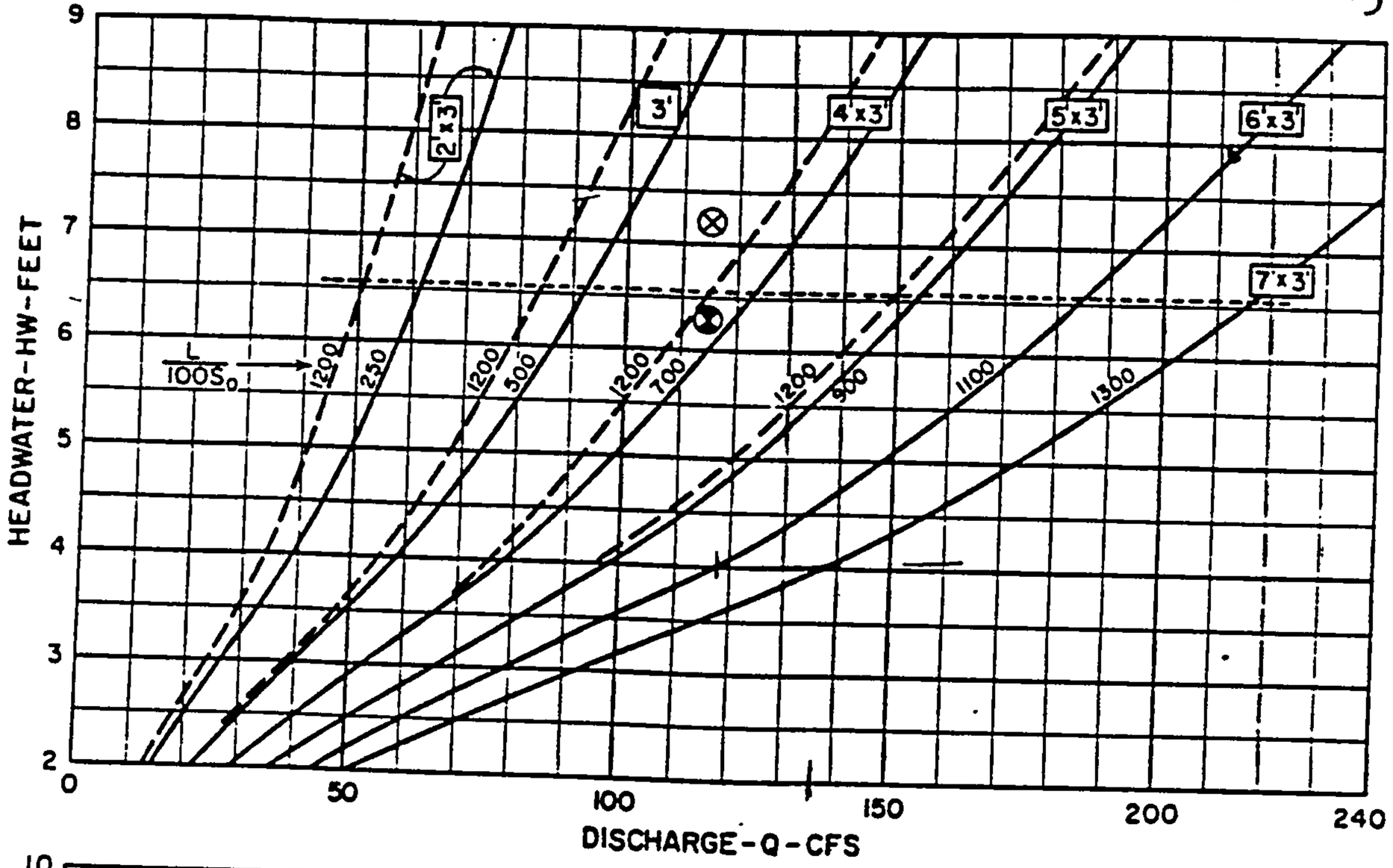
→832 CFS

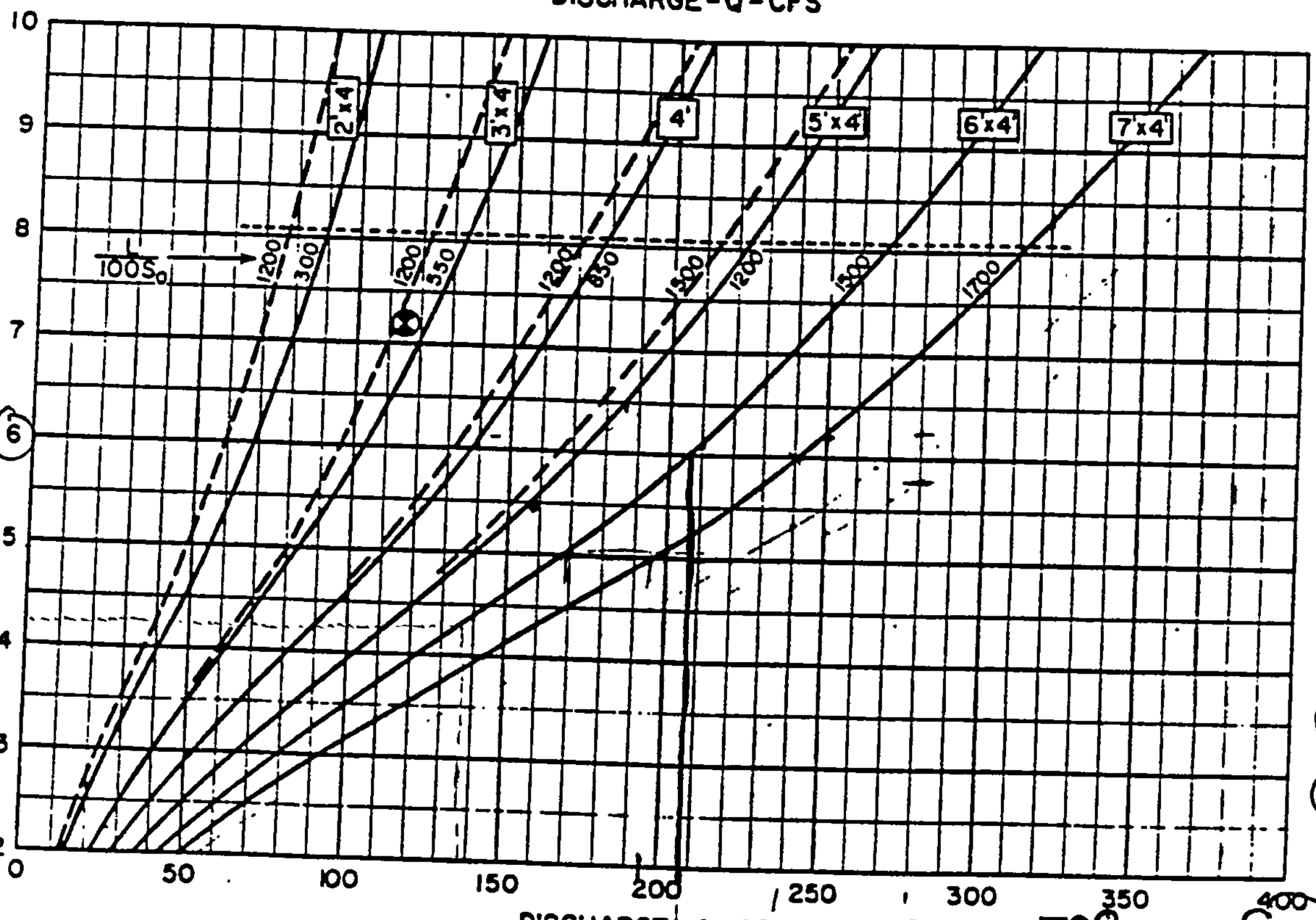
1996 ANALYSIS

$Q_{100} = 829$ cfs < 2214 cfs OK

EXISTING CROSSING STRUCTURE
4 - STORM DRAINAGE (Along Tramway Channel)
4 - 6'x4' CBC's ← THIS IS INCORRECT; THERE ARE 6-6'x4' CBC

CHART 2





TOP OF BARREL → 6'

HW → 4.25'

W/ 831.7 CFS

REVISED CAPACITY

EXAMPLE

⊗ GIVEN,
115 CFS, AHW = 7.2 FT.
L = 300 FT., S_0 = 0.003

⊗ SELECT 4' x 3'; HW = 6.3 FT.
OR 3' x 4', HW = 7.2 FT

Q_{-ew} = 203 cfs
× 4
832 cfs

Q_{100} = 208
× 6
= 1,248 CFS

CULVERT CAPACITY
RECTANGULAR CONCRETE BOX
90° AND 15° WINGWALL FLARE
3' AND 4' HEIGHTS ▯ & ▭

BUREAU OF PUBLIC ROADS JAN. 1963

10-26

Existing South Crossing
= 832 cfs

EXISTING CROSS-STRUCTURE AT SPAIN TRAMWAY

THERE ARE SIX (6) CBC @ SPAIN ROAD

SPAIN CBC CROSSING STRUCTURE 6 ~~4~~-6"X4' CBC'S

MANNING'S N = .0150 SLOPE = .0055

POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	4.00	3	6.00	0.00
2	0.00	0.00	4	6.00	4.00

	WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
	0.2	0.2	1.2	2.9	6.4	2.4	6.0
	0.4	0.4	2.4	8.8	6.8	3.7	6.0
	0.6	0.6	3.6	16.7	7.2	4.6	6.0
	0.8	0.8	4.8	26.0	7.6	5.4	6.0
	1.0	1.0	6.0	36.4	8.0	6.1	6.0
	1.2	1.2	7.2	47.7	8.4	6.6	6.0
	1.4	1.4	8.4	59.8	8.8	7.1	6.0
	1.6	1.6	9.6	72.6	9.2	7.6	6.0
	1.8	1.8	10.8	85.8	9.6	7.9	6.0
	2.0	2.0	12.0	99.6	10.0	8.3	6.0
	2.2	2.2	13.2	113.7	10.4	8.6	6.0
	2.4	2.4	14.4	128.2	10.8	8.9	6.0
	2.6	2.6	15.6	142.9	11.2	9.2	6.0
	2.8	2.8	16.8	158.0	11.6	9.4	6.0
	3.0	3.0	18.0	173.3	12.0	9.6	6.0
	3.2	3.2	19.2	188.8	12.4	9.8	6.0
⇒	3.4	3.4	20.4	204.5	12.8	10.0	6.0
	3.6	3.6	21.6	220.4	13.2	10.2	6.0
	3.8	3.8	22.8	236.4	13.6	10.4	6.0
	4.0	4.0	24.0	252.6	14.0	10.5	6.0

EXISTING CAPACITY BASED ON MANNING'S EQUATION USE $Y_n = 3.6$ FEET TO AVOID PRESSURE FLOW

CAPACITY = 220 x 4 = 880 CFS

Q_{100} = 831.7 CFS < 880 CFS OK

REVISED CAPACITY = 220 x 6 = 1,320 CFS
(Q_{100})

831.7 CFS < 1,320 CFS OK

TRAMWAY CHANNEL

MANNING'S N = .0300 SLOPE = .0015

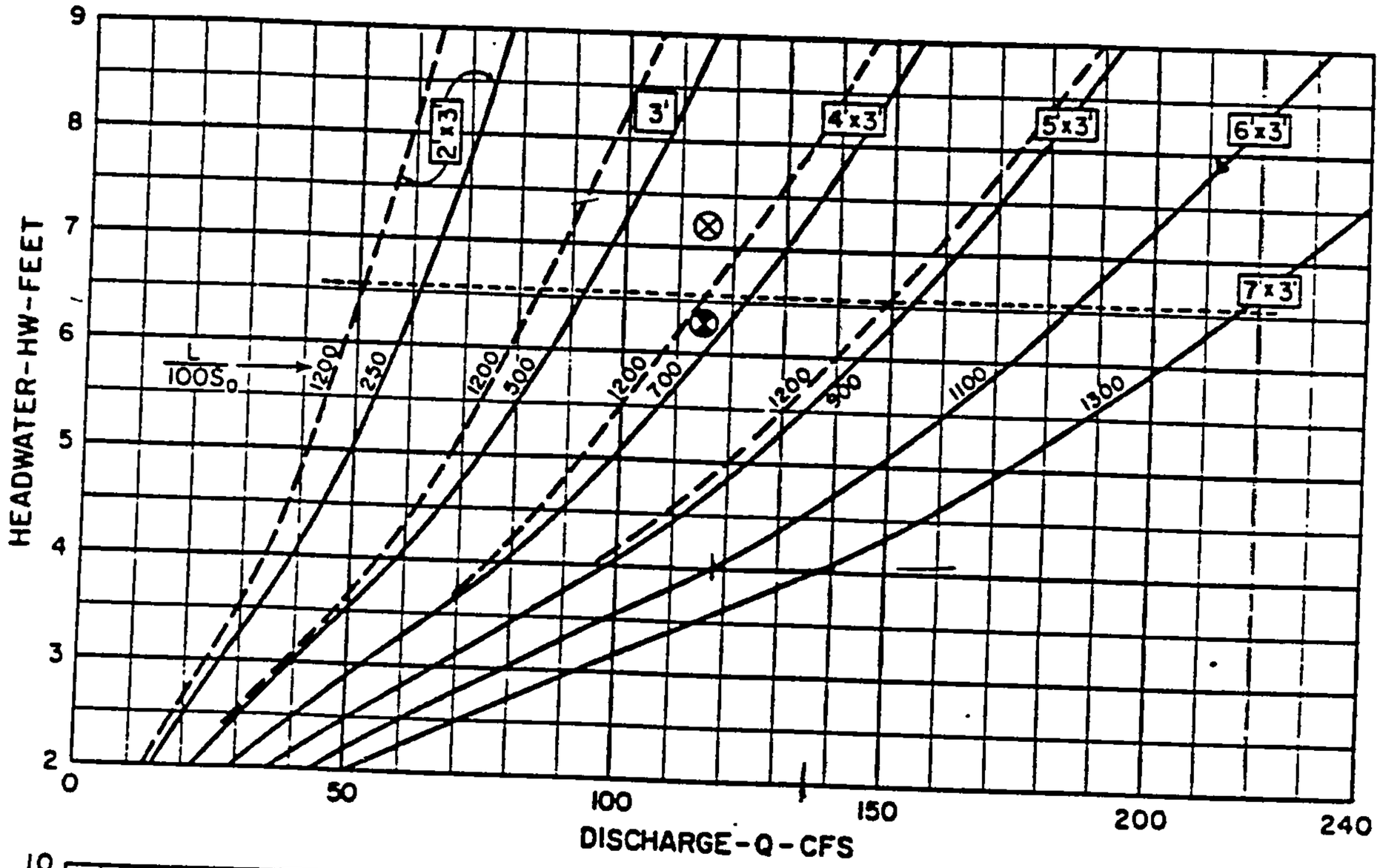
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	6.00	3	69.00	0.00			
2	18.00	0.00	4	87.00	6.00			

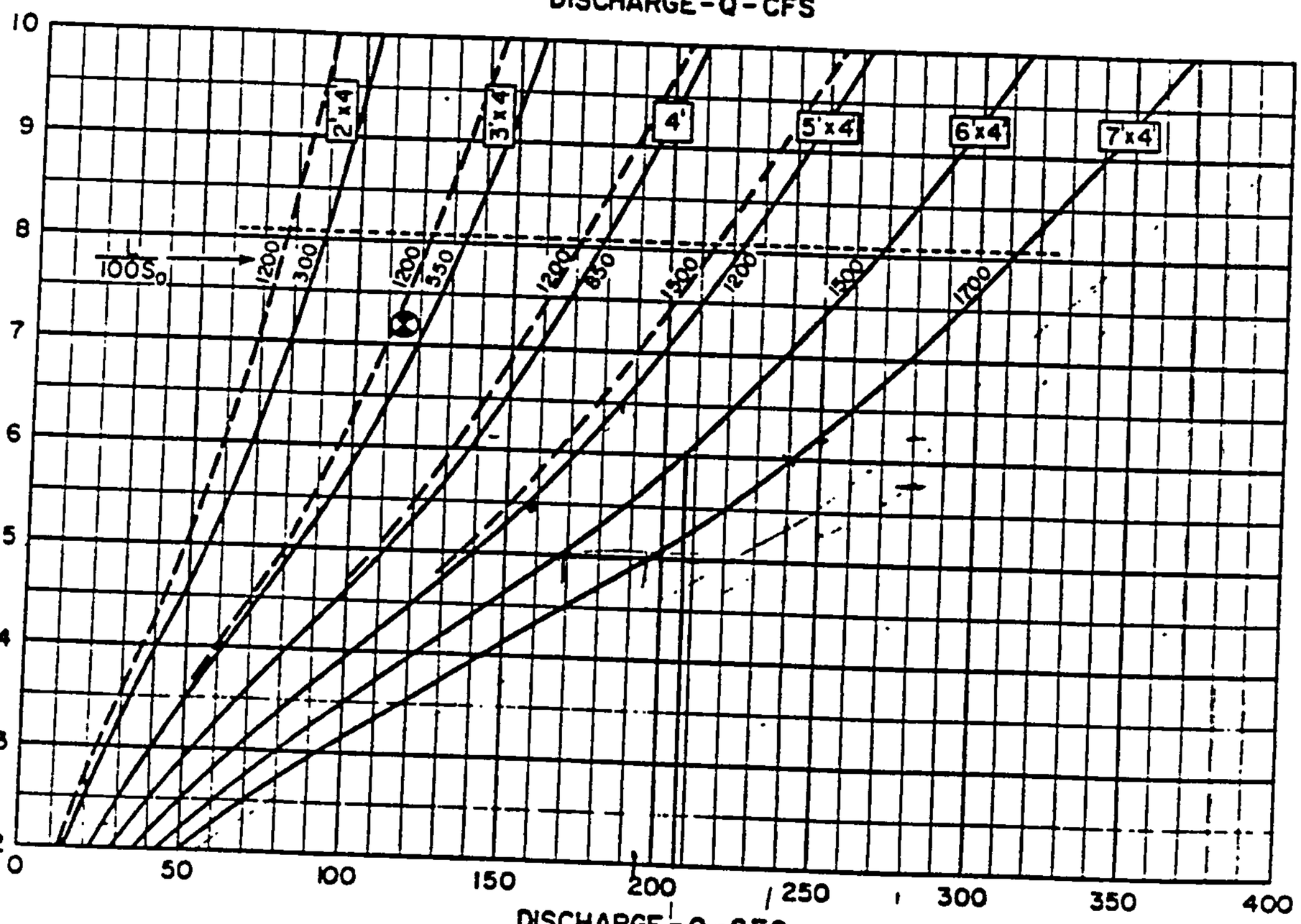
WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.2	0.2	10.3	6.7	52.3	0.7	52.2
0.4	0.4	20.9	21.4	53.5	1.0	53.4
0.6	0.6	31.7	42.2	54.8	1.3	54.6
0.8	0.8	42.7	68.4	56.1	1.6	55.8
1.0	1.0	54.0	99.5	57.3	1.8	57.0
1.2	1.2	65.5	135.4	58.6	2.1	58.2
1.4	1.4	77.3	175.8	59.9	2.3	59.4
1.6	1.6	89.3	220.5	61.1	2.5	60.6
1.8	1.8	101.5	269.5	62.4	2.7	61.8
2.0	2.0	114.0	322.5	63.6	2.8	63.0
2.2	2.2	126.7	379.7	64.9	3.0	64.2
2.4	2.4	139.7	440.9	66.2	3.2	65.4
2.6	2.6	152.9	506.1	67.4	3.3	66.6
2.8	2.8	166.3	575.2	68.7	3.5	67.8
3.0	3.0	180.0	648.3	70.0	3.6	69.0
3.2	3.2	193.9	725.3	71.2	3.7	70.2
3.4	3.4	208.1	806.2	72.5	3.9	71.4
3.6	3.6	222.5	890.9	73.8	4.0	72.6
3.8	3.8	237.1	979.6	75.0	4.1	73.8
4.0	4.0	252.0	1072.2	76.3	4.3	75.0
4.2	4.2	267.1	1168.6	77.6	4.4	76.2
4.4	4.4	282.5	1269.0	78.8	4.5	77.4
4.6	4.6	298.1	1373.3	80.1	4.6	78.6
4.8	4.8	313.9	1481.5	81.4	4.7	79.8
5.0	5.0	330.0	1593.7	82.6	4.8	81.0
5.2	5.2	346.3	1709.8	83.9	4.9	82.2
5.4	5.4	362.9	1829.9	85.2	5.0	83.4
5.6	5.6	379.7	1953.9	86.4	5.1	84.6
5.8	5.8	396.7	2082.0	87.7	5.2	85.8
6.0	6.0	414.0	2214.1	88.9	5.3	87.0

$Q_{100} = 830\ cfs$

EXISTING CROSSING STRUCTURE
4 - STEEL TRAMWAY (Along Tramway Channel)
4 - 6'x4' CBC's

CHART 2





EXAMPLE

⊗ GIVEN,
115 CFS, AHW = 7.2 FT.
L = 300 FT., S_0 = 0.003

⊗ SELECT 4' x 3'; HW = 6.3 FT.
OR 3' x 4', HW = 7.2 FT

Q_{in} = 20.3 cfs
x 4
83.2 cfs

CULVERT CAPACITY
RECTANGULAR CONCRETE BOX
90° AND 15° WINGWALL FLARE
3' AND 4' HEIGHTS ▯ & ▭

BUREAU OF PUBLIC ROADS JAN. 1963

10-26

Existing Culvert, Assumed as Rectangular
= 83.2 cfs

EXISTING CROSSING STRUCTURE
AT SPAIN TRAILWAY

SPAIN CBC CROSSING STRUCTURE 4-6"X4' CBC'S

MANNING'S N = .0150 SLOPE = .0055

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	4.00	3	6.00	0.00			
2	0.00	0.00	4	6.00	4.00			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.2	0.2	1.2	2.9	6.4	2.4	6.0
0.4	0.4	2.4	8.8	6.8	3.7	6.0
0.6	0.6	3.6	16.7	7.2	4.6	6.0
0.8	0.8	4.8	26.0	7.6	5.4	6.0
1.0	1.0	6.0	36.4	8.0	6.1	6.0
1.2	1.2	7.2	47.7	8.4	6.6	6.0
1.4	1.4	8.4	59.8	8.8	7.1	6.0
1.6	1.6	9.6	72.6	9.2	7.6	6.0
1.8	1.8	10.8	85.8	9.6	7.9	6.0
2.0	2.0	12.0	99.6	10.0	8.3	6.0
2.2	2.2	13.2	113.7	10.4	8.6	6.0
2.4	2.4	14.4	128.2	10.8	8.9	6.0
2.6	2.6	15.6	142.9	11.2	9.2	6.0
2.8	2.8	16.8	158.0	11.6	9.4	6.0
3.0	3.0	18.0	173.3	12.0	9.6	6.0
3.2	3.2	19.2	188.8	12.4	9.8	6.0
⇒ 3.4	3.4	20.4	204.5	12.8	10.0	6.0
3.6	3.6	21.6	220.4	13.2	10.2	6.0
3.8	3.8	22.8	236.4	13.6	10.4	6.0
4.0	4.0	24.0	252.6	14.0	10.5	6.0

Existing Culvert Sized for Maintenance Crossing
Use $Y_n = 3.6$ but 4' to avoid pressure flow

Capacity = 220 x 4 = 880 cfs

Q_{100} = 827 < 880 cfs OK

FHWA Region No.	STATE	NMP	SHEET NO.	TOTAL SHEETS
6	NEW MEXICO	SP(M)4057 (200)	3-90	

SCALE: HORIZ. 1"=50'
VERT. 1"=10'

MATCH LINE STA 265+00

MATCH LINE STA 278+00

TRAMWAY BLVD.

