CITY OF
Albuquerque

Martin J. Chávez, Mayor

October 1,1997

Jake Bordenave
Bordenave Designs
P.O. Box 91194
Albuquerque, New Mexico 87199

RE: ENGINEER CERTIFICATION FOR CHAMISA ELEMENTARY SCHOOL
(D11-D11) CERTIFICATION STATEMENT DATED 9/11/97

Dear Mr. Bordenave:

Based on the information provided on your October 1,1997 resubmittal, Engineer Certification for the above referenced site is acceptable.

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

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Associate Engineer

CITY OF
Albuquerque

August 13, 1996

Martin J. Chávez, Mayor

Jake Bordenave
Bordenave Designs
P.O. Box 91194
Albuquerque, NM 87199

RE: DRAINAGE PLAN FOR PHASE II CHAMISA ELEMENTARY SCHOOL
(D11-D11) ENGINEER'S STAMP DATED 5/17/96.

Dear Mr. Bordenave:

Based on the information provided on your July 22, 1996 submittal, the above referenced site is approved for Building Permit.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, Engineer Certification per the D.P.M. checklist will be required prior to Certificate of Occupancy release.

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

Sincerely,

Bernie J. Montoya

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 8, 1996

J. Bordenave, PE
Bordenave Designs
P.O. Box 91194
Albuquerque, NM 87199-1194

RE: ENGINEER'S CERTIFICATION FOR WESTSIDE ELEMENTARY (D-11/D11)
RECEIVED JANUARY 2, 1995 FOR CERTIFICATE OF OCCUPANCY
ENGINEER'S STAMP DATED 12/29/95

Dear Mr. Bordenave:

Based on the information included in the submittal referenced above, City Hydrology accepts the Engineer's Certification of grading & drainage for Certificate of Occupancy. Contact Vicki Chavez at Code Administration to obtain the Certificate of Occupancy for 5401 Homestead Circle NW.

If I can be of further assistance, You may contact me at 768-2727.

Sincerely,

John P. Curtin

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

c: Andrew Garcia

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 28, 1995

Jake Bordenave
Bordenave Designs
P.O. Box 91194
Albuquerque, NM 87199

RE: REVISED DRAINAGE PLAN FOR WESTSIDE ELEMENTARY (D11-D11)
REVISION DATED 3/23/95.

Dear Mr. Bordenave:

Based on the information provided on your March 24, 1995 resubmittal, the above referenced site is approved for Building Permit.

Please attach a copy of the approved plan to the construction sets prior to sign-off by Hydrology.

Also, prior to Certificate of Occupancy release, Engineer Certification per the D.P.M. checklist will be required. A critical portion of certification is as-built information where the development run-off will enter into the channel.

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

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
File

DRAINAGE MANAGEMENT PLAN

FOR

SHENANDOAH UNIT II AND III

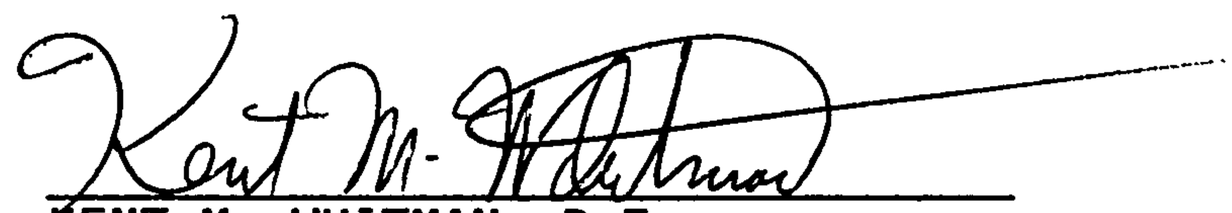
PREPARED FOR:

BELLAMAH COMMUNITY DEVELOPMENT

PREPARED BY:

COMMUNITY SCIENCES CORPORATION

DECEMBER, 1985



KENT M. WHITMAN, P.E.

