DRAINAGE REPORT

for

Paradise Skies Units 3 and 4

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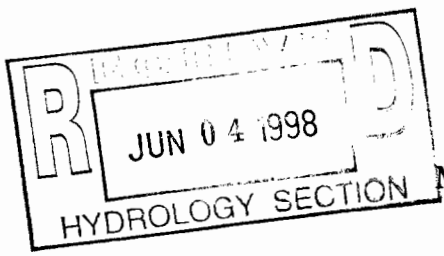

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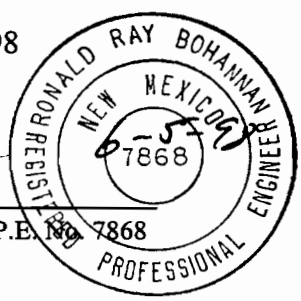

Ronald R. Bohannan P.E. No. 7868

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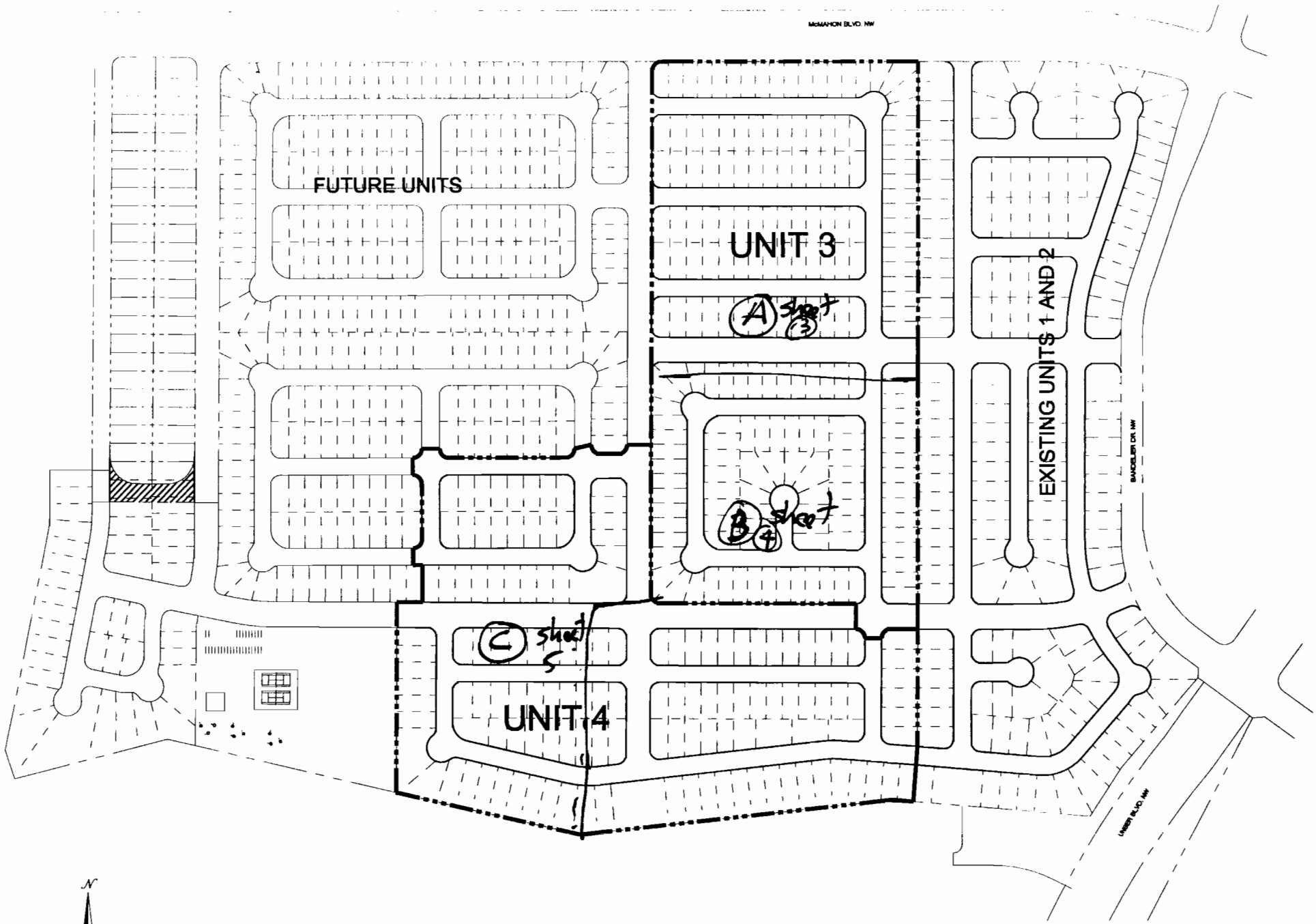
Location

Paradise Skies is a proposed single family subdivision zoned SU1-RT. It is located south of McMahon Boulevard and west of Bandelier Drive. It is located on Vicinity Map Page A-11 and contains approximately ±98 acres. The site has been previously analyzed under (A11/D3) by our office and is identified as Tract AAA Paradise Skies. Units 1 and 2 of the Paradise Skies Subdivision are already built. Units 3 and 4 are currently in the development process. The balance of the site is for future single family construction. The purpose of this report is to provide the drainage analysis and management plan to construct Units 3 and 4 containing 327 units. Site specific grading and drainage plans will be submitted for future units as they are developed. The site was previously approved under DRB 94-107. A new plat is being prepared for submittal to the City.

Existing Drainage Conditions

The previous development pattern that was used to analyze the project has changed and a different street layout will slightly modify the drainage basins prepared under the previous report (A11/D3). The existing basins identified under A11/D3 have been modified to reflect the improvements in Units 1 and 2. The area west of Unit 2 is currently undeveloped and is the location of the expansion of Units 3 and 4. We have included an overall unit layout to show the various units and their orientation (Exhibit 1).

There are four existing basins west of Units 1 and 2 shown on Exhibit 2. Basins A and B sheet flow south and west to the Arroyo de Las Calabacillas with an undeveloped runoff flow of 117.28 cfs. Basin C, with an undeveloped runoff flow of 98.02 cfs, drains to an existing desilting pond and then into the existing storm drain located in Unit 1 of Paradise Skies Subdivision. Basin D is the very north edge of the project and represents flows that would drain from the extension of McMahon Boulevard. Basin D, with a undeveloped runoff flow of 52.61



UNIT LAYOUT

EXHIBIT 1

cfs, drains northeast to the Black Channel. Flows from Basin D do not impact the site and do not need to be addressed at his time.

FEMA Map and Soil Conditions

The site is located on FIRM Map section 35001C0104 D as shown on the attached excerpt. The map shows that the site does not lie within any 100 year flood plains.

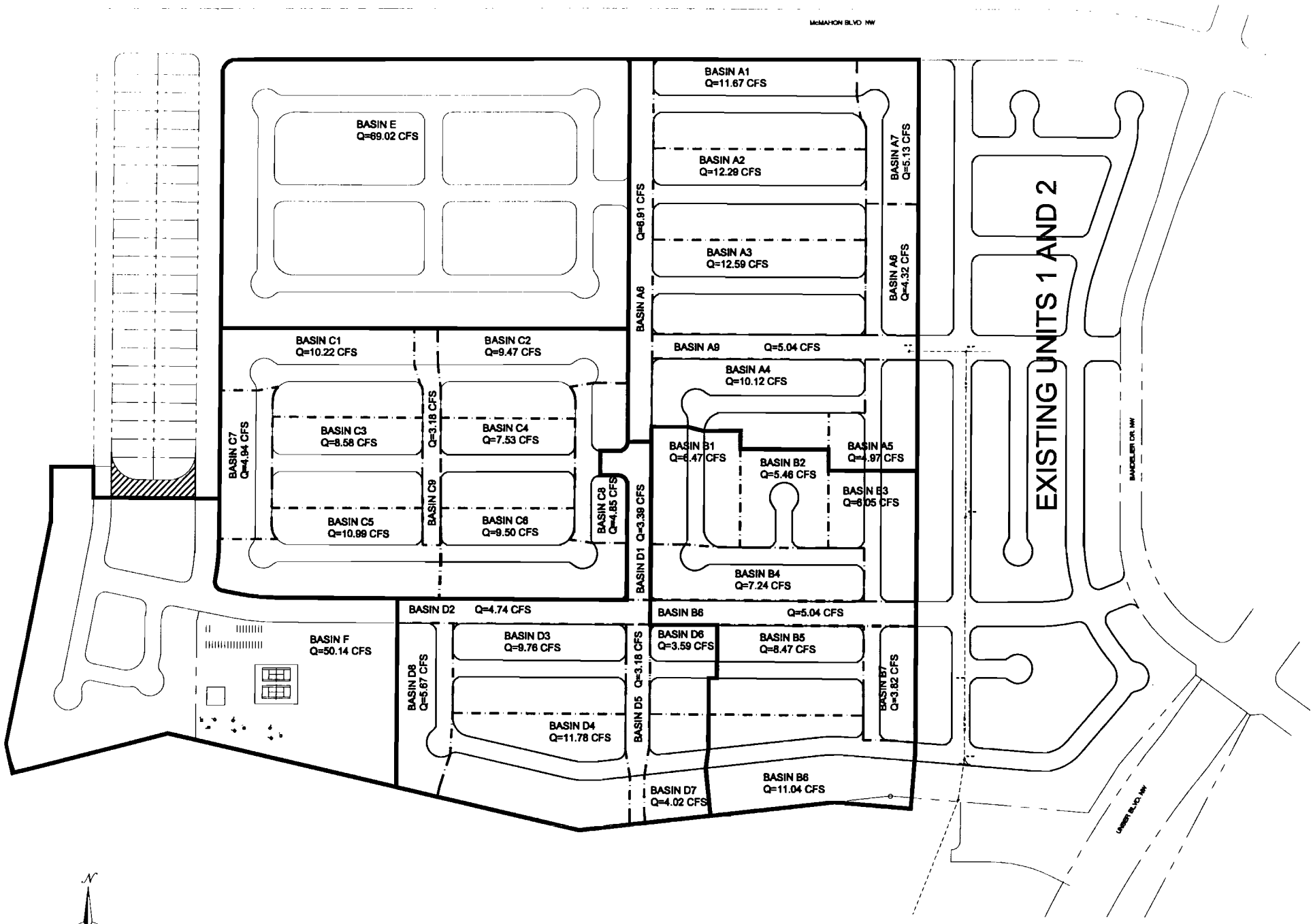
The site contains two different soils from the Soil Conservation Service Soil Survey of Bernalillo County. The soils are a Bluepoint loamy fine sand and a Madurez loamy fine sand. Both soils have slow runoff, a severe hazard of soil blowing and moderate to rapid permeability.

On Site Drainage Management Plan

The proposed drainage management plan is to collect the developed flows from six basins in three different storm drain systems. There are six proposed basins (Basins A-F) on the balance of the site shown on Exhibit 3. Basins A, B, D and a portion of Basin C will be developed with Units 3 and 4. The southeast portion of Basin C will be developed as part of Unit 4, and the rest of Basin C will be developed with future phases. Basins E and F will also be developed with future construction. The proposed improvements for Units 3 and 4 have been designed for the future developed flows from Basins E, F, and part of Basin C. When these basins are developed in the future the site specific drainage plans will be submitted.

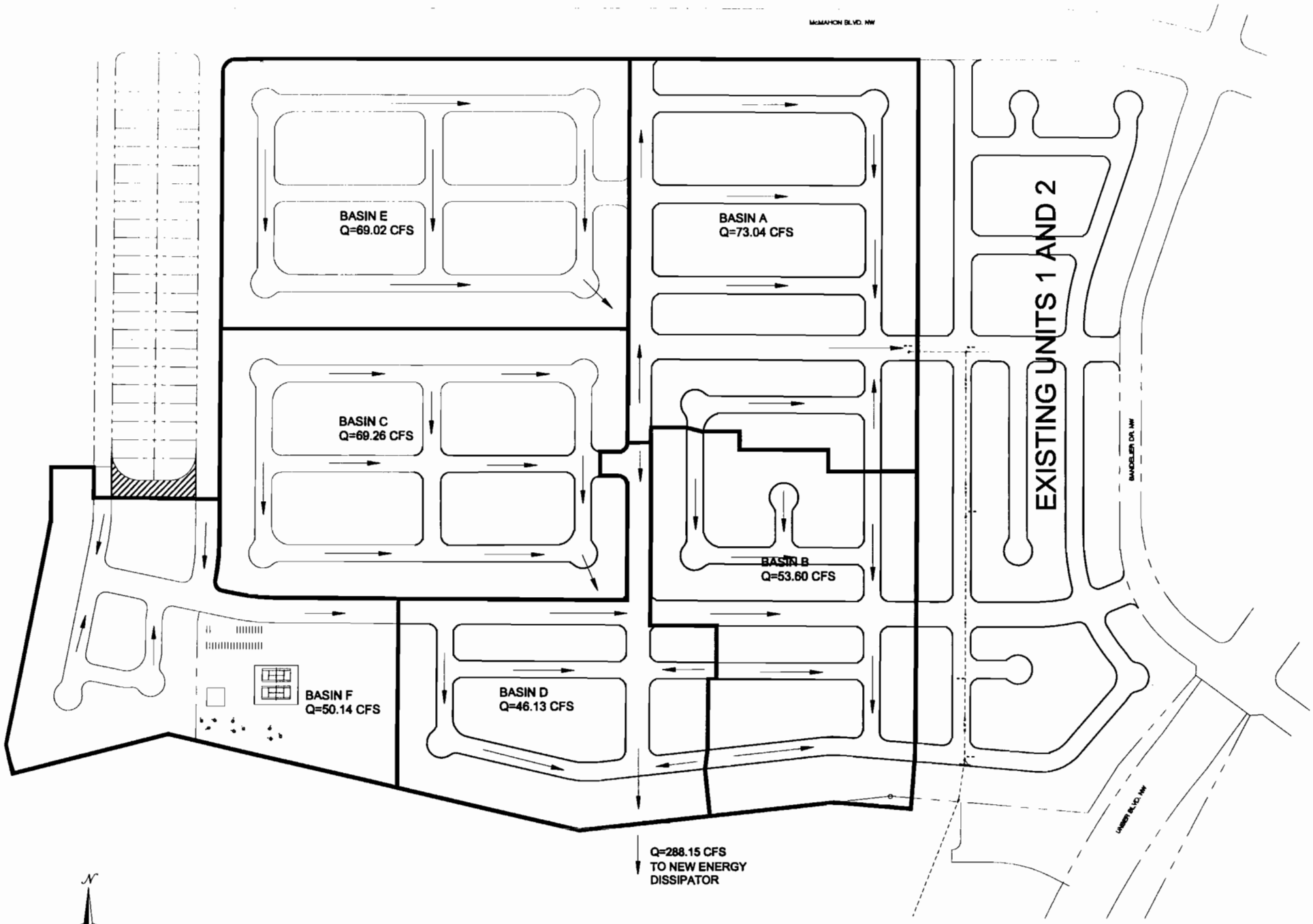
Storm Drain 'A' (Exhibit 4)

Basin A will drain a total of 70.60 cfs to the existing storm drain located in Units 1 and 2. Proposed drop inlets in Shooting Star will collect flows from the north and south sides of Aquarius Avenue. A series of six proposed drop inlets will collect the flows in Aquarius and