ACCESS CONTROL

EXIST R/W

SLOPE LIMITS

Tramway Blvd ℄ Sta 262+25.79, 91.5 Lt. Begin Soil Cement Berm & Cutoff Wall Elev = 5954.00

Contractor To Remove Metal Barrier & Existing 8" ℄ Fence

Existing Metal Barrier @ Arroyo

Tramway Blvd ℄ Sta 266+93.31, 91.5 Lt. Begin Soil Cement ℄ Cutoff Wall Elev = 5953.00

Tramway Blvd ℄ Sta 270+04.34.2 Lt. End Soil Cement Behind Cutoff Wall Elev = 5954.00

Soil Cement

Curve ②

N 32°19'E

PEDESTRIAN PATH

ARROYO

BEAR CANYON

Sta 266+93 Begin Forest Type Fence

NEW R/W

Build Forest Type Fence

Build B.W. Fence (Forest Type)

Build 3W Fence (Forest Type)

Backfill to 60' of Stilling Basin

Limits of New Concrete Pavement

Limits of New Concrete

CMP

CONC HEADWALL

N 0°00'43" E

N 2°00'43" E

STA 275+74.79 BEGIN TAPER 20:1 TAPER

STA 276+87 BEGIN C1B TYPE

STA 275+76.55 BEGIN TAPER 20:1 TAPER

Exist Transmission Lines to be Relocated by Others

10' PNM & TELE EASEMENT

12" HPG

Soil Cement Slope from 3:1 at 3+96.47 to 3:1 on Sta. 267+25.8 Detail 'A' Sheet E-38 for Cement

℄ Bike Path Curve Data
Curve ②
Δ 58°37'36"
L 43.82'
T 24.04'
R 42.82'
D 133.794°

EQUATION: STA 267+50.37 ℄ BIKE PATH = STA 267+39.97 ℄ TRAMWAY BLVD
EQUATION: STA 267+39.97 ℄ TRAMWAY BLVD = STA 267+62.79 ℄ BIKE PATH

℄ BIKE PATH

Sta 270+04 Beg Soil Cement Berm & Cutoff Wall Elev 5954.00

Exist Channel Bottom

HGL

Sta 270+04 Beg Soil Cement Berm & Cutoff Wall Elev 5954.00

+19.40 Begin Inlet Structure & Wingwalls
FE 60.38 ↑ 10 Above Exist Structure

+103.15 Begin 4:1 Slope to Exist Channel

+119.35 End Wingwalls & Inlet Structure
FE 63.13 Begin Grouted Rip Rap

+123 Existing Concrete Sill End Removal of Exist Structure

Existing Drop Structure

+119.40 Begin Inlet Structure & Wingwalls
FE 60.38 ↑ 10 Above Exist Structure

+103.15 Begin 4:1 Slope to Exist Channel

+119.35 End Wingwalls & Inlet Structure
FE 63.13 Begin Grouted Rip Rap

+123 Existing Concrete Sill End Removal of Exist Structure

+37.21 Begin 3:1 Stone Slope & Transition To 75' Bottom Width

+111.84 End Transition to 61' Bottom Width FE 33.30

+27.01 Begin Construction of Two Courses of 5' Blocks on Chute Walls End Removal of Exist. Structure FE 38.91

+11.84 Begin Stone Paved To Stilling Basin FE = 35.76

+26.36 Begin Stilling Basin & Drop Structure FE 28.78

+37.21 Begin 3:1 Stone Slope & Transition To 75' Bottom Width FE 28.78

+111.84 End Transition to 61' Bottom Width FE 33.30

+27.01 Begin Construction of Two Courses of 5' Blocks on Chute Walls End Removal of Exist. Structure FE 38.91

+11.84 Begin Conc Lined Chute Class 'B' 18" Thk (d'=14") Class 'B' Conc Thk Match Exist Channel FE = 35.76

+19.40 Begin Inlet Structure & Wingwalls FE = 35.43

Begin Grouted Rip Rap & Remove Exist Slope

EQUATION: STA 115+00 DIVERSION CHANNEL = STA 261+16.73 TRAMWAY BLVD.

Existing Slump Block Wall

Tramway Channel

Exist Ground

New Channel

SURVEY ℄

167.89'

Varies 18' Varies (25' to 60')

TYPICAL CHANNEL SECTION (SOUTH OF SPAIN)

Scale: 20' Hz. 1" = 5' Vt.

SOIL CEMENT & DIVERSION CHANNEL

5970 5965 5960 5955 5950 5945 5940 5935 5930

235 6 7 8 9 270+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00

FHWA Project No.	STATE	NMP	SHEET NO	TOTAL SHEETS
6	NEW MEXICO	SP(M)4067 (200)	3-41	

SCALE: HORIZ. 1"=50'
VERT. 1"=10'

MATCH LINE STA. 12+00

MATCH LINE STA. 23+00

CME

Remove Exist. Dumped Riprap

Remove Exist. Grouted Riprap

New Grouted Riprap to Elev. 72.0

ACCESS CONTROL

EXIST. R/W

SPAIN RD.

C.R. Sta. 280+85.24

C.R. Sta. 280+53.24

STA. 278+13.24 BEGIN C18 TYPE B END TAPER

Sta. 280+60.49

THAMWAY BLVD.

N 0°00'39"E

Sta 281+66.97

C.R. Sta. 281+82.21

STA. 278+18.24 BEGIN C18 TYPE B END TAPER

C.R. Sta. 280+32.21

END ACCESS CONTROL

BEGIN ACCESS CONTROL

C.R. Sta. 281+30.21

END ACCESS CONTROL

C.R. Sta. 281+30.22

SLOPE LIMITS

EXIST. R/W

426,250

10' PNM TELE EASEMENT

6' EXIST. R/W

END ACCESS CONTROL

NEW R/W

BEGIN ACCESS CONTROL

EQUESTRIAN PATH

12" HPG

Remove Exist. Grouted Riprap

New Grouted Riprap to Elev. 72.5

N 00°00'39" E

SLOPE LIMITS

STA. 281+16.73 ℄ THAMWAY BLVD.

STA. 50+00.00 ℄ SPAIN RD.

EXIST. R/W

C.R. Sta. 281+51.73

C.R. Sta. 281+83.29

STA. 284+25.25 END C18 TYPE B

5' x 3' Conc. Cutoff Wall

6" x 3' Conc. Cutoff Wall

51' Wide Channel Bottom

ACCESS CONTROL

STA. 282+03.25 END TAPER

STA. 282+08.97 END C18 TYPE A

STA. 284+21.21 END C18 TYPE B BEGIN TAPER

BEGIN ACCESS CONTROL

ACCESS CONTROL

SLOPE LIMITS

BICYCLE/PEDESTRIAN PATH

STA. 282+67.21 END TAPER

PC. STA. 288+07.56

EXIST. R/W

EOD NEW R/W

EXIST. R/W

12" HPG

10' PNM TELE EASEMENT

EQUESTRIAN PATH

EXIST. R/W

Existing Ground @ East Wall

New Top of Channel

HGL

Remove Existing Grouted Riprap

Remove Existing Dumped Riprap

Existing Double 6'x4' CBC (to Remain) w/Wingwalls (Wingwalls to be Removed)

HGL (Q = 800 cfs)

Existing Channel Bottom

New Channel Bottom

Remove Existing Grouted Riprap

Wire-Enclosed Riprap

6" Base Course I-8

S = 0.0055 Ft/Ft

S = 0.0030 Ft/Ft

S = 0.0015 Ft/Ft

Below Flowline Excavation

6' Wide Grouted Riprap

CBC w/Wingwalls

Remove Existing Wingwalls

Sloping Channel Regrading

Concrete: 3616 cu yds

Rebar: 369 lbs

End 2-Double 6'x4' CBC w/Wingwalls

Remove Exist. Wingwalls

Sloping Channel Regrading

Concrete: 2937 cu yds

Rebar: 203 lbs

End Grouted Riprap

12" Reinf. Conc. Class A

End 12" Reinf. Conc. Class A Wire Enclosed Riprap

Base Course I-8

Tramway Channel

Existing Ground

Tie to Exist Ground at R/W

New Channel

43.50'

51'

25.50'

25.50'

TYPICAL CHANNEL SECTION (NORTH OF SPAIN)

Scale: 1" = 20' Hz
1" = 5' Vt.

CONCRETE CULVERT

STA. 291+80

BUILD 1-60" x 249' RCP CLASS III (SKEW 15° RT FWD) W/END SECTION LT. & EROSION CONTROL LT.
BUILD MDI TYPE III ON ℄ NOR. H = 2.75' CONNECT MDI # 60" W/1-24" x 10' RCP CLASS III
STA. 292+00
BUILD MDI TYPE III 77' RT NOR H = 2.75' CONNECT MDI # 60" W/1-24" x 3' RCP CLASS III
BUILD 74 60" x 38' RCP CLASS III (SKEW 15° RT FWD) CONNECT TO 60" x 22' RCP @ 292+00 W/END SECTION RT & W/ DESILTING BASIN RT. (W=15', L=15' SER. E-K-71, EC-G1, ES-1, MDI-1 (SHTS. 1 & 2), BRR-001.

STA. 286+00

BUILD 4-60" x 258' RCP CLASS III NOR. W/CONC. SLOPE BLANKET LT & RIPRAP LT. W/O SAFETY GRATE (AS SHOWN ON SHT 2-G5) AND W/HEADWALL & DESILTING BASIN RT (SEE DETAIL SHT 2-G5)
BUILD MDI TYPE III ON ℄ NOR. AT STA. 286+05 H = 2.75'
CONNECT MDI # 60" W/1-24" x 6' RCP CLASS III
SEE BRR-001, M-1G-71, EC-G1, M-1-G1, MDI-1 (SHTS. 1 & 2) & MSHD DRAWING 027 (SHTS. 1 & 2) FOR MODIFIED CONC. BLANKETS.

STA. 282+00

BUILD CDI TYPE II 34.79' LT NOR. H = 11.28 (FOR TYPE-B CURB)
BUILD 1-24" x 78' RCP CLASS III LT. NOR. W/END SECTION & EROSION CONTROL PAD LT.
CONNECT TO CDI LT.
BUILD CDI TYPE II 10.73' RT NOR H = 9.58 (FOR TYPE-A CURB)
CONNECT CDI LT & CDI-RT W/1-24" x 64' RCP CLASS III NOR.
SER. ES-1, M-1G-71, BDIC-003, BDIC-004, BDIC-001, BDIC-002, EC-G1, BRR-001.

STA. 281+35.00

BUILD 1-22" x 200' STEEL PIPE CASEMENT 20' LT TO 100' RT

NOTE: Shown location of existing utilities is approximate.

SCALE:
HORIZ. 1" = 10'
VERT. 1" = 10'

City of Albuquerque

P. O. BOX 1293 ALBUQUERQUE. NEW MEXICO 87103
PUBLIC WORKS DEPARTMENT

December 27, 1996

CERTIFICATE OF WORK ORDER COMPLETION

High Desert Corporation
13000 Academy Blvd. NE
Albuquerque. NM 87111

RE: HIGH DESERT - IMPERATA STREET EXTENSION SOUTH
PROJECT NO. 4809.96, MAP NO. (F-23)

Dear Sir:

This is to certify that the City of Albuquerque accepts Project No. 4809.96 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion and acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- Construction of utilities (sanitary sewer, water and storm sewer) and street related work (curb & gutter, paving and grading) on Imperata Streeet from Spain Road to Golden Aster and on Golden Aster from Imperata Street to Cortaderia Street as shown on sheets 1 thru 10 of the City approved plans.

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

Sincerely,

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

CITY OF
Albuquerque

P.O. Box 1293 Albuquerque, NM 87103

August 26, 1996

Martin J. Chávez, Mayor

Kevin Patton
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

RE: CALCULATIONS FOR BEAR CANYON STORM DRAIN (E-23/D3)
RECEIVED AUGUST 6, 1996 FOR CHANGE ORDER
ENGINEER'S STAMP DATED 8/2/96

Dear Mr. Patton:

Based on the information included in the submittal referenced above, City Hydrology accepts the Change Order to City Project Number 4809.96 (Imperata Street Extension).

AMAFCA may limit the discharge to the Bear Canyon Arroyo to the 137 cfs approved in the HDDMP.

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

Sincerely,

John P. Curtin

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

c: Andrew Garcia
Fred Aguirre
Jack Eichorn, High Desert Investment Corp, 13000 Academy Rd NE, 87111

SUMMARY OF HYDROLOGIC DATA

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT A	B	C	D	TIME TO PEAK	DISCHARGE CFS/AC	Q (R) CFS	Q (R) FROM HDDMP
BASINS FROM HDDMMP 1993										
46	10.2	0.0159	35.0	21.0	9.8	32.2	0.1333	3.44	35	37
47	41.0	0.0641	40.0	17.7	8.0	34.3	0.1333	3.50	143	138
	51.2								178	175
OS*	-14.1	-0.0220	34.0	33.0	33.0	0.0	0.1333	2.94	-41	
	37.1								**137**	
NEW BASINS CONTRIBUTING TO PROPOSED STORM DRAIN										
ZONE 4: 49.5% LAND TREATMENT D = 5.0 DU/ACRE										
A	10.0	0.0156	0.0	25.3	25.3	49.5	0.1333	4.28	43	
B	27.1	0.0423	0.0	25.3	25.3	49.5	0.1333	4.28	116	
	37.1								**159**	

* BASINS 46 AND 47 INCLUDE 14.1 Ac OF OPEN SPACE (BASIN OS) NOT INCLUDED IN BASINS A AND B

Q_{Diff} = 159cfs - 137cfs = 22cfs more flow than in 1993 HDDMP

OR

$\frac{22cfs}{137cfs} \times 100\% = 16\%$ additional

48" at 2.6%

Sta 2+35 to
Sta 5+00

CULVERT RATING TABLE

48. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.02600

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.17915	0.75319	4.20416
4.00000	0.50017	3.29310	6.58400
6.00000	0.90662	7.71336	8.50784
8.00000	1.37665	13.98541	10.15900
10.00000	1.89666	22.02806	11.61411
12.00000	2.45673	31.72731	12.91443
14.00000	3.04898	42.94545	14.08519
16.00000	3.66675	55.52592	15.14307
18.00000	4.30421	69.29617	16.09962
20.00000	4.95605	84.06926	16.96297
22.00000	5.61729	99.64471	17.73895
24.00000	6.28318	115.80873	18.43155
26.00000	6.94907	132.33366	19.04335
28.00000	7.61031	148.97699	19.57567
30.00000	8.26215	165.47923	20.02860
32.00000	8.89961	181.56075	20.40099
34.00000	9.51738	196.91638	20.69018
36.00000	10.10963	211.20692	20.89166
38.00000	10.66970	224.04449	20.99821
40.00000	11.18971	234.96449	20.99827
42.00000	11.65974	243.36797	20.87250
44.00000	12.06619	248.37576	20.58443
46.00000	12.38721	248.30630	20.04538
48.00000	12.56637	231.61771	18.43156

Q=159cfs
D_N=2.5

48" at 7.35%

Sta 5+00 to
Sta 6+00

CULVERT RATING TABLE

48. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.07350

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.17915	1.26637	7.06865
4.00000	0.50017	5.53685	11.06997
6.00000	0.90662	12.96883	14.30462
8.00000	1.37665	23.51432	17.08078
10.00000	1.89666	37.03679	19.52734
12.00000	2.45673	53.34458	21.71361
14.00000	3.04898	72.20615	23.68207
16.00000	3.66675	93.35827	25.46074
18.00000	4.30421	116.51082	27.06902
20.00000	4.95605	141.34949	28.52062
22.00000	5.61729	167.53722	29.82530
24.00000	6.28318	194.71451	30.98981
26.00000	6.94907	222.49863	32.01846
28.00000	7.61031	250.48180	32.91346
30.00000	8.26215	278.22781	33.67500
32.00000	8.89961	305.26639	34.30111
34.00000	9.51738	331.08450	34.78735
36.00000	10.10963	355.11185	35.12611
38.00000	10.66970	376.69626	35.30524
40.00000	11.18971	395.05652	35.30534
42.00000	11.65974	409.18567	35.09388
44.00000	12.06619	417.60550	34.60954
46.00000	12.38721	417.48871	33.70321
48.00000	12.56637	389.42941	30.98982

Q=159cfs

D_N=1.83'

48" at 1.3%

Sta 6+00 to Sta 8+88

CULVERT RATING TABLE

48. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.01300

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.17915	0.53258	2.97279
4.00000	0.50017	2.32858	4.65559
6.00000	0.90662	5.45417	6.01595
8.00000	1.37665	9.88918	7.18350
10.00000	1.89666	15.57619	8.21242
12.00000	2.45673	22.43460	9.13188
14.00000	3.04898	30.36702	9.95973
16.00000	3.66675	39.26276	10.70777
18.00000	4.30421	48.99979	11.38415
20.00000	4.95605	59.44595	11.99463
22.00000	5.61729	70.45946	12.54333
24.00000	6.28318	81.88914	13.03307
26.00000	6.94907	93.57404	13.46568
28.00000	7.61031	105.34264	13.84209
30.00000	8.26215	117.01150	14.16236
32.00000	8.89961	128.38284	14.42568
34.00000	9.51738	139.24091	14.63017
36.00000	10.10963	149.34586	14.77264
38.00000	10.66970	158.42339	14.84797
40.00000	11.18971	166.14499	14.84802
42.00000	11.65974	172.08713	14.75908
44.00000	12.06619	175.62819	14.55539
46.00000	12.38721	175.57907	14.17422
48.00000	12.56637	163.77844	13.03308

Q=159 cfs → D_N=3.17'

42" at 2.5%

Sta 8+88 to
Sta 10+64 ?