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	1/12
		JJB	12/02/94

CALCULATIONS

NOTES:

1. Offsite flow data from Plate 3
2. Onsite proposed flow data from Plate 4
3. Calculations based on ultimate development as shown on Plate 4 and Phase II Grading Plan.
4. The site is presently developed as the Maria Hughes satelite school. The site is not in use.
5. Downstream Facilities are fully developed. Basin A requires flow control per report for Shenandoah Subdivision. BASIN B is allowed direct discharge per report for Maria Hughes satelite school.
6. Upstream areas are to be considered fully developed when considering offsite flows

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE (TABLE 4)	TREATMENT AREA	EXCESS PRECIPITATION (TABLE 8)	PEAK RUNOFF (TABLE 9)	RUNOFF VOLUME	RUNOFF RATE
-	-	year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
Undaveloped		10	A	222100	0.08	0.24	1481	1.22
			B	12200	0.22	0.76	224	0.21
			C	12200	0.44	1.49	447	0.42
			TOTAL	246500			2152	1.85
	-							
		100	A	222100	0.44	1.29	8144	6.58
			B	12200	0.67	2.03	681	0.57
			C	12200	0.99	2.87	1007	0.80
			TOTAL	246500			9832	7.95
		10	A	561700	0.08	0.24	3745	3.09
			B	25325	0.22	0.76	464	0.44
			C	49000	0.44	1.49	1797	1.68
			TOTAL	636025			6006	5.21
	2	100	A	561700	0.44	1.29	20596	16.63
			B	25325	0.67	2.03	1414	1.18
			C	49000	0.99	2.87	4043	3.23
			TOTAL	636025			26053	21.04
Developed	A OFFSITE	100	A	87500	0.44	1.29	3208	2.59
			B	67600	0.67	2.03	3774	3.15
			C	273600	0.99	2.87	22572	18.03
			D	53800	1.97	4.37	8832	5.40
			TOTAL	482500			38386	29.17

2/12

850'-20
×40 = D
×10 = C
[C + C(0.5)] : 300
= D RES.

135200 ⌀ YRD
67600 B
67600 C

BALANCE
A 87500
B 8750
C 75000

12

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE (TABLE 4)	TREATMENT AREA	EXCESS PRECIPITATION (TABLE 8)	PEAK RUNOFF (TABLE 9)	RUNOFF VOLUME	RUNOFF RATE
-		year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
Developed	A10	10	A	176715	0.08	0.24	1178	0.97
			B	78445	0.22	0.76	1438	1.37
			C	31810	0.44	1.49	1166	1.09
			D	300	1.24	2.89	31	0.02
			TOTAL	287270			3813	3.45
		100	A	176715	0.44	1.29	6480	5.23
			B	78445	0.67	2.03	4380	3.66
			C	31810	0.99	2.87	2624	2.10
			D	300	1.97	4.37	49	0.03
			TOTAL	287270			13533	11.02
	A20	10	A	66525	0.08	0.24	444	0.37
			B	15980	0.22	0.76	293	0.28
			C	26150	0.44	1.49	959	0.89
			D	24895	1.24	2.89	2572	1.65
			TOTAL	133550			4268	3.19
		100	A	66525	0.44	1.29	2439	1.97
			B	15980	0.67	2.03	892	0.74
			C	26150	0.99	2.87	2157	1.72
			D	24895	1.97	4.37	4087	2.50
			TOTAL	133550			9575	6.93
	A21	10	A	45425	0.08	0.24	303	0.25
			C	73395	0.44	1.49	2691	2.51
			TOTAL	118820			2994	2.76
		100	A	45425	0.44	1.29	1666	1.35
			C	73395	0.99	2.87	6055	4.84
			TOTAL	118820			7721	6.19
	A30	10	C	7275	0.44	1.49	267	0.25
			D	3490	1.24	2.89	361	0.23
			TOTAL	10765			628	0.48