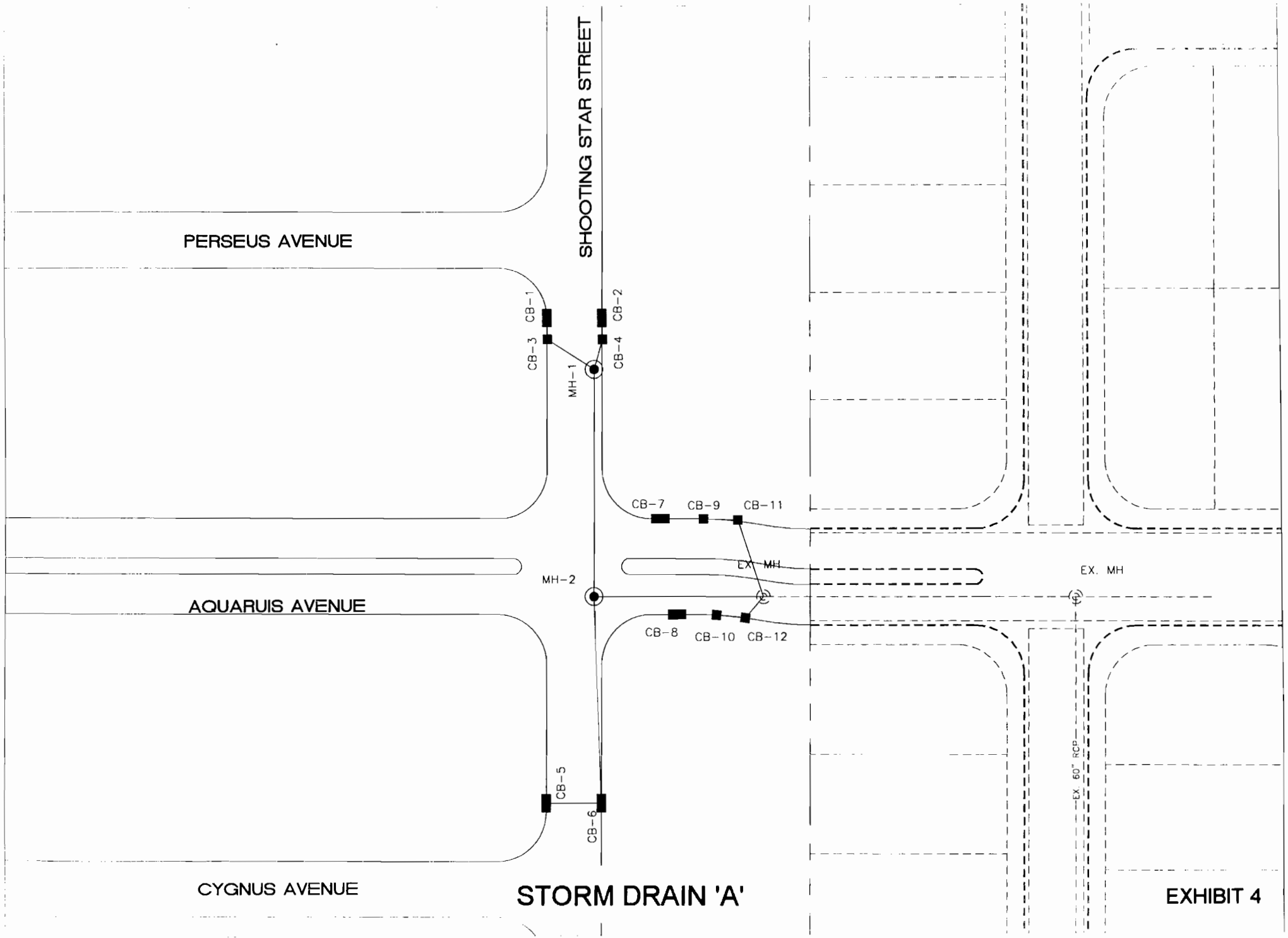
PROPOSED BASIN LAYOUT

EXHIBIT 3



PROPOSED BASIN LAYOUT

EXHIBIT 3A


PERSEUS AVENUE
SHOOTING STAR STREET
AQUARIUS AVENUE
CYGNUS AVENUE
CB-1
CB-2
CB-3
CB-4
MH-1
CB-7
CB-9
CB-11
EX. MH
MH-2
EX. MH
CB-8
CB-10
CB-12
CB-5
CB-6
EX. 60" RCP
STORM DRAIN 'A'
EXHIBIT 4

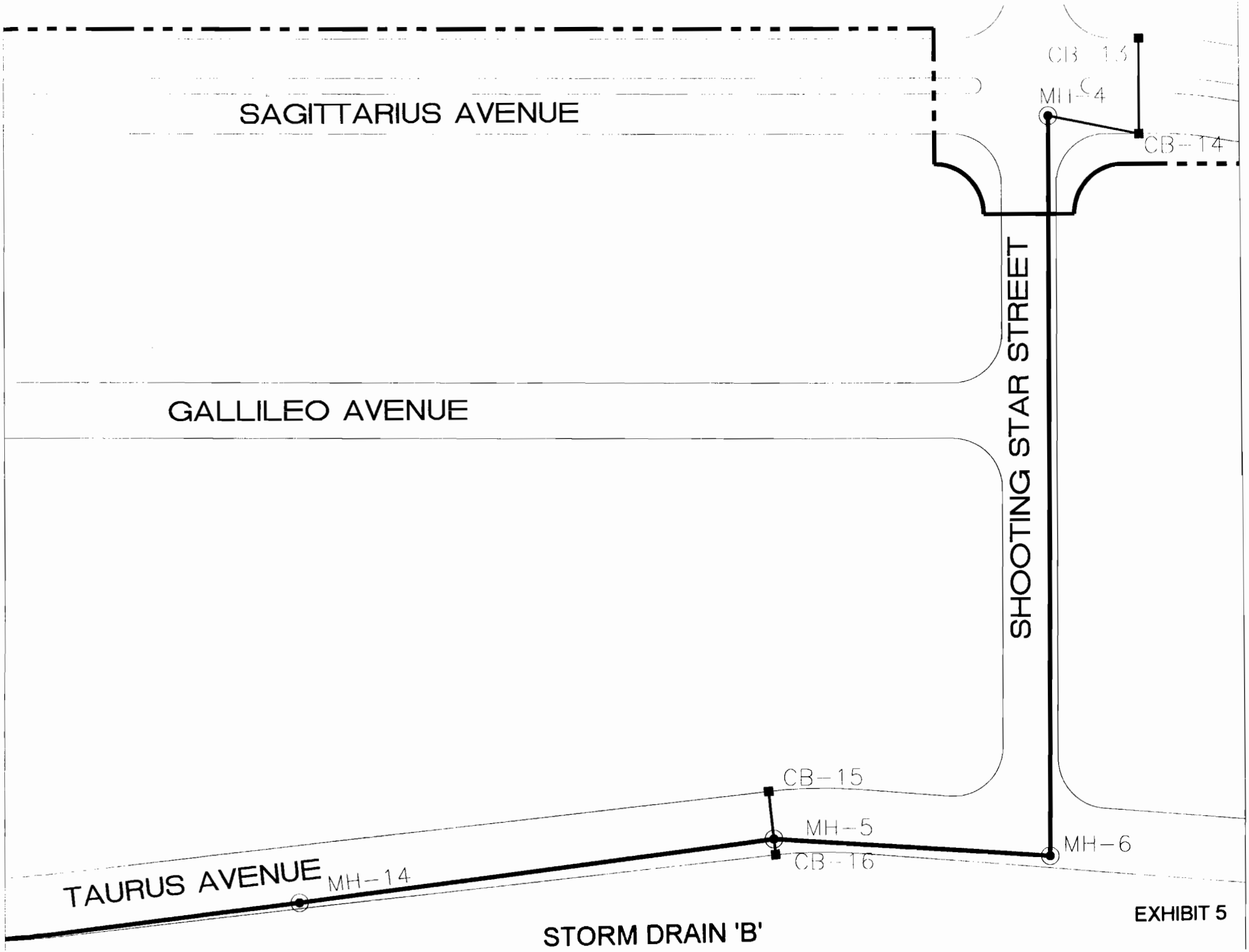
transport the flows via a proposed 42" pipe to the existing storm drain. The proposed 42" RCP will connect to the existing 48" RCP storm drain installed in Unit 1 of Paradise Skies. The existing 48" storm drain has capacity for the developed flows generated in Unit 3 of 104.61 cfs. However, only 70.60 cfs of developed flow will be entering the storm drain from Basin A. The existing 48" storm line drains through Units 1 and 2 and discharges to the Swinburn Dam via an existing energy dissipator.

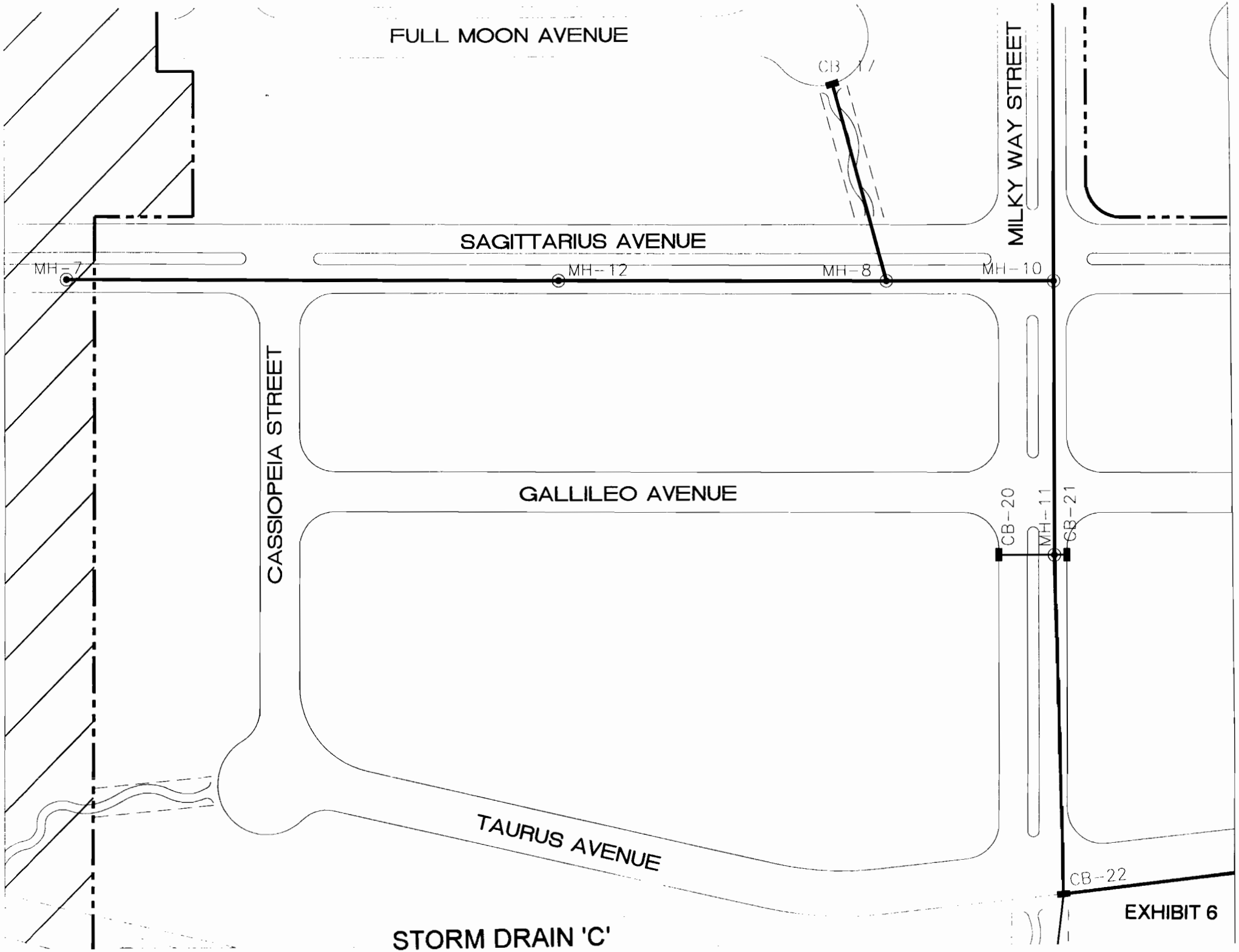
Storm Drain 'B' (Exhibit 5)

Basin B has a total developed flow rate of 53.60 cfs and will drain via a new energy dissipator to the Swinburn Dam. Two single 'A' drop inlets in Sagittarius will collect 30.26 cfs of developed flow. This flow will be conveyed via a new 30" RCP pipe in Taurus Avenue. The balance of the developed flow (23.34) will be carried by surface flow to Taurus Avenue. These remaining flows will be captured in two single 'A' drop inlets in Taurus Avenue. The flows from Basin B of 53.60 cfs will be conveyed via a 36" pipe to the new storm drain (Storm Drain 'C') in Milky Way Street.

Storm Drain 'C' (Exhibit 6)

This is the most extensive of the three storm drain systems being designed. This storm drain collects the flows from Storm Drain 'B' along with Basins C, D, E, and F. This storm drain will discharge a total of 288.15 cfs to the Swinburn Dam through a 66" RCP pipe. The northern Basin E will drain a future developed flow of 69.02 cfs to a 42" RCP pipe in Milky Way that will convey the developed flows south to the Swinburn Dam. Basin F to the west of the units being developed will contribute 50.14 cfs of future developed flows via a 36" pipe. Basin C will drain southeast to two double 'A' drop inlets. The drop inlets will capture the developed flows of 69.26 cfs. The flows from Basin C will be conveyed to Milky Way via a 42" pipe. Basin D also


SAGITTARIUS AVENUE
GALLILEO AVENUE
TAURUS AVENUE
SHOOTING STAR STREET
CB-13
MH-4
CB-14
CB-15
MH-5
CB-16
MH-6
MH-14
EXHIBIT 5
STORM DRAIN 'B'


FULL MOON AVENUE
CB - 17
MILKY WAY STREET
SAGITTARIUS AVENUE
MH - 7
MH - 12
MH - 8
MH - 10
CASSIOPEIA STREET
GALLILEO AVENUE
CB - 20
MH - 11
CB - 21
TAURUS AVENUE
CB - 22
EXHIBIT 6
STORM DRAIN 'C'

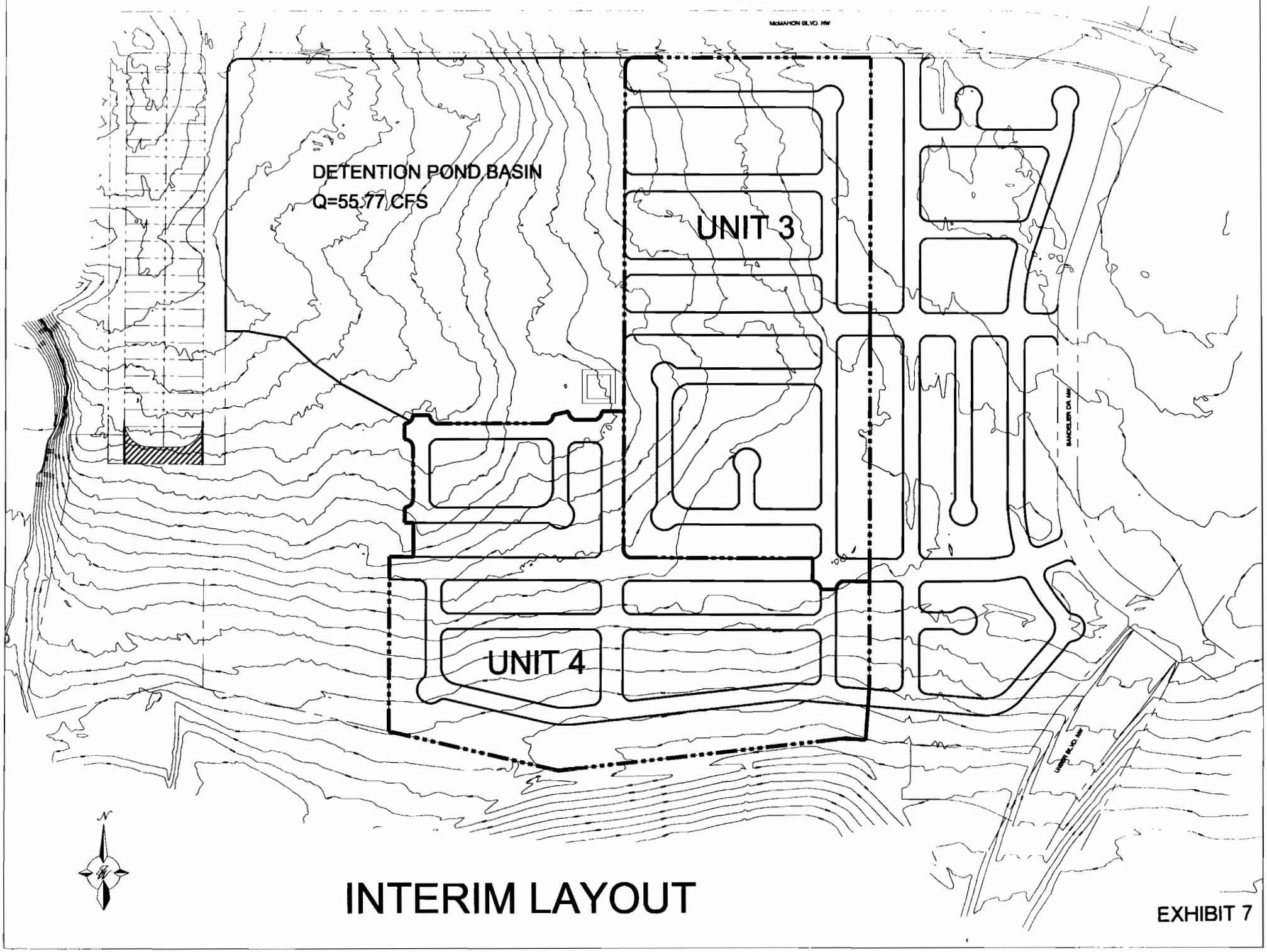
drains to Milky Way Drive and will contribute 46.13 cfs of developed flows. Two double 'A' drop inlets will capture 21.48 cfs of the flow in Milky Way Drive to ensure street capacity for the remaining flows. The balance of Basin D (24.65 cfs) will be captured at the south end of Milky Way Drive where a double 'A' drop inlet will be located and the flows conveyed to the proposed storm drain. The 53.60 cfs of developed flows from Basin B will connect to storm drain 'C' at Milky Way Street. At this point, the proposed storm drain will be carrying 288.15 cfs of developed flows from basins B, C, D, E, and F. These flows will be conveyed to the Swinburn Dam via a new energy dissipator similar in construction to the existing outlet in Units 1 and 2.

In the event of an emergency or a storm greater than 100 year, Basin A will continue to drain east in Aquarius Avenue. Basin C will overflow the curb and enter the pedestrian access to Sagittarius Avenue. From there the water will flow to Milky Way Drive. Basin D will flow to Milky Way Drive and overflow the curb to enter the drainage easement and flow south to the Swinburn Dam.