CULVERT RATING TABLE

42. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.02500

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.16728	0.68828	4.11468
4.00000	0.46609	2.99731	6.43072
6.00000	0.84309	6.99069	8.29171
8.00000	1.27735	12.61750	9.87786
10.00000	1.75567	19.77656	11.26442
12.00000	2.26829	28.33487	12.49173
14.00000	2.80736	38.13589	13.58426
16.00000	3.36612	49.00388	14.55795
18.00000	3.93854	60.74624	15.42352
20.00000	4.51900	73.15448	16.18819
22.00000	5.10212	86.00440	16.85662
24.00000	5.68257	99.05515	17.43139
26.00000	6.25499	112.04708	17.91322
28.00000	6.81376	124.69815	18.30093
30.00000	7.35283	136.69731	18.59112
32.00000	7.86545	147.69327	18.77746
34.00000	8.34377	157.27325	18.84919
36.00000	8.77803	164.91852	18.78765
38.00000	9.15503	169.89226	18.55726
40.00000	9.45385	170.84343	18.07132
42.00000	9.62112	159.07790	16.53423

Q=159cfs
D_N=1.83'

36" at 3.5%

Sta 10+64 to
Sta 11+64

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.03500

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.15449	0.75020	4.85612
4.00000	0.42932	3.24935	7.56860
6.00000	0.77437	7.53447	9.72984
8.00000	1.16962	13.51341	11.55367
10.00000	1.60224	21.03589	13.12908
12.00000	2.06255	29.91392	14.50337
14.00000	2.54258	39.93057	15.70474
16.00000	3.03532	50.84427	16.75088
18.00000	3.53429	62.39054	17.65293
20.00000	4.03326	74.28155	18.41726
22.00000	4.52600	86.20393	19.04640
24.00000	5.00603	97.81360	19.53916
26.00000	5.46634	108.72597	19.89008
28.00000	5.89896	118.49719	20.08782
30.00000	6.29421	126.58421	20.11121
32.00000	6.63926	132.24483	19.91861
34.00000	6.91409	134.18745	19.40782
36.00000	7.06858	124.78120	17.65294

From Basin A
Q=43cfs
D_N=1.2

Q_{max} = 124cfs

78% of total flow

Note: This is only important if the percentage of total flow changes for either branch. It shows how much more either line could handle.

42" at 2.0%

Sta 10+64 to
Sta 11+24

CULVERT RATING TABLE

42. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.02000

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.16728	0.61562	3.68028
4.00000	0.46609	2.68088	5.75181
6.00000	0.84309	6.25267	7.41633
8.00000	1.27735	11.28543	8.83503
10.00000	1.75567	17.68869	10.07521
12.00000	2.26829	25.34348	11.17294
14.00000	2.80736	34.10978	12.15013
16.00000	3.36612	43.83041	13.02103
18.00000	3.93854	54.33308	13.79522
20.00000	4.51900	65.43135	14.47916
22.00000	5.10212	76.92467	15.07701
24.00000	5.68257	88.59762	15.59111
26.00000	6.25499	100.21796	16.02207
28.00000	6.81376	111.53341	16.36885
30.00000	7.35283	122.26579	16.62840
32.00000	7.86545	132.10088	16.79507
34.00000	8.34377	140.66946	16.85922
36.00000	8.77803	147.50760	16.80419
38.00000	9.15503	151.95624	16.59812
40.00000	9.45385	152.80701	16.16348
42.00000	9.62112	142.28360	14.78867

From Basin B
Q=116cfs
D_N=2.3

Q_{max} = 142cfs

89% of total flow

Note: This is only important if the percentage of total flow changes for either branch.

REVISED
DRAINAGE REPORT
FOR
HIGH DESERT- IMPERATA STREET EXTENSION
SOUTH OF SPAIN ROAD
MARCH 1996

Prepared by:

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

Prepared for:

HIGH DESERT INVESTMENT CORP.
13000 ACADEMY ROAD NE
ALBUQUERQUE, NM 87111

PREPARED BY:

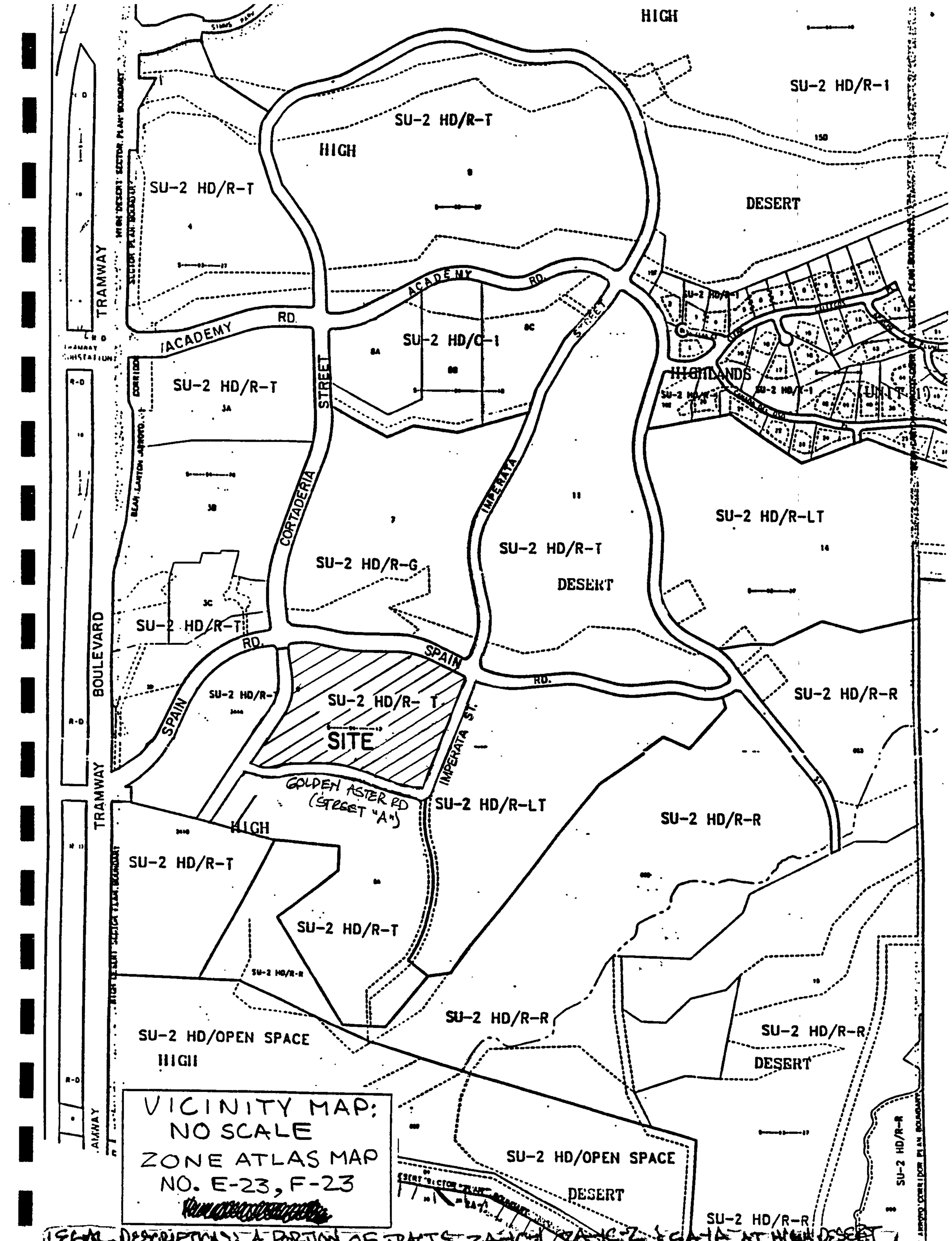
Pierce Runnels, E.I. Date

UNDER THE SUPERVISION OF:

James Topmiller, P.E. Date
3/8/96

JAMES R. TOPMILLER
NEW MEXICO
9394
REGISTERED PROFESSIONAL ENGINEER

E:\CDP\9536000\A2417\DRAING_R.RPT-3/7/96



VICINITY MAP:
NO SCALE
ZONE ATLAS MAP
NO. E-23, F-23

LEGAL DESCRIPTION: A PORTION OF TRACTS 2A-1CH / 2A-1C-2 & 2A-1A AT HUMMINGBIRD

I. PURPOSE

The purpose of this report is to present historic and proposed drainage conditions for the proposed extension of Imperata Street south of Spain Road and the proposed East/West Road connecting Imperata with Cortaderia in High Desert Subdivision, and to obtain approval of the drainage report to support the construction plans for this project. This report will also provide necessary revisions to a portion of the approved *High Desert Drainage Management Master Plan*, dated December 1993, to reflect the conditions that exist today along with the recent rezoning within Tract 2.

II. METHODOLOGIES

Site conditions are analyzed for a 10-year and 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993.

This report will reference the following City of Albuquerque approved studies prepared for the High Desert Development: 1) the *High Desert Drainage Management Master Plan*, dated December 1993, and 2) the *Final High Desert Phase 1 Hydrology and Design Drainage Report*, dated March 1994.

The *High Desert Drainage Management Master Plan*(Master Plan), dated December 1993, was prepared to support future drainage plans submitted for the development of individual land parcels within High Desert, and to provide design guidance to the installation of major drainage infrastructure to be constructed by High Desert in advance of, or simultaneously with, individual parcel development. In addition, it provides fully developed flow rates for basins that influence Tracts within the High Desert Development infrastructure.

BOHANNAN-HUSTON INC.
ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS
ALBUQUERQUE LAS CRUCES SANTA FE

Due to the re-zoning of certain parcels within Tract 2 and the necessary modifications to basin areas and treatment percentages, it was necessary to re-analyze a portion of the 1993 Master Plan. It was only necessary to re-analyze those basins (1-19) that impact the Tramway Channel located along the west side of Tramway Boulevard. The results of the modifications to the Master Plan had no significant impacts to the Tramway Channel or the original analysis performed in the 1993 report. Copies of the Hydrology and Hydraulic Summary Map and Summary Table for the Ultimate Developed Conditions are included in the plates section of this report.

The *Final High Desert Phase 1 Hydrology and Design Drainage Report*, dated March 1994 (Phase 1 report), was prepared to provide the necessary hydrologic and hydraulic information for the design of the High Desert Phase 1 infrastructure. That report provides the existing hydrology for this report and is based upon the above mentioned *High Desert Drainage Management Master Plan*. A copy of the Phase 1 Development Conditions Map is included in the plates section of this report.

Drainage reports for the adjacent subdivisions are being prepared and submitted as separate documents. In particular, the report for the area bounded by Spain Road, Cortaderia Street, Imperata Street and "Street A", referred to as Basin 15 herein, is being submitted simultaneously with this report.

III. SITE LOCATION AND CHARACTERISTICS

Please refer to the plat map enclosed with this report.

The Imperata Street Extension is a southerly continuation of the existing Imperata Street. Imperata Street is the second street east of and parallel to Tramway Boulevard, and the Extension covered by this report is located between Spain Road and the proposed east-west street between Cortaderia Street and

Imperata Street. Additionally, this project covers the construction of the proposed east-west street, which will be referred to as Street A in this report. The construction of the Imperata Street Extension and Street A affects the runoff from Drainage Basin 14, as shown on the High Desert Phase 1 Development Conditions Map. Immediately south of this project is a portion of Drainage Basin 47, as that basin is shown on the Master Plan map of Ultimate Development Conditions.

The roadway right-of-way for the Imperata Street Extension is 60 feet wide. The proposed street typical section consists of a 14.5 foot driving lane and 5.5 foot bicycle path in each direction with an 8 foot wide median. Street A has a 50 foot right of way with a 32 foot face-to-face pavement section. Both streets have a sidewalk on one side of the street. The Imperata Street roadway has been graded previously as part of the construction of the master waterline within the right-of-way.

Existing vegetation consists primarily of prairie grasses and a few juniper trees. Slopes in the project site range from 2% to 8%, with the majority of the project sloping at 5% 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.

IV. EXISTING HYDROLOGIC AND SITE DRAINAGE CONDITIONS

Please refer to the existing drainage conditions map enclosed with this report.

The existing conditions are a result of the High Desert Phase 1 Improvements and the construction of the Cortaderia Street Extension. The hydrology and hydraulic calculations supporting that construction are included in

the respective drainage reports for Phase 1 and Cortaderia Street. As shown on the Existing Drainage Conditions Map, the existing basins consist of Basin 14 and a portion of Basin 47. Basin 14, with a peak runoff of 79.9 cfs, flows into the swale and/or desiltation pond which directs it into the storm drain under Cortaderia Street.

The area to the south, a portion of Basin 47, flows to the south and west and discharges directly to the Bear Canyon Arroyo.

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.

V. MODIFICATIONS TO THE 1993 HIGH DESERT DRAINAGE MANAGEMENT MASTER PLAN

In the process of re-analyzing basins 1-19 in the approved *High Desert Drainage Management Master Plan* dated December 1993, a few insignificant errors were discovered. The errors determined were as follows: the areas of basins 15, 18 and 19 were too big; which in turn created more storm water runoff than what would have determined; the storm drain stubbed out to serve basin 14-16 is a 48" RCP instead of the 42 " indicated; analysis point 7 is a result of contributing basins 3-6 instead of basins 1-6 indicated on plate 4; analysis point 14 is a result of contributing basins 12 and 13 instead of just basin 12 indicated in the report; and there are six 4' x 6' concrete box culverts at the intersection of the Tramway Channel and Spain Road instead of the four indicated.

The modifications made to the '93 Master Plan included revising the treatment percentages to basins 4 - 7 and 10 - 19. The percentages were revised to reflect the rezoning and or the proposed development of the tracts within those

basins. The proposed development within tract 2 also required the adjustment to areas within basins 14 - 19. The modifications to the '93 Master Plan produced a maximum routed flow in the Tramway Channel north of Spain Road of 832 cfs compared to 829 determined before(in a 100 yr - 6 hr storm event). The analysis of these modifications clearly indicate that they are negligible. The results of this analysis have been included in the appendices of this report.

VI. PROPOSED (DEVELOPED) HYDROLOGIC AND HYDRAULIC CONDITIONS

Please refer to the Proposed Drainage Conditions Map enclosed with this report.

The Imperata Street Extension is divided into two new drainage basins, Imp1 and Imp2. Basin Imp1 is approximately 0.96 acres in size and is assumed to be 90% impervious for the hydraulic analyses. Basin Imp2 is approximately 0.51 acre and is also assumed to be 90% impervious. These basins generate a total of 7.5 cfs. 7.1 cfs is intercepted by four catch basins located in the new roadway and 0.4 cfs enters Street A(also referred to as E-W Street). Street A generates an additional 6.5 cfs. 7.0 cfs is intercepted by four catch basins in Street A, so that no residual flow remains. An analysis was done assuming that Imperata and Street A each received a flow of 5 cfs from the adjacent properties, and in that case, a residual flow of 1.5 cfs continued to the catch basins located in Cortaderia Street. A storm drain line is proposed for a portion of Imperata, and for the entire length of Street A.

The construction of the Imperata Extension subdivides Basin 14 into Basin 14 and Basin 15 as shown. The runoff from Basin 14 (undeveloped), 31.5 cfs, is intercepted by a sedimentation pond and discharged to the storm drain in Imperata Street. The runoff from Basin 15, 80.9 cfs, will be collected at the southwest corner of the development and discharged into the storm drain in Street A. The total runoff for the fully developed condition, carried by this 42" storm drain is 176.7 cfs as shown on the schematic drawing at the end of Appendix D. This includes the Cortaderia Street

basins. The storm drain in Street A is designed to operate under gravity flow (not full pipe) for the full length of the street.

The 42" storm drain outfalls in Basin 16 and is conveyed via an earthen swale to the existing natural channel. However, this tract is being subdivided and a drainage report will be required to cover this basis west of Cortaderia Street. Presently, the flows are combined in the natural channel where they are conveyed to the existing Ponds 5a and 5b adjacent to Spain Road. From these sedimentation ponds, the flows enter an existing 48" storm drain which goes west under Spain Road and ties into the 72" storm drain system west of Spain Road.

Phasing: The development of Imperata Street and Street A will be done in two phases. The first phase will be the installation of all of the storm drain and utilities, all of the rough grading, the paving of Street A from Cortaderia Street to the cut-off wall and the paving of Imperata Street from Spain Road to the subdivision entrance. Phase 2 will be the completion of the paving. In the interim, the unpaved portions of Imperata Street and Street A will run off of Street A and continue to flow to the arroyo to the south. The total runoff from the unpaved roadway is 6.7 cfs. The runoff from the paved portion of Imperata will flow to the sedimentation pond as shown on the attached Plate 5.

When Tract 2A-1A is developed, it will be the responsibility of the developer of that parcel to complete the 42" storm drain line between the outflow of Ponds 5a and 5b and the line running under Cortaderia Street at the location of the "Future Street."

VII. CONCLUSION

This report presents a workable drainage management plan for the proposed Imperata Street Extension construction. The plan provides safe and adequate drainage protection for the proposed development and is consistent with the previous, approved *High Desert Drainage Management Master Plan* and the *Final High Desert Phase 1*

SUMMARY OF HYDROLOGIC DATA
IMPERATA STREET EXTENSION BASINS
EXISTING CONDITIONS
100-YEAR STORM

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT A	B	C	D	TIME OF CONCENT	RATIONAL METHOD COMPOSITE C	I (IN/HR)	Q (CFS)	Q(bulked) (CFS)
14	35.20	0.0550	98.0	2.0	0.0	0.0	0.2	0.39	5.61	77.5	79.9
16	7.70	0.0120	46.0	13.1	6.6	34.3	0.2	0.61	5.61	26.5	27.3
CORT1	1.38	0.0022	0	0	0	100	0.2	0.94	5.61	7.3	7.5
CORT2	0.50	0.0008	0	20	5	75	0.2	0.84	5.61	2.4	2.4

SUMMARY OF HYDROLOGIC DATA

IMPERATA STREET EXTENSION BASINS

PROPOSED CONDITIONS

100-YEAR STORM

BASIN ID	AREA AC	AREA SQ.MI.	% LAND TREATMENT A	B	C	D	TIME OF CONCENT	RATIONAL METHOD COMPOSITE C	I (IN/HR)	Q (CFS)	Q(bulked) (CFS)
MASTER PLAN BASIN 14:	16.94	0.0265	0	31.3	31.3	37.41	0.2	0.72	5.61	68.5	69.9
14	15.47	0.0242	0.0	33.8	33.8	32.5	0.2	0.70	5.61	61.1	62.3
IMP1	0.96	0.0015	0.0	10.0	0.0	90.0	0.2	0.90	5.61	4.8	4.9
IMP2	0.51	0.0008	0.0	10.0	0.0	90.0	0.2	0.90	5.61	2.6	2.6
MASTER PLAN BASIN 15:	25.89	0.0405	0	31.3	31.3	37.41	0.2	0.72	5.61	104.7	106.8
15	20.30	0.0317	0.0	34.8	34.8	30.5	0.2	0.70	5.61	79.3	80.9
15A	2.45	0.0038	0.0	34.8	34.8	30.5	0.2	0.70	5.61	9.6	9.8
E-W ST	1.26	0.0020	0.0	10.0	0.0	90.0	0.2	0.90	5.61	6.3	6.5
CORT1	1.38	0.0022	0.0	10.0	0.0	90.0	0.2	0.90	5.61	7.0	7.1
CORT2	0.50	0.0008	0.0	20.0	5.0	75.0	0.2	0.84	5.61	2.4	2.4
MASTER PLAN BASIN 16:											
16	7.70	0.0120	46.0	13.1	6.6	34.3	0.2	0.61	5.61	26.5	27.0

B-1

LAND TREATMENTS

FOR BASINS 14 AND 15. FULLY DEVELOPED

USE: DENSITY OF 3.4 DUs/ACRE FOR BASINS 14 & 15.

$\%D = 7\sqrt{N^2+5N} = 7\sqrt{3.4^2+5(3.4)}$

$= 37.41\%$ (CONSERVATIVE)

ASSUME TYPE A IS 0%, AND REMAINDER IS SPLIT EQUALLY INTO TYPE B & TYPE C.

TREATMENT	PERCENTAGE
A	0
B	31.3
C	31.3
D	37.4

THESE PERCENTAGES ARE USED AND ARE MORE CONSERVATIVE THAN THE PERCENTAGES USED IN THE MASTER PLAN AS FOLLOWS:

BASIN	%A	%B	%C	%D
14	44.49	12.71	6.35	36.45
15	46.00	13.14	6.57	34.29

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____

PROJECT NO. ____ BY PR DATE 1/3/96

SUBJECT PROPOSED HYDROLOGY CH'D ____ DATE B-2

HIGH DESERT REPORT COMPARISIONS FOR TRACT 2

HDDMMP BASIN	Clara Vista by Goodwin & Associates	Tierra del Oso by Bohannan-Huston	Solterra by Bohannan-Huston	TOTAL Q(CFS)	Imperata Extension South Bohannan-Huston
15-N	NA	NA	85.0	85.0	82.0
16-N	31.6	NA	NA	31.6	32.5
17-N	13.7	27.6	NA	41.3	48.5
18-N	NA	19.5	NA	19.5	19.9
19-N	NA	37.2	NA	37.2	41.2

Clara Vista Subdivision
Tracts 2A-1A-1 & 2A-1A-2
Tierra del Oso Subdivision
Tract 2A-1B-1
Solterra Subdivision
Tract 2A-1C-1

The only portion of tract 2 remaining is Tract 2A-1C-2 and is located in basins 14 and portions of 46 - 47.