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE (TABLE 4)	TREATMENT AREA	EXCESS PRECIPITATION (TABLE 8)	PEAK RUNOFF (TABLE 9)	RUNOFF VOLUME	RUNOFF RATE
-		year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
Developed	A30	100	C	7275	0.99	2.87	600	0.48
			D	3490	1.97	4.37	573	0.35
			TOTAL	10765			1173	0.83
	A31	10	C	14545	0.44	1.49	533	0.50
			D	7030	1.24	2.89	726	0.47
			TOTAL	21575			1259	0.97
		100	C	14545	0.99	2.87	1200	0.96
			D	7030	1.97	4.37	1154	0.71
			TOTAL	21575			2354	1.67
	A32	10	B	1765	0.22	0.76	32	0.03
			D	2510	1.24	2.89	259	0.17
			TOTAL	4275			291	0.20
		100	B	1765	0.67	2.03	99	0.08
			D	2510	1.97	4.37	412	0.25
			TOTAL	4275			511	0.33
	A33	10	B	8735	0.22	0.76	160	0.15
			D	33010	1.24	2.89	3411	2.19
			TOTAL	41745			3571	2.34
		100	B	8735	0.67	2.03	488	0.41
			D	33010	1.97	4.37	5419	3.31
			TOTAL	41745			5907	3.72
	A34	10	D	4880	1.24	2.89	504	0.32
		100	D	4880	1.97	4.37	801	0.49

4/12

4/12

CONDITION	BASIN	STORM RETURN PERIOD	TREATMENT TYPE (TABLE 4)	TREATMENT AREA	EXCESS PRECIPITATION (TABLE 8)	PEAK RUNOFF (TABLE 9)	RUNOFF VOLUME	RUNOFF RATE
-	-	year	-	sq. ft.	in.	cfs/acre	cu. ft.	cfs
Developed	A35	10	B	25370	0.22	0.76	465	0.44
			C	51930	0.44	1.49	1904	1.78
			D	101315	1.24	2.89	10469	6.72
			TOTAL	178615			12838	8.94
		100	B	25370	0.67	2.03	1416	1.18
			C	51930	0.99	2.87	4284	3.42
			D	101315	1.97	4.37	16632	10.16
			TOTAL	178615			22332	14.76
	B10	10	A	15625	0.08	0.24	104	0.09
			B	19635	0.22	0.76	360	0.34
			C	5275	0.44	1.49	193	0.18
			D	37415	1.24	2.89	3866	2.48
			TOTAL	77950			4523	3.09
		100	A	15625	0.44	1.29	573	0.46
			B	19635	0.67	2.03	1096	0.91
			C	5275	0.99	2.87	435	0.35
			D	37415	1.97	4.37	6142	3.75
			TOTAL	77950			8246	5.47
	B11	10	B	36860	0.22	0.76	676	0.64
			D	80015	1.24	2.89	8268	5.31
			TOTAL	116875			8944	5.95
		100	B	36860	0.67	2.03	2058	1.72
			D	80015	1.97	4.37	13136	8.03
			TOTAL	116875			15194	9.75
	B20	10	A	4025	0.08	0.24	27	0.02
		100	A	4025	0.44	1.29	148	0.12

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	6/12
		JJB	12/02/94

EXISTING CONDITION (See Grading & Drainage by T. Mann & Assoc. 07/09/87)

BASIN 1 (100 year data)

Runoff Source	Land Treat	Area (s.f.)	Vol. Coeff. (in)	Rate Coeff (cfs/ac)	Runoff Vol. (ft^3)	Runoff Rate (cfs)
Natural <10%	A	17825	0.44	1.29	654	0.53
Landscape	B	117190	0.67	2.03	6543	5.46
Natural >10%<20%	B	10600	0.67	2.03	592	0.49
Natural >20%	C	10625	0.99	2.87	877	0.70
Roof	D	9975	1.97	4.37	1638	1.00
Paving	D	58160	1.97	4.37	9548	5.83
Total		185325			19852	14.01
vs.						
T. Mann & Assoc. data		185325			7715	9.9

BASIN 2 (100 year data)

Runoff Source	Land Treat.	Area (s.f.)	Vol Coeff (in)	Rate Coeff (cfs/ac)	Runoff Vol (ft^3)	Runoff Rate (cfs)
Natural <10%	A	293250	0.44	1.29	10753	8.68
Landscape	B	87500	0.67	2.03	4885	4.08
Natural >10%,<20%	B	31215	0.67	2.03	1743	1.45
Playground	C	180067	0.99	2.87	14856	11.86
Natural >20%	C	61295	0.99	2.87	5057	4.04
Roof	D	31105	1.97	4.37	5106	3.12
Paving	D	12875	1.97	4.37	2114	1.29
Total		697307			44514	34.52
vs.						
T. Mann & Assoc. data		697307			11625	30.5

NOTE: The T. Mann & Assoc. calculations were based on a calculation procedure requested by the City of Albuquerque which was later determined to be incorrect. The method underestimates the runoff from impervious surfaces.