Interim Solution (Exhibit 7)

Units 3 and 4 will be the first of the new units to be developed. The existing terrain on the proposed Basin E and part of Basin C flows east and impacts Unit 3 with 55.77 cfs of undeveloped flow. Until the future units are developed a temporary detention pond will catch the undeveloped runoff from Basin E and a portion of Basin C. A stub from the 42" pipe in Milky Way Drive will capture the undeveloped flows from a temporary desilting pond north of Milky Way Drive and route the flow via the proposed storm drain system to the Swinburn Dam. The detention pond provided will have a capacity of 0.5131 ac-ft which is greater than the required capacity of 0.4336 ac-ft.

Basin F drains south and will not impact the developed lots in Basins C and D. No desilting pond is necessary for the this basin and it will continue the existing drainage patterns.

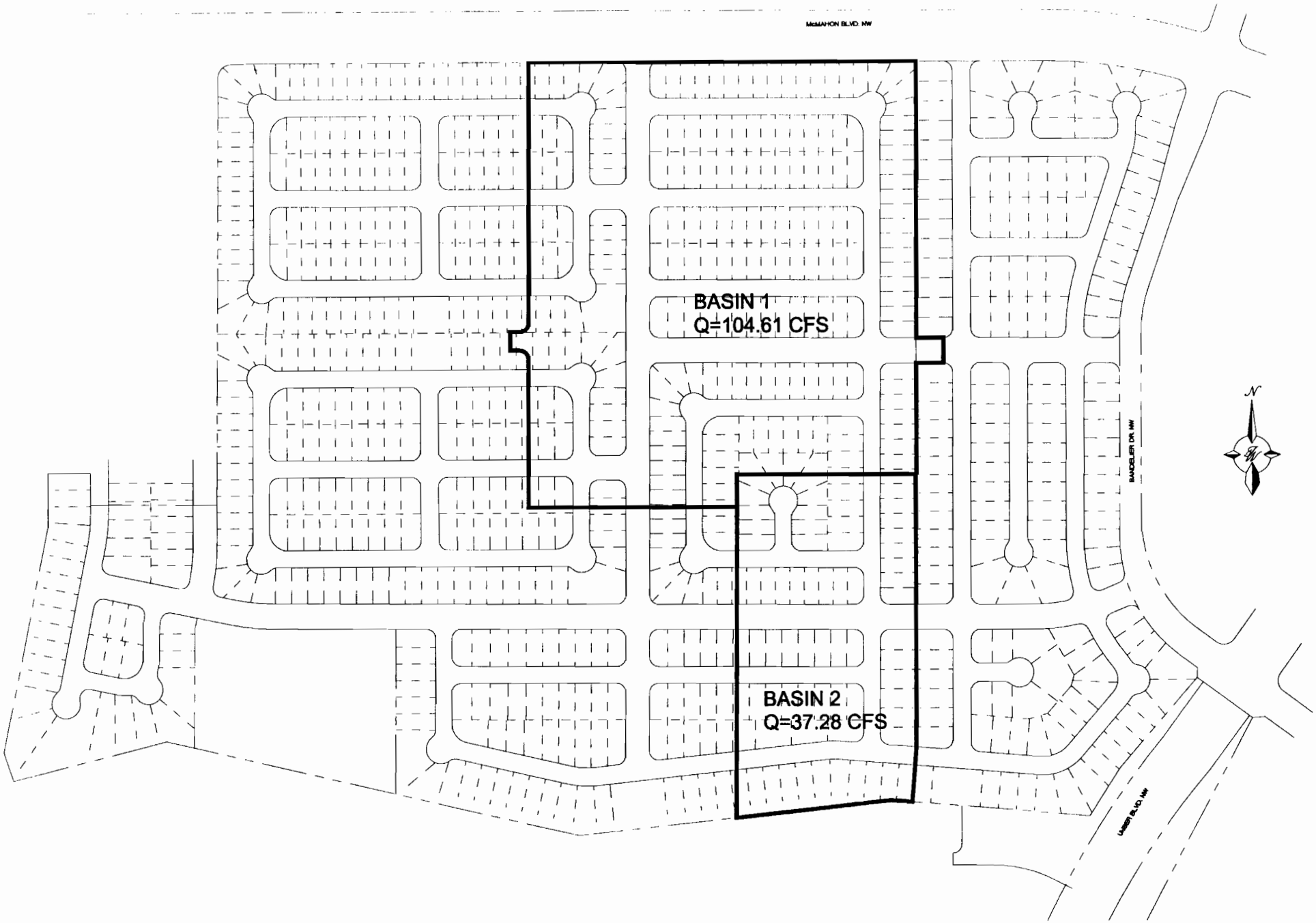


INTERIM LAYOUT

EXHIBIT 7

Summary

There are three proposed storm drain systems for the site to develop Units 3 and 4. Basin A and Basin B will discharge a total of 70.60 cfs to the existing storm drain in Aquarius Avenue and then to Virgo Street. The original basins for the site provided for the Basins A and B to contribute 141.89 cfs to the existing storm drain (Exhibit 8). The site is discharging less than originally designed and the existing storm sewer has capacity for the flows. The existing storm drain system will discharge to the Swinburn Dam via an existing 60" RCP line in Units 1 and 2. Basins B, C, D, E, and F will discharge a total developed flow of 288.15 cfs to Storm Drain 'B' and 'C' and eventually to the Swinburn Dam. Basins D and a portion of C will be developed with this phase and Basins E and F consist of future phases.



ORIGINAL BASIN LAYOUT

EXHIBIT 8

RUNOFF CALCULATIONS

The site is @ Zone 1

LAND TREATMENT

Proposed
B = 20%
C = 20%
D = 60 %

Existing
B = 100%

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 1.87 inches

P_{360} = 2.20 inches

P_{1440} = 2.66 inches

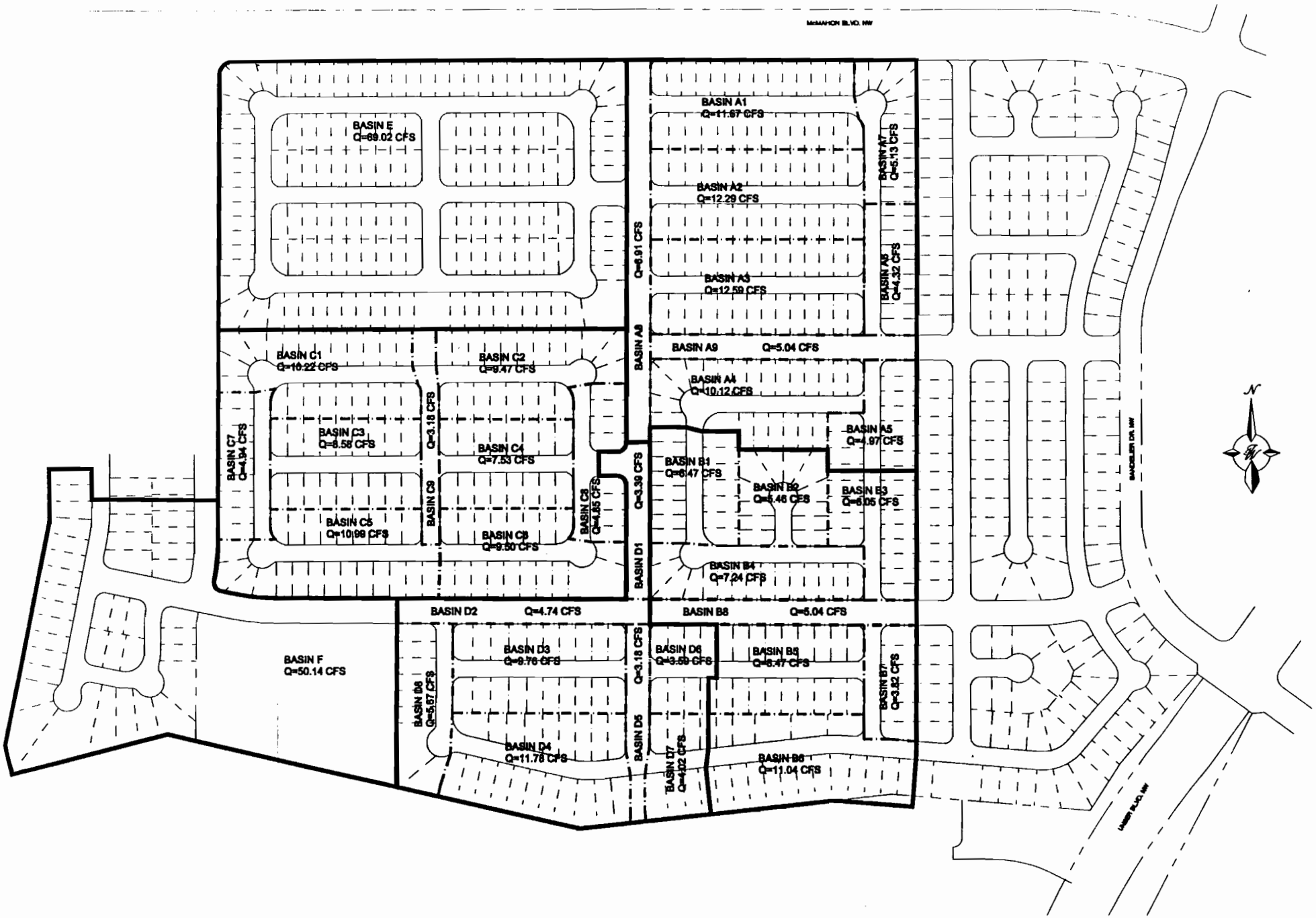
DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 1.87 x 0.667
= 1.25 inches

P_{360} = 1.47

P_{1440} = 1.77

See the summary output from AHYMO calculations.



PROPOSED BASIN LAYOUT

Runoff Calculation Results

BASIN A

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	11.67	7.03	0.406	0.235
2	12.29	7.41	0.428	0.247
3	12.59	7.59	0.438	0.253
4	10.12	6.10	0.352	0.204
5	4.97	3.00	0.173	0.100
6	4.32	2.60	0.150	0.087
7	5.13	3.09	0.179	0.103
8	6.91	4.58	0.259	0.163
9	5.04	3.34	0.189	0.119
Total	73.04	44.74	2.574	1.511

BASIN B

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	6.47	3.90	0.225	0.130
2	5.46	3.29	0.190	0.110
3	6.05	3.65	0.211	0.122
4	7.24	4.36	0.252	0.146
5	8.47	5.10	0.295	0.170
6	11.04	6.66	0.385	0.222
7	3.82	2.30	0.133	0.077
8	5.04	3.34	0.189	0.119
Total	53.59	32.60	1.880	1.096

BASIN C

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	10.22	6.16	0.356	0.206
2	9.47	5.71	0.330	0.190
3	8.58	5.17	0.299	0.173
4	7.53	4.54	0.262	0.151
5	10.99	6.62	0.383	0.221
6	9.50	5.73	0.331	0.191
7	4.94	2.98	0.172	0.099
8	4.85	2.92	0.168	0.097
9	3.18	2.11	0.119	0.075
Total	69.26	41.94	2.420	1.403

BASIN D

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	3.39	2.25	0.127	0.080
2	4.74	3.14	0.170	0.112
3	9.76	5.88	0.340	0.196
4	11.78	7.10	0.410	0.237
5	3.18	2.10	0.119	0.075
6	3.59	2.16	0.125	0.072
7	4.02	2.42	0.140	0.081
8	5.67	3.42	0.197	0.114
Total	46.13	28.47	1.628	0.967

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
E	69.02	41.60	2.407	1.391
F	50.14	30.22	1.749	1.010
Total	119.16	71.82	4.156	2.401

Drainage Basins

BASIN A

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	141133.14	3.2400	0.005062
2	148714.12	3.4140	0.005334
3	152231.68	3.4948	0.005461
4	122350.07	2.8088	0.004389
5	60011.38	1.3777	0.002153
6	52161.97	1.1975	0.001871
7	61994.88	1.4232	0.002224
8	68868.76	1.5810	0.002470
9	50179.35	1.1520	0.001800
Total	857645.36	19.6888	0.030764

BASIN B

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	78154.30	1.7942	0.002803
2	65905.08	1.5130	0.002364
3	73128.57	1.6788	0.002623
4	87452.76	2.0076	0.003137
5	102333.89	2.3493	0.003671
6	133570.48	3.0664	0.004791
7	46016.57	1.0564	0.001651
8	50175.73	1.1519	0.001800
Total	636737.38	14.6175	0.022840

BASIN C

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	123613.84	2.8378	0.004434
2	114461.05	2.6277	0.004106
3	103701.57	2.3807	0.003720
4	91004.53	2.0892	0.003264
5	132925.17	3.0515	0.004768
6	114891.38	2.6375	0.004121
7	59641.26	1.3692	0.002139
8	58498.01	1.3429	0.002098
9	31662.56	0.7269	0.001136
Total	830399.37	19.0633	0.029786

BASIN D

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	33734.80	0.7744	0.001210
2	47195.05	1.0834	0.001693
3	118065.13	2.7104	0.004235
4	142416.99	3.2694	0.005109
5	31605.07	0.7256	0.001134
6	43265.26	0.9932	0.001552
7	48443.21	1.1121	0.001738
8	68521.26	1.5730	0.002458
Total	533246.77	12.2417	0.019128

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
E	835718.73	19.1855	0.029977
F	607077.75	13.9366	0.021776
Total	1442796.49	33.1220	0.051753

DRAINAGE BASINS

Existing

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
B	2505215.34	57.5118	0.089862
C	2100545.87	48.2219	0.075347
D	1099488.20	25.2408	0.039439

RUNOFF CALCULATION RESULTS

Existing

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
B	117.28	43.96	3.199	1.075
C	98.02	36.91	2.682	0.902
D	51.16	19.34	1.404	0.472

Pipe Capacity

STORM SEWER 'A' (Basin A)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
CB1 to CB3	24	1	3.14	0.5	22.68	11.50	3.66
CB2 to CB4	24	1	3.14	0.5	22.68	11.50	3.66
CB3 to MH1	24	1	3.14	0.5	22.68	17.10	5.44
CB4 to MH1	24	1	3.14	0.5	22.68	17.10	5.44
MH1 to MH2	30	1	4.91	0.625	41.13	34.20	6.97
CB5 to CB6	15	1	1.23	0.3125	6.48	4.10	3.34
CB6 to MH2	18	1	1.77	0.375	10.53	8.20	4.64
MH2 to MH3	36	1	7.07	0.75	66.88	42.40	6.00
CB7 to CB9	18	1	1.77	0.375	10.53	7.60	4.30
CB8 to CB10	18	1	1.77	0.375	10.53	7.60	4.30
CB9 to CB11	24	1	3.14	0.5	22.68	11.60	3.69
CB10 to CB12	24	1	3.14	0.5	22.68	11.60	3.69
CB11 to MH3	24	1	3.14	0.5	22.68	14.10	4.49
CB12 to MH3	24	1	3.14	0.5	22.68	14.10	4.49
MH3 to EXISTING	42	1	9.62	0.875	100.88	70.60	7.34

STORM SEWER 'B' (Basin B)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
CB13 to CB14	24	1	3.14	0.5	22.68	15.13	4.82
CB14 to MH4	30	1	4.91	0.625	41.13	30.26	6.16
MH4 to MH6	30	1	4.91	0.625	41.13	30.26	6.16
MH6 to MH5	30	1	4.91	0.625	41.13	30.26	6.16
CB15 to MH5	24	1	3.14	0.5	22.68	11.67	3.71
CB16 to MH5	24	1	3.14	0.5	22.68	11.67	3.71
MH5 to MH14	36	0.7	7.07	0.75	55.95	53.60	7.58
MH14 to CB22	36	0.7	7.07	0.75	55.95	53.60	7.58

STORM SEWER 'C' (BASINS C AND D)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
MH7 to MH8	36	1	7.07	0.75	66.88	50.14	7.09
CB17 to MH8	42	1	9.62	0.875	100.88	69.26	7.20
MH8 to MH10	48	1	12.57	1	144.03	119.40	9.50
MH9 to MH10	42	1	9.62	0.875	100.88	69.02	7.17
MH10 to MH11	54	1	15.90	1.125	197.18	188.42	11.85
CB20 to MH11	24	1	3.14	0.5	22.68	10.74	3.42
CB21 to MH11	24	1	3.14	0.5	22.68	10.74	3.42
MH11 to CB22	60	1	19.63	1.25	261.14	209.90	10.69
CB22 to OUTFALL	66	1	23.76	1.375	336.71	288.15	12.13

Manning's Equation:

$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$

A = Area

R = D/4

S = Slope

n = 0.013

MANHOLE HEAD CAPACITY

MANHOLE	PIPE DIAMETER (IN)	AREA (SF)	Q (CFS)	H REQ (FT)	H ALLOW (FT)
1	30	4.91	34.20	3.34	4.50
2	36	7.07	42.40	3.05	5.00
3	42	9.62	70.60	4.07	5.50
4	30	4.91	30.26	2.89	4.50
5	36	7.07	53.60	3.98	5.00
6	30	4.91	30.26	2.89	4.50
7	36	7.07	50.14	3.67	5.00
8	48	12.57	119.40	5.89	6.00
9	42	9.62	69.02	3.97	5.50
10	54	15.90	118.42	4.64	6.50
11	60	19.63	209.90	7.43	7.50
12	36	7.07	50.14	3.67	5.00
13	42	9.62	69.02	3.97	5.50
14	36	7.07	53.60	3.98	5.00