Tramway Channel Capacity

The capacity of the Tramway Channel west of Tramway Boulevard that discharges to the Bear Canyon Arroyo was analized in the 1993 High Desert Drainage Management Master Plan (HDDMMP) for 829 cfs. After revising the '93 HDDMMP, the runoff has increased from 829 cfs to 831.7 cfs, less than 0.3%. The '93 HDDMMP also analized the concrete box culverts in the Tramway Channel at Spain Road. The '93 HDDMMP indicated that 832 cfs could flow through four CBC's assuming a headwater depth of six feet. There are actually six culverts instead of four which will allow 1,320 cf through the CBC's instead of the 832 cfs.

	Capacity	1993 HDDMMP	1996 HDDMMP	Result
Tramway Channel	*1072 cfs	829 cfs	832 cfs	OK
CBC Capacity @ Spain Rd. & the Tramway Channel	1320 cfs	829 cfs	832 cfs	OK

*The Tramway Channel is six feet deep. The capacity is based upon 2.0' of freeboard. Therefore, the capacity of the channel at four feet deep is 1072 cfs.

1-1-8

PLATE 4
ULTIMATE DEVELOPED CONDITIONS
PER THE APPROVED HIGH DESERT DRAINAGE MANAGEMENT MASTER PLAN
DATED DECEMBER 1993

HDDMMP BASIN #	HDDMMP BASIN NAMES	AREA (SQ MI)	AREA (ACRES)	DISCHARGES TO	UNBULKED Q(100-YR) (CFS)	BULKING FACTOR (%)	BULKED Q(100-YR) (CFS)	MASTER PLAN Q (cfs)
1	NMBA-1	0.049	31.36	42" SD	80.81	10.00	88.9	88
2	NMBA-2	0.026	16.64	36" SD	53.50	10.00	58.9	59
3	NMBA-3A	0.016	10.24	54" SD	24.40	8.00	26.4	27
4	NMBA-3B	0.032	20.48	36" SD	86.95	2.00	88.7	89
5	NMBA-3C	0.017	10.88	30"SD	46.66	2.00	47.6	48
6	NMBA-3D	0.013	8.32	IMPERATA STREET	35.40	2.00	36.1	36
7	NMBA-4A	0.012	7.68	24" SD	22.95	7.00	24.6	25
8	NMBA-4B	0.009	5.76	24" SD	26.46	2.00	27.0	27
9	NMBA-4C	0.038	24.32	42" SD	111.28	2.00	113.5	114
10	NMBA-5	0.016	10.24	EXISTING 60" SD	29.46	7.00	31.5	32
11	NMBA-6	0.006	3.84	EXISTING 60" SD	11.21	10.00	12.3	13
12	NBA-1	0.042	26.88	EXISTING 60" SD	113.51	2.00	115.8	120
13	NBA-2	0.005	3.20	EXISTING 60" SD	9.34	10.00	10.3	10
14	SMBA-1	0.024	15.36		53.77	2.00	54.8	55
15	SMBA-2	0.041	26.24 (19.0)	54" SD	90.29	2.00	92.1	92
16	SMBA-3	0.012	7.68	42" SD (48" SD)	26.43	2.00	27.0	27
17	SBA-1	0.017	10.88	EXISTING 36" SD	45.43	2.00	46.3	47
18	SBA-2	0.021	13.44(6.6)	EXISTING 36" SD	56.12	2.00	57.2	28(57)
19	SBA-3	0.0107	6.85(3.1)	EXISTING 36" SD	28.60	2.00	29.2	30

EXAMPLE:

The highlighted areas indicate the errors that were found in the '93 HDDMMP.

28(57)

The items in the ( ) is what I believe the '93 HDDMMP should have produced. The items outside the ( ) is what was given in the '93 report.

ANALYSIS POINT (AP)	CONTRIBUTING BASINS	COMBINED Q (CFS)	STORM DRAIN SIZE (INCHES)	Minimum Pipe slope (%)	*Storm Drain Capacity	COMMENTS
1	1	88	30	5.5	89	Flow in storm drain below permanent proposed pond #1.
2	2	59	36	1.75	82	Flow in storm drain below permanent proposed pond #2.
3	1, 2	146	42	3.6	177	Total flow in storm dain at confluence of strom drains from ponds 1 & 2.
4	6	36	N/A	N/A	N/A	Flows from basin 6 discharge into Imperata Street.
5	6, 5	81	42	0.75	81	Flow in storm drain from basins 5 & 6.
6	6, 5, 4	166	54	0.75	158	Flow in storm drain from basins 4 - 6.
7	1 - 6 (3 - 6)	193	66	1.25	349	Total flow in storm drain from basins 3 - 6.
7A	1 - 6	340	60	2.85	408	Total flow in storm drain from basins 1 - 6.
8	8	27	24	2	30	Flow in storm drain from basin 8.
9	1 - 6, 8	366	60	4.6	519	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 6 and 8.
9A	1 - 6, 8, 14, 15	510	60	4.2	495	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 6, 8, 14 & 15.
10	7, 9	114	42	3	162	Flow in storm drain from basin 9.
11	1 - 9, 14, 15	642	66	5.2	711	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 9, 14 & 15.
12	1 - 9, 14 - 16	668	72	3.1	692	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 9 & 14 - 16.
13	AP12 ROUTED	668	two existing 60" culverts	5.2	1102	Flow in storm drain at pipe to pipe connection at east side of Tramway Blvd.
14	12 (12 &13)	126	existing 60" culvert	N/A	230	Flow at existing Tramway culvert, capacity based on allowable headwater depth.
15	17	47	existing 36" culvert	N/A	42	Flow at existing Tramway culvert, capacity based on allowable headwater depth. See plan note 5.
16	18	28	existing 36" culvert	N/A	24	Flow at existing Tramway culvert, capacity based on allowable headwater depth. See plan note 5.
17	19	30	existing 36" culvert	N/A	37	Flow at existing Tramway culvert, capacity based on allowable headwater depth. See plan note 5.

*Storm drain capacity based on non-pressurized full pipe flow, unless otherwise noted, and mannings "n" of 0.014

8-2-1

ULTIMATE DEVELOPED CONDITIONS
PER THE APPROVED HIGH DESERT DRAINAGE MANAGEMENT MASTER PLAN
DATED DECEMBER 1993

HDDMMP BASIN #	HDDMMP BASIN NAMES	AREA (SQ MI)	AREA (ACRES)	% LAND TREATMENT* A	B	C	D		PEAK DISCHARGE - (CFS/ACRE)** A	B	C	D	Q(100-YR) DEV (CFS)	BULKING FACTOR (%)	Q(100-YR) DEV (CFS)	MASTER PLAN Q (cfs)
1	NMBA-1	0.049	31.36	73.88	14.60	5.23	6.29		2.20	2.92	3.73	5.25	80.81	10.00	88.90	88.0
2	NMBA-2	0.026	16.64	58.37	6.35	7.04	28.25		2.20	2.92	3.73	5.25	53.50	10.00	58.85	58.5
3	NMBA-3A	0.016	10.24	94.00	0.00	0.00	6.00		2.20	2.92	3.73	5.25	24.40	8.00	26.35	26.4
4	NMBA-3B	0.032	20.48	0.00	35.41	11.81	52.78		2.20	2.92	3.73	5.25	86.95	2.00	88.69	88.5
5	NMBA-3C	0.017	10.88	0.00	33.90	11.30	54.80		2.20	2.92	3.73	5.25	46.66	2.00	47.59	47.5
6	NMBA-3D	0.013	8.32	0.00	35.07	11.68	53.25		2.20	2.92	3.73	5.25	35.40	2.00	36.11	36.0
7	NMBA-4A	0.012	7.68	65.00	12.00	0.00	23.00		2.20	2.92	3.73	5.25	22.95	7.00	24.55	24.5
8	NMBA-4B	0.009	5.76	0.00	22.34	8.93	68.74		2.20	2.92	3.73	5.25	26.46	2.00	26.99	27.0
9	NMBA-4C	0.038	24.32	0.00	22.80	9.15	67.97		2.20	2.92	3.73	5.25	111.28	2.00	113.50	113.7
10	NMBA-5	0.016	10.24	74.00	5.00	0.00	21.00		2.20	2.92	3.73	5.25	29.46	7.00	31.52	31.5
11	NMBA-6	0.006	3.84	0.00	100.00	0.00	0.00		2.20	2.92	3.73	5.25	11.21	10.00	12.33	12.3
12	NBA-1	0.042	26.88	0.00	36.21	12.08	51.71		2.20	2.92	3.73	5.25	113.51	2.00	115.78	115.5
13	NBA-2	0.005	3.20	0.00	100.00	0.00	0.00		2.20	2.92	3.73	5.25	9.34	10.00	10.28	10.3
14	SMBA-1	0.024	15.36	44.49	12.71	6.35	36.45		2.20	2.92	3.73	5.25	53.77	2.00	54.84	54.6
15	SMBA-2	0.041	26.24	46.00	13.14	6.57	34.29		2.20	2.92	3.73	5.25	90.29	2.00	92.10	91.6
16	SMBA-3	0.012	7.68	46.00	13.14	6.57	34.29		2.20	2.92	3.73	5.25	26.43	2.00	26.96	26.8
17	SBA-1	0.017	10.88	0.00	37.88	12.63	49.50		2.20	2.92	3.73	5.25	45.43	2.00	46.34	46.2
18	SBA-2	0.021	13.44	0.00	37.88	12.63	49.50		2.20	2.92	3.73	5.25	56.12	2.00	57.25	57.1
19	SBA-3	0.0107	6.85	0.00	37.88	12.63	49.50		2.20	2.92	3.73	5.25	28.60	2.00	29.17	30.0
TOTAL															988.1	986.0

NOTES:
Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993 * Table A-4 ** Table A-9

B-2-2

ULTIMATE DEVELOPED CONDITIONS
PER THE REVISED HIGH DESERT DRAINAGE MANAGEMENT MASTER PLAN to
THOSE BASINS (1-19) THAT OUTFALL TO THE TRAMWAY CHANNEL AND THEN JOHN ROBERTS DAM HAVE BEEN REVISED
MARCH 1996

HDDMMP BASIN	HDDMMP BASIN NAMES	AREA (SQ MI)	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	EST. DNSTY (DU/AC)	PEAK DISCHARGE - (CFS/ACRE)** A	B	C	D	REVISED Q(100-YR) DEVELOPED (CFS)	BULKING FACTOR (%)	REVISED Q(100-YR) DEVELOPED BULKED(CFS)	Dec. 1993 MASTER PLAN Q (cfs)
1	NMBA-1	0.049	31.36	73.88	14.60	5.23	6.29		2.20	2.92	3.73	5.25	80.81	10.00	88.9	88.0
2	NMBA-2	0.026	16.64	58.37	6.35	7.04	28.25		2.20	2.92	3.73	5.25	53.50	10.00	58.9	58.5
3	NMBA-3A	0.016	10.24	94.00	0.00	0.00	6.00	NA	2.20	2.92	3.73	5.25	24.40	8.00	26.4	26.4
4	NMBA-3B	0.032	20.48	0.00	32.85	32.85	34.29	3.0	2.20	2.92	3.73	5.25	81.62	2.00	83.2	88.5
5	NMBA-3C	0.017	10.88	0.00	32.85	32.85	34.29	3.0	2.20	2.92	3.73	5.25	43.36	2.00	44.2	47.5
6	NMBA-3D	0.013	8.32	0.00	32.85	32.85	34.29	3.0	2.20	2.92	3.73	5.25	33.16	2.00	33.8	36.0
7	NMBA-4A	0.012	7.68	80.00	0.00	0.00	20.00	NA	2.20	2.92	3.73	5.25	21.58	7.00	23.1	24.5
8	NMBA-4B	0.009	5.76	0.00	22.34	8.93	68.74		2.20	2.92	3.73	5.25	26.46	2.00	27.0	27.0
9	NMBA-4C	0.038	24.32	0.00	22.88	9.15	67.97		2.20	2.92	3.73	5.25	111.33	2.00	113.6	113.7
10	NMBA-5	0.016	10.24	80.00	0.00	0.00	20.00		2.20	2.92	3.73	5.25	28.77	7.00	30.8	31.5
11	NMBA-6	0.006	3.84	100.00	0.00	0.00	0.00	NA	2.20	2.92	3.73	5.25	8.45	10.00	9.3	12.3
12	NBA-1	0.042	26.88	0.00	25.25	25.25	49.50	5.0	2.20	2.92	3.73	5.25	114.99	2.00	117.3	115.5
13	NBA-2	0.005	3.20	100.00	0.00	0.00	0.00	NA	2.20	2.92	3.73	5.25	7.04	10.00	7.7	10.3
14-N	SMBA-1	0.026	16.94	0.00	31.30	31.30	37.41	3.4	2.20	2.92	3.73	5.25	68.52	2.00	69.9	54.6
15-N	SMBA-2	0.040	25.89	0.00	31.30	31.30	37.41	3.4	2.20	2.92	3.73	5.25	104.73	2.00	106.8	91.6
16-N	SMBA-3	0.011	6.99	0.00	17.92	17.92	64.16	7.0	2.20	2.92	3.73	5.25	31.87	2.00	32.5	26.8
17-N	SBA-1	0.017	10.94	0.00	23.40	23.40	53.20	5.5	2.20	2.92	3.73	5.25	47.58	2.00	48.5	46.2
18-N	SBA-2	0.008	4.98	0.00	34.84	34.84	30.31	2.5	2.20	2.92	3.73	5.25	19.46	2.00	19.9	57.1
19-N	SBA-3	0.016	10.33	0.00	34.84	34.84	30.31	2.5	2.20	2.92	3.73	5.25	40.37	2.00	41.2	30.0
TOTALS															982.9	986.0

NOTES: **EXAMPLE** = Items that have been revised from the approved High Desert DMMP to better reflect the approved rezoning and the conditions existing today.
*Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993 * Table A-4 ** Table A-9
Basins 1 thur 16 all drain to the Tramway Channel via underground storm drain pipes that daylight into the channel north of Spain Rd.

Basins 17 thur 19 all drain to the Tramway Channel via underground storm drain pipes that daylight into the channel south of Spain Rd.

Basins 42 thur 51 all drain to the existing Bear Cayon Arroyo via surface runoff to the existing Tramway Bridge. No revisions were made to these basins.

THE FOLLOWING TABLE PROVIDES THE REVISED FLOW RATES AT THE SAME ANALYSIS POINTS GIVEN IN THE 1993 HDDMMP. BASINS "13B" AND "13C" WERE NOT GIVEN IN THE SUMMARY TABLE FOR THE '93 HDDMMP BUT WERE PROVIDED IN ITS AHYMO ANALYSIS. THEY ARE PROVIDED IN THIS TABLE FOR QUICKER REVIEW AND COMPARISION.

ANALYSIS POINT (AP)	CONTRIBUTING BASINS	COMBINED RUNOFF BEFORE ROUTING (CFS)	COMBINED RUNOFF AFTER ROUTING (CFS)	DESCRIPTION
1	1	88.9	88.0	Flow in storm drain below permanent proposed pond #1.
2	2	58.9	58.5	Flow in storm drain below permanent proposed pond #2.
3	1, 2	147.7	145.9	Total flow in storm dain at confluence of strom drains from ponds 1 & 2.
4	6	33.8	33.7	Flows from basin 6 discharge into Imperata Street.
5	5 & 6	78.0	75.1	Flow in storm drain from basins 5 & 6.
6	4 - 6	161.3	155.5	Flow in storm drain from basins 4 - 6.
7	3 - 6	187.6	182.2	Total flow in storm drain from basins 3 - 6.
7A	1 - 6	335.4	329.2	Total flow in storm drain from basins 1 - 6.
8	8	27.0	27.0	Flow in storm drain from basin 8.
9	1 - 6, 8	362.4	355.3	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 6 and 8.
9A	1 - 6, 8, 14 & 15	539.1	521.6	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 6, 8, 14 & 15.
10	7, 9	136.7	113.3	Flow in storm drain from basin 9.
11	1 - 9, 14 & 15	675.8	652.5	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 9, 14 & 15.
12	1 - 9, 14 - 16	708.3	688.4	Total flow in strom drain below storm drain confluence. Flow from basins 1 - 9 & 14 - 16.
13	AP12 Routed	706.4	686.2	Flow in storm drain at pipe to pipe connection at east side of Tramway Blvd.
"13B"	1 - 11 & 14 - 16	748.3	725.0	In the AHYMO analysis this is labled as "Total flow at Tramway Channel from 4-60" RCP's".
"13C"	1 - 16	873.4	831.7	In the AHYMO analysis this is labled as "Total flow at Tramway Channel at outlet of AP13".
14	12 & 13	125.0	117.2	Flow at existing tramway culvert, capacity based upon allowable headwater depth.
15	17	48 5	48.2	
16	18	19.9	26.2	
17	19	41.2	27.2	

B-3-1

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			

Roll Curb

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**	**Q(100)=5.0 CFS**
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 + $V^2/2g$ = 0.36' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

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**	**Q(100)=3.4 CFS**
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	

CURB HEIGHT = 0.33'
NORMAL DEPTH, d = 0.22'
VELOCITY, V = 1.9 FPS
TOTAL ENERGY, E = d + $V^2/2g$ = 0.28' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

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**	**Q(100) = 2.0 CFS**
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**	**Q(100) = 7.0 CFS**
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 = 0.21'
VELOCITY, V = 4.3 FPS
TOTAL ENERGY, E = d + $V^2/2g$ = 0.50' -- OK (WITHIN RIGHT-OF-WAY @ 0.66')

CATCH BASIN CALCULATION SHEET

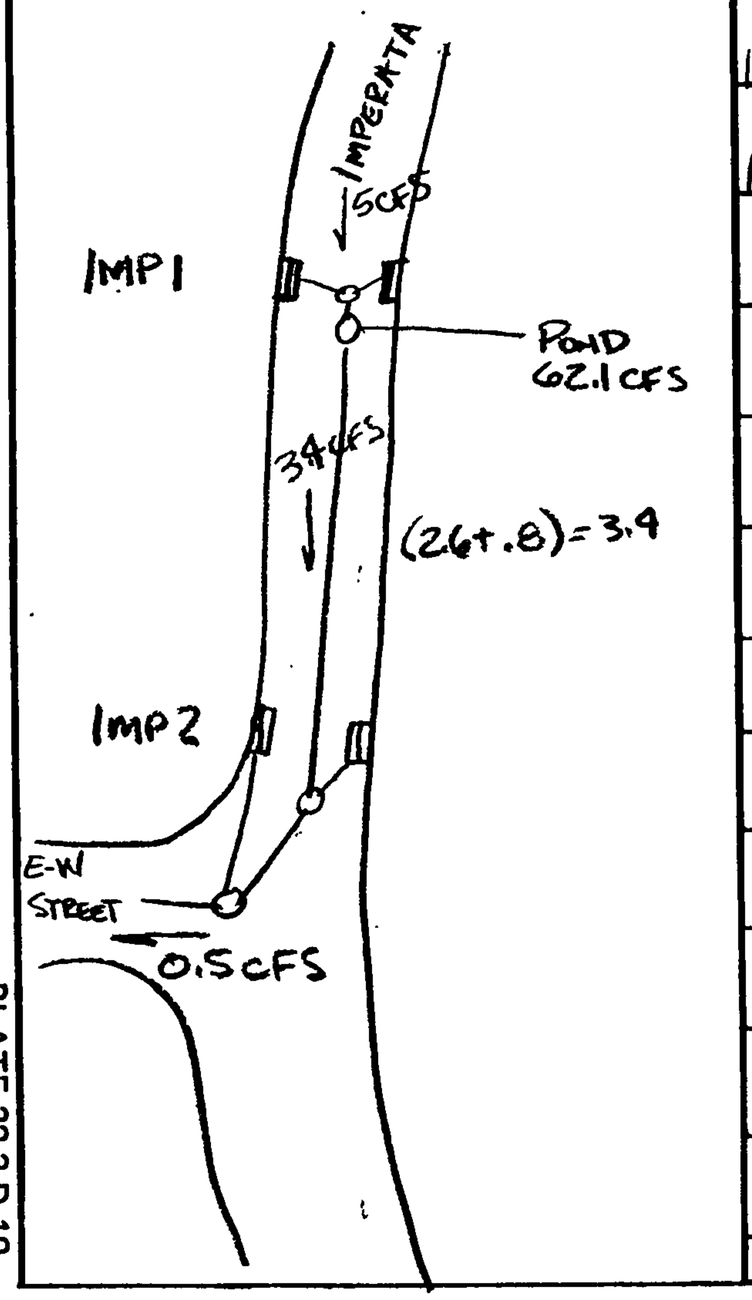
Sht___of___

PROJECT IMPERATA EXTENSION

CALCULATED BY PR

DESIGN FREQUENCY _____

DATE 3/5/96



Sym.	Drain. Area	Q Total	Q Inter.	Cap. of ½ Street	Gutter "d"	C.B. No.	C.B. Size	Connector Pipe Head	Connector Pipe L	Connector Pipe Dia.	V Depth
IMP1	IMP1	5.0	2x2.1 4.2		.21	2	"D" W/GRATE			18"	4'
IMP2	IMP2	3.4	2x1.45 2.90		.21						
		5.4	4.2	RESIDUAL FLOW =	0.5	CFS					
		1.9									