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	7/12
		JWB	12/02/94

PROPOSED CONDITION (See Basin Map & Grading Plans)

BASIN A

$A_{20} + A_{21}$ - Orifice Grate

Q = 13.97 cfs
sump condition w/ depth = 0.5'

Required Opening 4.1 ft^2
Use COA Single Grate Type 'D' w/ Area = 4.5 ft^2

A_{20+21} - Storm Drain Pipe

Approx. Grade

(87 - 2.5 - 73)/380 = 0.030 ft/ft

Pipe Size
Use 18" CMP w/ depth = 1.1ft

Inlet Condition (HEC 5)

HW/D = 1.4 HW = 2.1 ft. minimum
Set Invert 3.0 ft. below Grate

A_{30} - Broadcrested Weir

Q = 0.83 cfs
$= CLH^{1.5}$, w/ C = 2.8 & H = 0.45 ft
L = 0.98'
Use 1 foot wide sidewalk culvert

$A_{30} + A_{31}$ - Orifice Grate

Q = 2.50 cfs
$= CA\sqrt{2gh}$ w/ C = 0.60, h = 0.5
A = 0.75 s.f.
Use Neenah R-4421

$A_{30} + A_{31}$ - Storm Drain Pipe

Approx. Grade
Set @ 2 %
Use 10" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ C = 0.6, 10" pipe
h = 0.9 ft

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	8/12
		JJB	12/05/94

PROPOSED CONDITION (cont.)

BASIN A (cont.)

A32 - Orifice Grate

$Q = 0.33$ cfs
$= 0.6 A\sqrt{2gh}$, w/ $C = 0.6$, $h = 0.5$ ft.
$A = 0.10$ s.f.
Use Neenah R-4441

A32 - Storm Drain

Approx. Grade
Set @ 2%
6" PVC Pipe min.
Use 10" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ $C = 0.6$, 10" pipe
$h = 0.1$ ft. (the pipe is not full)

A33 - Weir Grate

$Q = 3.72$ cfs
$= CLH^{3/2}$, w/ $C = 3.2$, $H = 0.15$ ft
$L = 20.0$ ft
Use 6 - Neenah R-4450 on 2 runs of 3 each

A33 - Storm Drain

Approx. Grade
set @ 2%
$Q = 3.72/2 = 1.86$ cfs
Use 10" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ $C = 0.6$
$h = 0.5$ ft

A30 + A31 + ½ A33 - Storm Drain

Approx. Grade
set @ 2%
$Q = 2.5 + 1.86 = 4.36$ cfs
Use 12" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ $C = 0.6$
$h = 1.33$ ft.

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	9/12
		JJB	12/05/94

PROPOSED CONDITION (cont.)

BASIN A (cont)

A30 + A31 + A32 + A33 - Storm Drain

Approx Grade
Set @ 1.25%
Q = 2.5 + 0.33 + 3.72 = 6.55 cfs
Use 15" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ C=0.6
h = 1.23 ft

A34 - Orifice Grate
Q = 0.49 cfs
$= CA\sqrt{2gh}$, w C=0.6, h=0.5
A = 0.14 s.f
Use Neenah R-4441

A34 - Storm Drain

Approx. Grade
Set @ 2%
6" PVC min
Use 10" PVC Pipe
Inlet Condition
$Q = CA\sqrt{2gh}$ w/ C=0.6
h = 0.03 ft (pipe not flowing full)

A30 + A31 + A32 + A33 + A34 - Storm Drain

Approx. Grade
set @ 1.25%
Q = 6.55 + 0.49 = 7.04 cfs
Use 15" PVC Pipe w/ surcharge (req'd grade: 1.6%)
Inlet Condition
$Q = CA\sqrt{2gh}$ w/C=0.6
h = 1.42 ft.