DROP INLET HEAD CAPACITY

CATCH BASIN	PIPE DIAMETER (IN)	AREA (SF)	Q (CFS)	H REQ (FT)	H ALLOW (FT)
1	24	3.14	11.50	1.58	4.00
2	24	3.14	11.50	1.58	4.00
3	24	3.14	17.10	2.28	4.00
4	24	3.14	17.10	2.28	4.00
5	15	1.23	4.10	1.11	3.50
6	18	1.77	8.20	1.68	3.50
7	18	1.77	7.60	1.55	3.50
8	18	1.77	7.60	1.55	3.50
9	24	3.14	11.60	1.59	4.00
10	24	3.14	11.60	1.59	4.00
11	24	3.14	14.10	1.87	4.00
12	24	3.14	14.10	1.87	4.00
13	24	3.14	15.13	2.00	4.00
14	30	4.91	30.26	2.89	4.50
15	24	3.14	11.67	1.60	4.00
16	24	3.14	11.67	1.60	4.00
17	42	9.62	69.26	3.99	5.50
20	24	3.14	10.74	1.50	4.00
21	24	3.14	10.74	1.50	4.00
22	66	23.76	288.15	9.09	10.00

ORIFICE EQUATION

$Q = CA \sqrt{2gH}$

C = 0.6

A= Area of pipe leaving manhole

g = 32.2

H = Height of water within manhole

HYDRAULIC GRADE LINE

MANNING'S EQUATION
Q=1.49/n * A * R^(3/2) * S^(1/2)

LOCATION	DEPTH (IN)	DEPTH (FT)	IAMETE (IN)	SLOPE (FT/FT)	THETA	AREA (FT^2)	WP	R	Q (CFS)	V (FPS)
CB-1 to CB-3	12.10	1.01	24	0.01	3.16	1.59	3.16	0.50	11.50	7.25
CB-2 to CB-4	12.10	1.01	24	0.01	3.16	1.59	3.16	0.50	11.50	7.25
CB-3 to MH-1	15.56	1.30	24	0.01	3.74	2.16	3.74	0.58	17.09	7.93
CB-4 to MH-1	12.87	1.07	24	0.018	3.29	1.72	3.29	0.52	17.10	9.97
MH-1 to MH-2	20.89	1.74	30	0.01	3.95	3.65	4.94	0.74	34.20	9.37
CB-5 to CB-6	8.66	0.72	15	0.01	3.45	0.73	2.16	0.34	4.10	5.59
CB-6 to MH-2	7.69	0.64	18	0.042	2.85	0.72	2.14	0.34	8.20	11.38
MH-2 to EX.	11.73	0.98	36	0.0762	2.43	2.00	3.65	0.55	42.40	21.20
CB-7 to CB-9	8.07	0.67	18	0.0304	2.93	0.77	2.20	0.35	7.60	9.90
CB-8 to CB-10	7.17	0.60	18	0.0465	2.73	0.66	2.05	0.32	7.60	11.57
CB-9 to CB-11	12.16	1.01	24	0.01	3.17	1.60	3.17	0.50	11.60	7.26
CB-10 to CB-12	11.92	0.99	24	0.0107	3.13	1.56	3.13	0.50	11.60	7.45
CB-11 to EX.	6.20	0.52	24	0.1806	2.13	0.64	2.13	0.30	14.10	21.91
CB-12 to EX.	4.79	0.40	24	0.5079	1.85	0.45	1.85	0.24	14.10	31.61
CB-13 to CB-14	14.33	1.19	24	0.01	3.53	1.96	3.53	0.55	15.13	7.73
CB-14 to MH-4	19.13	1.59	30	0.01	3.70	3.30	4.62	0.71	30.26	9.16
MH-4 to MH-6	13.15	1.10	30	0.0343	2.89	2.07	3.62	0.57	30.26	14.63
MH-6 to MH-5	13.94	1.16	30	0.0279	3.00	2.23	3.75	0.60	30.26	13.55
CB-15 to MH-5	8.90	0.74	24	0.0308	2.62	1.06	2.62	0.40	11.67	11.01
CB-16 to MH-5	6.68	0.56	24	0.0925	2.22	0.71	2.22	0.32	11.67	16.35
MH-5 to MH-14	28.23	2.35	36	0.007	4.35	5.95	6.53	0.91	53.60	9.01
MH-14 to CB-22	28.23	2.35	36	0.007	4.35	5.95	6.53	0.91	53.60	9.01
MH-7 to MH-12	17.07	1.42	36	0.027	3.04	3.30	4.56	0.72	50.14	15.19
MH-12 to MH8	15.94	1.33	36	0.0343	2.91	3.02	4.37	0.69	50.14	16.60
CB-17 to MH8	15.59	1.30	42	0.0547	2.62	3.25	4.59	0.71	69.26	21.31
MH-8 to MH-10	27.85	2.32	48	0.0169	3.46	7.56	6.93	1.09	119.42	15.79
MH-9 to MH-13	16.17	1.35	42	0.0474	2.68	3.42	4.69	0.73	69.02	20.21
MH-13 to MH-10	16.31	1.36	42	0.046	2.69	3.45	4.71	0.73	69.02	19.99
MH-10 to MH-11	23.09	1.92	54	0.0631	2.85	6.49	6.42	1.01	188.42	29.02
CB-20 to MH-11	6.59	0.55	24	0.0826	2.21	0.70	2.21	0.32	10.74	15.33
CB-21 to MH-11	4.57	0.38	24	0.3578	1.81	0.42	1.81	0.23	10.74	25.78
MH-11 to CB-22	23.41	1.95	60	0.0623	2.70	7.10	6.75	1.05	209.90	29.58
CB-22 to OUTFALL	46.99	3.92	66	0.01	4.02	18.09	11.05	1.64	288.15	15.93

DROP INLET CALCULATIONS

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

INLET	TYPE OF INLET	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
13	Single 'A'	5.82	15.13	0.2915	0.667
14	Single 'A'	5.82	15.13	0.2915	0.667
15	Single 'A'	5.82	11.67	0.1734	0.667
16	Single 'A'	5.82	11.67	0.1734	0.667
17	2-Double 'A'	22.48	69.26	0.4094	0.667
22	Double 'A'	11.24	24.65	0.2074	0.667

STORM DROP INLET-EFFECTIVE AREA
Single 'A'

Area at the grate:

L = 38.375" - 7(½" $_{\text{middle bars}}$)
= 34.875"
= 2.906'

W = 25.5" - 13(½" $_{\text{middle bars}}$)
= 19"
= 1.583'

Area = 1.583' x 2.906'
= 4.601 ft^2

Effective Area = 4.601- 4.601 (0.5 $_{\text{clogging factor}}$)
= 2.30 ft^2 at the grate

Area at the throat:

L = 81.00"
= 6.75'

H = 10¾" - 4½"
= 6¼"
= 0.5208'

Area = 6.75' x 0.5208'
= 3.52 ft^2 at the throat

Total Area:

Area = 2.30_{grate} + 3.52_{throat}
= 5.82 ft^2

STORM DROP INLET-EFFECTIVE AREA
Double 'A'

Area at the grate:

L = 88 ¾" - 2(6"$_{ends}$) - 6"$_{center\ piece}$ - 14(½ $_{middle\ bars}$)
= 63 ¾"
= 5.3125'

W = 25 ½" - 13(½"$_{middle\ bars}$)
= 19"
= 1.5833'

Area = 5.3125' x 1.5833'
= 8.41 ft^2

Effective Area = 8.41- 8.41 (0.5 $_{clogging\ factor}$)
= 4.21 ft^2 at the grate

Area at the throat:

L = 13.50"

H = 10 ¾" - 4 ½"
= 6 ¼"
= 0.5208'

Area = 13.50' x 0.5208'
= 7.03 ft^2 at the throat

Total Area:

Area = 4.21_{grate} + 7.03_{throat}
= 11.24 ft^2

Design Calculations for Baffled Outlet

Q=234.55 cfs
H=38 ft

A) Pipe Dimensions

a)Pipe Size - Based on maximum pipe velocity of 12 ft/sec.
A=Q/V
A=234.55 cfs/12 fps
A=19.55 ft^2
Use 60" pipe which has area of 19.63 ft^2

b) Air Vent Size
Vent=1/6*Diameter
60/6 = 10" vent required

B) Baffled Outlet Dimensions

1) Compute Theoretical Velocity
$V=\sqrt{2gH}$
$V=\sqrt{(2*32.2*30)}$
V=49.47 ft/sec

2) Area of Flow
A=Q/V
A=234.55 cfs/49.47 fps
A=4.74 ft^2

3) Depth of Flow
$d=\sqrt{A}$
$d=\sqrt{4.74}$
d=2.18 ft

4) Froude Number
$F=V/\sqrt{(gd)}$
$F=49.47/\sqrt{(32.2*2.18)}$
F=5.90

5) W/d Ratio (from Figure 6-10)
W/d = 7.80

6) Minimum Width of Basin
W=W/d * d
W=7.80*2.18
W=17.0 ft
Use W = 17.0 ft1

7) Basin Invert

Invert=1/6 W

17/6 = 2.833

Set basin 2'10" below natural ground surface

C) Erosion Protection Requirements

1) Required Rock Diameter

Diameter = W/20

17/20 = 0.85 = 10"

Use Type 2 (12" coarse gravel)

2) Length of Protection

Length=W

Length=17 feet

3) Depth of Protection

Depth=W/6

17/6=2.83 or 2'10"

Street Capacity Calculations

SHOOTING STAR

28' F-F Street Section with 8" curb

Slope= 0.006

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.19	0.00	0.33	0.001885
0.02	0.00	0.34	0.01	0.00	0.00	0.30	0.01	0.38	0.004591
0.04	0.01	0.68	0.02	0.01	0.01	0.48	0.02	0.42	0.011128
0.06	0.03	1.02	0.03	0.02	0.04	0.63	0.04	0.45	0.018635
0.08	0.05	1.36	0.04	0.04	0.08	0.76	0.06	0.47	0.026838
0.1	0.08	1.70	0.05	0.07	0.14	0.88	0.09	0.49	0.035592
0.12	0.12	2.04	0.06	0.11	0.23	1.00	0.12	0.51	0.044809
0.125	0.13	2.13	0.06	0.13	0.26	1.02	0.13	0.51	0.047178

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.14	0.27	1.00	0.13	0.49	0.046016
0.16	0.23	3.91	0.06	0.23	0.46	1.01	0.16	0.45	0.048626
0.2	0.42	5.95	0.07	0.48	0.95	1.15	0.23	0.45	0.062378
0.24	0.69	8.00	0.09	0.90	1.81	1.32	0.32	0.47	0.08061
0.3045	1.29	11.29	0.11	2.06	4.11	1.59	0.49	0.51	0.11469
0.32	1.47	12.08	0.12	2.43	4.87	1.66	0.53	0.52	0.123469
0.3436	1.76	13.28	0.13	3.09	6.18	1.76	0.60	0.53	0.137182
0.365	2.05	14.37	0.14	3.77	7.55	1.85	0.67	0.54	0.149944

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	3.99	7.98	1.89	0.70	0.55	0.155661
0.41	2.68	14.42	0.19	5.89	11.78	2.20	0.90	0.61	0.201921
0.45	3.24	14.46	0.22	8.07	16.15	2.50	1.12	0.66	0.249038
0.49	3.80	14.50	0.26	10.52	21.03	2.77	1.36	0.70	0.296935
0.54	4.50	14.55	0.31	13.91	27.82	3.09	1.67	0.74	0.357805
0.5544	**4.70**	**14.56**	**0.32**	**14.96**	**29.91**	**3.18**	**1.77**	**0.75**	**0.375527**
0.63	5.76	14.64	0.39	20.91	41.83	3.63	2.29	0.81	0.469849
0.667	6.27	14.67	0.43	24.10	48.21	3.84	2.56	0.83	0.516734

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	25.44	50.89	3.76	2.63	0.79	0.509096
0.7204	**7.09**	**17.34**	**0.41**	**26.45**	**52.91**	**3.73**	**2.69**	**0.77**	**0.507166**
0.74	7.43	18.32	0.41	27.55	55.10	3.71	2.74	0.76	0.506979
0.76	7.79	19.32	0.40	28.79	57.58	3.70	2.81	0.75	0.508251
0.78	8.17	20.32	0.40	30.16	60.31	3.69	2.88	0.74	0.510818
0.8	8.58	21.32	0.40	31.64	63.29	3.69	2.95	0.73	0.514525
0.847	9.60	23.68	0.41	35.63	71.26	3.71	3.14	0.71	0.527033

Street Capacity Calculations

SHOOTING STAR

28' F-F Street Section with 8" curb

Slope= 0.0181

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.33	0.00	0.58	0.004622
0.02	0.00	0.34	0.01	0.00	0.00	0.52	0.01	0.65	0.010989
0.04	0.01	0.68	0.02	0.01	0.02	0.83	0.03	0.73	0.026003
0.06	0.03	1.02	0.03	0.03	0.06	1.09	0.07	0.78	0.042942
0.08	0.05	1.36	0.04	0.07	0.14	1.32	0.11	0.82	0.06124
0.1	0.08	1.70	0.05	0.12	0.24	1.53	0.15	0.85	0.080608
0.12	0.12	2.04	0.06	0.20	0.40	1.73	0.21	0.88	0.100866
0.125	0.13	2.13	0.06	0.22	0.44	1.78	0.22	0.89	0.106054

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.24	0.47	1.74	0.23	0.85	0.104289
0.16	0.23	3.91	0.06	0.40	0.79	1.75	0.28	0.77	0.112362
0.2	0.42	5.95	0.07	0.83	1.66	1.99	0.40	0.79	0.143664
0.24	0.69	8.00	0.09	1.57	3.14	2.29	0.55	0.82	0.183913
0.3045	1.29	11.29	0.11	3.57	7.14	2.77	0.84	0.88	0.257887
0.32	1.47	12.08	0.12	4.23	8.45	2.88	0.92	0.90	0.27678
0.3436	1.76	13.28	0.13	5.36	10.73	3.05	1.05	0.92	0.306195
0.365	2.05	14.37	0.14	6.55	13.11	3.21	1.17	0.93	0.333475

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	6.93	13.86	3.28	1.21	0.95	0.345154
0.3779	**2.23**	**14.38**	**0.15**	**7.54**	**15.09**	**3.39**	**1.28**	**0.97**	**0.363628**
0.45	3.24	14.46	0.22	14.02	28.05	4.33	1.95	1.14	0.533807
0.49	3.80	14.50	0.26	18.26	36.53	4.81	2.36	1.21	0.6296
0.54	4.50	14.55	0.31	24.16	48.32	5.38	2.90	1.29	0.75077
0.5544	4.70	14.56	0.32	25.98	51.95	5.53	3.07	1.31	0.785955
0.63	5.76	14.64	0.39	36.32	72.65	6.31	3.98	1.40	0.972682
0.667	6.27	14.67	0.43	41.86	83.73	6.67	4.45	1.44	1.065229

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	44.19	88.38	6.54	4.57	1.38	1.05691
0.72	7.09	17.32	0.41	45.91	91.82	6.48	4.67	1.35	1.056759
0.74	7.43	18.32	0.41	47.85	95.70	6.44	4.77	1.32	1.059689
0.76	7.79	19.32	0.40	50.01	100.01	6.42	4.88	1.30	1.065307
0.78	8.17	20.32	0.40	52.38	104.75	6.41	5.00	1.28	1.073286
0.8	8.58	21.32	0.40	54.96	109.92	6.41	5.13	1.26	1.083355
0.847	9.60	23.68	0.41	61.88	123.76	6.44	5.46	1.23	1.114

Street Capacity Calculations

Aquarius Avenue

48' F-F Street Section with 8" curb

Slope= 0.0101

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.002919
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.49	0.00703
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.55	0.016847
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.59	0.028023
0.08	0.05	1.36	0.04	0.05	0.10	0.99	0.08	0.61	0.040166
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.64	0.053072
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.66	0.066615
0.125	0.13	2.13	0.06	0.17	0.33	1.33	0.17	0.66	0.070089

For water depths greater than 0.125 ft but less than 0.565 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.30	0.17	0.64	0.068639
0.18	0.31	4.93	0.06	0.43	0.86	1.39	0.25	0.58	0.082354
0.24	0.69	8.00	0.09	1.17	2.34	1.71	0.41	0.61	0.120633
0.336	**1.66**	**12.89**	**0.13**	**3.72**	**7.44**	**2.24**	**0.75**	**0.68**	**0.196616**
0.35	1.84	13.61	0.14	4.26	8.52	2.31	0.81	0.69	0.208575
0.4197	**2.89**	**17.16**	**0.17**	**7.72**	**15.44**	**2.68**	**1.12**	**0.73**	**0.270502**
0.45	3.42	18.71	0.18	9.66	19.31	2.83	1.27	0.74	0.298498
0.5208	**4.83**	**22.32**	**0.22**	**15.31**	**30.62**	**3.17**	**1.65**	**0.77**	**0.366041**
0.565	5.85	24.57	0.24	19.71	39.42	3.37	1.91	0.79	0.40955