4-82

80

PLATE 22.3 D-10

D-1

22.3

CATCH BASIN CALCULATION SHEET

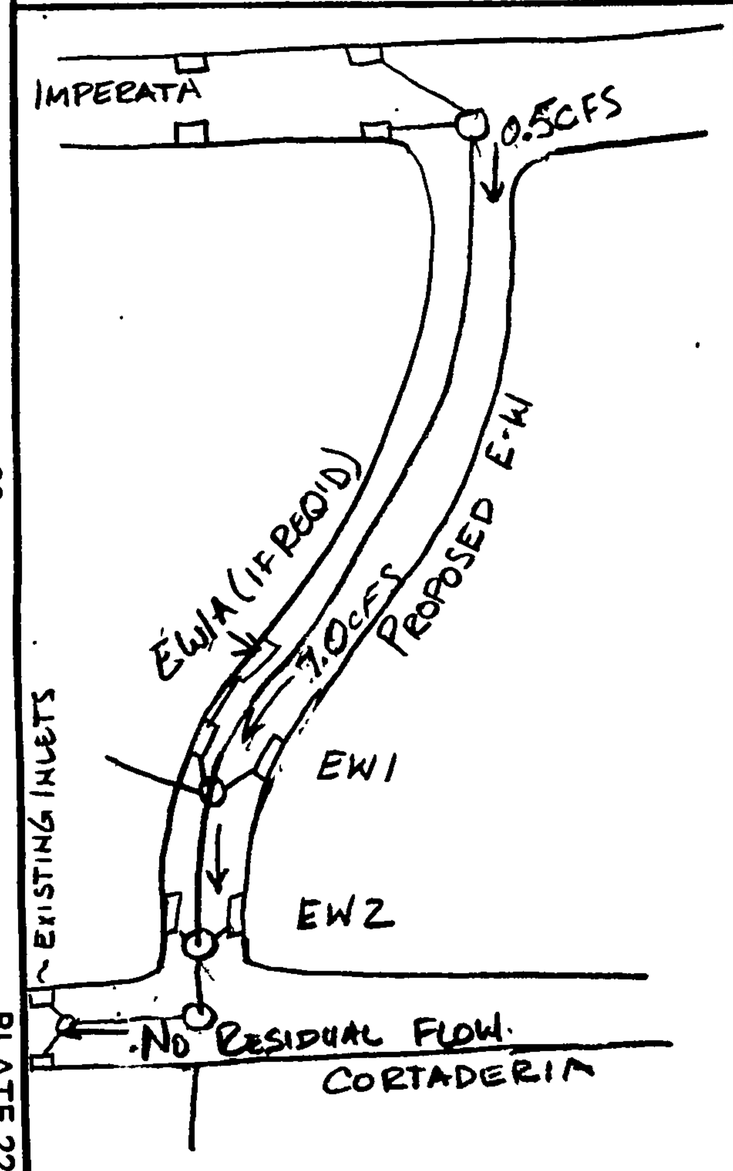
Sht___ of___

PROJECT IMPERATA EXTENSION

CALCULATED BY PR

DESIGN FREQUENCY 100-YR

DATE 12/14/95



Sym.	Drain. Area	Q Total	Q Inter.	Cap. of ½ Street	Gutter "d"	C.B. No.	C.B. Size	Connector Pipe Head	Connector Pipe L	Connector Pipe Dia.	V Depth
EW1		7.0	2x2.5 5.0		0.21	2	NEENAH D			18"	4'
EW2		2.0	2x1.3 2.0		0.14	2	NEENAH D			18"	4'
	RESID.=	0.0CFS									

NOTE: CATCH BASINS ARE CAPABLE OF ACCEPTING AN ADDITIONAL 5CFS OF STREET FLOW ON IMPERATA AND 5CFS 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.

4-82

80

PLATE 22.3 D-10

D-2

22.3

CATCH BASIN CALCULATION SHEET

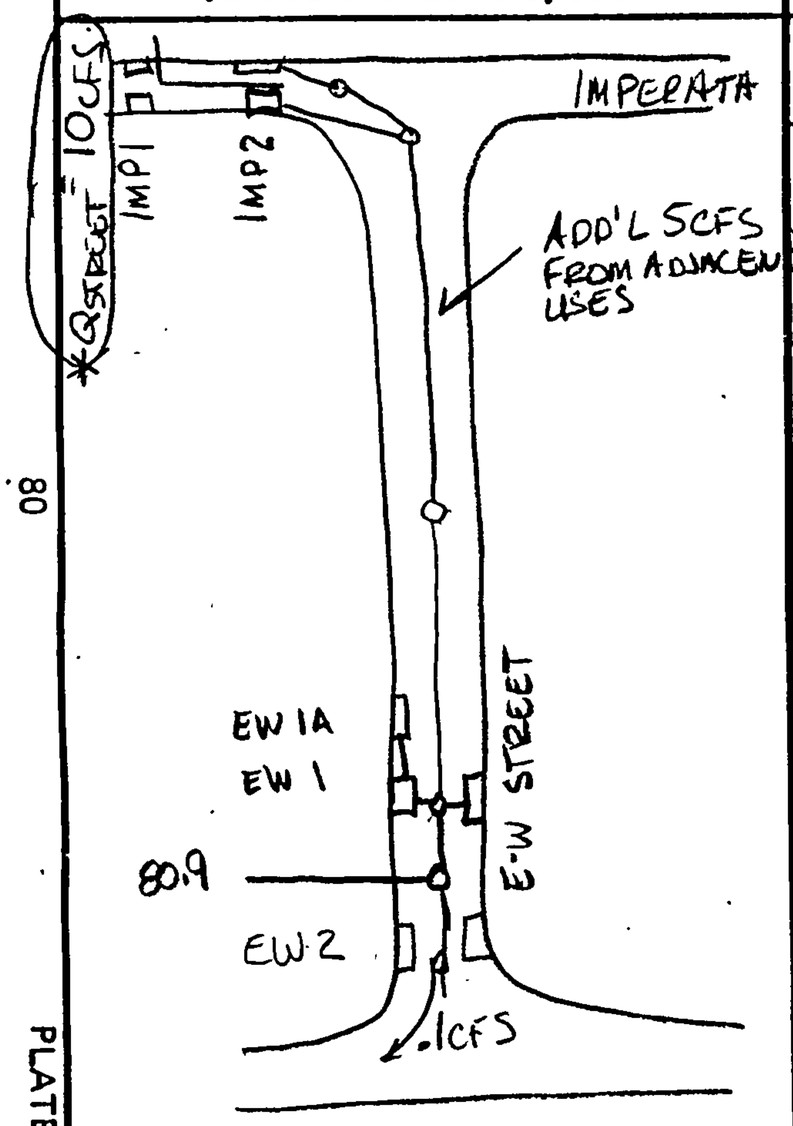
Sht___of___

PROJECT IMPERATH EXTENSION

DESIGN FREQUENCY 100-YR

CALCULATED BY PR

DATE 3/6/96



*INCLUDES 5 CFS FROM ADJACENT LAND USES.

Sym.	Drain. Area	Q Total	Q Inter.	Cap. of ½ Street	Gutter "d"	C.B. No.	C.B. Size	Connector Pipe Head	Connector Pipe L	Connector Pipe Dia.	V Depth
IMP1	IMP1	10.0	2x3.0 6		.26						
IMP2	IMP2	4+2.6 6.6	2x2.2 4.4		.27						
EW1A		2.2+5+6.5 13.7	1x3.6 3.6		.26						
EW1		10.1	2x3.2 6.4		.24						
EW2		3.7	2x1.8 3.6		.17						
		RESID = 0.1 CFS									

RATING TABLE FOR NEENAH GRATE

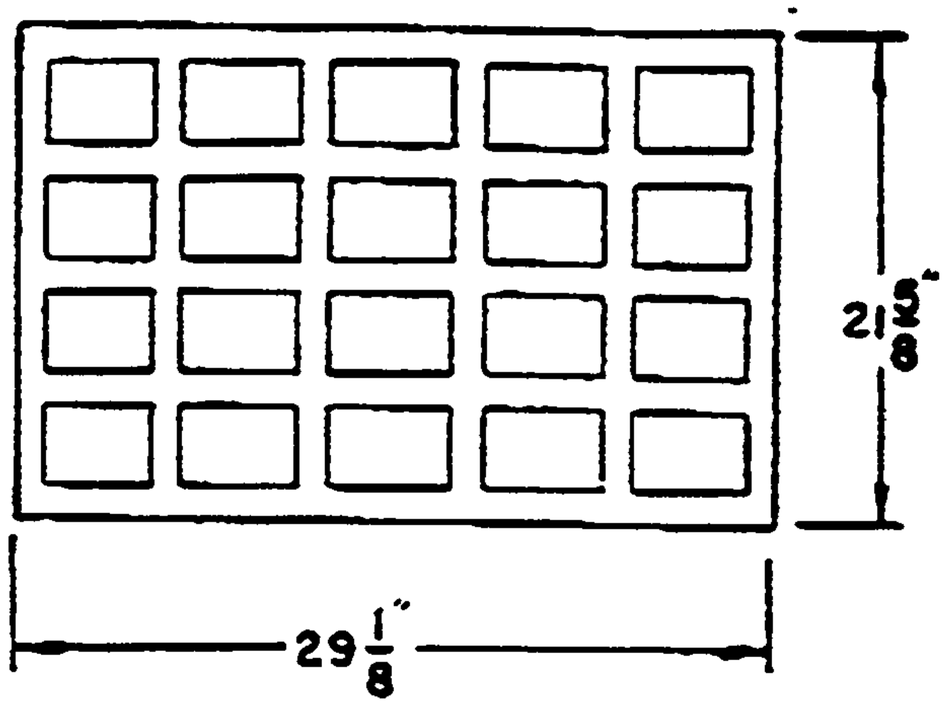
Wrong Grate

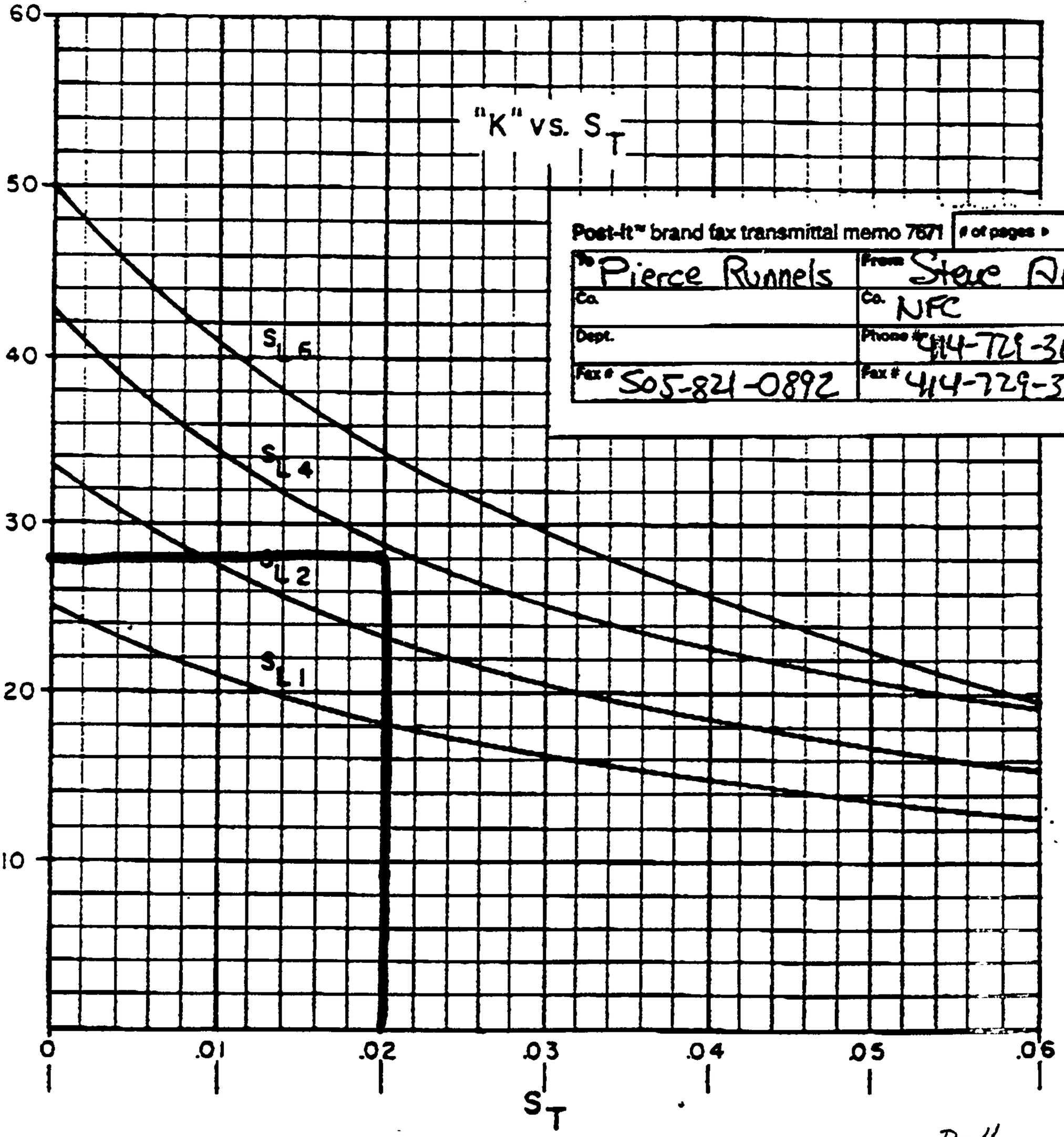
CAT. NO.- R-3227C
DESCRIPTION- TYPE C
COMP. CODE - 3227-0003

MP1

$S_T = 0.02$
$S_L = 3.35\%$
$D = 0.21'$
FLOW ——→

$K = 28$
$Q = KD^{5/3} = 28(.21)^{5/3} = 2.1 CFS$





Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To Pierce Runnels	From Steve Nickels
Co.	Co. NFC
Dept.	Phone # 414-729-3653
Fax # 505-821-0892	Fax # 414-729-3682

S_T = TRANSVERSE GUTTER SLOPE

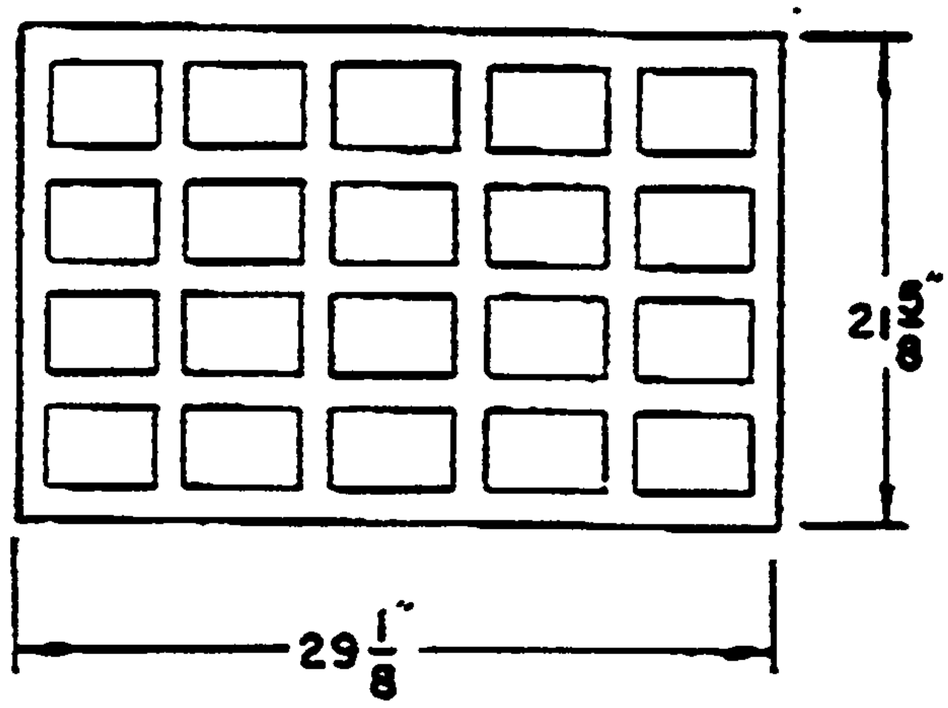
D-4

RATING TABLE FOR NEENAH GRATE

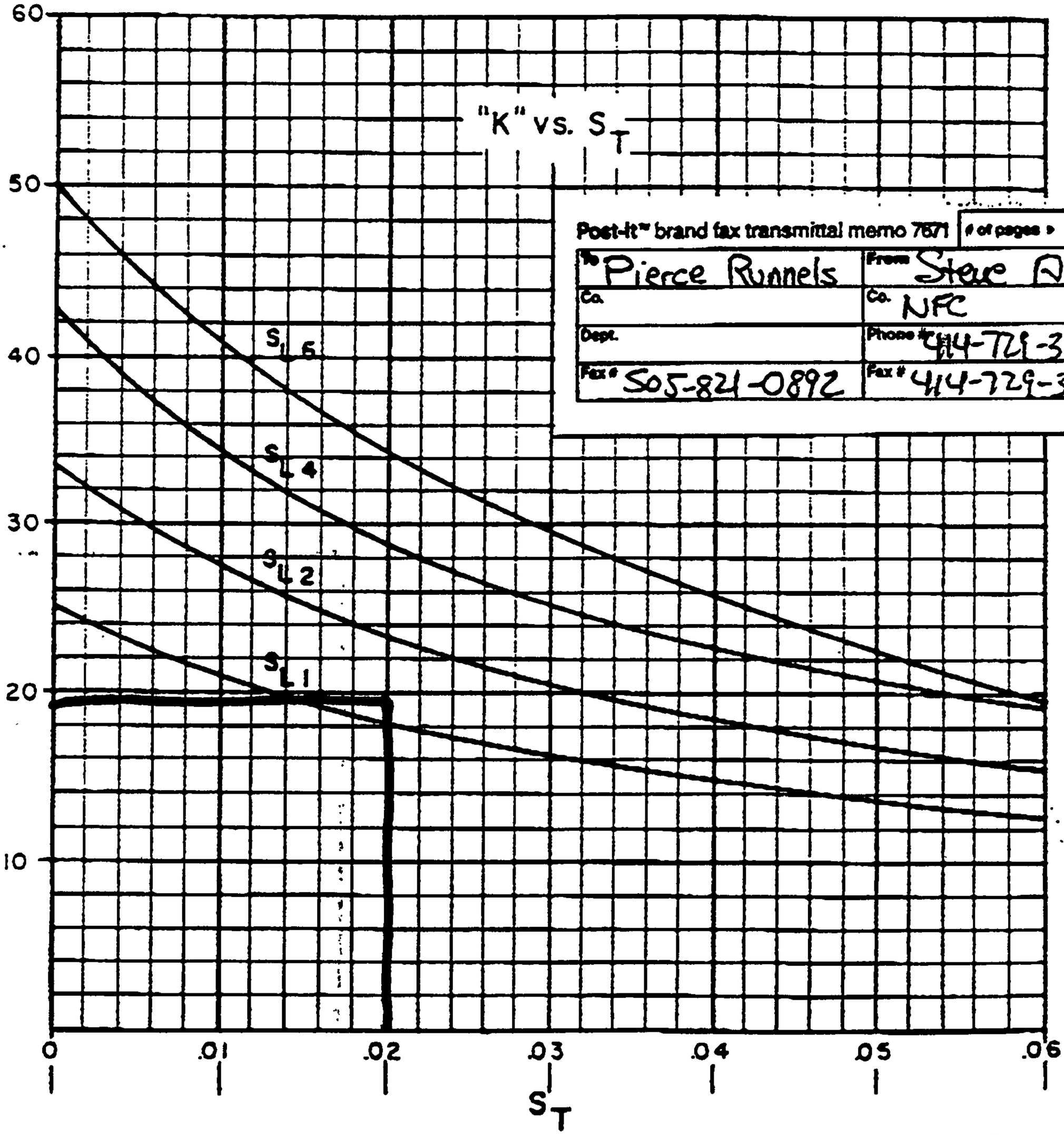
CAT. NO.-R-3227C
DESCRIPTION-TYPE C
COMP. CODE-3227-0003