Basin A Detention Pond

Allowable discharge rate 2.17 cfs per acre (See Shenandoah I & II Drainage Management Plan by Community Sciences Corp dated 12/85). Also the total discharge rate is limited to 58 cfs (downstream capacity)
Basin A onsite Area = 15.67 Ac, ∴ discharge = (15.67)(2.17) = 34.01 cfs
or discharge = (58 - 29.17) = 28.83 cfs
Basin A Direct Discharge (A10 + A20) = 17.95 cfs

PROPOSED CONDITION

BASIN A (cont.)

Basin A Detention Pond (cont.)

Detention Pond Allowable Discharge (28.83-17.95) = 10.88 cfs
Peak Discharge into Pond (Basins A30 to A35) = 21.80 cfs
Set pipe 3" above pond bottom (nuisance water storage)

Maximum head on outlet pipe (assume "pipe)

Water surface	5176
Pipe bottom	5173
Water depth	3
½ Pipe diam	0.75
Maximum head	2.25

$Q = Ca\sqrt{2gh}$

where C = 0.60, g = 32.2, h = 2.25, Q = 10.88
therefore a = 1.51 s.f. r = 0.70ft use 18" CMP

Emergency Overflow

100 year discharge = 21.80 cfs

$Q = CLH^{3/2}$

where C = 2.8, H = 0.95ft, Q = 21.80
therefore L = 8.4 use 10 ft

Pond Characteristics

Elevation	surface Area	Volume (diff)
73	4560	
		5256
74	5952	(1400)
		6656
75	7360	(1503)
		8159
76	8958	
		20071

Use single equation for pond volume

Volume = $(4560 + ((8958-4560)d/3 + 4560))d/2$

depth = $\sqrt{0.00136V + 9.67524} - 3.11050$

BORDENAVE DESIGNS	WESTSIDE ELEMENTARY SCHOOL	9427	11/12
		JJB	12/07/94

PROPOSED CONDITION

BASIN A (cont.)

Basin A Detention Pond (cont.)

Pond Routing

Runoff Areas - B = 35870ft², C = 73750 ft², D = 152235ft²

Note: Col. 2,3,4,5 & 9 are incremental; col. 10 is accumulative

Time [1]	Rainfall [2]	B Runoff [3]	C Runoff [4]	D Runoff [5]	Inflow [6]	Depth [7]	Ave Head [8]	Outflow [9]	Storage [10]
min.	in.	in.	in.	in.	cu. ft	ft	ft	cu ft	cu ft
0									
20	0.0190	-	-	-	-	-			
40	0.0247	-	-	-	-	-			
60	0.0361	-	-	-	-				
70	0.0581	-	-	0.0379	481	0	0	0	481
74	0.1071	-	-	0.1058	1342	0.103	0	0	1823
76	0.0861	-	-	0.0848	1076	0.376	0.222	60	2839
78	0.1133	-	0.0944	0.1120	2001	0.568	0.483	125	4715
80	0.1443	0.0887	0.1166	0.1430	2796	0.900	0.847	364	7158
82	0.1798	0.1381	0.1521	0.1785	3612	1.293	1.258	697	10073
84	0.2193	0.1776	0.1916	0.2180	3985	1.724	0.927	983	13074
86	0.2029	0.1612	0.1752	0.2016	4116	2.130	1.313	1170	16020
88	0.0849	0.0432	0.0572	0.0836	1541	2.495	1.514	1256	16305
90	0.0717	0.0300	0.0440	0.0704	1253	2.534	1.533	1264	16294
92	0.0638	0.0221	0.0361	0.0625	1081	2.532	1.521	1259	16114
94	0.0580	0.0163	0.0303	0.0567	954	2.510			
96	0.0533	0.0118	0.0258	0.0522	856				
98	0.0496	0.0079	0.0219	0.0483	771				
100	0.0463	0.0046	0.0186	0.0450	699				
102	0.0435	0.0018	0.0158	0.0422	638				
104	0.0409	-	0.0132	0.0396	584				

PROPOSED CONDITION

BASIN A (cont.)