For water depths greater than 0.565 ft but less than 0.667 ft

Y2= Y - 0.565
A3= A2 + Y2*22
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.57	5.96	24.58	0.24	20.33	40.66	3.41	1.95	0.80	0.417786
0.58	6.18	24.59	0.25	21.59	43.19	3.50	2.03	0.81	0.434289
0.59	6.40	24.60	0.26	22.88	45.77	3.58	2.11	0.82	0.450836
0.6	6.62	24.61	0.27	24.20	48.41	3.66	2.20	0.83	0.467426
0.61	6.84	24.62	0.28	25.55	51.11	3.74	2.28	0.84	0.484059
0.62	7.06	24.63	0.29	26.93	53.86	3.82	2.37	0.85	0.500735
0.64	7.50	24.65	0.30	29.77	59.55	3.97	2.54	0.88	0.534213
0.667	8.09	24.68	0.33	33.78	67.57	4.18	2.79	0.90	0.579675

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= A3 + 22 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	8.84	26.33	0.34	37.53	75.07	4.24	2.97	0.89	0.601782
0.73	9.57	27.83	0.34	41.30	82.60	4.31	3.15	0.89	0.623371
0.75	10.09	28.83	0.35	44.00	88.01	4.36	3.27	0.89	0.63847
0.77	10.62	29.83	0.36	46.87	93.74	4.41	3.40	0.89	0.654086
0.79	11.17	30.83	0.36	49.90	99.79	4.47	3.53	0.89	0.670183
0.82	12.04	32.33	0.37	54.75	109.51	4.55	3.73	0.89	0.695161
0.847	12.86	33.68	0.38	59.45	118.91	4.62	3.92	0.89	0.718427

Street Capacity Calculations

Milky Way

48' F-F Street Section with 8" curb

Slope= 0.06

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.60	0.01	1.06	0.01078
0.02	0.00	0.34	0.01	0.00	0.01	0.95	0.02	1.19	0.025056
0.04	0.01	0.68	0.02	0.02	0.04	1.51	0.06	1.33	0.058034
0.06	0.03	1.02	0.03	0.06	0.11	1.98	0.12	1.43	0.094714
0.08	0.05	1.36	0.04	0.12	0.25	2.40	0.19	1.50	0.13399
0.1	0.08	1.70	0.05	0.22	0.45	2.79	0.28	1.55	0.175301
0.12	0.12	2.04	0.06	0.36	0.73	3.15	0.38	1.60	0.218297
0.125	0.13	2.13	0.06	0.40	0.81	3.23	0.40	1.61	0.22928

For water depths greater than 0.125 ft but less than 0.565 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.43	0.86	3.17	0.41	1.55	0.226927
0.18	0.31	4.93	0.06	1.05	2.10	3.39	0.61	1.41	0.279393
0.24	0.69	8.00	0.09	2.85	5.71	4.16	1.00	1.50	0.402343
0.3	1.24	11.06	0.11	6.18	12.36	4.98	1.49	1.60	0.54633
0.3535	**1.89**	**13.78**	**0.14**	**10.73**	**21.47**	**5.69**	**2.01**	**1.69**	**0.684384**
0.4	2.57	16.16	0.16	16.11	32.22	6.28	2.51	1.75	0.809677
0.45	3.42	18.71	0.18	23.54	47.07	6.89	3.10	1.81	0.94884
0.5	4.39	21.26	0.21	32.85	65.70	7.48	3.74	1.86	1.091927
0.565	5.85	24.57	0.24	48.04	96.09	8.22	4.64	1.93	1.283023

For water depths greater than 0.565 ft but less than 0.667 ft

Y2= Y - 0.565

A3= A2 + Y2*22

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.57	5.96	24.58	0.24	49.55	99.11	8.32	4.74	1.94	1.30648
0.58	6.18	24.59	0.25	52.63	105.26	8.52	4.94	1.97	1.353442
0.59	6.40	24.60	0.26	55.78	111.55	8.72	5.15	2.00	1.400473
0.6	6.62	24.61	0.27	58.99	117.99	8.92	5.35	2.03	1.447575
0.61	6.84	24.62	0.28	62.28	124.57	9.11	5.56	2.06	1.49475
0.62	7.06	24.63	0.29	65.64	131.28	9.30	5.77	2.08	1.542
0.64	7.50	24.65	0.30	72.57	145.13	9.68	6.20	2.13	1.636736
0.667	8.09	24.68	0.33	82.34	164.69	10.18	6.79	2.20	1.765139

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 22 * Y3 + 25 * Y3^2

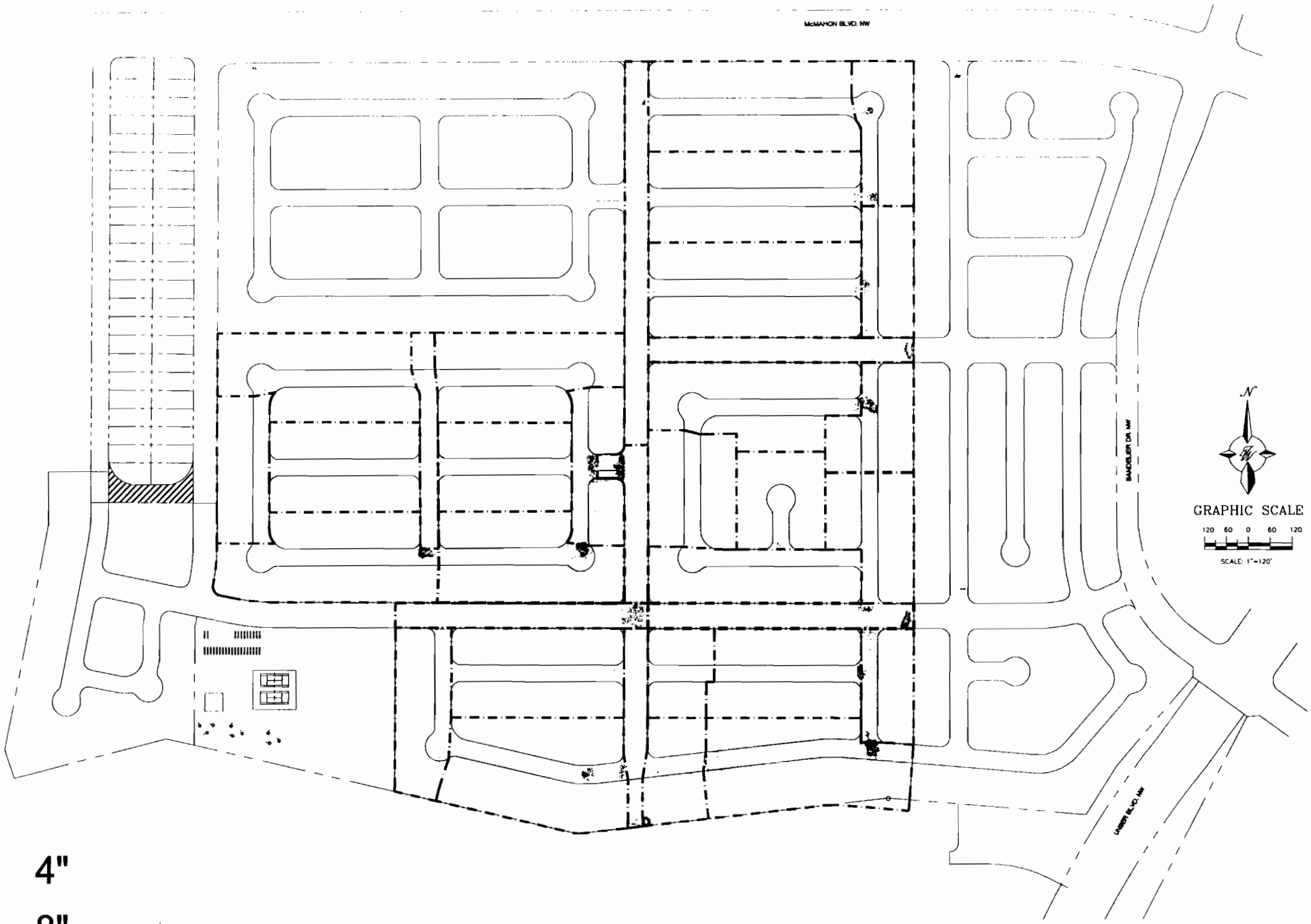
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	8.84	26.33	0.34	91.48	182.96	10.35	7.24	2.18	1.835473
0.73	9.57	27.83	0.34	100.66	201.32	10.51	7.67	2.17	1.903263
0.75	10.09	28.83	0.35	107.25	214.51	10.63	7.97	2.16	1.950283
0.77	10.62	29.83	0.36	114.24	228.47	10.76	8.28	2.16	1.99864
0.79	11.17	30.83	0.36	121.62	243.23	10.88	8.60	2.16	2.048242
0.82	12.04	32.33	0.37	133.45	266.91	11.08	9.09	2.16	2.124801
0.847	12.86	33.68	0.38	144.91	289.82	11.27	9.55	2.16	2.195738

Street Capacity Summary

	Basin	Street Slope (%)	Width of Street (ft)	Curb Height (inches)	Basins Contributing to Street	Flow (cfs)	Capacity (cfs)
	A1	3.43	28	4	A1, A8	18.58	20.45
	A2	3.90	32	4	A2	12.29	19.42
	A3	4.72	28	4	A3	12.59	16.4
	A4	4.50	28	4	A4	10.12	17.09
	A5	1.81	28	4	A4, A5	15.09	36.08
	A6	0.60	28	8	A1, A2, A3, A6, A7, A8	52.91	71.26
	A7	0.60	28	8	A1, A2, A3, A7, A8	36.00	71.26
	A8	1.44	48	8	A8	6.91	117.98
*	A9	5.00	48	8	A1 thru A9	73.04	42.58
	B1	3.50	28	4	B1	6.47	20.24
	B2	3.50	28	4	B2	5.46	20.24
	B3	1.00	28	4	B1, B2, B3, B4	25.22	39.39
	B4	3.50	28	4	B1, B2, B4	19.17	20.24
	B5	2.32	28	4	B5	8.47	28.13
	B6	1.81	32	8	B5, B6, B7	23.33	65.29
*	B7	3.90	28	8	B5, B7	12.29	39.96
	B8	1.96	48	8	B1, B2, B3, B4, B8	30.26	85.92
	C1	3.03	28	4	C1	10.22	21.82
	C2	3.00	28	4	C2	9.47	21.94
	C3	2.75	28	4	C3	5.58	23.77
	C4	1.27	28	4	C4	7.53	44.39
	C5	3.35	28	4	C5, C7	15.93	20.72
	C6	1.00	28	8	C1 thru C9	69.26	91.99
	C7	3.35	28	4	C7	4.94	20.72
	C8	4.00	28	8	C2, C4, C8	21.85	39.47
	C9	4.47	28	8	C1, C3, C9	21.98	37.28
	D1	4.79	48	8	D1	3.39	44.3
	D2	2.84	48	8	D1, D2	8.13	70.63
	D3	2.75	28	4	D3	9.76	23.77
	D4	2.23	32	4	D4, D8	17.45	32.14
*	D5	6.00	48	8	C1, C3, C5	46.13	35.91
	D6	0.60	28	4	D6	3.59	30.51
	D7	1.29	32	4	D7	4.02	47.76
	D8	7.00	28	4	D8	5.67	11.61

* Note: Storm sewer has been added to alleviate the capacity problem in these basins.



4"

8"

CURB HEIGHT

Street Capacity Calculations

STREET A

28' F-F Street Section with 4" curb

Slope= 0.035

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.330156	0.004846	0.000749	0.001499	0.468314	0.004683	0.825296	0.007697
0.02	0.0064	0.660312	0.009692	0.004758	0.009516	0.743403	0.014868	0.926363	0.018045
0.025	0.01	0.825391	0.012115	0.008626	0.017253	0.862643	0.021566	0.961464	0.023718
0.035	0.0196	1.155547	0.016962	0.02116	0.042319	1.079567	0.037785	1.016922	0.03579
0.045	0.0324	1.485703	0.021808	0.041358	0.082716	1.276476	0.057441	1.060421	0.048637
0.055	0.0484	1.815859	0.026654	0.070625	0.14125	1.459193	0.080256	1.096487	0.062111
0.06	0.0576	1.980937	0.029077	0.089069	0.178138	1.54634	0.09278	1.112504	0.069051
0.0625	0.0625	2.063476	0.030289	0.099313	0.198625	1.589001	0.099313	1.120099	0.072569

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.063506	2.088981	0.030401	0.10116	0.20232	1.592912	0.100353	1.118391	0.073004
0.1	0.172656	3.976351	0.043421	0.348807	0.697613	2.020237	0.202024	1.125834	0.116883
0.13	0.311406	5.506651	0.056551	0.750282	1.500564	2.409334	0.313213	1.177599	0.161046
0.16	0.495156	7.036951	0.070365	1.380124	2.760247	2.787249	0.44596	1.22797	0.209145
0.2	0.810156	9.077351	0.08925	2.645935	5.291869	3.265956	0.653191	1.286967	0.277495
0.24	1.205156	11.11775	0.108399	4.480552	8.961104	3.717818	0.892276	1.337379	0.349516
0.28	1.680156	13.15815	0.127689	6.967176	13.93435	4.146743	1.161088	1.381021	0.424492
0.3025	1.9825	14.30588	0.138579	8.68193	17.36386	4.379284	1.324733	1.403177	0.46779

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.30638	0.139064	8.732878	17.46576	4.389484	1.330014	1.405284	0.469439
0.305	2.0175	14.30838	0.141001	8.937847	17.87569	4.43016	1.351199	1.413649	0.476037
0.31	2.0875	14.31338	0.145843	9.458451	18.9169	4.530994	1.404608	1.434117	0.49255
0.3162	**2.1743**	**14.31958**	**0.151841**	**10.12006**	**20.24011**	**4.654397**	**1.47172**	**1.458662**	**0.513063**
0.32	2.2275	14.32338	0.155515	10.53424	21.06848	4.729176	1.513336	1.473271	0.525656
0.325	2.2975	14.32838	0.160346	11.08916	22.17831	4.826618	1.568651	1.492015	0.54225
0.33	2.3675	14.33338	0.165174	11.65525	23.3105	4.92302	1.624596	1.510242	0.558872
0.333	2.4095	14.33638	0.168069	12.00022	24.00044	4.980378	1.658466	1.52094	0.568859

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.4364	0.168851	12.1778	24.3556	4.995815	1.673598	1.521094	0.572346
0.35	2.654725	15.18655	0.174808	13.57262	27.14525	5.112629	1.78942	1.522938	0.598863
0.38	3.122725	16.68685	0.187137	16.70747	33.41494	5.350285	2.033108	1.529527	0.653643
0.41	3.635725	18.18715	0.199906	20.32728	40.65456	5.590984	2.292303	1.538751	0.710458
0.45	4.389725	20.18755	0.217447	25.95835	51.9167	5.913434	2.661045	1.55348	0.788909
0.48	5.007725	21.68785	0.2309	30.82197	61.64394	6.154885	2.954345	1.565566	0.849504
0.513	5.7395	23.33818	0.245928	36.84253	73.68505	6.419118	3.293007	1.579388	0.917691

Street Capacity Calculations

STREET A

28' F-F Street Section with 8" curb

Slope= 0.006

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.000152	0.000304	0.189907	0.001899	0.334668	0.001885
0.02	0.0032	0.340624	0.009395	0.000965	0.001929	0.301459	0.006029	0.375652	0.004591
0.04	0.0128	0.681249	0.018789	0.006125	0.012251	0.478536	0.019141	0.421655	0.011128
0.06	0.0288	1.021873	0.028184	0.018059	0.036119	0.62706	0.037624	0.451134	0.018635
0.08	0.0512	1.362498	0.037578	0.038893	0.077786	0.759629	0.06077	0.473292	0.026838
0.1	0.08	1.703122	0.046973	0.070518	0.141035	0.881472	0.088147	0.491225	0.035592
0.12	0.1152	2.043746	0.056367	0.11467	0.229339	0.995396	0.119448	0.506381	0.044809
0.125	0.125	2.128902	0.058716	0.127857	0.255714	1.022857	0.127857	0.509838	0.047178

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.135836	0.271671	1.001552	0.130202	0.489524	0.046016
0.16	0.225625	3.914252	0.057642	0.22796	0.45592	1.010348	0.161656	0.445126	0.048626
0.2	0.415625	5.954652	0.069798	0.477065	0.95413	1.147825	0.229565	0.452306	0.062378
0.24	0.685625	7.995052	0.085756	0.902767	1.805534	1.316707	0.31601	0.473648	0.08061
0.3045	1.289506	11.2852	0.114265	2.055947	4.111893	1.594367	0.485485	0.509175	0.11469
0.32	1.465625	12.07585	0.121368	2.432606	4.865212	1.659774	0.531128	0.517066	0.123469
0.36	1.975625	14.11625	0.139954	3.605843	7.211685	1.825165	0.65706	0.536072	0.146936
0.365	2.045	14.3713	0.142297	3.774015	7.54803	1.845484	0.673602	0.538314	0.149944

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.3763	0.147117	3.990843	7.981687	1.886924	0.698162	0.54667	0.155661
0.41	2.675	14.4163	0.185554	5.892269	11.78454	2.202717	0.903114	0.606232	0.201921
0.484	3.711	14.4903	0.256102	10.13317	20.26635	2.730578	1.3216	0.691678	0.289704
0.49	3.795	14.4963	0.261791	10.51543	21.03086	2.770864	1.357723	0.697572	0.296935
0.54	4.495	14.5463	0.309013	13.91105	27.8221	3.094783	1.671183	0.742173	0.357805
0.59	5.195	14.5963	0.355912	17.66551	35.33102	3.400483	2.006285	0.780165	0.419684
0.63	5.755	14.6363	0.3932	20.91383	41.82765	3.634027	2.289437	0.806845	0.469849
0.667	6.273	14.6733	0.427511	24.10381	48.20763	3.84247	2.562927	0.829124	0.516734