MPZ

$S_T = 0.02$
$S_L = 1.12\%$
$D = 0.21$
FLOW



$K = 19.5$
$Q = KD^{5/3} = 19.5(0.21)^{5/3} = 1.45$ CFS



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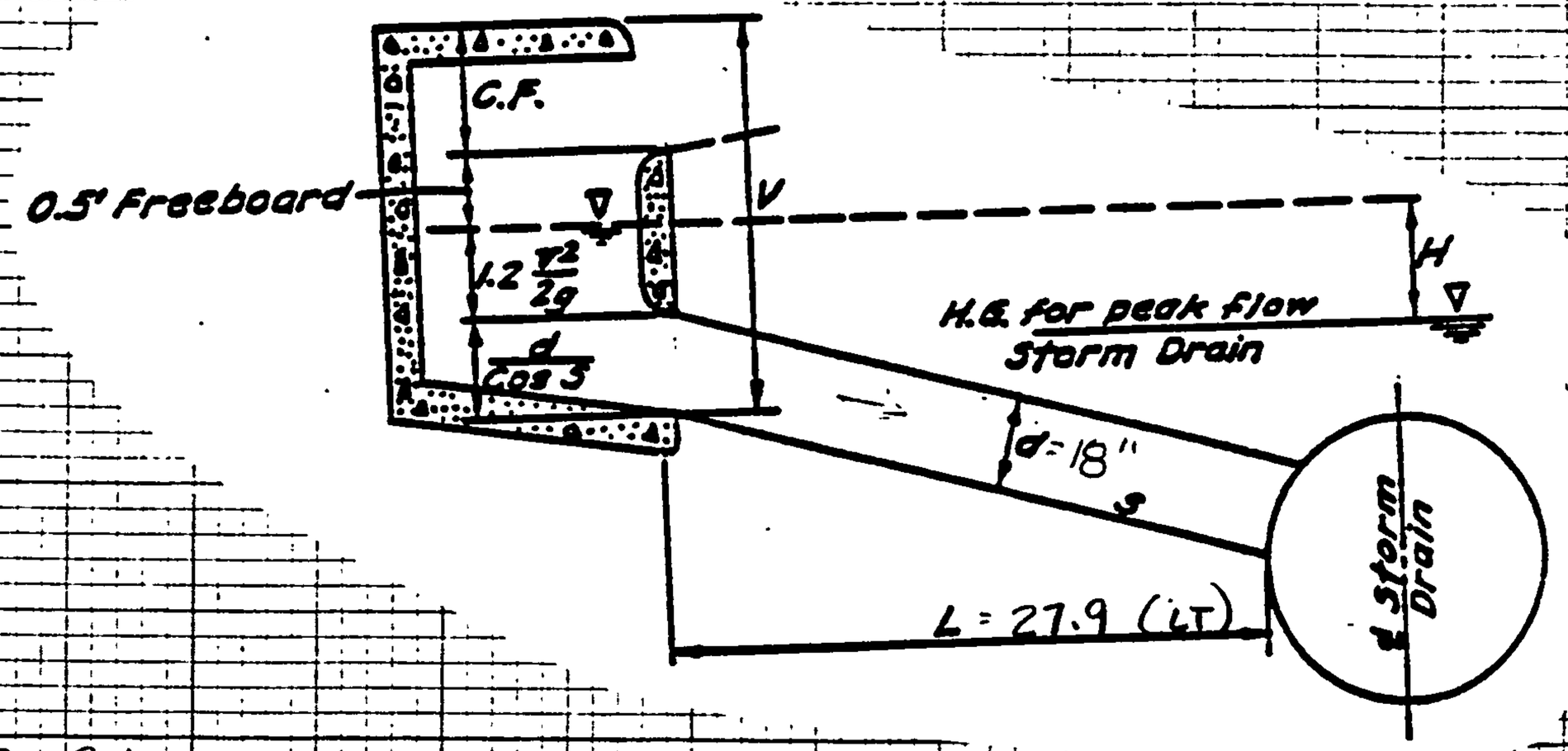
To Pierce Runnels	From Steve Nickels
Co.	Co. NFC
Dept.	Phone # 414-729-3653
Fax # 505-821-0892	Fax # 414-729-3682

S_T = TRANSVERSE GUTTER SLOPE

STA 32 + 64.8224' RT & LT
SINGLE TYPE "D"
TC = 6084.40



Q = 2.1 CFS
V = 1.19 FPS
$\frac{1.2\,V^2}{2g}$ = 0.03

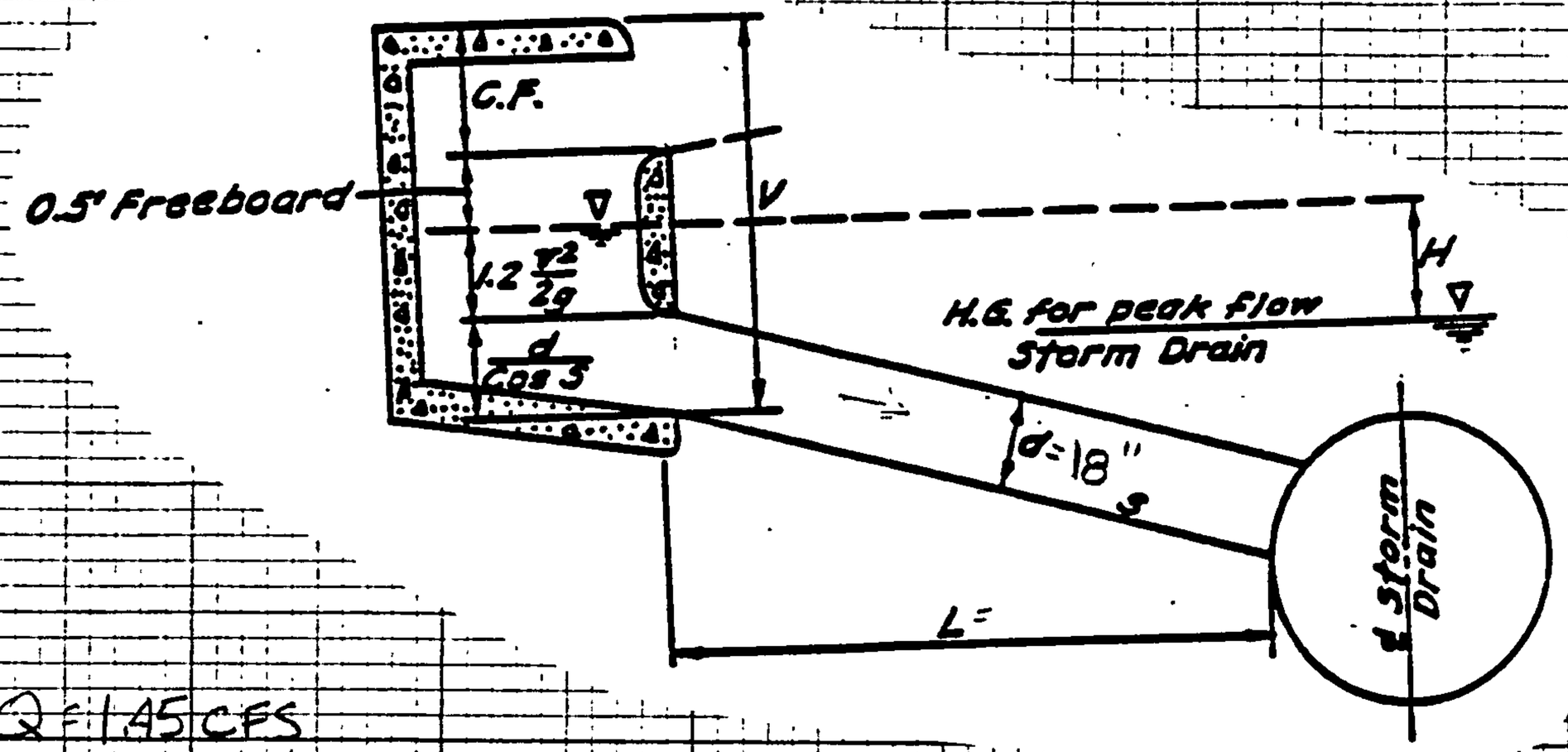
$V_{MIN} = 1.33 + 0.03 + 1.5$
$= 2.86$
USE 4' - MIN V

$H_f = \left(\frac{Q}{K}\right)^2 L = \left(\frac{2.1}{105}\right)^2 (27.9) = 0.011$

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____
PROJECT NO. ____ BY PR DATE 12/14/95
SUBJECT ____ CH'D ____ DATE D-6

STA 36+04.75, 24' RT & LT
SINGLE TYPE "D"
TC 78.49



$Q = 1.45$ CFS

$V = 0.82$ FPS

$1.2 V^2/2g = 0.01$

$V_{MIN} = 1.33 + 0.01 + 1.5$

$= 2.84$ FPS

USE $Y_{MIN} = 4'$

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE 2-7

RATING TABLE FOR NEENAH GRATE

CAT. NO.-R-3227C
DESCRIPTION-TYPE C
COMP. CODE-3227-0003

EW1

$S_T = 0.02$

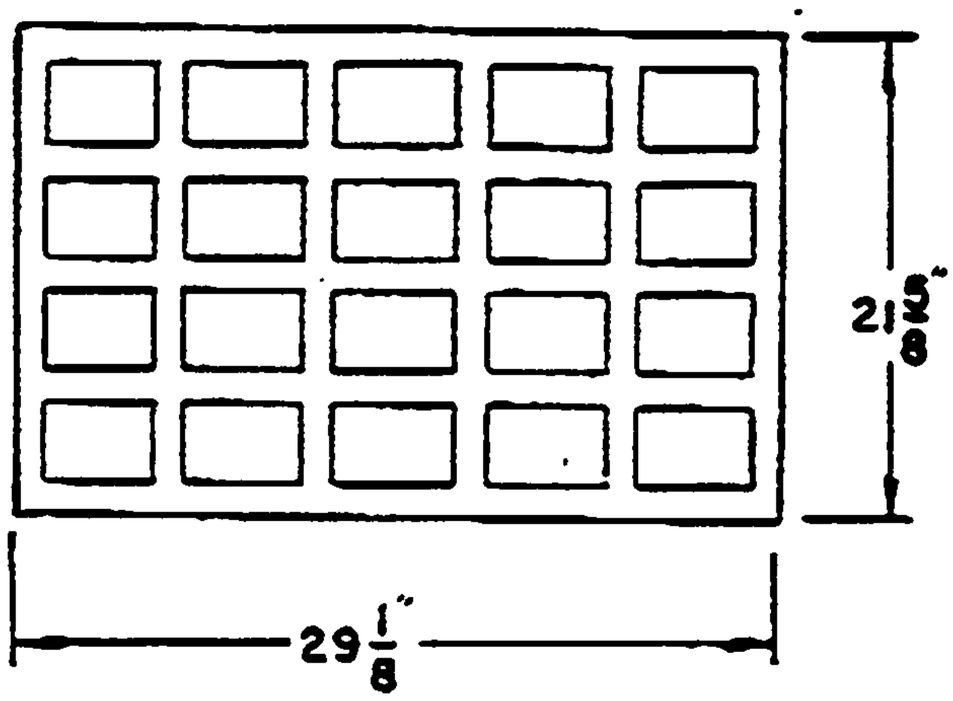
$S_L = 6.0\%$

FLOW →

$D = 0.21$

$K = 34$

$Q = KD^{5/3} = 2.5$ CFS



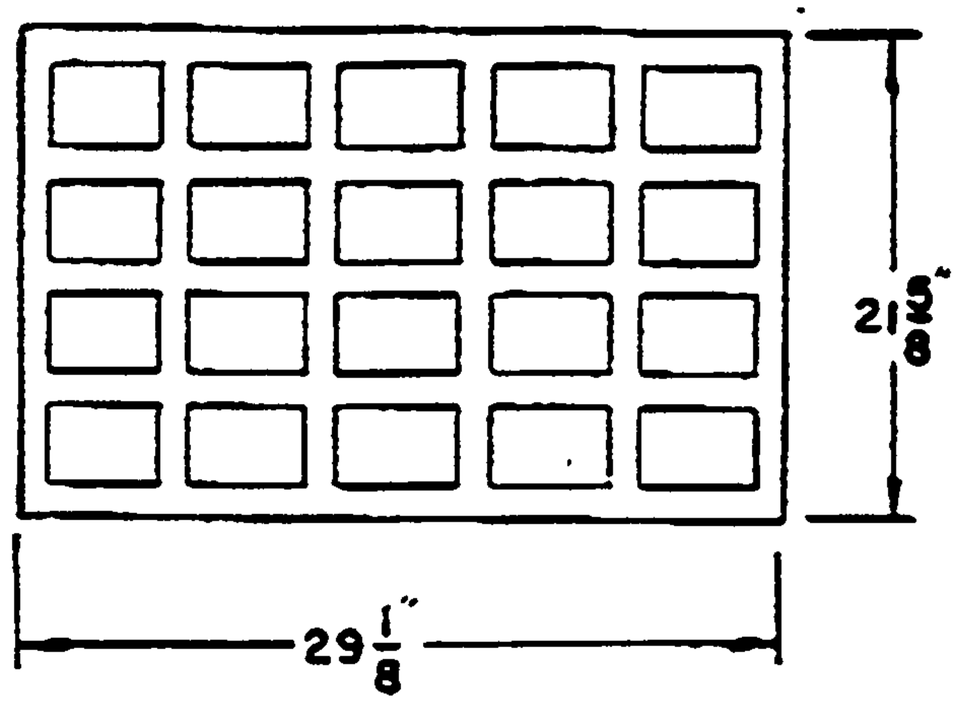
Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To Pierce Runnels	From Steve Nickola
Co.	Co. NFC
Dept.	Phone # 414-729-3653
Fax # 505-821-0892	Fax # 414-729-3682

S_T = TRANSVERSE GUTTER SLOPE

RATING TABLE FOR NEENAH GRATE

CAT. NO.-R-3227C
DESCRIPTION-TYPE C
COMP. CODE-3227-0003



EW2 $S_T = 0.02$

$S_L = 6.0\%$

$D = 0.14_{FLOW}$

$K = 34$

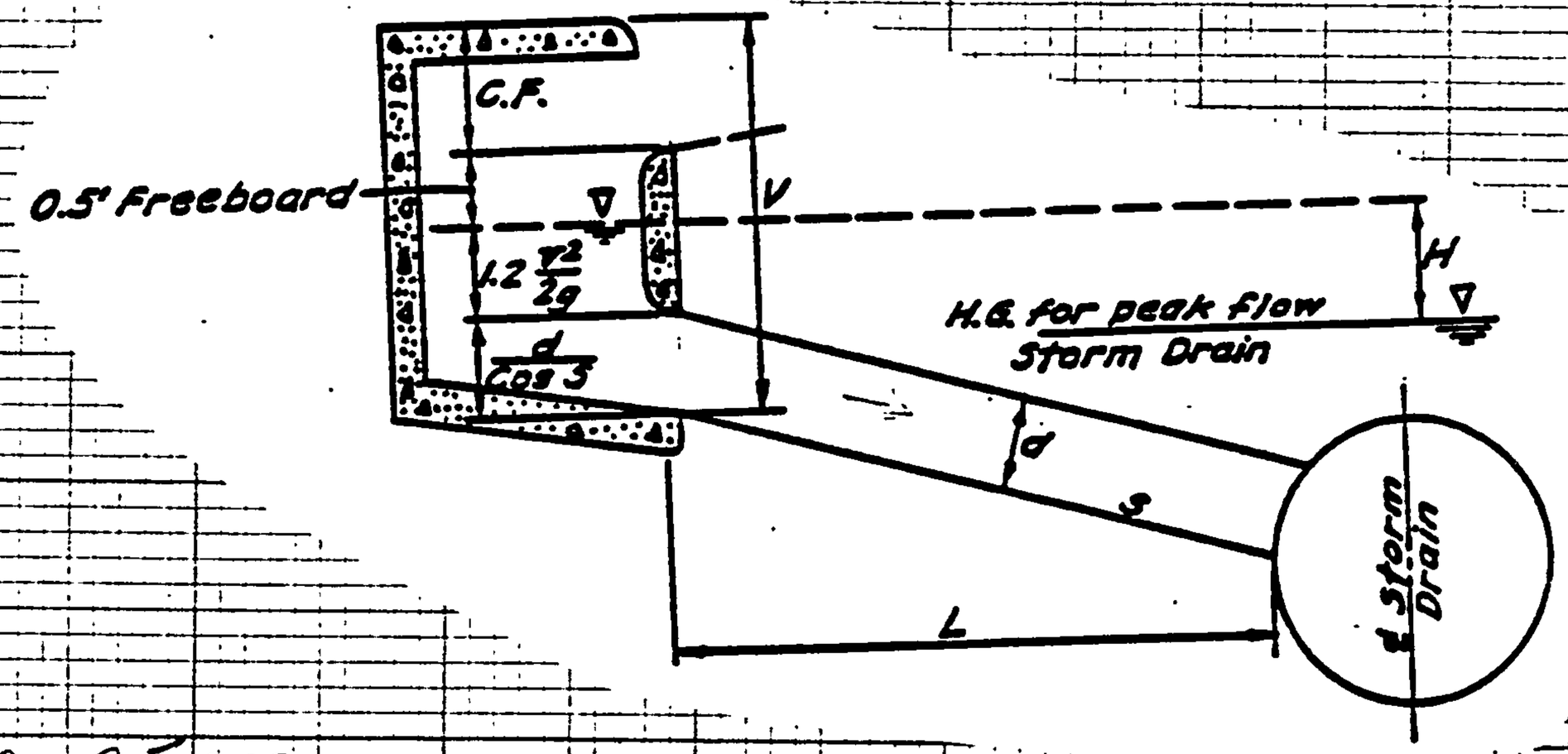
$Q = KD^{5/3} = 1.3 CFS$

Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To Pierce Runnels	From Steve Nickels
Co.	Co. NFC
Dept.	Phone # 414-729-3653
Fax # 505-821-0892	Fax # 414-729-3682

S_T = TRANSVERSE GUTTER SLOPE

INLETS EW1



Q = 2.5 CFS

V = 1.41 FPS

$1.2 V^2/2g = 0.0$ CA'

V = 1.33 + 0.04 + 1.5 = 2.87'

USE V_{MIN} = 4'

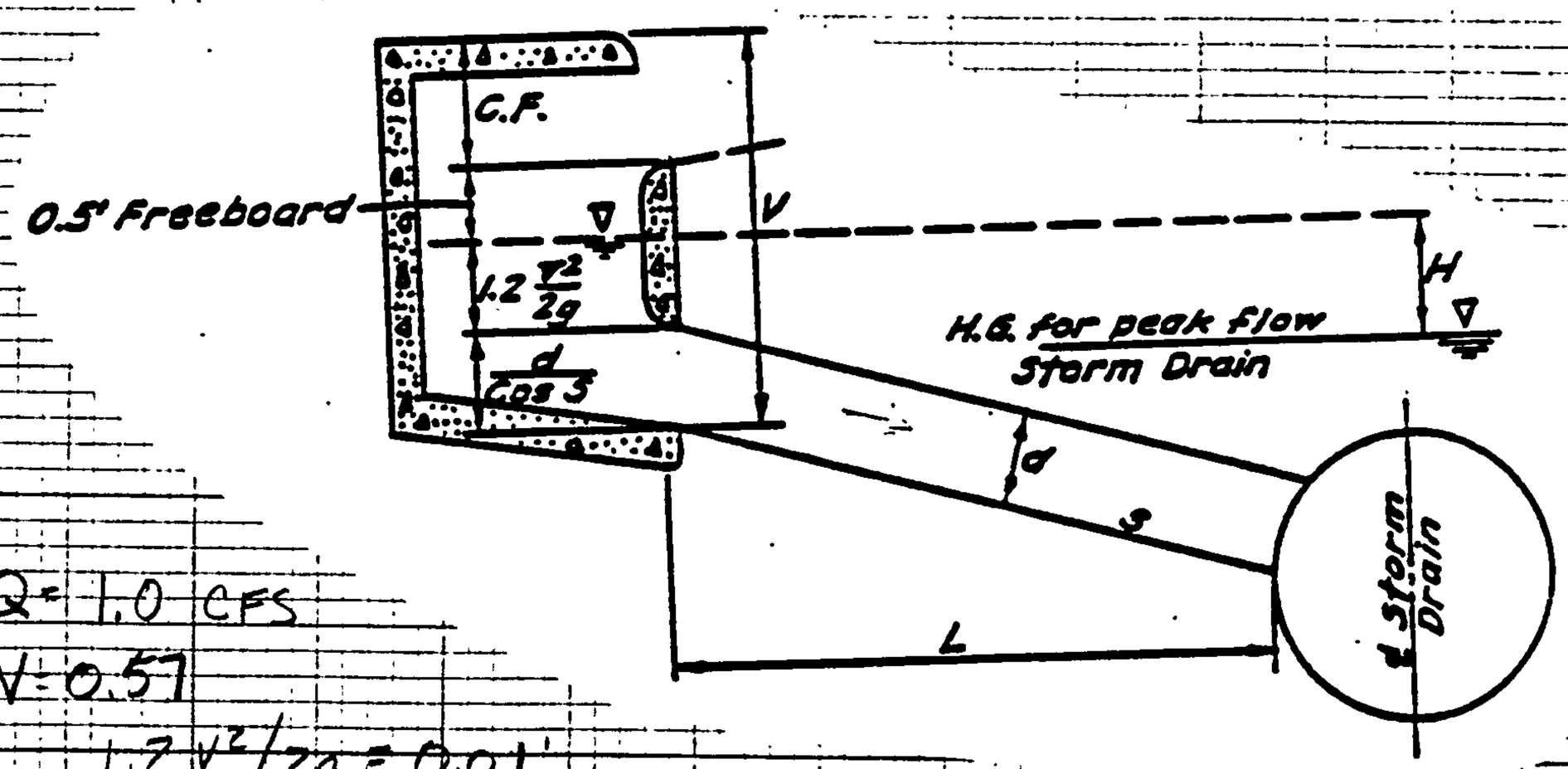
BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE D-10