BASIN A DETENTION POND (cont)

Pond Summary

Allowable discharge rate	10.88 cfs
Actual discharge rate	10.53 cfs
Required Pond Volume	16305 c.f.
Provided Pond Volume	20071 c.f.

18" Diameter outfall set 3" above bottom of pond

10' Wide emergency spillway

Pond depth 3 ft. (provide fencing)

BASIN B

BASIN 10

Sidewalk Culvert (onsite)

$Q = CLH^{3/2}$

where $C = 2.8$, $H = 0.45$ ft, $Q = 5.47$ cfs

therefore $L = 6.47$ ft. Use 3 - 2 foot wide

BASIN 11

Existing Outfall thru existing drivepad.

existing flow rate 14.01 cfs (see sht c)

proposed flow rate 15.22 cfs (negligible difference)

SHENANDOAH UNIT II & III

TRAINER DIKES INTO CHANNEL

CALCULATIONS

MANNING @ ENTRANCE

MAIN FLOW

Q=36 $n = 0.03$ $S = \frac{4}{210} = 0.019$ $SS_1 = 50$

$SS_2 = 50$ $W = 0$ $D_1 = ?$ $D_2 = 0$

$D_1 = 0.51'$ $V = 2.77'$ $F = 0.97$

NATURAL CONDITION IS SUBCRITICAL

SIDE FLOW

Q = 22 $n = 0.03$ $S = 0.005$ $SS_1 = 33$

$SS_2 = 16$ $W = 0$ $D_1 = ?$ $D_2 = 0$

$D_1 = 0.71'$ $V = 1.76$ fps $F = 0.52'$

NATURAL CONDITION IS SUBCRITICAL

POOL DEPTH

ASSUME SIDE FLOW WITH TOTAL MOMENTUM LOST (CONSERVATIVE)

$$V_{TOTAL} Q_T = V_{MAIN} Q_{MAIN} + V_{SIDE} Q_{SIDE}$$

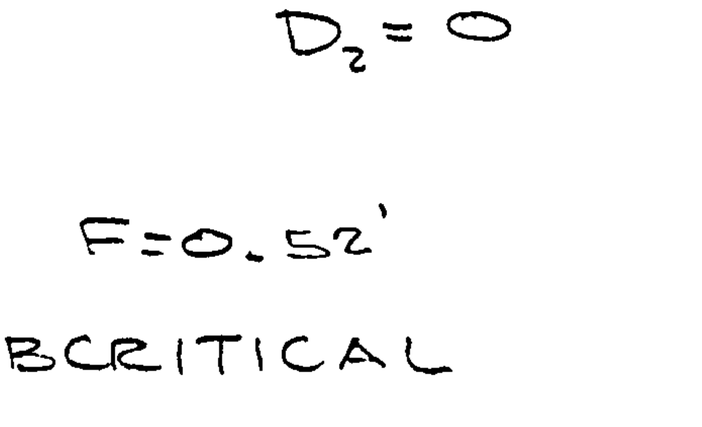
$$V_T = \frac{V_M Q_M}{Q_T} = \frac{2.77(36)}{58} = 1.72 \text{ fps}$$

$Q = VA$ Q = 58 $V = 1.72$ fps

$$A = \frac{58 \text{ ft}^3/\text{s}}{1.72 \text{ fps}} = 33.72 \text{ ft}^2$$

$A = by + y^2 z$ (TRAPEZOID)

$b = 25'$ $z = 3$ $A = 33.72 \text{ ft}^2$



$y = 1.0 \rightarrow A = 28 \text{ ft}^2$

$y = 1.2 \rightarrow A = 34.3 \text{ ft}^2$

$y = 1.18 \rightarrow A = 33.7 \text{ ft}^2$

POOL DEPTH = 1.18'