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.32363	0.41426	25.4439	50.8878	3.762652	2.633856	0.792533	0.509096
0.72	7.085225	17.32383	0.408987	26.43254	52.86509	3.730657	2.686073	0.774803	0.507186
0.74	7.428225	18.32403	0.405382	27.54905	55.09809	3.708698	2.744437	0.759762	0.506979
0.76	7.791225	19.32423	0.403184	28.79079	57.58158	3.695284	2.808416	0.746987	0.508251
0.78	8.174225	20.32443	0.402187	30.15626	60.31253	3.689189	2.877568	0.736132	0.510818
0.8	8.577225	21.32463	0.402221	31.64481	63.28962	3.689399	2.95152	0.726914	0.514525
0.847	**9.603**	**23.6751**	**0.405616**	**35.62836**	**71.25672**	**3.710128**	**3.142478**	**0.710427**	**0.527033**

Street Capacity Calculations

STREET:

32' F-F Street Section with 4" curb

Slope= 0.0402

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0100	0.0016	0.3302	0.0048	0.0008	0.0016	0.5019	0.0050	0.8845	0.0085
0.0175	0.0049	0.5778	0.0085	0.0036	0.0071	0.7289	0.0128	0.9709	0.0168
0.0250	0.0100	0.8254	0.0121	0.0092	0.0185	0.9245	0.0231	1.0304	0.0260
0.0325	0.0169	1.0730	0.0158	0.0186	0.0372	1.1012	0.0358	1.0765	0.0358
0.0400	0.0256	1.3206	0.0194	0.0324	0.0648	1.2647	0.0506	1.1144	0.0461
0.0475	0.0361	1.5682	0.0230	0.0512	0.1024	1.4182	0.0674	1.1468	0.0569
0.0550	0.0484	1.8159	0.0267	0.0757	0.1514	1.5638	0.0860	1.1751	0.0680
0.0625	0.0625	2.0635	0.0303	0.1064	0.2129	1.7030	0.1064	1.2004	0.0794

For water depths greater than 0.0625 ft but less than 0.333 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.0630	0.0635	2.0890	0.0304	0.1084	0.2168	1.7071	0.1076	1.1986	0.0798
0.0900	0.1364	3.4663	0.0394	0.2766	0.5532	2.0277	0.1825	1.1911	0.1131
0.1200	0.2602	4.9966	0.0521	0.6358	1.2715	2.4438	0.2933	1.2432	0.1593
0.1500	0.4289	6.5269	0.0657	1.2241	2.4482	2.8540	0.4281	1.2986	0.2105
0.1800	0.6427	8.0572	0.0798	2.0870	4.1740	3.2475	0.5845	1.3489	0.2650
0.2100	0.9014	9.5875	0.0940	3.2665	6.5330	3.6238	0.7610	1.3936	0.3220
0.2400	1.2052	11.1178	0.1084	4.8019	9.6037	3.9844	0.9563	1.4333	0.3811
0.3041	**2.0050**	**14.3875**	**0.1394**	**9.4450**	**18.8901**	**4.7108**	**1.4326**	**1.5054**	**0.5130**
0.3330	2.4328	15.8617	0.1534	12.2165	24.4331	5.0217	1.6722	1.5336	0.5746

For water depths greater than 0.333 ft but less than 0.513 ft

Y2= Y - 0.333

A3= A2 + Y2*16 + 25 Y2^2

P3= P2 + SQRT (2501 Y2^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3400	2.5460	16.2118	0.1570	12.9884	25.9768	5.1015	1.7345	1.5418	0.5906
0.3700	3.0590	17.7121	0.1727	16.6264	33.2528	5.4353	2.0111	1.5747	0.6595
0.4000	3.6170	19.2124	0.1883	20.8228	41.6457	5.7570	2.3028	1.6041	0.7292
0.4200	4.0140	20.2126	0.1986	23.9457	47.8914	5.9656	2.5055	1.6222	0.7761
0.4300	4.2200	20.7127	0.2037	25.6081	51.2161	6.0683	2.6094	1.6308	0.7998
0.4500	4.6470	21.7129	0.2140	29.1400	58.2800	6.2707	2.8218	1.6473	0.8472
0.4800	5.3250	23.2132	0.2294	34.9723	69.9445	6.5676	3.1524	1.6705	0.9191
0.5130	6.1228	24.8635	0.2463	42.1586	84.3173	6.8856	3.5323	1.6942	0.9991

Street Capacity Calculations

STREET _____

32' F-F Street Section with 8" curb

Slope= 0.015

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.00024	0.00048	0.30027	0.003003	0.529156	0.004
0.02	0.0032	0.340624	0.009395	0.001525	0.003051	0.476649	0.009533	0.593958	0.009551
0.04	0.0128	0.681249	0.018789	0.009685	0.01937	0.756633	0.030265	0.666695	0.022689
0.06	0.0288	1.021873	0.028184	0.028554	0.057109	0.991469	0.059488	0.713306	0.037553
0.08	0.0512	1.362498	0.037578	0.061495	0.122991	1.201079	0.096086	0.74834	0.053638
0.1	0.08	1.703122	0.046973	0.111498	0.222997	1.393729	0.139373	0.776695	0.070686
0.12	0.1152	2.043746	0.056367	0.181309	0.362617	1.573859	0.188863	0.800658	0.088534
0.125	0.125	2.128902	0.058716	0.20216	0.40432	1.617279	0.20216	0.806124	0.093107

For water depths greater than 0.125 ft but less than 0.405 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.214775	0.42955	1.583593	0.205867	0.774005	0.091442
0.16	0.225625	3.914252	0.057642	0.360436	0.720872	1.597501	0.2556	0.703806	0.098218
0.2	0.415625	5.954652	0.069798	0.754306	1.508611	1.814871	0.362974	0.715159	0.125646
0.24	0.685625	7.995052	0.085756	1.4274	2.8548	2.081896	0.499655	0.748903	0.161088
0.28	1.035625	10.03545	0.103197	2.439281	4.878561	2.355371	0.659504	0.784427	0.200709
0.32	1.465625	12.07585	0.121368	3.846288	7.692575	2.624333	0.839786	0.817553	0.243097
0.36	1.975625	14.11625	0.139954	5.701338	11.40268	2.88584	1.038902	0.847604	0.287566
0.39	2.410625	15.64655	0.154067	7.416845	14.83369	3.076731	1.199925	0.868219	0.322042
0.405	2.645	16.4117	0.161165	8.38602	16.77204	3.170518	1.28406	0.87796	0.339599

For water depths greater than 0.405 ft but less than 0.667 ft

Y2= Y - 0.405
A3= A2 + Y2*16
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.725	16.4167	0.165989	8.811214	17.62243	3.233473	1.325724	0.889917	0.350229
0.44	3.205	16.4467	0.194872	11.53302	23.06604	3.598446	1.583316	0.956006	0.414256
0.47	3.685	16.4767	0.223649	14.53554	29.07108	3.944515	1.853922	1.013951	0.478749
0.5	4.165	16.5067	0.252322	17.80466	35.60932	4.274828	2.137414	1.065383	0.543738
0.55	4.965	16.5567	0.299879	23.81397	47.62793	4.796368	2.638002	1.139733	0.653178
0.6	5.765	16.6067	0.347149	30.48541	60.97083	5.288016	3.17281	1.203065	0.764004
0.6371	**6.3586**	**16.6438**	**0.38204**	**35.84124**	**71.68248**	**5.636655**	**3.591113**	**1.244485**	**0.847097**
0.667	6.837	16.6737	0.410047	40.39895	80.79791	5.908871	3.941217	1.27501	0.914575

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= A3 + 16 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.392225	18.32403	0.403417	43.2076	86.41519	5.845006	4.091504	1.231142	0.918028
0.73	7.944225	19.82433	0.400731	46.22771	92.45542	5.819033	4.247894	1.200222	0.926721
0.75	8.337225	20.82453	0.400356	48.48431	96.96862	5.815401	4.361551	1.183372	0.934977
0.77	8.750225	21.82473	0.400932	50.93484	101.8697	5.820975	4.482151	1.169021	0.944944
0.8	9.407225	23.32503	0.40331	54.97559	109.9512	5.843975	4.67518	1.151424	0.962716
0.82	9.870225	24.32523	0.405761	57.91476	115.8295	5.867623	4.811451	1.141898	0.976228
0.85	10.60223	25.82553	0.410533	62.69665	125.3933	5.913537	5.026507	1.130342	0.998679

Street Capacity Calculations

Milky Way Drive

48' F-F Street Section with 8" curb

Slope= 0.0124

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.170312	0.004697	0.000218	0.000437	0.273009	0.00273	0.481115	0.003444
0.02	0.0032	0.340624	0.009395	0.001387	0.002774	0.433375	0.008667	0.540033	0.008257
0.04	0.0128	0.681249	0.018789	0.008806	0.017611	0.687939	0.027518	0.606167	0.019696
0.06	0.0288	1.021873	0.028184	0.025962	0.051924	0.901456	0.054087	0.648546	0.032677
0.08	0.0512	1.362498	0.037578	0.055912	0.111824	1.092036	0.087363	0.680399	0.046751
0.1	0.08	1.703122	0.046973	0.101376	0.202751	1.267195	0.12672	0.70618	0.061686
0.12	0.1152	2.043746	0.056367	0.164848	0.329696	1.430972	0.171717	0.727968	0.07734
0.125	0.125	2.128902	0.058716	0.183806	0.367612	1.47045	0.183806	0.732938	0.081353

For water depths greater than 0.125 ft but less than 0.565 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.383952	0.056891	0.195276	0.390552	1.439822	0.187177	0.703735	0.07979
0.18	0.310625	4.934452	0.06295	0.478463	0.956927	1.540325	0.277258	0.639806	0.096081
0.24	0.685625	7.995052	0.085756	1.297809	2.595619	1.892885	0.454292	0.680912	0.140406
0.3	1.240625	11.05565	0.112216	2.809476	5.618952	2.264565	0.67937	0.728612	0.193595
0.39	2.410625	15.64655	0.154067	6.743485	13.48697	2.797401	1.090986	0.789395	0.282059
0.4	2.565625	16.15665	0.158797	7.323215	14.64643	2.854359	1.141744	0.795336	0.292361
0.45	3.415625	18.70715	0.182584	10.70022	21.40043	3.132726	1.409727	0.822978	0.345025
0.5	4.390625	21.25765	0.206543	14.93302	29.86605	3.401116	1.700558	0.847634	0.399417
0.565	5.845	24.5733	0.23786	21.84134	43.68268	3.736756	2.111267	0.876078	0.472367

For water depths greater than 0.565 ft but less than 0.667 ft

Y2= Y - 0.565

A3= A2 + Y2*22

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.57	5.955	24.5783	0.242287	22.52764	45.05529	3.78298	2.156298	0.883016	0.481737
0.58	6.175	24.5883	0.251136	23.92526	47.85052	3.874536	2.247231	0.896557	0.50051
0.59	6.395	24.5983	0.259977	25.35585	50.71171	3.96495	2.33932	0.90967	0.519328
0.6	6.615	24.6083	0.268812	26.81901	53.63802	4.054272	2.432563	0.922379	0.538191
0.61	6.835	24.6183	0.277639	28.31432	56.62865	4.142549	2.526955	0.934706	0.557098
0.62	7.055	24.6283	0.286459	29.84142	59.68283	4.229825	2.622492	0.94667	0.576051
0.64	7.495	24.6483	0.304078	32.98948	65.97896	4.401532	2.81698	0.969585	0.614091
0.667	8.089	24.6753	0.327818	37.43379	74.86758	4.62774	3.086703	0.998569	0.665728

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 22 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	8.842225	26.32563	0.335879	41.58763	83.17525	4.703299	3.292309	0.990662	0.691289
0.73	9.574225	27.82593	0.344076	45.7601	91.5202	4.77951	3.489042	0.985812	0.716201
0.75	10.08723	28.82613	0.349933	48.75764	97.51528	4.833603	3.625202	0.983586	0.733601
0.77	10.62023	29.82633	0.356069	51.93224	103.8645	4.889938	3.765252	0.982042	0.751582
0.8	11.45723	31.32663	0.365734	57.03446	114.0689	4.978034	3.982427	0.98081	0.779553
0.82	12.04023	32.32683	0.372453	60.66846	121.3369	5.038814	4.131828	0.980604	0.798817
0.85	**12.95223**	**33.82713**	**0.382895**	**66.478**	**132.956**	**5.132554**	**4.362671**	**0.981061**	**0.828559**

VOLUME CALCULATIONS

BASIN E DETENTION POND

Ab - Bottom Of The Pond Surface Area
At - Top Of The Pond Surface Area
D - Water Depth
Dt - Total Pond Depth
C - Change In Surface Area / Water Depth

Volume = $Ab * D + 0.5 * C * D^2$

C = (At - Ab) / Dt

Ab =	4,900.00
At =	10,000.00
Dt =	3.00
C =	1700.00

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
55	0	0	0.0000
56.00	1	0.1320	ERR
57.00	2	0.3030	23.1628
58.00	3	0.5131	51.7935

Orifice Equation
Q = CA * SQRT(2gH)

C =	0.6
A=	9.621128
Diameter (ft)	3.5
H (ft) =	Depth of water above center of pipe
Q (cfs)=	Flow

Street Capacity Calculations

McMahon Boulevard

68' F-F Street Section with 8" curb

Slope= 0.0547

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.41	0.00	0.73	0.006447
0.02	0.00	0.34	0.01	0.00	0.00	0.66	0.01	0.82	0.015186
0.04	0.01	0.68	0.02	0.01	0.03	1.04	0.04	0.92	0.035614
0.06	0.03	1.02	0.03	0.04	0.08	1.36	0.08	0.98	0.058521
0.08	0.05	1.36	0.04	0.08	0.17	1.65	0.13	1.03	0.083173
0.1	0.08	1.70	0.05	0.15	0.31	1.92	0.19	1.07	0.109196
0.12	0.12	2.04	0.06	0.25	0.50	2.17	0.26	1.10	0.136355
0.125	0.13	2.13	0.06	0.28	0.56	2.23	0.28	1.11	0.143303

For water depths greater than 0.125 ft but less than 0.565 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.30	0.59	2.18	0.28	1.07	0.141309
0.18	0.31	4.93	0.06	0.72	1.45	2.33	0.42	0.97	0.172399
0.25	0.77	8.51	0.09	2.27	4.53	2.96	0.74	1.04	0.264315
0.3	1.24	11.06	0.11	4.25	8.50	3.43	1.03	1.10	0.341282
0.35	1.84	13.61	0.14	7.15	14.29	3.88	1.36	1.16	0.423517
0.4	2.57	16.16	0.16	11.08	22.17	4.32	1.73	1.20	0.509651
0.45	3.42	18.71	0.18	16.19	32.39	4.74	2.13	1.25	0.598935
0.5	4.39	21.26	0.21	22.60	45.20	5.15	2.57	1.28	0.690893
0.565	5.85	24.57	0.24	33.05	66.11	5.66	3.20	1.33	0.813906

For water depths greater than 0.565 ft but less than 0.667 ft

Y2= Y - 0.565
A3= A2 + Y2*32
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.57	6.01	24.58	0.24	34.57	69.14	5.76	3.28	1.34	0.835112
0.5729	**6.10**	**24.58**	**0.25**	**35.46**	**70.93**	**5.82**	**3.33**	**1.35**	**0.847403**
0.59	6.65	24.60	0.27	40.91	81.81	6.16	3.63	1.41	0.919788
0.6	6.97	24.61	0.28	44.23	88.46	6.35	3.81	1.44	0.962064
0.61	7.29	24.62	0.30	47.65	95.31	6.54	3.99	1.48	1.004314
0.63	7.93	24.64	0.32	54.81	109.61	6.92	4.36	1.54	1.088775
0.65	8.57	24.66	0.35	62.34	124.69	7.28	4.73	1.59	1.173241
0.667	9.11	24.68	0.37	69.05	138.10	7.58	5.06	1.64	1.245078

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= A3 + 32 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	9.17	26.33	0.35	66.90	133.80	7.29	5.11	1.54	1.210636
0.73	10.20	27.83	0.37	77.01	154.03	7.55	5.51	1.56	1.282985
0.75	10.92	28.83	0.38	84.18	168.37	7.71	5.78	1.57	1.331021
0.77	11.65	29.83	0.39	91.70	183.41	7.87	6.06	1.58	1.378939
0.79	12.40	30.83	0.40	99.58	199.16	8.03	6.34	1.59	1.426766
0.82	13.57	32.33	0.42	112.07	224.14	8.26	6.77	1.61	1.49839
0.847	14.66	33.68	0.44	124.03	248.05	8.46	7.17	1.62	1.56278

Design Calculations for Baffled Outlet

Q=334.82 cfs
H=27.0 ft

A) Pipe Dimensions

1)Pipe Size - Based on maximum pipe velocity of 12 ft/sec.
A=Q/V
A=334.82 cfs/12 fps
A=27.90 ft^2
Use 72" pipe which has area of 28.27 ft^2

2) Air Vent Size
Vent=1/6*Diameter
72/6 = 12" vent required

B) Baffled Outlet Dimensions

1) Compute Theoretical Velocity
$V=\sqrt{2gH}$
$V=\sqrt{(2*32.2*27)}$
V=41.70 ft/sec

2) Area of Flow
A=Q/V
A=334.82 cfs/41.70 fps
A=8.03 ft^2

3) Depth of Flow
$d=\sqrt{A}$
$d=\sqrt{8.03}$
d=2.83 ft

4) Froude Number
$F=V/\sqrt{(gd)}$
$F=41.70/\sqrt{(32.2*2.83)}$
F=4.37

5) W/d Ratio (from Figure 6-10)
W/d = 6.50

6) Minimum Width of Basin
W=W/d * d
W=6.50*2.83
W=18.40 ft
Use W = 18' 5"

7) Basin Invert

Invert=1/6 W

18.40/6 = 3.067

Set basin 3'1" below natural ground surface

C) Erosion Protection Requirements

1) Required Rock Diameter

Diameter = W/20

18.40/20 = 0.92 = 11"

Use Type 2 (12" coarse gravel)

2) Length of Protection

Length=W

Length=18.40 feet

3) Depth of Protection

Depth=W/6

18.40/6=3.067 or 3'1"

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/30/1998

INPUT FILE = a:mcmahon.dat USER NO.= R_BOHANN.101

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	101.G	-	1	.02027	46.67	1.628	1.50556	1.500	3.598	PER IMP= 60.00
COMPUTE NM HYD	101.H	-	1	.01623	45.39	1.701	1.96548	1.500	4.370	PER IMP= 100.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.470
COMPUTE NM HYD	111.G	-	1	.02027	28.13	.940	.86984	1.500	2.168	PER IMP= 60.00
COMPUTE NM HYD	111.H	-	1	.01623	30.05	1.071	1.23785	1.500	2.893	PER IMP= 100.00
FINISH										

Drainage Basins

BASIN A

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	141133.14	3.2400	0.005062
2	148714.12	3.4140	0.005334
3	152231.68	3.4948	0.005461
4	122350.07	2.8088	0.004389
5	60011.38	1.3777	0.002153
6	52161.97	1.1975	0.001871
7	61994.88	1.4232	0.002224
8	68868.76	1.5810	0.002470
9	50179.35	1.1520	0.001800
Total	857645.36	19.6888	0.030764

BASIN B

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	78154.30	1.7942	0.002803
2	65905.08	1.5130	0.002364
3	73128.57	1.6788	0.002623
4	87452.76	2.0076	0.003137
5	82108.12	1.8849	0.002945
6	76020.66	1.7452	0.002727
7	45864.72	1.0529	0.001645
8	94828.98	2.1770	0.003402
9	50175.73	1.1519	0.001800
Total	653638.92	15.0055	0.023446

BASIN C

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	123613.84	2.8378	0.004434
2	114461.05	2.6277	0.004106
3	103701.57	2.3807	0.003720
4	91004.53	2.0892	0.003264
5	132925.17	3.0515	0.004768
6	114891.38	2.6375	0.004121
7	59641.26	1.3692	0.002139
8	58498.01	1.3429	0.002098
9	31662.56	0.7269	0.001136
Total	830399.37	19.0633	0.029786

BASIN D

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	33734.80	0.7744	0.001210
2	47195.05	1.0834	0.001693
3	76004.29	1.7448	0.002726
4	93392.50	2.1440	0.003350
5	99256.60	2.2786	0.003560
6	119925.65	2.7531	0.004302
7	42996.46	0.9871	0.001542
Total	512505.35	11.7655	0.018384

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
E	835718.73	19.1855	0.029977
F	607077.75	13.9366	0.021776
G	565097.26	12.9728	0.020270
H	452400.00	10.3857	0.016228
Total	2460293.74	56.4806	0.088251

Runoff Calculation Results

BASIN A

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	11.67	7.03	0.406	0.235
2	12.29	7.41	0.428	0.247
3	12.59	7.59	0.438	0.253
4	10.12	6.10	0.352	0.204
5	4.97	3.00	0.173	0.100
6	4.32	2.60	0.150	0.087
7	5.13	3.09	0.179	0.103
8	6.91	4.58	0.259	0.163
9	5.04	3.34	0.189	0.119
Total	73.04	44.74	2.574	1.511

BASIN B

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	6.47	3.90	0.225	0.130
2	5.46	3.29	0.190	0.110
3	6.05	3.65	0.211	0.122
4	7.24	4.36	0.252	0.146
5	6.79	4.09	0.236	0.137
6	6.29	3.79	0.219	0.127
7	3.80	2.29	0.132	0.076
8	7.85	4.73	0.273	0.158
9	5.04	3.34	0.189	0.119
Total	54.99	33.44	1.927	1.125

BASIN C

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	10.22	6.16	0.356	0.206
2	9.47	5.71	0.330	0.190
3	8.58	5.17	0.299	0.173
4	7.53	4.54	0.262	0.151
5	10.99	6.62	0.383	0.221
6	9.50	5.73	0.331	0.191
7	4.94	2.98	0.172	0.099
8	4.85	2.92	0.168	0.097
9	3.18	2.11	0.119	0.075
Total	69.26	41.94	2.420	1.403

BASIN D

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	3.39	2.25	0.127	0.080
2	4.74	3.14	0.177	0.112
3	6.29	3.79	0.219	0.126
4	7.73	4.66	0.269	0.155
5	9.96	4.95	0.373	0.165
6	9.92	5.98	0.345	0.200
7	3.57	2.15	0.124	0.072
Total	45.60	26.92	1.634	0.910

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
E	69.02	41.60	2.407	1.391
F	50.14	30.22	1.749	1.010
G	46.67	28.13	1.628	0.940
H	45.39	30.05	1.701	1.071
Total	211.22	130.00	7.485	4.412

Street Capacity Summary

	Basin	Street Slope (%)	Width of Street (ft)	Curb Height (inches)	Basins Contributing to Street	Flow (cfs)	Capacity (cfs)
	A1	3.43	28	4	A1, A8	18.58	20.45
	A2	3.90	32	4	A2	12.29	19.42
	A3	4.72	28	4	A3	12.59	16.4
	A4	4.50	28	4	A4	10.12	17.09
	A5	1.81	28	4	A4, A5	15.09	36.08
	A6	0.60	28	8	A1, A2, A3, A6, A7, A8	52.91	71.26
	A7	0.60	28	8	A1, A2, A3, A7, A8	36.00	71.26
	A8	1.44	48	8	A8	6.91	117.98
*	A9	5.00	48	8	A1 thru A9	73.04	42.58
	B1	3.50	28	4	B1	6.47	20.24
	B2	3.50	28	4	B2	5.46	20.24
	B3	1.00	28	4	B1, B2, B3, B4	25.22	39.39
	B4	3.50	28	4	B1, B2, B4	19.17	20.24
	B5	2.32	28	4	B5	8.47	28.13
	B6	1.81	32	8	B5, B6, B7	23.33	65.29
*	B7	3.90	28	8	B5, B7	12.29	39.96
	B9	1.96	48	8	B1, B2, B3, B4, B8	30.26	85.92
	C1	3.03	28	4	C1	10.22	21.82
	C2	3.00	28	4	C2	9.47	21.94
	C3	2.75	28	4	C3	5.58	23.77
	C4	1.27	28	4	C4	7.53	44.39
	C5	3.35	28	4	C5, C7	15.93	20.72
	C6	1.00	28	8	C1 thru C9	69.26	91.99
	C7	3.35	28	4	C7	4.94	20.72
	C8	4.00	28	8	C2, C4, C8	21.85	39.47
	C9	4.47	28	8	C1, C3, C9	21.98	37.28
	D1	4.79	48	8	D1	3.39	44.3
	D2	2.84	48	8	D1, D2	8.13	70.63
	D3	2.75	28	4	D3	9.76	23.77
	D4	2.23	32	4	D4, D8	17.45	32.14
*	D5	6.00	48	8	D1 thru D8	46.13	35.91
	D6	6.00	28	4	D6	3.59	30.51
	D7	1.29	32	4	D7	4.02	47.76
	D8	7.00	28	4	D8	5.67	11.61

* Note: Storm sewer has been added to alleviate the capacity problem in these basins.

Pipe Capacity

STORM SEWER 'A' (Basin A)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
CB1 to CB3	24	1	3.14	0.5	22.68	11.50	3.66
CB2 to CB4	24	1	3.14	0.5	22.68	11.50	3.66
CB3 to MH1	24	1	3.14	0.5	22.68	17.10	5.44
CB4 to MH1	24	1	3.14	0.5	22.68	17.10	5.44
MH1 to MH2	30	1	4.91	0.625	41.13	34.20	6.97
CB5 to CB6	15	1	1.23	0.3125	6.48	4.10	3.34
CB6 to MH2	18	1	1.77	0.375	10.53	8.20	4.64
MH2 to MH3	36	1	7.07	0.75	66.88	42.40	6.00
CB7 to CB9	18	1	1.77	0.375	10.53	7.60	4.30
CB8 to CB10	18	1	1.77	0.375	10.53	7.60	4.30
CB9 to CB11	24	1	3.14	0.5	22.68	11.60	3.69
CB10 to CB12	24	1	3.14	0.5	22.68	11.60	3.69
CB11 to MH3	24	1	3.14	0.5	22.68	14.10	4.49
CB12 to MH3	24	1	3.14	0.5	22.68	14.10	4.49
MH3 to EXISTING	42	1	9.62	0.875	100.88	70.60	7.34

48"

STORM SEWER 'B' (Basin B)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
CB13 to CB14	24	1	3.14	0.5	22.68	15.13	4.82
CB14 to MH4	30	1	4.91	0.625	41.13	30.26	6.16
MH4 to MH6	30	1	4.91	0.625	41.13	30.26	6.16
MH6 to MH5	30	1	4.91	0.625	41.13	30.26	6.16
CB15 to MH5	24	1	3.14	0.5	22.68	11.67	3.71
CB16 to MH5	24	1	3.14	0.5	22.68	11.67	3.71
MH5 to MH14	36	0.7	7.07	0.75	55.95	53.60	7.58
MH14 to CB22	36	0.7	7.07	0.75	55.95	53.60	7.58

STORM SEWER 'C' (BASINS C AND D)

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
MH7 to MH8	42	1	9.62	0.875	100.88	96.81	10.06
CB17 to MH8	42	1	9.62	0.875	100.88	69.26	7.20
MH8 to MH10	54	1	15.90	1.125	197.18	166.07	10.44
MH9 to MH10	42	1	9.62	0.875	100.88	69.02	7.17
MH10 to MH11	60	1	19.63	1.25	261.14	235.09	11.97
CB20 to MH11	24	1	3.14	0.5	22.68	10.74	3.42
CB21 to MH11	24	1	3.14	0.5	22.68	10.74	3.42
MH11 to CB22	60	1	19.63	1.25	261.14	256.57	13.07
CB22 to OUTFALL	66	1	23.76	1.375	336.71	334.82	14.09

Manning's Equation:

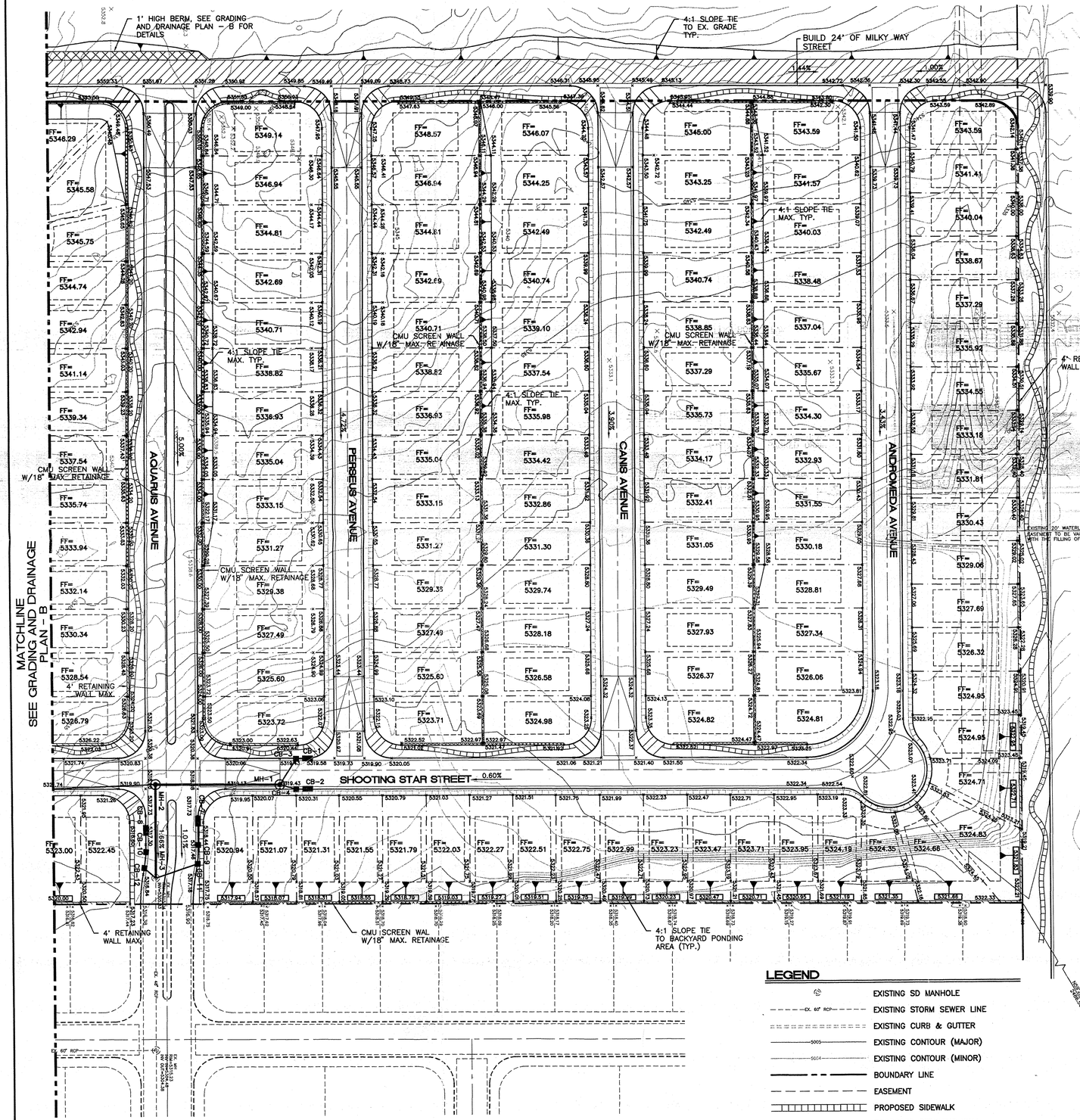
Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area

R = D/4

S = Slope

n = 0.013

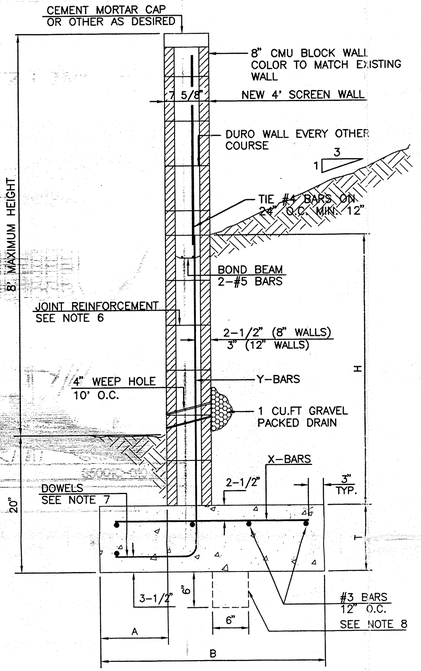


LEGEND

- EXISTING SD MANHOLE
- EXISTING STORM SEWER LINE
- EXISTING CURB & GUTTER
- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- BOUNDARY LINE
- EASEMENT
- PROPOSED SIDEWALK
- PROPOSED RETAINING WALL
- PROPOSED CMU SCREEN WALL

EROSION CONTROL PLAN AND POLLUTION PREVENTION NOTES

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT OUT OF EXISTING RIGHT-OF-WAY.
3. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL STORM RUN OFF ON SITE.
4. REPAIR OF DAMAGED FACILITIES AND CLEAN-UP OF SEDIMENT ACCUMULATION ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.



RETAINING WALL DETAIL

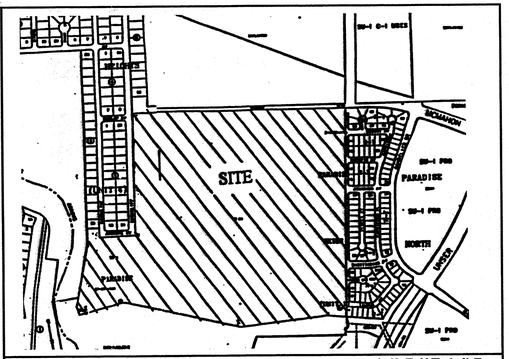
NOT TO SCALE

8 INCH REINFORCED CONCRETE MASONRY WALL

H	X	A	B	T	Y-BARS	X-BARS
ft.-in.	ft.-in.	in.	ft.-in.	in.		
2'-0"	1'-1"	8"	2'-4"	9"	#3 @32" O.C.	
2'-8"	1'-9"	8"	2'-9"	9"	#4 @32" O.C.	#3 @27" O.C.
3'-4"	2'-5"	8"	2'-4"	9"	#3 @32" O.C.	#3 @27" O.C.
4'-0"	3'-1"	10"	2'-9"	9"	#4 @32" O.C.	#3 @27" O.C.
4'-8"	3'-10"	12"	3'-4"	10"	#5 @32" O.C.	#3 @27" O.C.
5'-4"	4'-6"	14"	3'-8"	10"	#4 @16" O.C.	#4 @30" O.C.
6'-0"	5'-3"	16"	4'-2"	12"	#6 @24" O.C.	#4 @25" O.C.

WALL NOTES:

1. ALL CONCRETE IS TO BE 4000 PSI @ 28 DAYS.
2. MINIMUM COMPACTION UNDER FOOTINGS IS TO BE 95% PER ASTM. D 1557 FOR A DEPTH OF 12" MOISTURE CONTENT IS TO BE ± 2.0%.
3. BACK FILL AGAINST WALLS IS TO BE HAND-PLACED AND COMPACTED.
4. ALL BARS ARE TO BE GRADE 60, ASTM 615.
5. TRUSS TYPE DUR-O-WALL EVERY OTHER COURSE.
6. DOWELS SHALL BE AT LEAST EQUAL IN SIZE AND SPACING TO V-BARS, SHALL PROJECT A MINIMUM OF 30 BAR DIA. INTO THE FILLED BLOCK CORES, AND SHALL EXTEND TO THE TOE OF THE FOOTING.
7. PROVIDE KEY FOR 8" AND 12" WALLS WHERE H EXCEEDS 5'-0"
8. USE EITHER EXPANSION JOINTS ON 20' CENTERS OR PILASTERS EVERY 16'.
9. #3 BARS TO BE USED ON WALLS EXCEEDING 2'-8" HEIGHT
10. X BARS TO BE USED ON WALLS EXCEEDING 2'-8" HEIGHT
11. #4 BARS TO BE USED ON WALLS SMALLER THAN 3'-4"
12. BOND BEAM, 1-#4 BARS FOR WALLS UNDER 3'-4", 2-#4 BARS FOR WALLS UNDER 5'-4", 2-#5 BARS FOR WALLS OVER 5'-4".



VICINITY MAP: A-10-Z AND A-11-Z

FEMA MAP: 35001C-0104D

LEGAL DESCRIPTION:

TRACT AAA PARADISE SKIES SUBDIVISION

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT THE FLOWLINE ELEVATION UNLESS OTHERWISE NOTED
2. SEE GRADING AND DRAINAGE PLAN – B FOR DESILTING PONDING
3. SEE GRADING AND DRAINAGE PLAN – C FOR TYPICAL LOT LAYOUT
4. SEE MASTER STORM SEWER PLAN FOR STORM SEWER DATA
5. PAD ELEVATION IS THE FINISH FLOOR ELEVATION MINUS 0.50 FEET.

ROUGH GRADING APPROVAL DATE

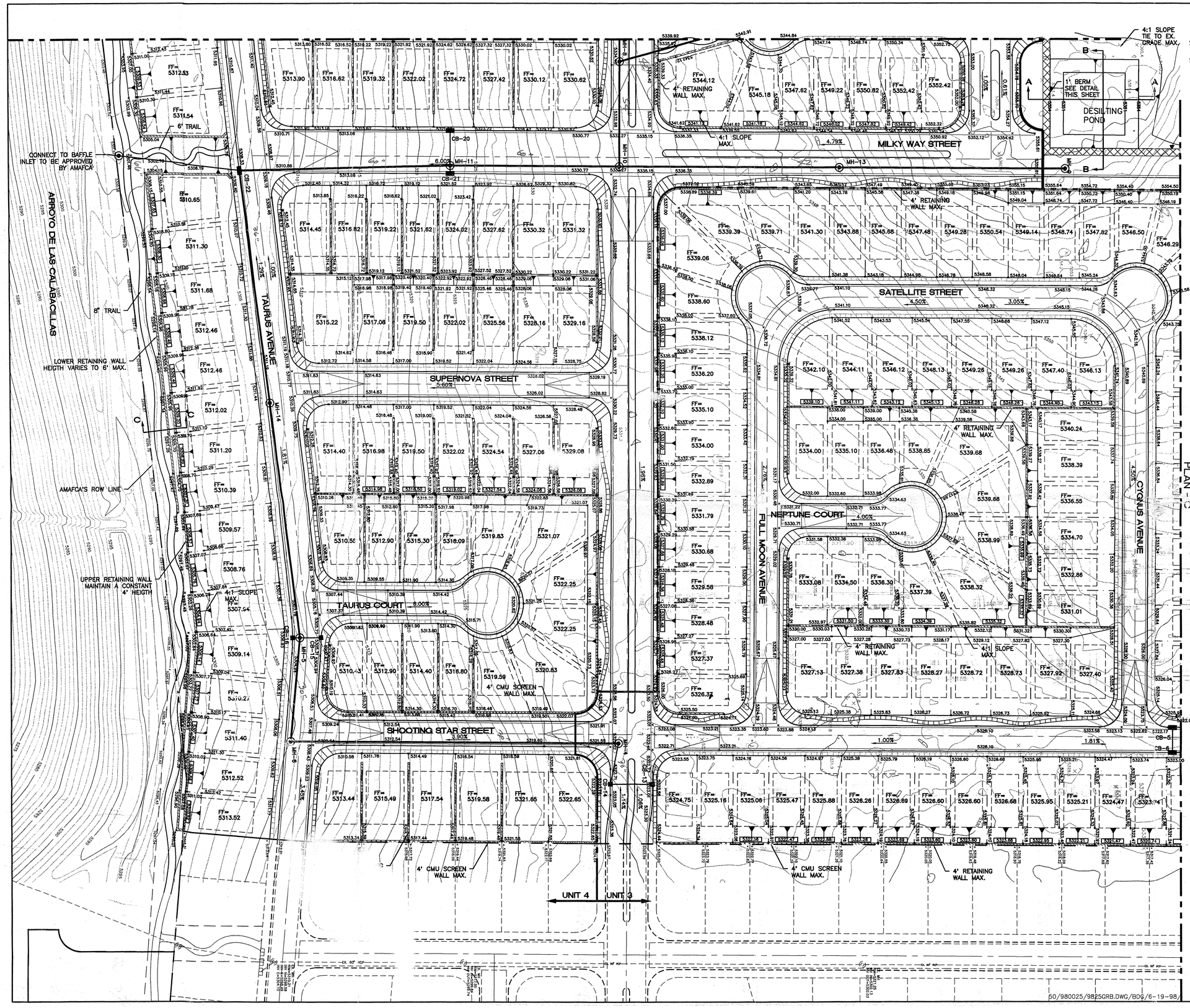
GRAPHIC SCALE

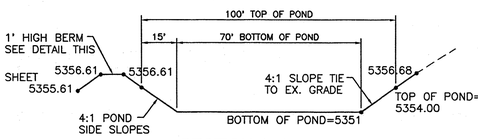
50 25 0 25 50

SCALE: 1"=50'

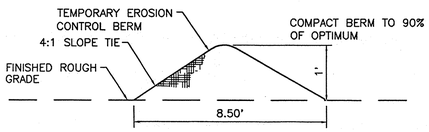
ENGINEER'S SEAL: RONALD RAY BOHANNAN NEW MEXICO 7868 PROFESSIONAL ENGINEER	PARADISE SKIES SUBDIVISION GRADING AND DRAINAGE PLAN - A	DRAWN BY BDG DATE 6-2-98 9825GRA.DWG SHEET # 3
RONALD R. BOHANNAN P.E. #7868	TIERRA WEST, LLC 4421 McLEOD ROAD, N.E., SUITE D ALBUQUERQUE, NEW MEXICO 87109 (505)883-7592	JOB # 980025

50/980025/9825GRA.DWG/BDG/6-3-98/

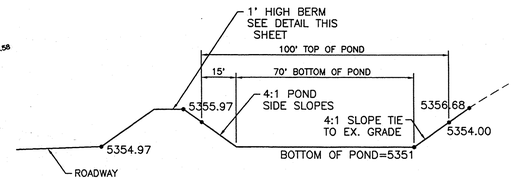




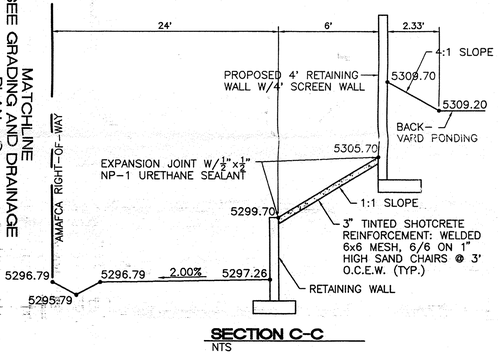
SECTION A-A
NTS



BERM DETAIL
NTS



SECTION B-B
NTS



SECTION C-C
NTS

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT THE FLOWLINE ELEVATION UNLESS OTHERWISE NOTED
2. SEE GRADING AND DRAINAGE PLAN – A FOR RETAINING WALL DETAILS
3. SEE GRADING AND DRAINAGE PLAN – C FOR TYPICAL LOT LAYOUT
4. SEE MASTER STORM SEWER PLAN FOR STORM SEWER DATA
5. PAD ELEVATION IS THE FINISH FLOOR ELEVATION MINUS 0.50 FEET.

N

GRAPHIC SCALE

50 25 0 25 50

SCALE: 1"=50'

ENGINEER'S SEAL

RONALD R. BOHANNAN P.E. #7868

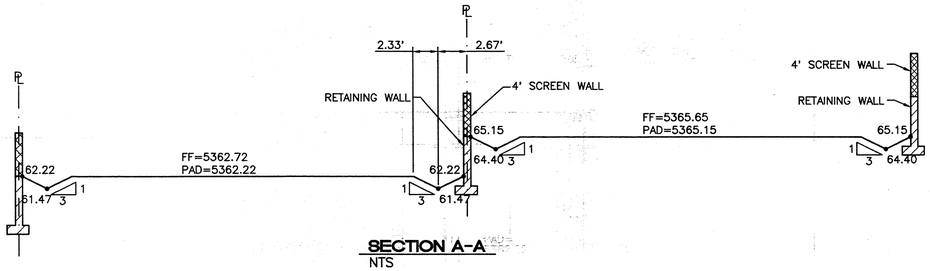
PARADISE SKIES SUBDIVISION

GRADING AND DRAINAGE PLAN - B

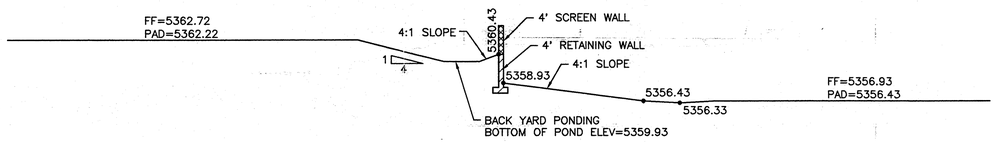
TIERRA WEST, LLC
4421 McLEOD ROAD, N.E., SUITE D
ALBUQUERQUE, NEW MEXICO 87109
(505)883-7592

DRAWN BY	BDG
DATE	6-3-98
	9825GRB.DWG
SHEET #	
JOB #	980025

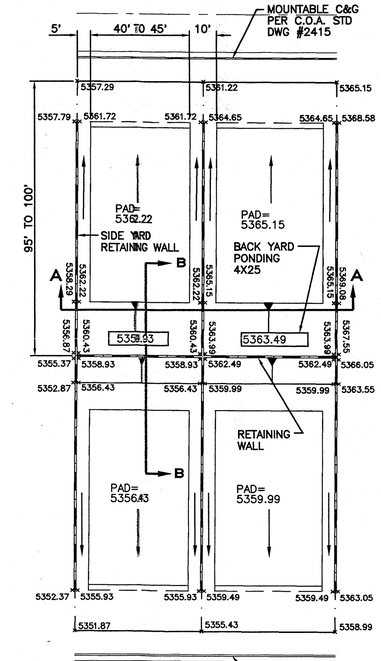
50/980025/9825GRB.DWG/BDG/6-19-98/



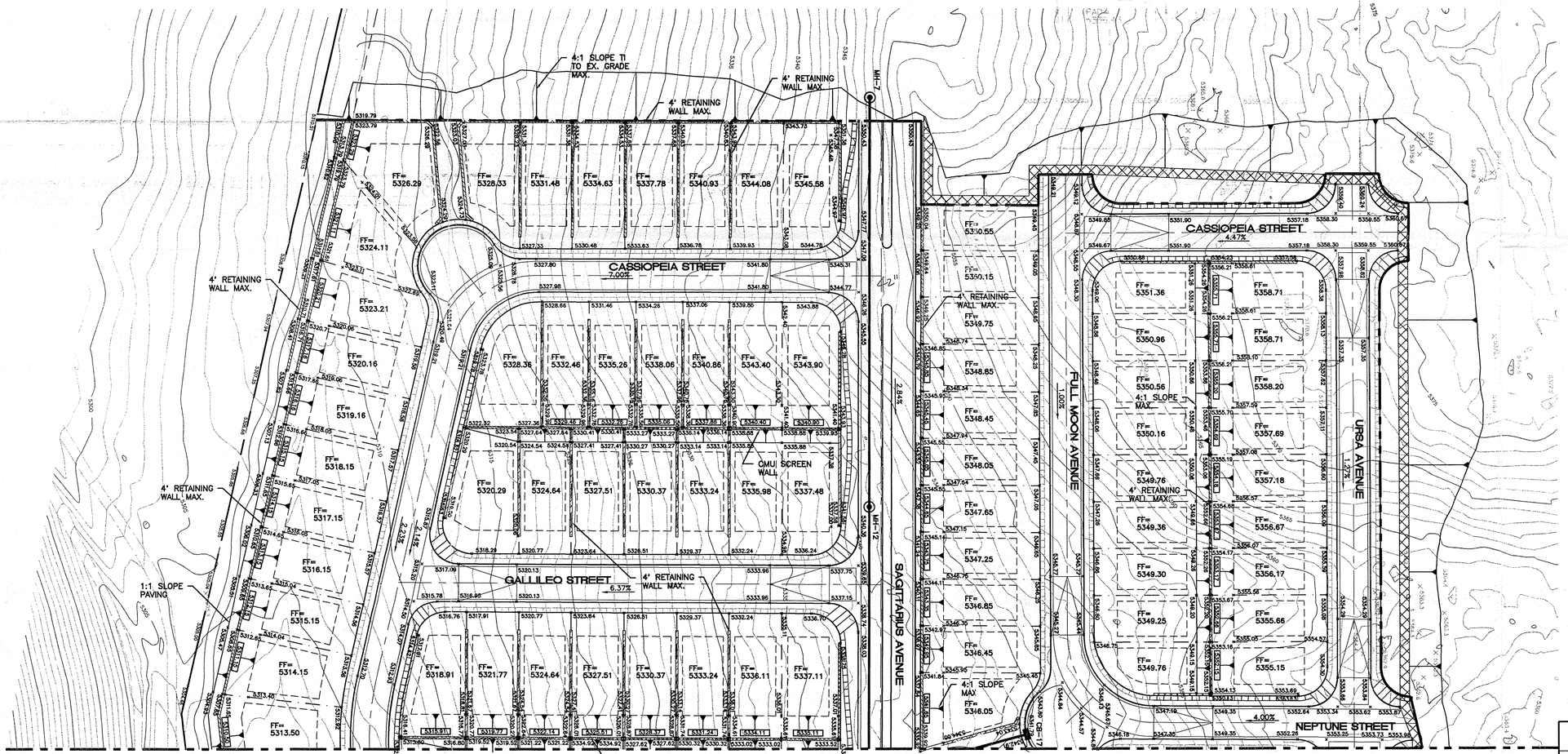
SECTION A-A
NTS



SECTION B-B
NTS



TYPICAL LOT LAYOUT
NTS



NOTES:

1. ALL SPOT ELEVATIONS REPRESENT TH FLOWLINE ELEVATION UNLESS OTHERWISE NOTED
2. SEE GRADING AND DRAINAGE PLAN – B FOR DESILTING PONDING
3. SEE GRADING AND DRAINAGE PLAN – A RETAINING WALL DETAIL
4. SEE MASTER STORM SEWER PLAN FOR STORM SEWER DATA
5. PAD ELEVATION IS THE FINISH FLOOR ELEVATION MINUS 0.50 FEET.

GRAPHIC SCALE

50 25 0 25 50

SCALE 1"=50'

ENGINEER'S SEAL

RONALD R. BOHANNAN P.E. #7868

PARADISE SKIES SUBDIVISION

GRADING AND DRAINAGE PLAN - C

TIERRA WEST, LLC
4421 McLEOD ROAD, N.E., SUITE D
ALBUQUERQUE, NEW MEXICO 87109
(505)883-7592

DRAWN BY BDG

DATE 6-3-98

9825GRC.DWG

SHEET #

JOB # 980025

50/980025/9825GRC.DWG/BDG/6-11-98/