INLETS EW2



$Q = 1.0$ CFS

$V = 0.57$

$1.2 V^2/2g = 0.01'$

$V = 1.33 + 0.01' + 1.5 = 2.84'$

USE $V_{MIN} = 4'$

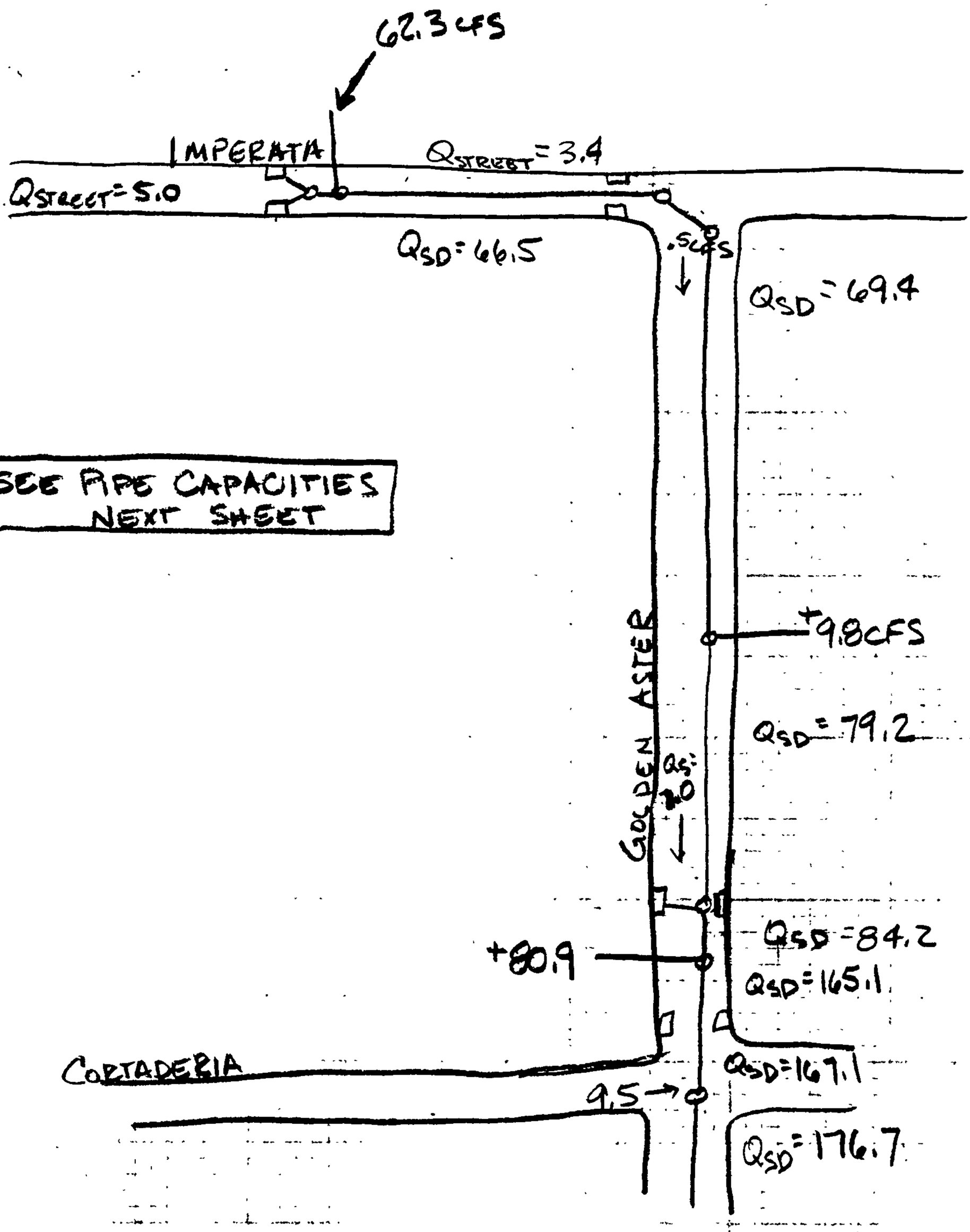
BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE 12-11

SCHEMATIC OF STORM DRAIN:



SEE PIPE CAPACITIES NEXT SHEET

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____

PROJECT NO. ____ BY PR DATE 3/6/96

SUBJECT ____ CH'D ____ DATE D-12

HYDRAULIC CAPACITIES
HIGH DESERT STORM DRAIN
TO ANALYSIS POINT 12

REACH	LENGTH	Q(100),CFS	PIPE DIA., FEET	FRICTION SLOPE,Sf,%	PIPE SLOPE,Sp,%	PIPE FULL?
EXISTING 72"		688.4	6	2.64	3.17	NO
EXISTING 48"		208.3	4	2.10	3.85	NO
CLARA VISTA 48"	69	208.3	4	2.10	3.85	NO
CLARA VISTA 48"	46	192.5	4	1.80	1.00	YES
CLARA VISTA 48"	200	192.5	4	1.80	6.69	NO
CLARA VISTA 42"	33	176.7	3.5	3.09	7.95	NO
CLARA VISTA 42"	150	176.7	3.5	3.09	4.00	NO
CORTADERIA CROSSING	150	176.7	3.5	3.09	4.00	NO
42"-GOLDEN ASTER	161	176.7	3.5	3.09	4.65	NO
36" GOLDEN ASTER	31	84.2	3	1.59	3.59	NO
36" GOLDEN ASTER	399	79.2	3	1.41	5.29	NO
36" GOLDEN ASTER	428	69.4	3	1.08	3.76	NO
36" GOLDEN ASTER	45	69.4	3	1.08	2.31	NO
36" IMPERATA	279	66.5	3	0.99	1.00	NO
36" IMPERATA	65	66.5	3	0.99	7.98	NO

E-W CULVERT #4

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

E-W CULVERT #1

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 0.50 SLOPE = 0.03600

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
0.50000	0.01956	0.03873	1.98042
1.00000	0.05509	0.17244	3.13023
1.50000	0.10077	0.41153	4.08368
2.00000	0.15449	0.76085	4.92500
2.50000	0.21497	1.22300	5.68924
10.00000	1.60224	21.33429	13.31532
10.50000	1.71505	23.46453	13.68153
11.00000	1.82946	25.67755	14.03560
11.50000	1.94533	27.96996	14.37799
12.00000	2.06255	30.33825	14.70910
12.50000	2.18100	32.77884	15.02930
13.00000	2.30056	35.28802	15.33891
13.50000	2.42112	37.86204	15.63823
14.00000	2.54258	40.49698	15.92751
14.50000	2.66483	43.18890	16.20698
15.00000	2.78778	45.93373	16.47684
15.50000	2.91130	48.72735	16.73730
16.00000	3.03532	51.56550	16.98849
16.50000	3.15972	54.44386	17.23058
17.00000	3.28442	57.35800	17.46368
17.50000	3.40930	60.30342	17.68790
18.00000	3.53429	63.27553	17.90333
18.50000	3.65927	66.26962	18.11006
19.00000	**3.78416**	**69.28088**	**18.30813**
19.50000	3.90885	72.30442	18.49760
20.00000	4.03326	75.33521	18.67850
20.50000	4.15727	78.36815	18.85086
21.00000	4.28080	81.39797	19.01466
21.50000	**4.40374**	**84.41932**	**19.16991**
22.00000	4.52599	87.42670	19.31657
22.50000	4.64746	90.41445	19.45461
23.00000	4.76802	93.37676	19.58397
23.50000	4.88758	96.30770	19.70457
24.00000	5.00603	99.20103	19.81632
24.50000	5.12324	102.05048	19.91911
25.00000	5.23912	104.84943	20.01280
25.50000	5.35352	107.59105	20.09724
26.00000	5.46634	110.26823	20.17222
26.50000	5.57743	112.87354	20.23755
27.00000	5.68666	115.39916	20.29295
27.50000	5.79389	117.83691	20.33814
28.00000	5.89896	120.17807	20.37276
28.50000	6.00170	122.41337	20.39643
29.00000	6.10196	124.53278	20.40866
29.50000	6.19953	126.52556	20.40891
30.00000	6.29421	128.37981	20.39649
30.50000	6.38579	130.08241	20.37062
31.00000	6.47401	131.61858	20.33030
31.50000	6.55861	132.97133	20.27433
32.00000	6.63926	134.12076	20.20116
32.50000	6.71561	135.04283	20.10879
33.00000	6.78723	135.70749	19.99452
33.50000	6.85361	136.07524	19.85453
34.00000	6.91409	136.09090	19.68312
34.50000	6.96781	135.66956	19.47092
35.00000	7.01349	134.66016	19.20016
35.50000	7.04902	132.70752	18.82637
36.00000	7.06858	126.55122	17.90334

E-W CULVERT #2

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 0.50 SLOPE = 0.05300

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
0.50000	0.01956	0.04699	2.40295
1.00000	0.05509	0.20923	3.79807
9.50000	1.49114	23.40568	15.69646
10.00000	1.60224	25.88599	16.15617
10.50000	1.71505	28.47073	16.60051
11.00000	1.82946	31.15590	17.03012
11.50000	1.94533	33.93740	17.44556
12.00000	2.06255	36.81097	17.84732
12.50000	2.18100	39.77226	18.23583
13.00000	2.30056	42.81679	18.61150
13.50000	2.42112	45.93997	18.97467
14.00000	2.54258	49.13708	19.32567
14.50000	2.66483	52.40333	19.66476
15.00000	2.78778	55.73378	19.99220
15.50000	2.91130	59.12341	20.30823
16.00000	3.03532	62.56709	20.61302
16.50000	3.15972	66.05955	20.90676
17.00000	3.28442	69.59542	21.18958
17.50000	3.40930	73.16927	21.46164
18.00000	3.53429	76.77547	21.72304
18.50000	**3.65927**	**80.40835**	**21.97387**
19.00000	3.78416	84.06207	22.21420
19.50000	3.90885	87.73069	22.44410
20.00000	4.03326	91.40810	22.66360
20.50000	4.15727	95.08812	22.87272
21.00000	4.28080	98.76437	23.07147
21.50000	4.40374	102.43034	23.25984
22.00000	4.52599	106.07935	23.43780
22.50000	4.64746	109.70453	23.60529
23.00000	4.76802	113.29885	23.76224
23.50000	4.88758	116.85510	23.90858
24.00000	5.00603	120.36575	24.04417
24.50000	5.12324	123.82314	24.16889
25.00000	5.23912	127.21925	24.28257
25.50000	5.35352	130.54579	24.38502
26.00000	5.46634	133.79414	24.47600
26.50000	5.57743	136.95529	24.55526
27.00000	5.68666	140.01978	24.62248
27.50000	5.79389	142.97762	24.67731
28.00000	5.89896	145.81827	24.71933
28.50000	6.00170	148.53047	24.74805
29.00000	6.10196	151.10207	24.76289
29.50000	6.19953	153.51999	24.76318
30.00000	6.29421	155.76988	24.74812
30.50000	6.38579	157.83572	24.71672
31.00000	6.47401	159.69962	24.66780
31.50000	6.55861	161.34099	24.59989
32.00000	6.63926	162.73566	24.51112
32.50000	6.71561	163.85446	24.39904
33.00000	6.78723	164.66090	24.26038
33.50000	6.85361	165.10712	24.09052
34.00000	6.91409	165.12611	23.88254
34.50000	6.96781	164.61490	23.62507
35.00000	7.01349	163.39012	23.29655
35.50000	7.04902	161.02090	22.84301
36.00000	7.06858	153.55113	21.72305

E-W CULVERT #3

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 0.50 SLOPE = 0.02300

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
0.50000	0.01956	0.03096	1.58296
1.00000	0.05509	0.13783	2.50201
11.00000	1.82946	20.52420	11.21873
11.50000	1.94533	22.35654	11.49240
12.00000	2.06255	24.24953	11.75706
12.50000	2.18100	26.20030	12.01300
13.00000	2.30056	28.20591	12.26048
13.50000	2.42112	30.26332	12.49972
14.00000	2.54258	32.36945	12.73094
14.50000	2.66483	34.52112	12.95432
15.00000	2.78778	36.71508	13.17003
15.50000	2.91130	38.94803	13.37821
16.00000	3.03532	41.21658	13.57899
16.50000	3.15972	43.51726	13.77249
17.00000	3.28442	45.84655	13.95881
17.50000	3.40930	48.20084	14.13803
18.00000	3.53429	50.57647	14.31023
18.50000	3.65927	52.96965	14.47546
19.00000	3.78416	55.37657	14.63379
19.50000	3.90885	57.79330	14.78523
20.00000	4.03326	60.21583	14.92983
20.50000	4.15727	62.64008	15.06759
21.00000	4.28080	65.06184	15.19852
21.50000	4.40374	67.47681	15.32261
22.00000	**4.52599**	**69.88062**	**15.43984**
22.50000	4.64746	72.26875	15.55018
23.00000	4.76802	74.63654	15.65357
23.50000	4.88758	76.97925	15.74997
24.00000	5.00603	79.29191	15.83929
24.50000	5.12324	81.56949	15.92145
25.00000	5.23912	83.80672	15.99634
25.50000	5.35352	85.99809	16.06383
26.00000	5.46634	88.13799	16.12377
26.50000	5.57743	90.22041	16.17598
27.00000	5.68666	92.23916	16.22026
27.50000	5.79389	94.18766	16.25638
28.00000	5.89896	96.05896	16.28406
28.50000	6.00170	97.84565	16.30298
29.00000	6.10196	99.53971	16.31276
29.50000	6.19953	101.13254	16.31295
30.00000	6.29421	102.61467	16.30302
30.50000	6.38579	103.97556	16.28234
31.00000	6.47401	105.20341	16.25011
31.50000	6.55861	106.28468	16.20538
32.00000	6.63926	107.20344	16.14690
32.50000	6.71561	107.94045	16.07306
33.00000	6.78723	108.47171	15.98172
33.50000	6.85361	108.76566	15.86983
34.00000	6.91409	108.77818	15.73282
34.50000	6.96781	108.44139	15.56321
35.00000	7.01349	107.63457	15.34679
35.50000	7.04902	106.07383	15.04802
36.00000	7.06858	101.15306	14.31024

IMPERATA CULVERT

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 0.50 SLOPE = 0.01000

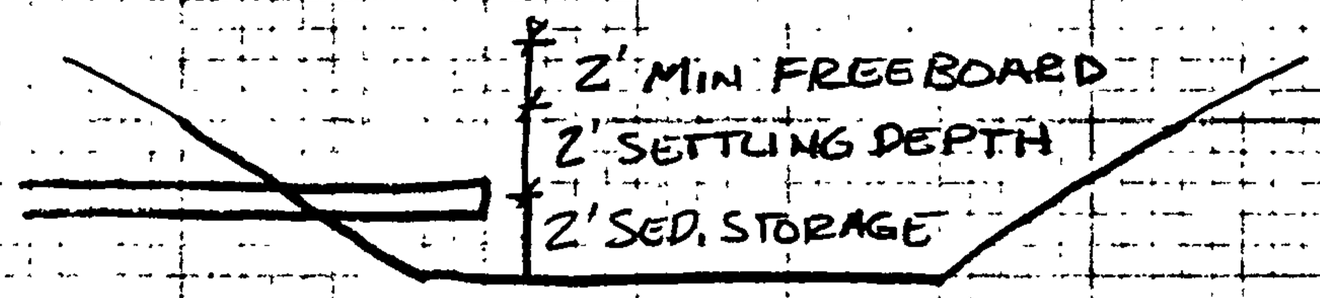
FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
10.50000	1.71505	12.36690	7.21080
11.00000	1.82946	13.53326	7.39741
11.50000	1.94533	14.74146	7.57787
12.00000	2.06255	15.98966	7.75238
12.50000	2.18100	17.27597	7.92114
13.00000	2.30056	18.59842	8.08432
13.50000	2.42112	19.95505	8.24207
14.00000	2.54258	21.34379	8.39453
14.50000	2.66483	22.76255	8.54183
15.00000	2.78778	24.20921	8.68406
15.50000	2.91130	25.68157	8.82133
16.00000	3.03532	27.17741	8.95372
16.50000	3.15972	28.69444	9.08132
17.00000	3.28442	30.23032	9.20417
17.50000	3.40930	31.78270	9.32234
18.00000	3.53429	33.34914	9.43589
18.50000	3.65927	34.92715	9.54484
19.00000	3.78416	36.51423	9.64923
19.50000	3.90885	38.10778	9.74909
20.00000	4.03326	39.70514	9.84444
20.50000	4.15727	41.30364	9.93528
21.00000	4.28080	42.90050	10.02161
21.50000	4.40374	44.49289	10.10343
22.00000	4.52599	46.07792	10.18073
22.50000	4.64746	47.65261	10.25348
23.00000	4.76802	49.21388	10.32166
23.50000	4.88758	50.75861	10.38522
24.00000	5.00603	52.28354	10.44412
24.50000	5.12324	53.78533	10.49830
25.00000	5.23912	55.26051	10.54768
25.50000	5.35352	56.70547	10.59217
26.00000	5.46634	58.11647	10.63170
26.50000	5.57743	59.48958	10.66612
27.00000	5.68666	60.82070	10.69532
27.50000	5.79389	62.10551	10.71914
28.00000	5.89896	63.33941	10.73739
28.50000	6.00170	64.51751	10.74986
29.00000	6.10196	65.63454	10.75631
29.50000	**6.19953**	**66.68483**	**10.75644**
30.00000	6.29421	67.66210	10.74990
30.50000	6.38579	68.55946	10.73626
31.00000	6.47401	69.36908	10.71501
31.50000	6.55861	70.08205	10.68551
32.00000	6.63926	70.68785	10.64695
32.50000	6.71561	71.17383	10.59827
33.00000	6.78723	71.52413	10.53804
33.50000	6.85361	71.71796	10.46426
34.00000	6.91409	71.72620	10.37391
34.50000	6.96781	71.50414	10.26207
35.00000	7.01349	70.97214	10.11937
35.50000	7.04902	69.94301	9.92237
36.00000	7.06858	66.69835	9.43589

SEDIMENTATION POND SUMMARY

AREA OF BOTTOM = 5' X 15' SIDE SLOPES 3:1

MINIMUM DEPTH = 6'

OUTLET PIPE = 30" RCP



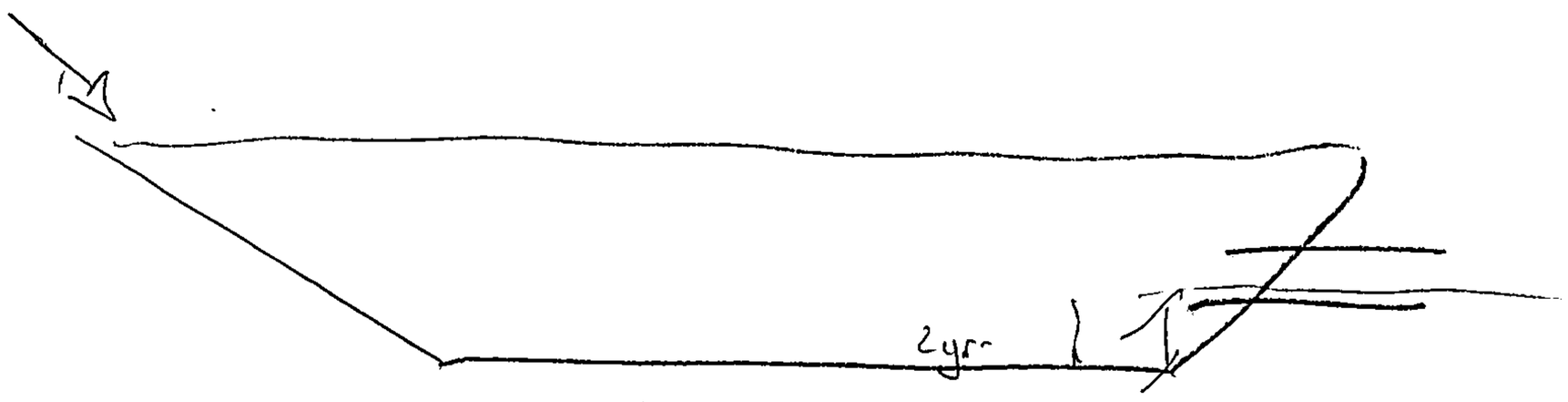
SEE DESIGN ON FOLLOWING PAGES

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET _____ OF _____

PROJECT NO. _____ BY PR DATE 12/11/95

SUBJECT _____ CH'D _____ DATE E-1


2yr-

SEDIMENTATION POND (NE CORNER IMPERATA & FUTURE STREET)

1. SIZE POND BASED ON SETTLING VELOCITY (V_S)

POND SIZED FOR BASIN 14 RUNOFF (THIS PROJECT)

DESIGN PARTICLE = VERY FINE SAND, D = 0.06 MM

100% REMOVAL OF DESIGN PARTICLE IN 2 YR EVENT

$V_S = 0.009$ FPS

SURFACE AREA REQ'D = $SA = 1.2\, Q_{2\text{-YR}} / V_S$

$Q_{2\text{-YR}}$ = ? $\Rightarrow$ $E = .98(.05) + .02(.38) = 0.057$ (TABLE A-9 DPM)

AREA = 9 ACRE

10 year per Ordinance $Q_{21\text{-YR}} = 0.057(9) = 0.51$ CFS

$SA = 1.2(0.51)/.009 = 68$ SF

USE LENGTH = 3 x WIDTH

$SA = 3W \cdot W = 68$

$W \geq 4.8'$

USE 5' x 15' POND SA = 75 SF

2. POND SIZE BASED ON SEDIMENT STORAGE:

FROM USLE, THE AVERAGE ANNUAL SEDIMENT YIELD IS 522 CF

ASSUME: MIN SETTLING DEPTH = 2'

MAX SEDIMENT STORAGE DEPTH = 3'

MIN FREEBOARD = 2' (100 YR STORM)

ELEV	LENGTH (FT)	WIDTH (FT)	AREA (SF)	VOL (CF)	CUM VOL
0	15	5	75		0
1	21	11	231	153	153
2	27	17	459	345	498
3	33	23	759	609	1107

REQD SED. STORAGE DEPTH = 2.04' USE 2'

TOTAL DEPTH REQ'D =	2'	SED STORAGE
	2'	MIN SETTLING
	2'	MIN FREEBOARD
	6'	MIN TOTAL DEPTH

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____

PROJECT NO. ____ BY PR DATE 12/9/95

SUBJECT ____ CH'D ____ DATE E-2

3) OUTLET:

OUTLET PIPE IS SIZED TO CONVEY ULTIMATE DEVELOPED FLOW FOR BASIN 14 = 62.3CFS

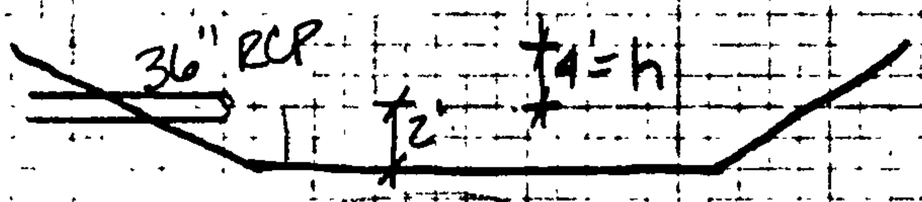
AVG. SLOPE ~ 1% IN IMPERATA:

AT SLOPE = 1.2% NEED ϕ = 2.8' - MANNINGS

USE 36", ⇒ GRAVITY FLOW

⟹ USE 36" RCP IN IMPERATA EXTENSION

CHECK ORIFICE CONTROL OF POND OUTLET:



$Q = 0.6A\sqrt{2gh}$

$= 0.6(7.1)\sqrt{2(32.2)(4)}$

$= 68.4$ CFS

$Q_{100} = 31.5$ CFS < 68.4 ..... OK

(31.5 CFS IS FLOW AFTER THIS PROJECT)

HOWEVER, 36" RCP CAN ACCOMMODATE ULTIMATE FLOW OF 62.3CFS, IF ORIFICE CONTROLLED.

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____

PROJECT NO. ____ BY PR DATE 12/11/95

SUBJECT ____ CH'D ____ DATE E-3

HIGH DESERT - IMPERATA EXTENSION
UNIVERSAL SOIL LOSS EQUATION

DESCRIPTION	VARIABLE	UNIT		
BASIN				
Drainage Area	DA	Sq. Mi.	0.014	
Slope	S	Ft/Ft	0.050	
Slope Angle	THETA	Radians	0.050	
	L	Feet	1500.000	
Rainfail	R		45.000	
Soil Erodability*	K		0.100	
Slope Length Factor	LS		1.531	
Cover*	C		0.140	
Support Practice Factor	P		1.000	
Sediment Yield	A	Tons/Acre	0.964	
		Tons	8.702	
		Cy	6.446	
			Total Annual Sediment Yield	6.446 Cy
Estimated Soil Unit Weight	100.000	Lbs/Cf	Adjustment Factor	3.000

			Adjusted Sediment Yield	19.337 Cy
				522.105 Cf

NOTE: The Universal Soil Loss Equation typically underestimates the actual sediment yield by 3 times so a factor of 4 is applied to the total annual sediment yield.

GOLDEN ASTER ROAD- GRADING ONLY-NO PAVEMENT

MANNING'S N = .0300 SLOPE = .0400

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	0.3	0.44	
4.42	0.02	0.0	0.0	0.9	0.5	0.88	
4.43	0.03	0.0	0.0	1.3	0.6	1.32	
4.44	0.04	0.0	0.0	1.8	0.7	1.76	
4.45	0.05	0.1	0.0	2.2	0.8	2.19	
4.46	0.06	0.1	0.1	2.6	1.0	2.63	
4.47	0.07	0.1	0.1	3.6	1.0	3.61	
4.48	0.08	0.2	0.2	4.6	1.0	4.58	
4.49	0.09	0.2	0.2	5.6	1.1	5.55	
4.50	0.10	0.3	0.3	6.5	1.2	6.52	
4.51	0.11	0.3	0.4	7.5	1.2	7.49	
4.52	0.12	0.4	0.5	8.5	1.3	8.46	
4.53	0.13	0.5	0.7	9.5	1.4	9.44	
4.54	0.14	0.6	0.9	10.4	1.5	10.41	
4.55	0.15	0.7	1.1	11.4	1.6	11.38	
4.56	0.16	0.8	1.4	12.4	1.6	12.35	
4.57	0.17	1.0	1.6	13.4	1.7	13.32	
4.58	0.18	1.1	2.0	14.3	1.8	14.30	
4.59	0.19	1.2	2.3	15.3	1.9	15.27	
4.60	0.20	1.4	2.7	16.3	1.9	16.24	
4.61	0.21	1.6	3.1	17.3	2.0	17.21	
4.62	0.22	1.7	3.6	18.2	2.1	18.18	
4.63	0.23	1.9	4.1	19.2	2.1	19.16	
4.64	0.24	2.1	4.7	20.2	2.2	20.13	
4.65	0.25	2.3	5.3	21.2	2.3	21.10	
4.66	0.26	2.5	6.0	22.1	2.3	22.07	
4.67	**0.27**	**2.8**	**6.7**	**23.1**	**2.4**	**23.04**	**Q=6.7 CFS**
4.68	0.28	3.0	7.5	24.1	2.5	24.02	
4.69	0.29	3.3	8.3	25.1	2.5	24.99	
4.70	0.30	3.5	9.1	26.0	2.6	25.96	
4.71	0.31	3.8	10.1	27.0	2.7	26.93	
4.72	0.32	4.0	11.1	28.0	2.7	27.90	
4.73	0.33	4.3	12.1	29.0	2.8	28.87	
4.74	0.34	4.6	13.1	30.4	2.8	30.37	
4.75	0.35	4.9	14.1	31.9	2.9	31.87	
4.76	0.36	5.3	15.2	33.4	2.9	33.36	
4.77	0.37	5.6	16.4	34.9	2.9	34.86	
4.78	0.38	6.0	17.7	36.4	3.0	36.35	
4.79	0.39	6.3	19.3	37.1	3.1	36.97	
4.80	0.40	6.7	21.0	37.7	3.1	37.59	
4.81	0.41	7.1	22.8	38.3	3.2	38.21	
4.82	0.42	7.5	24.6	38.9	3.3	38.83	
4.83	0.43	7.9	26.5	39.5	3.4	39.45	
4.84	0.44	8.3	28.5	40.2	3.5	40.07	
4.85	0.45	8.7	30.5	40.8	3.5	40.69	
4.86	0.46	9.1	32.7	41.4	3.6	41.31	
4.87	0.47	9.5	34.8	42.0	3.7	41.94	
4.88	0.48	9.9	37.1	42.6	3.7	42.56	
4.89	0.49	10.3	39.4	43.3	3.8	43.18	
4.90	0.50	10.8	41.8	43.9	3.9	43.80	
4.91	0.51	11.2	44.3	44.5	4.0	44.42	
4.92	0.52	11.7	46.9	45.1	4.0	45.04	
4.93	0.53	12.1	49.5	45.7	4.1	45.66	
4.94	0.54	12.6	52.2	46.4	4.2	46.28	
4.95	0.55	13.0	55.0	47.0	4.2	46.90	
4.96	0.56	13.5	57.8	47.6	4.3	47.52	
4.97	0.57	14.0	60.7	48.2	4.3	48.14	
4.98	0.58	14.5	63.7	48.8	4.4	48.76	
4.99	0.59	15.0	66.8	49.5	4.5	49.38	

PHASING:

SIZE OF UNPAVED PORTIONS OF IMPERATA AND STREET A=

$$\frac{(3680-3121)66+(1200-377)50}{43560} = 1.8 \text{ ACRE}$$

LAND TREATMENT OF UNPAVED PORTIONS = 100% TYPE C

PEAK DISCHARGE, Q = 3.73(1.80) = 6.7 CFS

AS SHOWN ON THE ATTACHED RATING TABLE, THIS FLOW HAS VELOCITY OF 2.4 FPS < 3.0 FPS ⟹ NON-EROSIVE. ✓

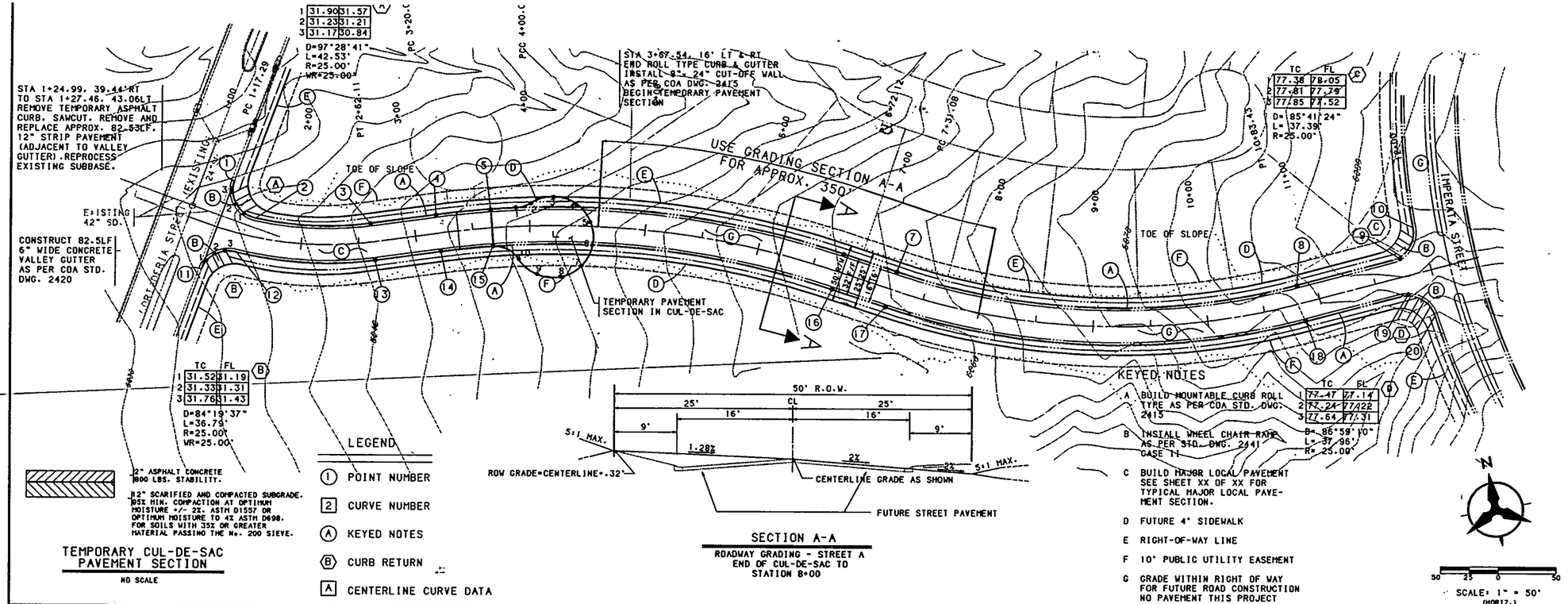
THIS FLOW WILL EXIT THE STREET "A" GRADED SECTION AND FLOW SOUTH, TO THE EXISTING ARROYO AS INDICATED ON THE ATTACHED PLAN

BOHANNAN-HUSTON INC.

PROJECT NAME IMPERATA EXTENSION SHEET ____ OF ____

PROJECT NO. ____ BY ____ DATE ____

SUBJECT ____ CH'D ____ DATE ____



1. ALL CURB DATA AND DIMENSIONS REFER TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.

2. GRADE ELEVATIONS, WHERE NOTED, ARE FOR TOP OF STANDARD CURB UNLESS OTHERWISE SPECIFIED.

3. CONTRACTOR IS TO INSTALL A 4" X 4" X 5' POST AND EMD AT THE END OF EACH SANTITARY SEWER SERVICE.

4. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.

5. CONTRACTOR SHALL PROVIDE THE INSPECTORS (CITY AND PRIVATE) WITH THE PROPOSED HYDROSTATIC TESTING PLAN. THE PLAN MUST BE APPROVED BEFORE TESTING OPEATIONS BEGIN.

6. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.

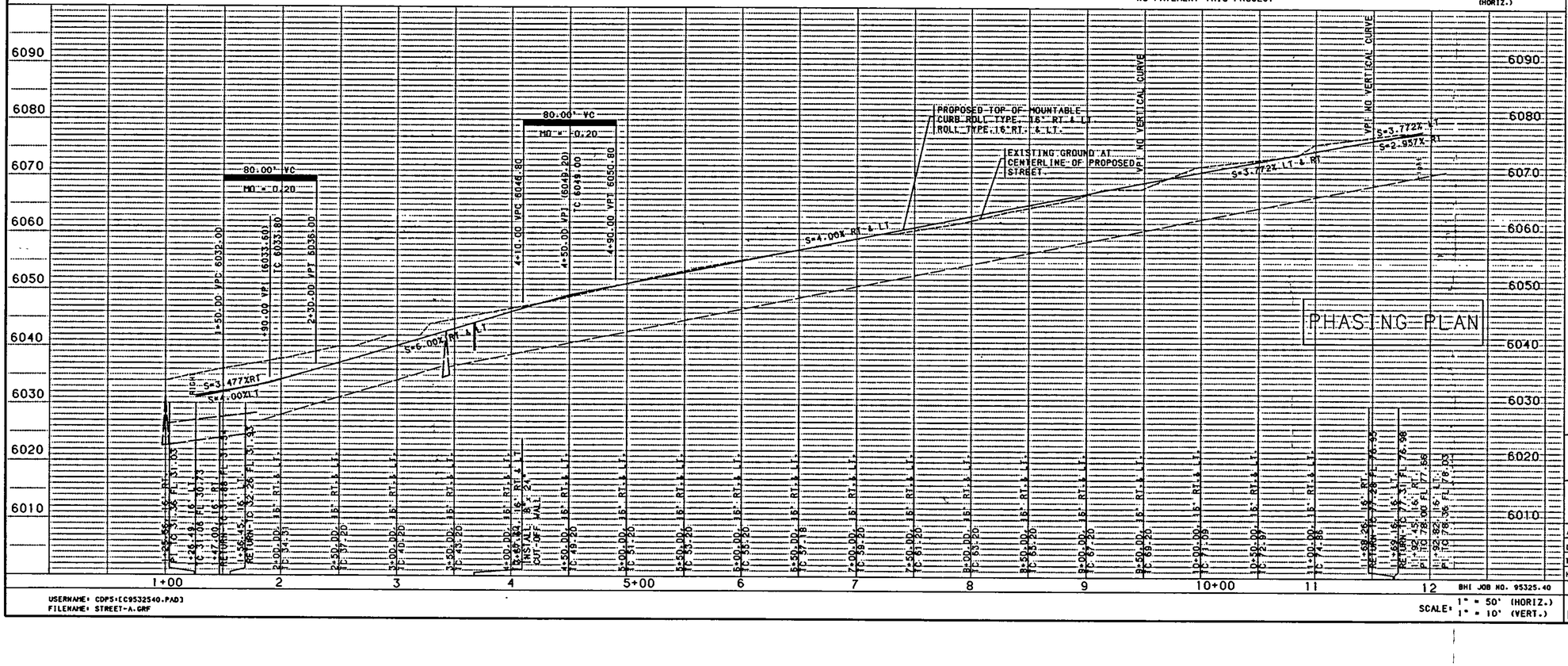
7. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

8. REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).

9. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

10. CONTRACTOR SHALL HAVE PROPOSED CURB STAKED PRIOR TO SETTING FINAL FIRE HYDRANT LOCATION. ANY SUBSEQUENT RELOCATION OF A FIRE HYDRANT TO CONFORM TO ACTUAL CURB LOCATIONS AND CITY OF ALBUQUERQUE STANDARD DETAILS SHALL BE MADE AT CONTRACTOR'S EXPENSE.

11. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION, AS AMENDED WITH UPDATE #4.



STREET "A"
STA. 1+00 TO XX+XX

PT NO.	STATION	OFFSET	DESC	TC
1	1+27.46.	43.06' LT	PC	60XX
2	1+56.45.	16.00' LT	PCC	60XX
3	2+62.11.	16.00' LT	PT	60XX
4	3+20.03.	16.00' LT	PC	60XX
5	3+66.86.	16.00' LT	PCC	60XX
6	6+72.14.	16.00' LT	PT	60XX
7	7+20.65.	16.00' LT	PC	60XX
8	10+83.43.	16.00' LT	PT	60XX
~~9~~	~~26+17.97.~~	~~24.00' LT~~	~~PT~~	~~6101.11~~
~~10~~	~~26+50.75.~~	~~24.00' LT~~	~~PC~~	~~6101.66~~
11	1+24.99.	39.44' RT	PC	60XX
12	1+47.00.	16.00' RT	PCC	60XX
13	2+62.11.	16.00' RT	PT	60XX
14	3+20.03.	16.00' RT	PC	60XX
15	3+66.86.	16.00' RT	PCC	60XX
16	6+72.12.	16.00' RT	PT	60XX
17	7+20.61.	16.00' RT	PC	60XX
18	10+83.43.	16.00' RT	PT	60XX
~~19~~	~~3+66.06.~~	~~16.00' RT~~	~~PCC~~	~~60XX~~
~~20~~	~~3+66.06.~~	~~16.00' RT~~	~~PCC~~	~~60XX~~

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS
The bench mark is a standard USC&GS brass tablet stamped "Tumble 1969" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tennyson Street and San Antonio Drive.
Plane coordinates: X=425 465.55 Y=1513 470.01
Ground-to-grid factor 0.99961970
Elevation = 6009.155 feet

AS-BUILT INFORM.
CONTRACTOR
WORK STAKED BY
INSPECTED BY
FIELD VERIFICATION BY
AS-BUILTING BY
CORRECTED BY
MICRO-FILM INFORMA
RECORDED BY
NO.

ENGINEER'S SEAL

NO.	BY	REMARKS	DATE
		REVISIONS	
		DESIGN	DATE 2/94
		DESIGNED BY PR	
		DRAWN BY JAQ	DATE 2/94

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE I-B
PAVING PLAN & PROFILE
STREET "A" STA. 1+00 TO 12+00 (SOUTH)

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN			WATER		
TRANSPORTATION			WASTE WATER		
HYDROLOGY					

DRAWING NO. XX.XX
MAP NO. E23 F23
SHEET XX OF XX
BHI JOB NO. 95325.40

F-2