WING WALL FORMULA

$Y = C + kx^2$ @ $x = 0$ $Y = 15 \rightarrow C = 15$

$Y = 15 + kx^2$

$Y = 25'$ ENTRANCE WIDTH

$X = 50'$ LENTH OF DIKES

$25 = 15 + k(50)^2$

$k = \frac{25 - 15}{(50)^2} = 0.004$

$Y = 15 + 0.004\,x^2$

SECTION	X	Y
5	0	15
4	10	15.4
3	20	16.6
2	30	18.6
1	40	21.4
0	50	25.0

5

ENTRANCE → FLOW ENTERS AT CRITICAL DEPTH

$Q = 58$ $SS_1 = 3$

$SS_2 = 3$ $W = 25'$ $D_1 = ?$ $D_2 = 0$

$\rightarrow D_c = 0.54'$ $V_c = 4.06$ fps

CONCLUSION 8

FLOW POOLS UP BEFORE ENTERING TRAINER DIKES TO A DEPTH OF 1.18'

FLOW THEN ENTERS TRAINER DIKES AT CRITICAL DEPTH OF 0.54' and 4.06fps

FLOW IS ACCELERATED THRU TRAINER DIKES THRU SUPERCRITICAL AT ENTERS CONCRETE CHANNEL AT A DEPTH OF 0.68' AND 5.83 fps

FLOW CONTINUES THROUGH CONCRETE CHANNEL AT SUPERCRITICAL AND REACHES A NORMAL DEPTH OF 0.64' AND 8.0 fps. with a 4" INVERTED CROWN

SINCE CHANNEL EXIT IS TANGENTIAL WITH STREET AND BOTH FLOWS ARE SUPERCRITICAL NO HYDRALILIC JUMP OR POOLING WILL OCCUR.

AFTER CHANNEL AND STREET FLOW MERGE, STREET REACHES A NORMAL DEPTH OF 0.58' AND 8.9fps

CONCRETE CHANNEL

$Q = 58$ $n = 0.013$ $S = 0.014$ $SS_1 = 0$

$SS_2 = 0$ $W = 15$ $D_1 = ?$ $D_2 = 0$

→ $D_n = 0.48'$ $V = 8.00$ fps $F = 2.03$

→ $D_c = 0.77$ $V_c = 5.00$ fps

FLOW IS SUPERCRITICAL

WITH 4" INVERTED CROWN $D_n = 0.64'$ TO INVERT

$V = 8.06$ fps $F = 2.05$

STREET @ CHANNEL EXIT

$Q = 40$ cfs $n = 0.017$ $S = 0.045$ $SS_1 = 0$

$SS_2 = 0$ $W = 32'$ $D_1 = ?$ $D_2 = -0.32$

→ $D_n = 0.36'$ $V = 6.28$ fps $\therefore F = 2.48$

STREET IS SUPERCRITICAL

SINCE CHANNEL EXIT IS TANGENTIAL WITH STREET AND BOTH FLOWS ARE SUPERCRITICAL WITH COMPARATIVE VELOCITIES, NO HYDRAULIC JUMP WILL OCCUR OR POOLING

CHANNEL AND STREET FLOW: MERGED

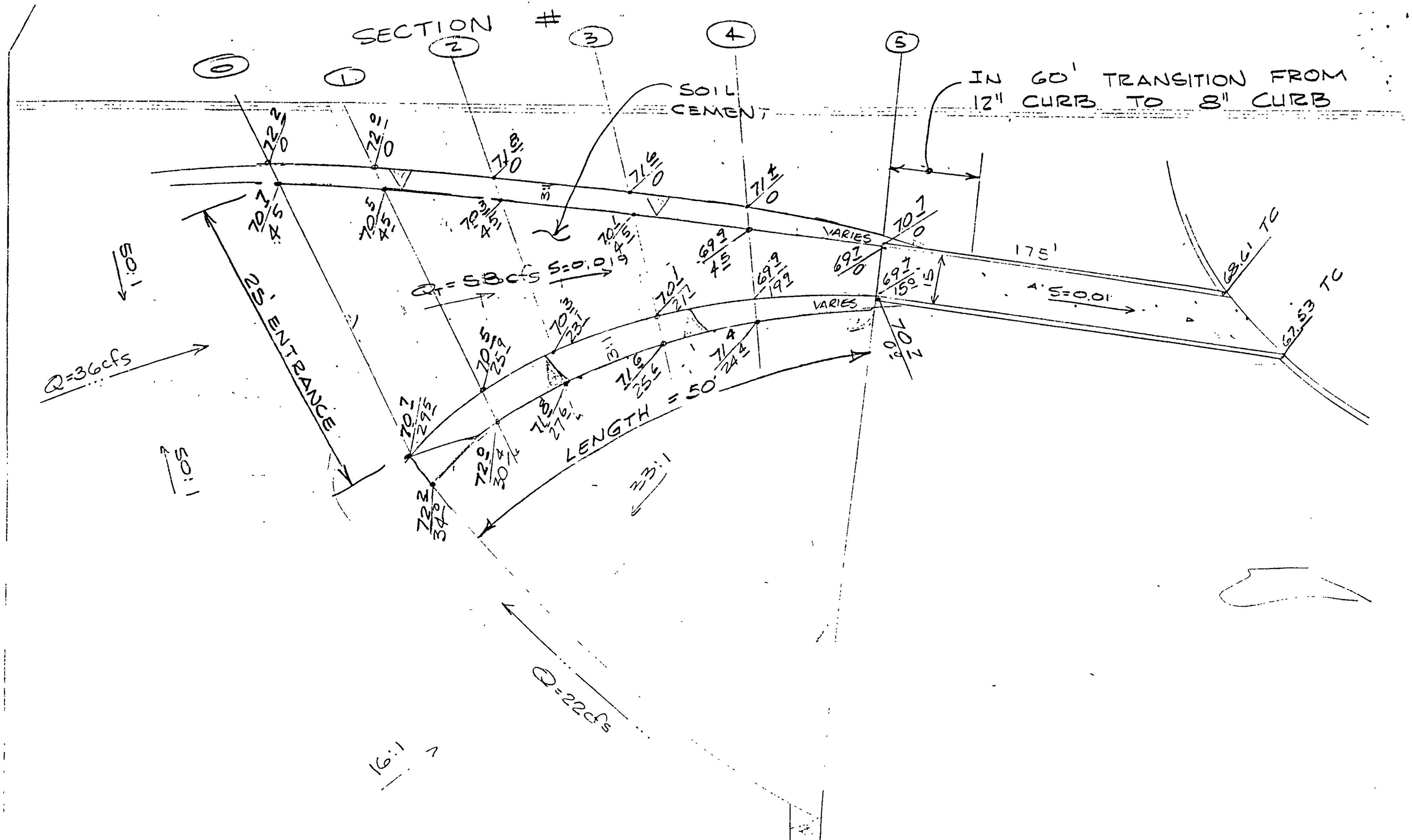
$Q = 58 + 40 = 98$ cfs $n = 0.017$ $S = 0.045$ $SS_1 = 0$

$SS_2 = 0$ $W = 32'$ $D_1 = ?$ $D_2 = -0.32'$

NORMAL DEPTH $= 0.58' < 0.87'$ OK

$V = 8.91$ fps $F = 2.68$

$V \times D = 5.2 < 6.5$ OK


SECTION #
0
1
2
3
4
5
SOIL CEMENT
IN 60' TRANSITION FROM 12" CURB TO 8" CURB
VARIES
VARIES
175'
S=0.01
68.6' TC
62.53 TC
Q_T = 58cfs S=0.015
Q=36cfs
25' ENTRANCE
LENGTH = 50'
10:1
3:1
16:1
Q=22cfs

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

July 17, 1987

Jeff Mortensen, P.E.
Tom Mann & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: REVISED DRAINAGE PLAN FOR MARIE HUGHES PORTABLE MODULAR SCHOOL
(D-11/D11) ENGINEER'S STAMP DATED JULY 9, 1987 - SHEET 2 OF 2

Dear Jeff:

Based on the information provided on your resubmittal of July 9, 1987, the above referenced plan is approved for Building Permit.

Please attach a copy of this plan to the construction sets prior to sign-off by Hydrology.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya

Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj