DRAINAGE REPORT

for

Spectrum
Assisted Living Facility

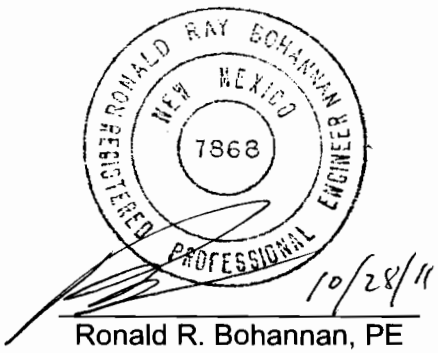
Golf Course Road & McMahon Boulevard N.W.
Albuquerque, New Mexico

Prepared by:

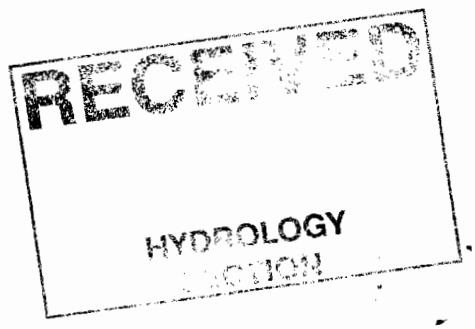
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

October 28, 2011

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the State of New Mexico in good standing.



Ronald R. Bohannan, PE
NO. 7868



Job No. 2011026

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PURPOSE

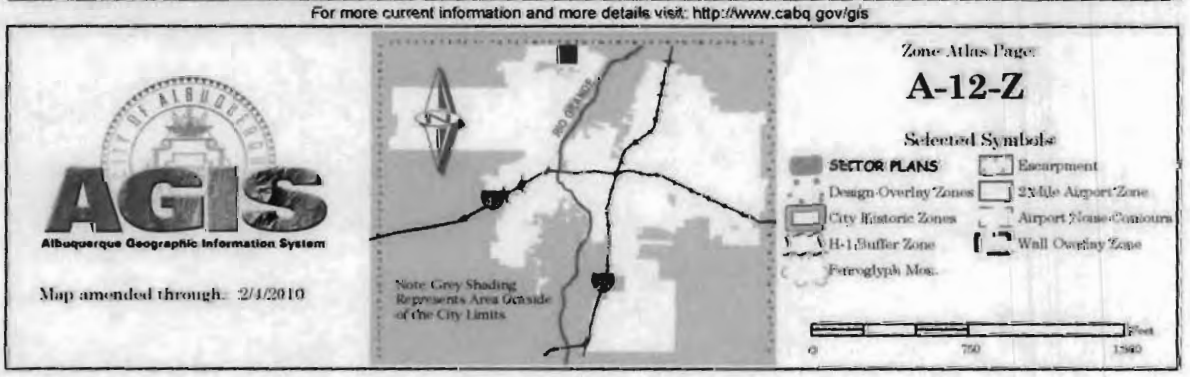
The purpose of this report is to provide the drainage management plan for a proposed Spectrum Assisted Living Facility within Tract 1B-1 (Development) of Paradise North in accordance with the City of Albuquerque Development Process Manual (DPM) – Chapter 22 – Hydrology Section. This document details the drainage analysis of the existing and proposed conditions for the subject site and describes anticipated implications, and aims to act as an accurate record for future reference. A Conceptual Grading and Drainage Plan was approved by EPC in conjunction with Site Development Plan approval; this report was developed in order to obtain Site Plan Approval by DRB and for Grading Permit.

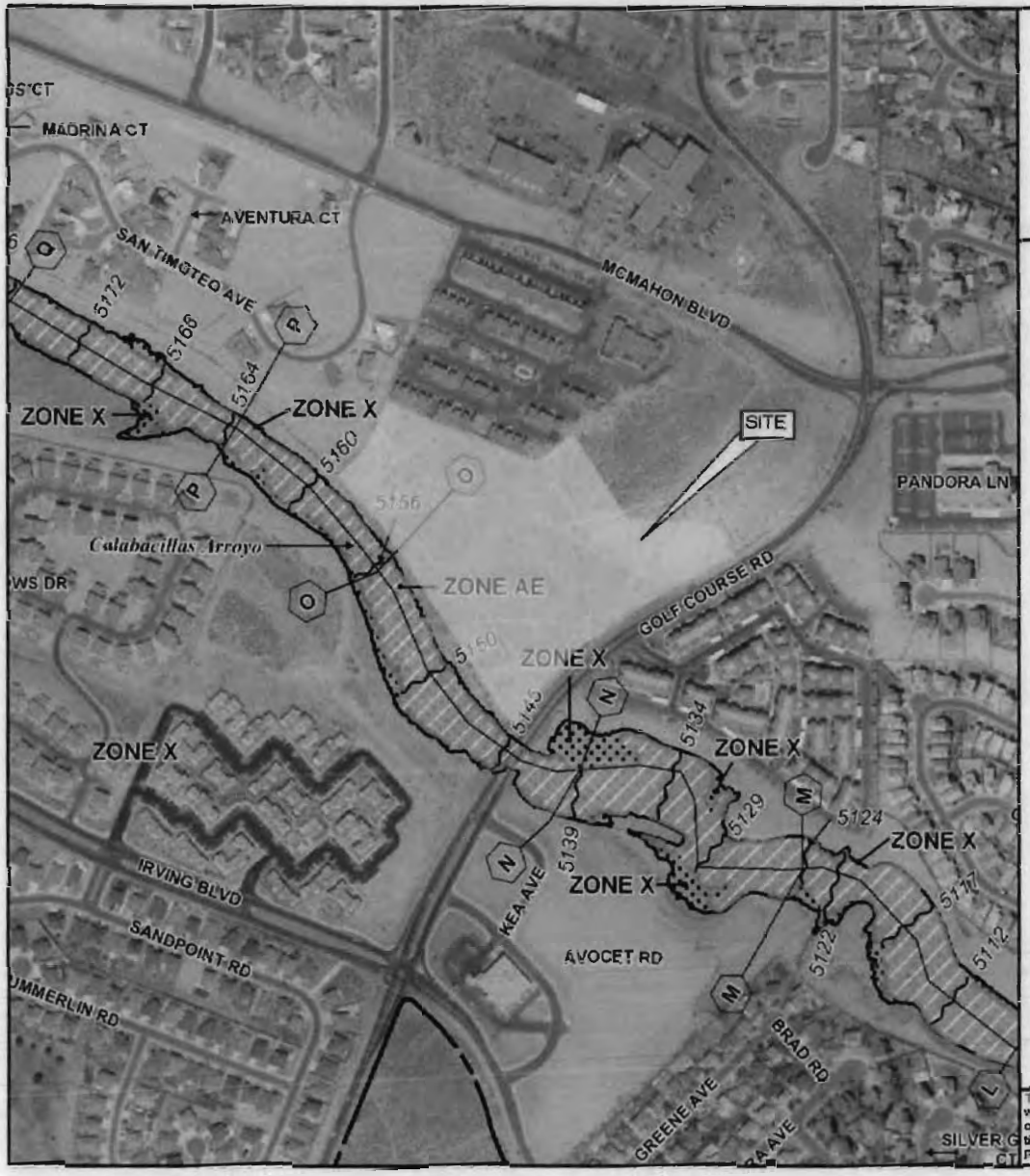
INTRODUCTION

The subject of this report, shown in Exhibit A – Vicinity Map, is a 13.55-acre parcel of undeveloped land identified as Tract 1B-1 of Paradise North, located south of McMahon Boulevard with Golf Course Boulevard bordering the southeast property line. The site appears on Zone Atlas Page A-12-Z, Bernalillo County, Albuquerque New Mexico. As shown in Exhibit B – FIRMap, the subject property lies outside the mapped flood hazard zone. The site is contained in Precipitation Zone 1 according to Table A-1 of the City of Albuquerque DPM. This project will subdivide the parcel into two lots (Lot 1 on the north, Lot 2 on the south) and proposes to develop and build the Facility on Lot 1, while rough grading Lot 2 for future development.

Exhibit A- Vicinity Map

For more current information and more details visit: http://www.cabq.gov/gis





NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0108G

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 108 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0108	G
BERNALILLO COUNTY	350001	0108	G
UNINCORPORATED AREAS	350001	0108	G
RIO RANCHO, CITY OF	350146	0108	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35001C0108G

MAP REVISED
SEPTEMBER 26, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Exhibit B – FIRMap

EXISTING CONDITIONS

The subject parcel is an undeveloped 13.55 acre lot, bound by developed residential land to the west, developed residential and commercial land to the north, Golf Course Road to the southeast, and the Calabacillas Arroyo to the southwest. The existing topography conveys storm water run-off to the Calabacillas Arroyo upstream of the Golf Course Road Bridge. Minor offsite flows discharge onto the site via surface drainage. Flows from the commercial development to the north (Smiths) are conveyed by a storm drain system to an outfall discharging into the Calabacillas Arroyo just downstream of the Golf Course Road Bridge. A portion of this storm drain runs parallel to the Developments' southerly property line, constructed with the *Smith's Golf Course Road Improvements,* which and was designed to accept drainage from the subject property. Similarly, the Puerta del Sol Apartment complex to the north conveys storm water through a 30" pipe which crosses the northern portion of the site and discharges into the arroyo. Appendix A contains tabulations for the existing basin areas and peak discharge rates.

PROPOSED CONDITIONS

A new assisted living facility consisting of a central building and five cottage duplex buildings along with landscaping, concrete and asphalt pavement, and curb and gutter, are proposed for site development on Lot 1. The development will contain buildings with Finished Floor Elevations ranging from 5159.50 to 5167.05, with proposed grading maintaining positive drainage away from all buildings. Lot 2 will be rough graded.

The existing storm drain line from the Puerta del Sol Apartment complex will be lowered to accommodate grading and development of the northwest portion of the site. Offsite surface flows from the Puerta Del Sol Apartments (Basin 6 of PDS Drainage Study, estimated at 1.0 cfs) will also be directed into this same storm drain. An area drain system in the northwest courtyard will be used to connect the roof drain downspouts and convey nuisance flows from landscape

areas, while grading design will provide positive overflow. This area drain system will connect to the realigned apartment complex storm drain and discharge into the Calabacillas Arroyo via the existing channel outfall. Pipe capacity calculations can be found in Appendix A for the proposed storm drain identified as System 1.

The majority of remaining onsite flows will be conveyed to a proposed storm drain system to tie into the existing Smith's storm drain line at the southeast property line. Drainage from roof drains and landscape areas will be connected to the proposed storm drain directly through a private area drain system while the majority of parking lot drainage within Lot 1 will sheet flow toward a vegetated swale and ponds intended to improve water quality. Lot 2 will be rough graded and drainage will be directed to temporary de-silting basins which will be privately maintained until they are removed with future development. The plans for *Golf Course Road by Wilson & Associates* indicates the anticipated flows from the Development to be handled by this existing storm drain line and discharging into the arroyo. The hydraulic analysis for the proposed and existing system combination can be found in Appendix A, indicating adequate capacity for proposed flows to be added to the existing Smith's storm drain line.

Under the developed conditions, two small basins which have historically drained to the Calabacillas Arroyo, will remain undeveloped and continue to discharge run-off directly into the Calabacillas Arroyo (Basin 8 and Basin 9, shown in Appendix A). Offsite flows from the Puerta Del Sol Apartments and the Smith's site will be accommodated by the proposed grading and drainage configuration.

AMAFCA will be constructing drainage improvements within the Calabacillas Arroyo consisting of grade control structures and slope bank protection along the project frontage with the arroyo and has entered into a funding agreement with the developer which was approved by the Board of Directors at AMAFCA's meeting September 15, 2011. A copy of the agreement is included in Appendix C.

SUMMARY AND RECOMMENDATIONS

The proposed development of Tract 1B-1 of Paradise North for a Spectrum Assisted Living Facility, located at the Calabacillas Arroyo and Golf Course Road in Albuquerque New Mexico, has been analyzed according to the Development Process Manual – Chapter 22 – Hydrology Section, does not lie within the mapped flood hazard zone, and has been designed to meet 100-year, 6-hour storm event capacity for all hydraulic structures and grading design.

Historic drainage paths within the site convey run-off to the Calabacillas Arroyo. The proposed development will maintain historic discharge patterns and drainage to the arroyo. Offsite flows from the Puerta Del Sol Apartments and the Smith's site will be accommodated by the proposed grading and drainage configuration. Capacity is available in the existing Smith's storm drain line at the southwest property line, as well as the existing line from the Puerta del Sol Apartment complex, and these existing systems can be utilized to eliminate additional arroyo channel work and penetrations.

Under the proposed conditions and accompanying Grading and Drainage Plan, no surrounding property will be negatively impacted by the Development, onsite drainage design will properly convey the 100-year, 6-hour storm event, and historic tributary areas will not be increased nor will discharge locations be diverted. The proposed drainage management plan thus illustrates capacity to effectively convey the design storm according to the DPM.

MAP POCKET A

SITE GRADING AND DRAINAGE PLAN

APPENDIX A

HYDROLOGIC AND HYDRAULIC ANALYSIS

DPM Weighted E Method

Spectrum Assisted Living Facility - Precipitation Zone 1

Existing Basins

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr			2-Year, 6-Hr		
Basin	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
Basin A	85,364.00	1.960	0.00306	90%	1.763719	0%	0.000	10%	0.195969	0%	0.000	0.495	0.081	2.84	0.116	0.019	0.72	0.012	0.002	0.09
Basin B	526,154.00	12.079	0.01887	90%	10.87095	0%	0.000	10%	1.207883	0%	0.000	0.495	0.498	17.49	0.116	0.117	4.41	0.012	0.012	0.57
	2.80																			
Total	**611,518.00**	**14.039**	**0.02194**										**0.579**	**20.33**		**0.136**	**5.12**		**0.014**	**0.66**

Notes: All site run off assumed to enter the Calabacillas Arroyo

Proposed Developed Basins

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr			2-Year, 6-Hr		
Basin	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
Basin 1	102,178.46	2.346	0.00367	0%	0	0%	0.000	29%	0.677606	71%	1.668	1.687	0.330	9.23	1.009	0.197	5.83	0.547	0.107	3.14
Basin 2	44,951.50	1.032	0.00161	0%	0	0%	0.000	43%	0.440517	57%	0.591	1.552	0.133	3.85	0.898	0.077	2.37	0.464	0.040	1.21
Basin 3	61,589.34	1.414	0.00221	0%	0	0%	0.000	31%	0.443558	69%	0.970	1.663	0.196	5.51	0.989	0.117	3.47	0.532	0.063	1.85
Basin 4	99,017.39	2.273	0.00355	0%	0	0%	0.000	15%	0.340969	85%	1.932	1.823	0.345	9.42	1.120	0.212	6.09	0.630	0.119	3.43
Basin 5	128,992.22	2.961	0.00463	0%	0	0%	0.000	54%	1.592053	46%	1.369	1.443	0.356	10.55	0.810	0.200	6.33	0.397	0.098	3.06
Basin 6	78,252.24	1.796	0.00281	0%	0	0%	0.000	15%	0.269464	85%	1.527	1.823	0.273	7.45	1.120	0.168	4.81	0.630	0.094	2.71
Basin 7	33,284.23	0.764	0.00119	0%	0	0%	0.000	81%	0.620683	19%	0.143	1.174	0.075	2.41	0.590	0.038	1.34	0.233	0.015	0.53
Basin 8	8,737.55	0.201	0.00031	0%	0	0%	0.000	100%	0.200587	0%	0.000	0.990	0.017	0.58	0.440	0.007	0.30	0.120	0.002	0.09
Basin 9	3,953.79	0.091	0.00014	0%	0	0%	0.000	100%	0.090767	0%	0.000	0.990	0.007	0.26	0.440	0.003	0.14	0.120	0.001	0.04
Basin 10	49,878.97	1.145	0.00179	0%	0	0%	0.000	53%	0.611918	47%	0.533	1.446	0.138	4.09	0.812	0.078	2.45	0.399	0.038	1.19
Total	**610,835.69**	**14.023**	**0.02191**										**1.870**	**53.35**		**1.096**	**33.12**		**0.577**	**17.25**

Notes:

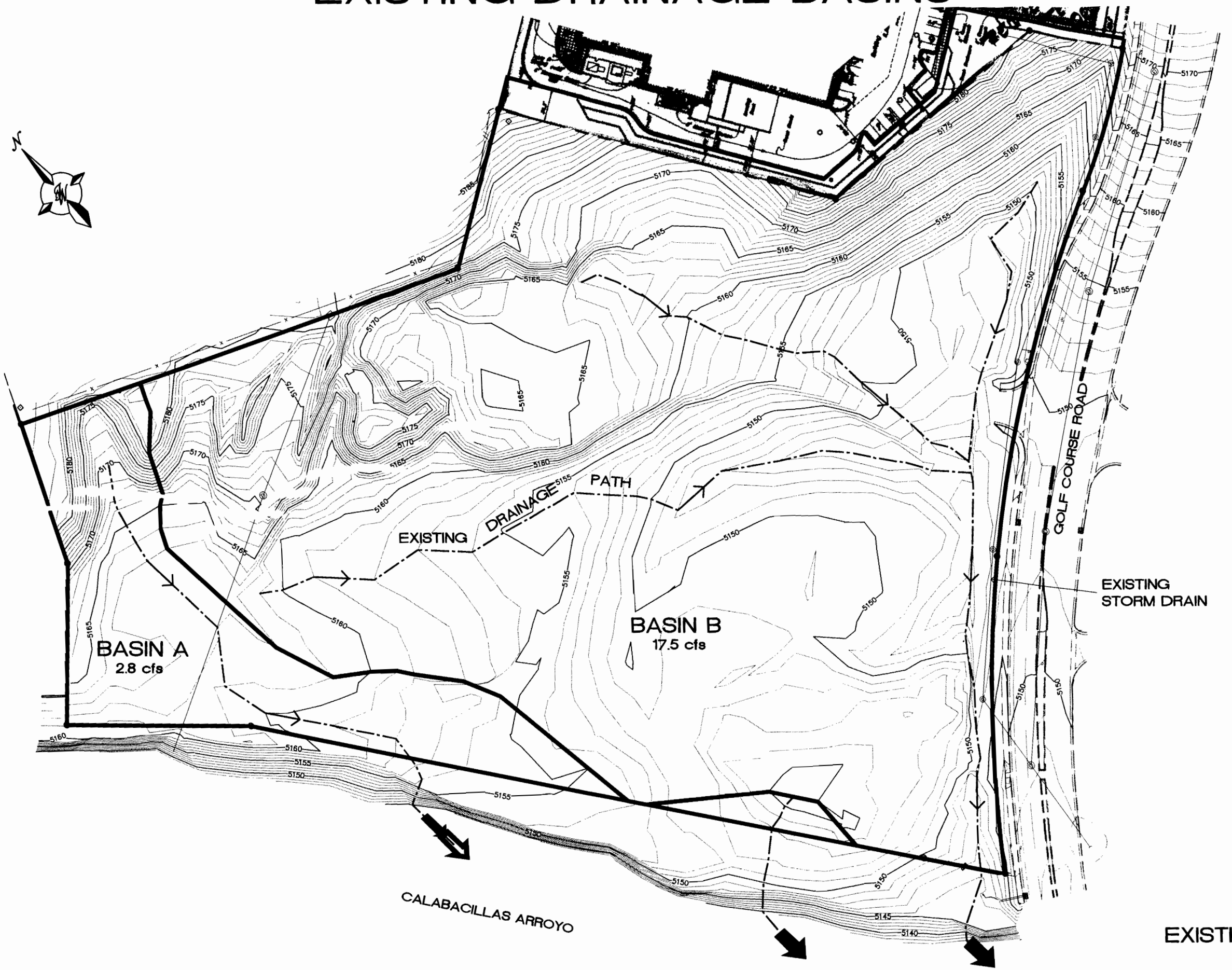
Equations:

Weighted E = $E_a*A_a + E_b*A_b + E_c*A_c + E_d*A_d$ / (Total Area)

Volume = Weighted D * Total Area

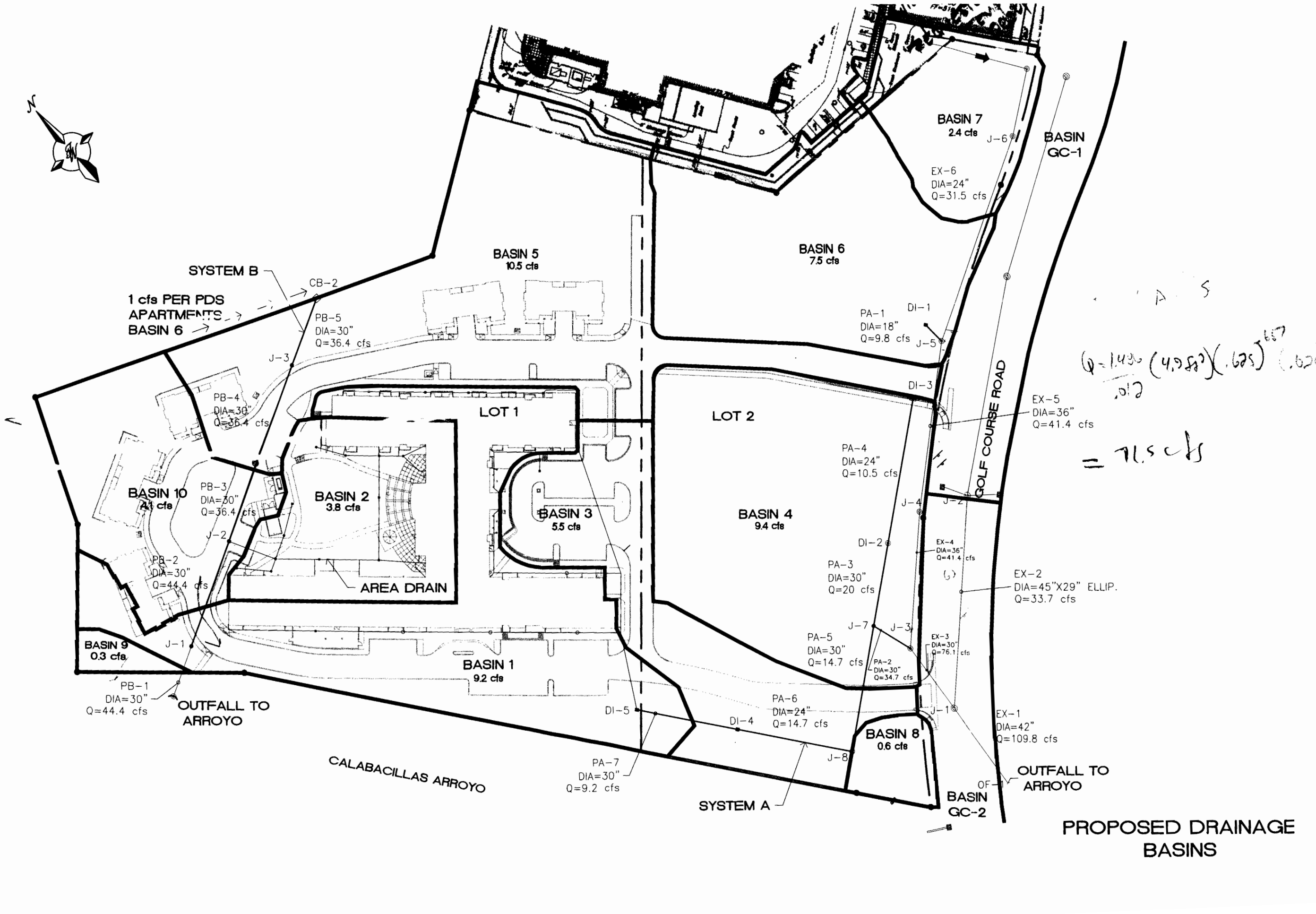
Flow = $Q_a * A_a + Q_b * A_b + Q_c * A_c + Q_d * A_d$

EXISTING DRAINAGE BASINS

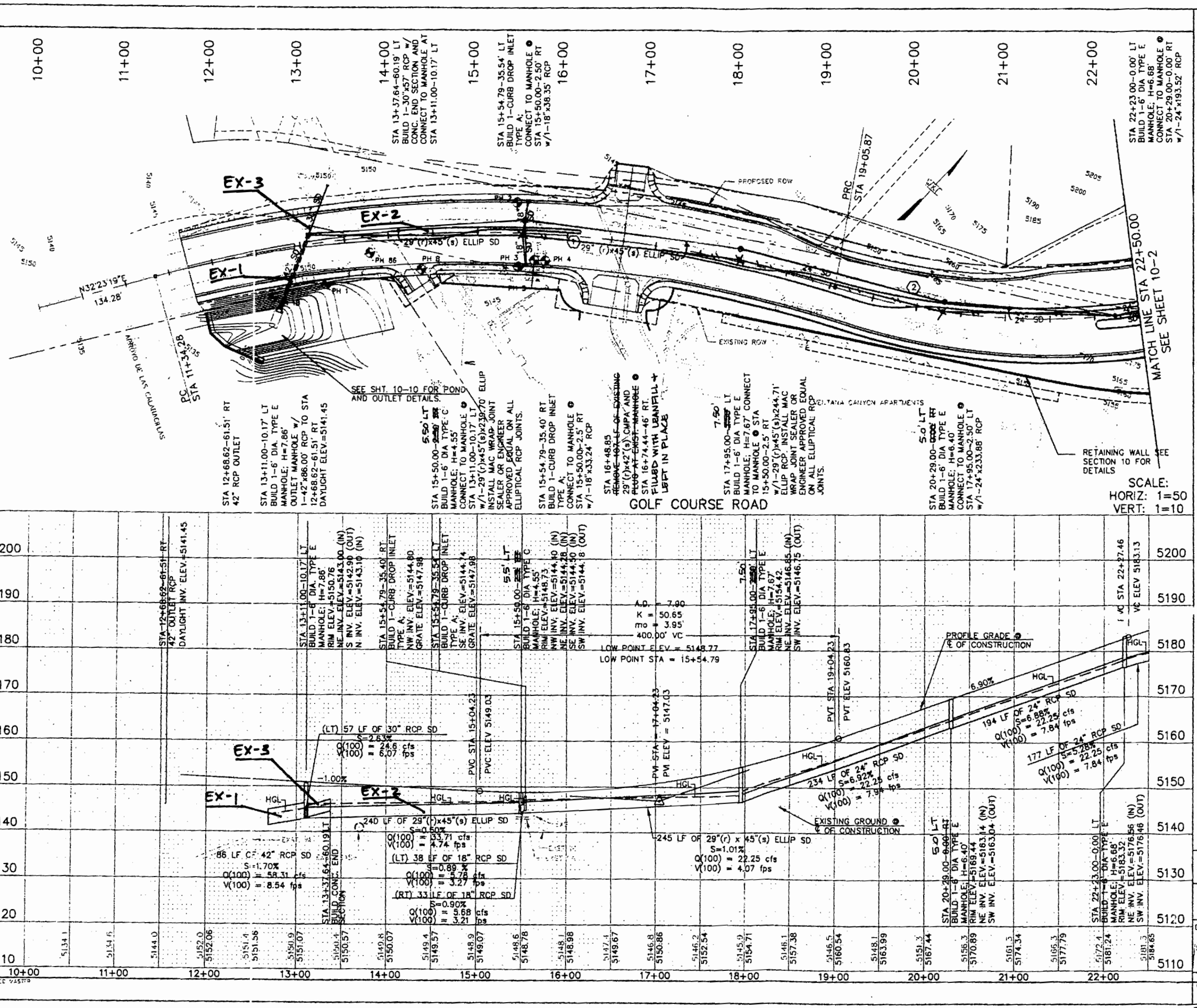


EXISTING DRAINAGE
BASINS

PROPOSED DRAINAGE BASINS



PROPOSED DRAINAGE BASINS



① ℄ CURVE DATA

PI STA 15+30.93
Δ = 32°44'51"
R = 1350.00'
T = 771.60'
L = 396.66'
E = 57.07'
M = 54.75'

② ℄ CURVE DATA

PI STA 23+27.79
Δ = 55°36'49"
R = 800.00'
T = 776.51'
L = 421.91'
E = 104.44'
M = 92.36'

NOTES:

1. FOR STORM DRAIN CONSTRUCTION, RCP PIPE JOINTS SHALL NOT BE GROUTED PRIOR TO FINAL INSPECTION. FINAL INSPECTION WILL DETERMINE JOINTS TO BE GROUTED FOR FINAL ACCEPTANCE OF THE CONSTRUCTION.
2. COA STANDARD DRAWINGS:
   - MANHOLE, TYPE "C" – 2101
   - MANHOLE, TYPE "E" – 2102
   - CURB DROP INLET, TYPE "A" – 2202
   - DROP INLET, TYPE SINGLE "D" – 2206
3. THE PROPOSED STORM DRAIN SYSTEM IS PLANNED TO CROSS OVER AN EXISTING SAS LINE AT STA 13+70.14, 3.05' LT AND STA 42+97.38, 24.09' LT. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF THESE EXISTING SAS LINES AND SHALL MAKE PROVISIONS, PROVIDE PROTECTION, AND COORDINATE CONSTRUCTION ACTIVITIES SO AS TO PREVENT ANY DAMAGE TO THE EXISITNG SAS LINES. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE. IF ANY DAMAGE TO THE SAS LINE(S) OCCUR THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIRS AND ANY ASSOCIATED COST.

AS-BUILT INFORMATION
CONTRACTOR A.S. Horner
INSPECTOR W&C
SURVEYOR W&C/COA
FIELD CONTROL BY COA
CONSTRUCTED BY W&C
MICRO-FILM INFORMATION

BENCH MARKS
THE STA. IS A USGS BRASS TABLET STAMPED "BLACK-2 1977" SET FLUSH W/THE GROUND. THE STA IS LOCATED 8.5 MI. N.W. OF DOWNTOWN ALBQ. TO REACH THE STA FROM THE INTX. OF COORS/I–40 GO N. ON COORS 5.8 MI. TO PARADISE BLVD. TURN LEFT (W) ON PARADISE BLVD. 5.1 MI. TO GOLF COURSE RD. TURN RIGHT GO N. ON GOLF COURSE RD. 1.3 MI. TO McMAHON BLVD. THE STA. IS ON THE LEFT.
ELEVATION = 5213.926' FT. (2ND ORDER)

SURVEY INFORMATION
FIELD NOTES

NO.	DATE	BY

ENGINEER'S SEAL

REMARKS
REVISIONS

NO.	DATE	BY

WILSON & COMPANY, ENGINEERS & ARCHITECTS
DESIGNED BY SKG DATE 2001
DRAWN BY CLO DATE 2001
CHECKED BY SFP DATE 2001

NOTICE OF EXTENDED PAYMENT PROVISION

This Contract allows the Owner to make payment within 45 days after submission of an undisputed request for payment.

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

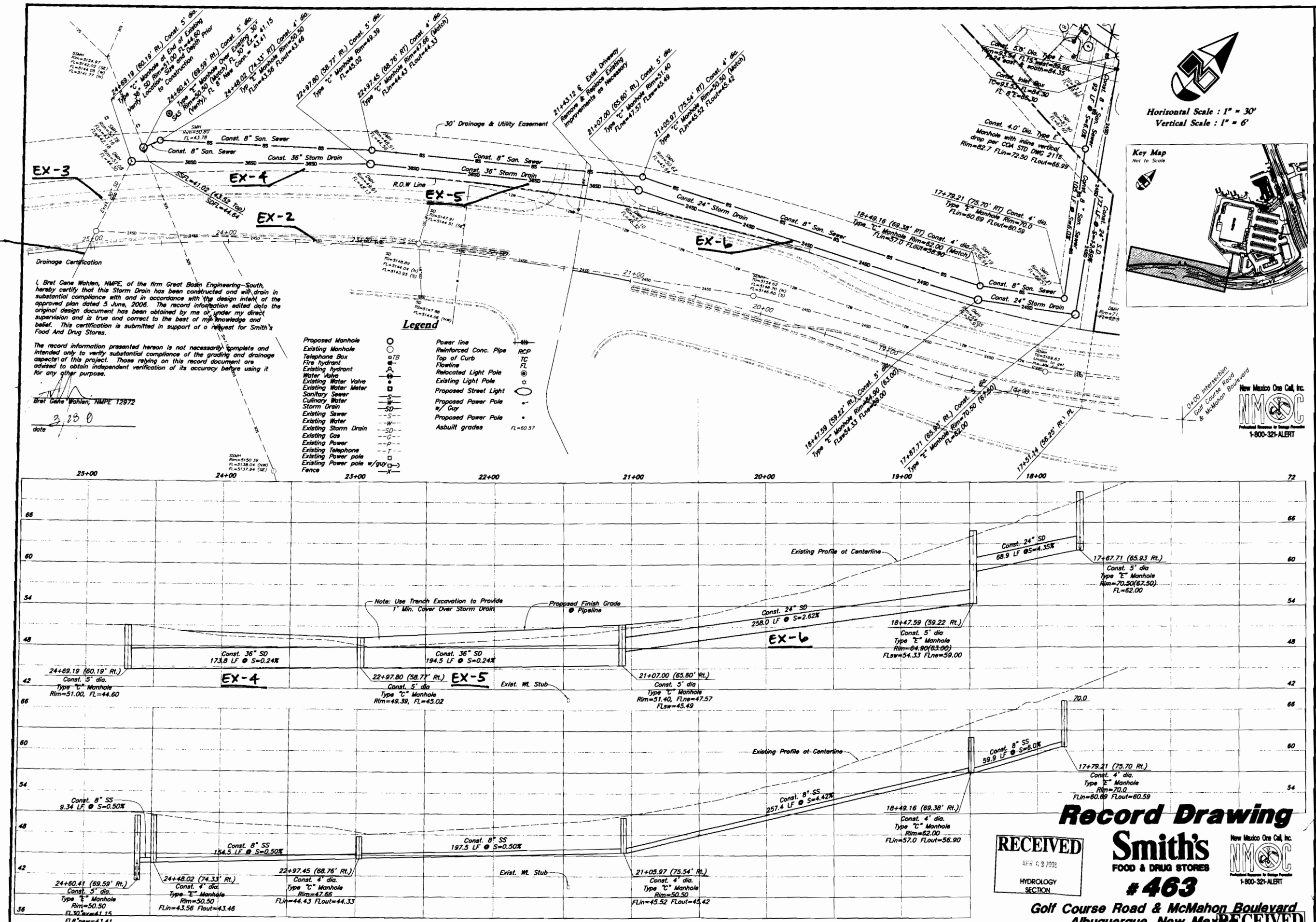
GOLF COURSE RD. IMPROVEMENTS PROJECT
STORM DRAIN PLAN & PROFILE
STA 10+00 TO STA 22+50

Design Review Committee
City Engineer
Last Design Update

City Project No. COA 5894.91
Zone Map No. A-12 & B-12
Sheet 10 – 2

WILSON & COMPANY

SHEET 133 OF 301



REV	DATE	DESCRIPTION
	19 Mar 2007	Construction Set
1	15 Nov 2006	Clmc. Storm, Power Line
2	18 Aug 2006	Sewer & Water Revisions

Designed by: KR
Drafted by: BP
Client Name: Smith's Food & Drug Centers, Inc.
SMC463-SP

GREAT BASIN ENGINEERING - SOUTH
CONSULTING ENGINEERS and LAND SURVEYORS
2010 North Redwood Road, P.O. Box 16747
Salt Lake City, Utah 84116
Salt Lake City (801)521-8529 Ogden (801)394-7288 Fax (801)521-9551

Utility Outfall Plan

Smith's Food and Drug Stores
1550 South Redwood Road
Salt Lake City, Utah 84104
Telephone (801) 974-1400

BRET GENE WAHLEN 12972 REGISTERED PROFESSIONAL ENGINEER

5 Jun, 2006

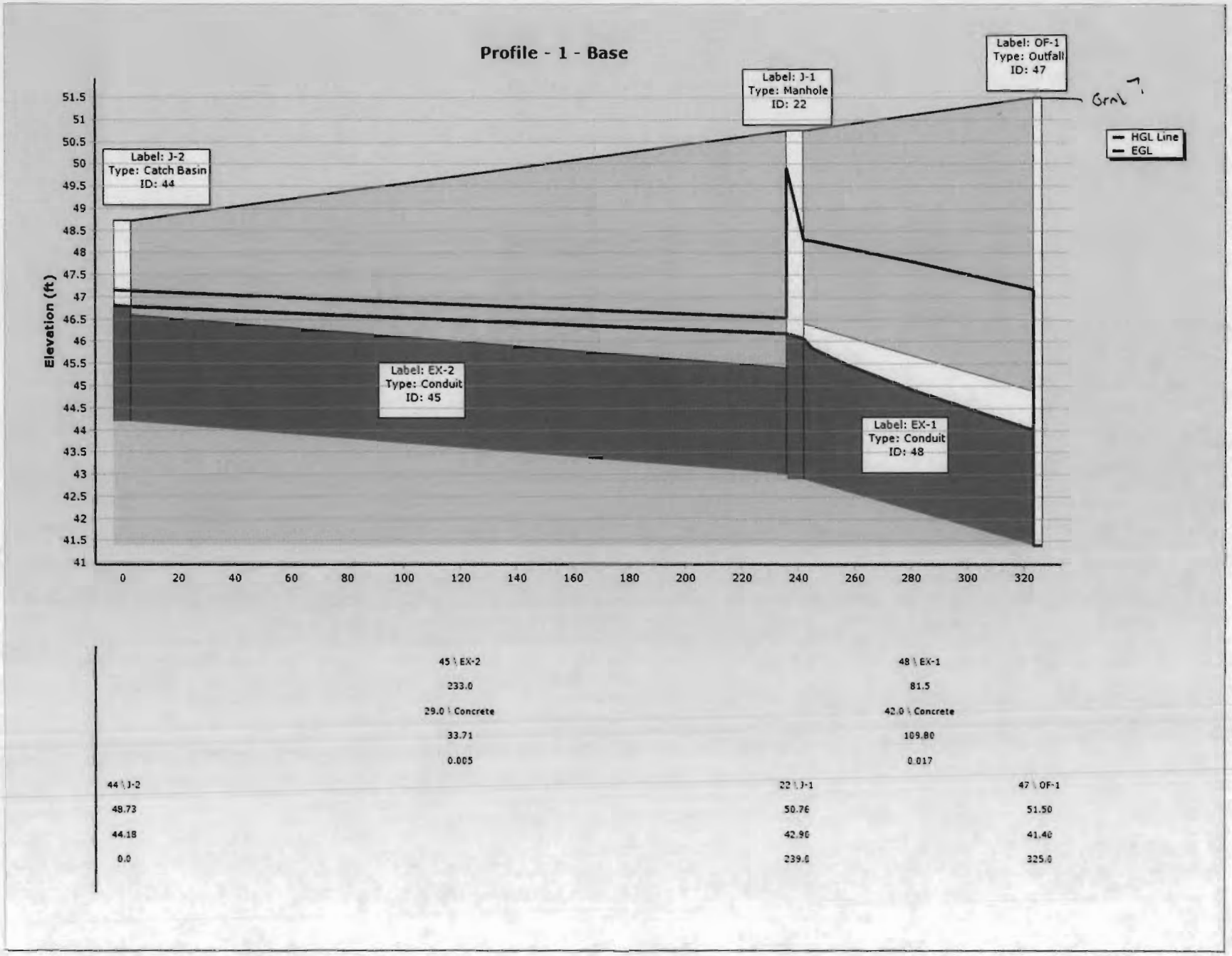
SHEET NO.
C3.4

+4.1 = 13.3

SYSTEM A

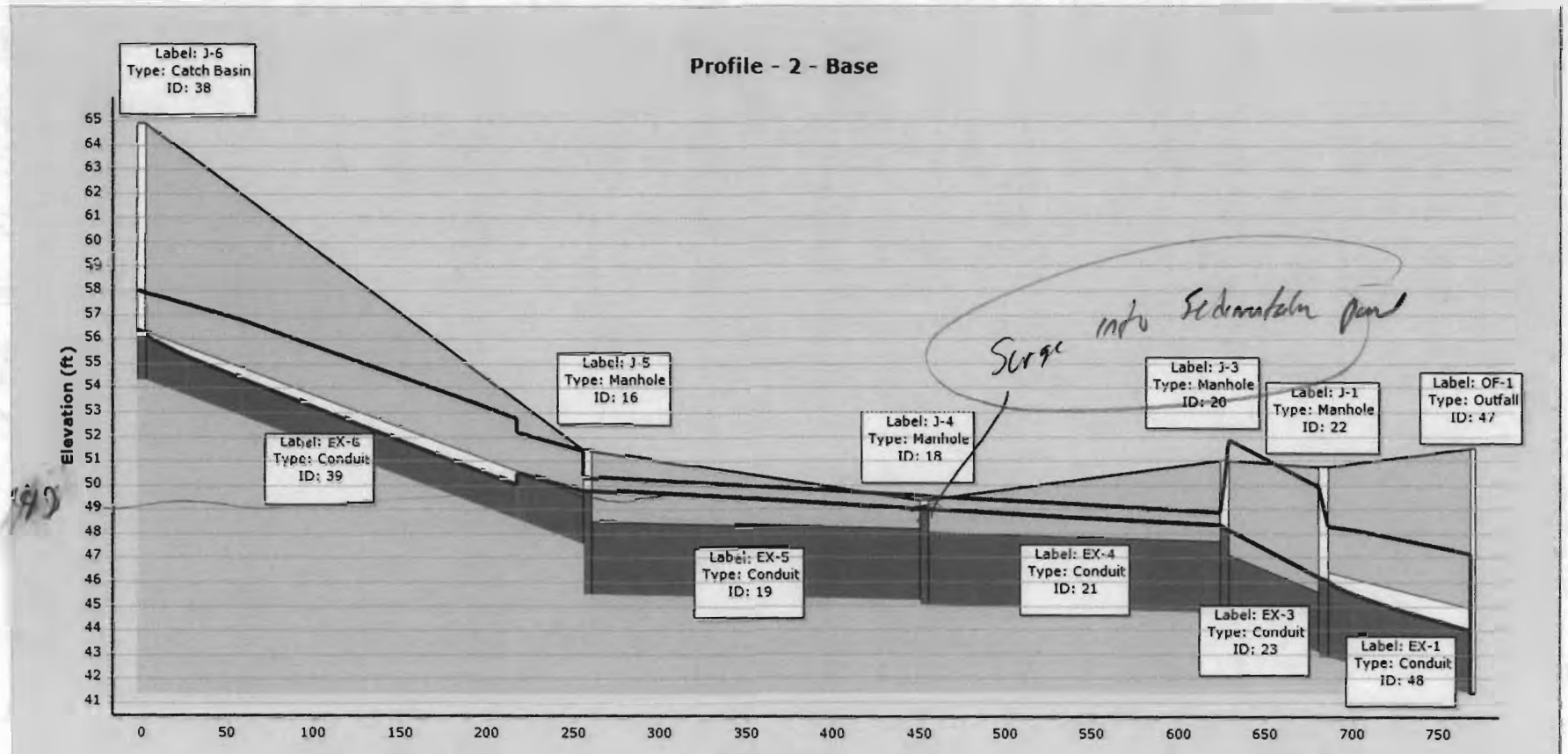
Label	Start Node	Stop Node	Length (Unified) (ft)	Diameter (in)	Flow / Capacity (Full) (%)	Total Flow (ft^3/s)	Invert (Downstream) (ft)	Invert (Upstream) (ft)	Velocity (Average) (ft/s)	Slope (ft/ft)
PA-7	DI-5	DI-4	117.6	24	44.7	9.23	46.7	47.28	2.94	0.005
PA-6	DI-4	J-8	134.5	24	71	14.74	45.93	46.6	4.69	0.005
PA-5	J-8	J-7	158.7	30	50.9	14.74	45.04	45.83	3	0.005
PA-4	DI-3	DI-2	164.6	24	66.1	10.55	45.61	46.43	3.36	0.005
PA-3	DI-2	J-7	94.7	30	69.1	19.97	45.04	45.51	4.07	0.005
PA-2	J-7	J-3	49.3	30	118.8	34.71	44.7	44.95	7.07	0.005
PA-1	DI-1	J-5	50	18	125.4	9.86	48	48.28	5.58	0.006
EX-6	J-6	J-5	258	24	86.1	31.52	47.57	54.33	13.11	0.026
EX-5	J-5	J-4	194.5	36	166.5	41.38	45.22	45.49	5.85	0.001
EX-4	J-4	J-3	173.8	36	144.6	41.38	44.7	45.02	5.85	0.002
EX-3	J-3	J-1	57	30	114.4	76.09	43.1	44.6	15.5	0.026
EX-2	J-2	J-1	239	45 x 29	72.8	33.71	43	44.18	4.38	0.005
EX-1	J-1	OF-1	86	42	82.6	109.8	41.4	42.9	15.43	0.017

SYSTEM A



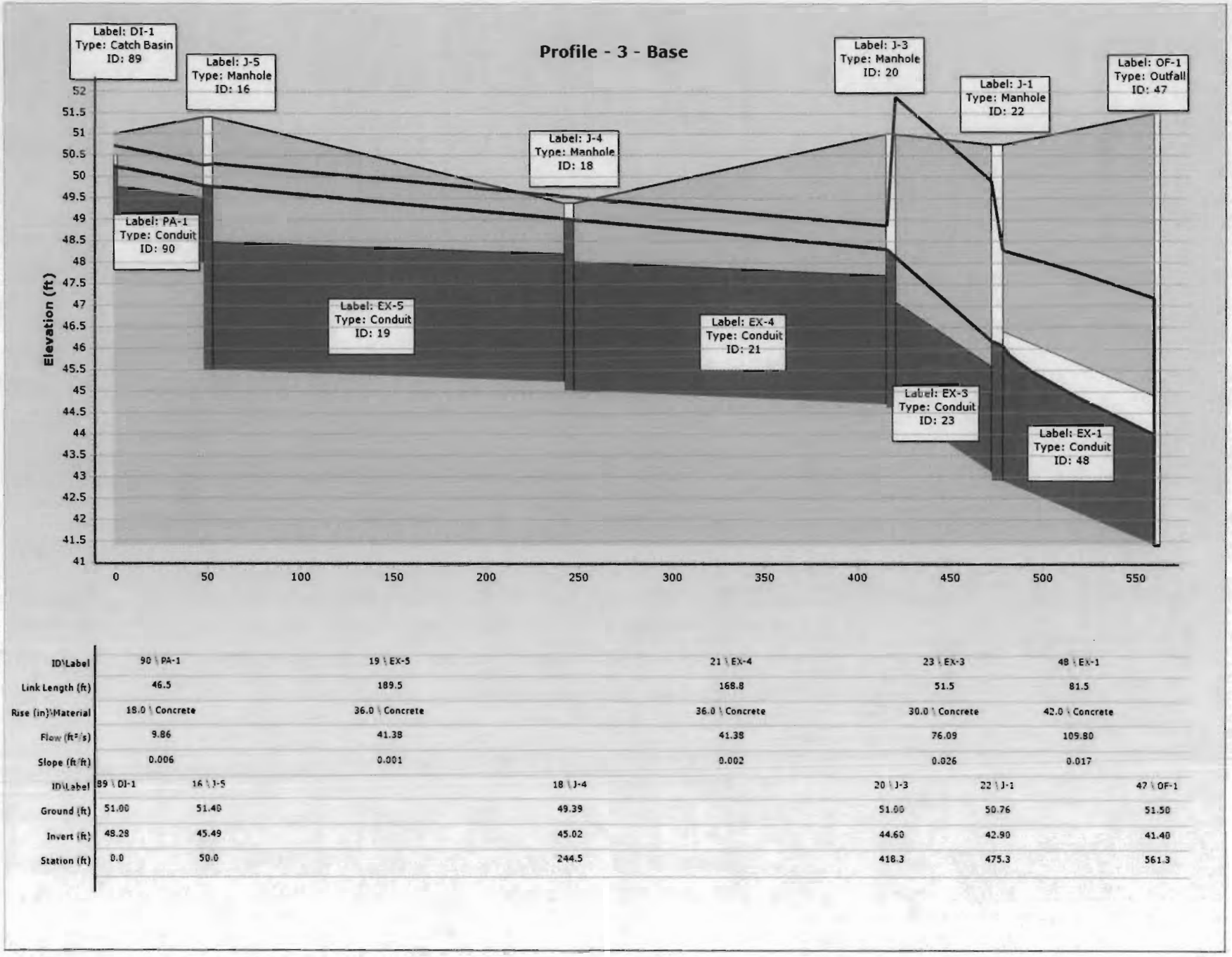
	45 \ EX-2	48 \ EX-1	
	233.0	81.5	
	29.0 \ Concrete	42.0 \ Concrete	
	33.71	109.80	
	0.005	0.017	
44 \ J-2		22 \ J-1	47 \ OF-1
48.73		50.76	51.50
44.18		42.90	41.40
0.0		239.0	325.0

SYSTEM A



ID\Label		39 \ EX-6	19 \ EX-5	21 \ EX-4	23 \ EX-3	48 \ EX-1
Link Length (ft)		253.0	189.5	169.8	51.5	81.5
ise (in)\Material		24.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete	30.0 \ Concrete	42.0 \ Concrete
Flow (ft³/s)		31.52	41.38	41.38	76.09	109.80
Slope (ft/ft)		0.026	0.001	0.002	0.026	0.017
ID\Label	38 \ J-6	16 \ J-5	18 \ J-4	20 \ J-3	22 \ J-1	47 \ OF-1
Ground (ft)	64.90	51.40	49.39	51.80	50.76	51.50
Invert (ft)	54.33	45.49	45.02	44.60	42.90	41.40
Station (ft)	0.0	258.0	452.5	626.3	683.3	769.3

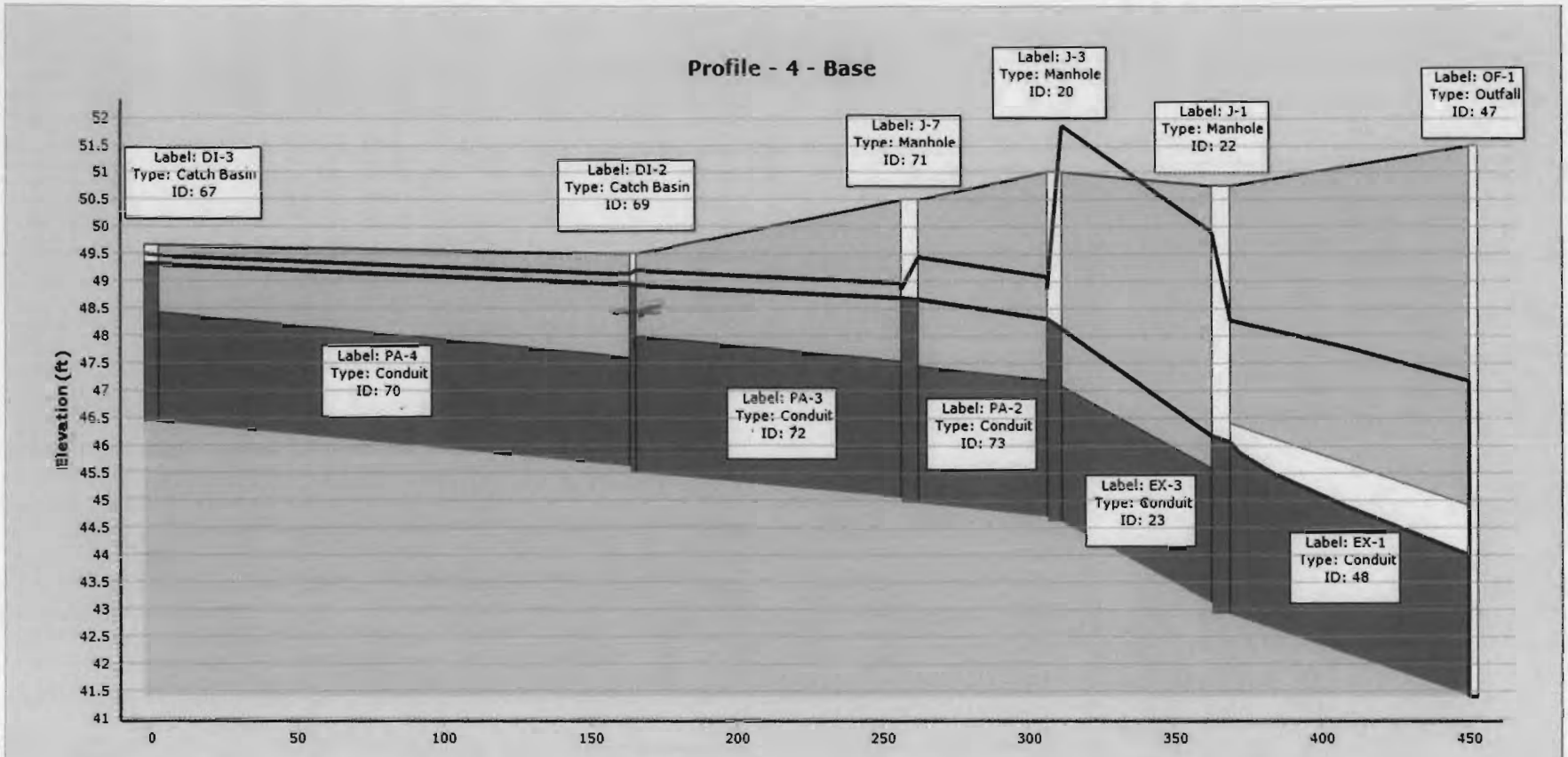
SYSTEM A



ID\Label	90 \ PA-1	19 \ EX-5	21 \ EX-4	23 \ EX-3	48 \ EX-1
Link Length (ft)	46.5	189.5	168.8	51.5	81.5
Rise (in)\Material	18.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete	30.0 \ Concrete	42.0 \ Concrete
Flow (ft³/s)	9.86	41.38	41.38	76.09	105.80
Slope (ft/ft)	0.006	0.001	0.002	0.026	0.017

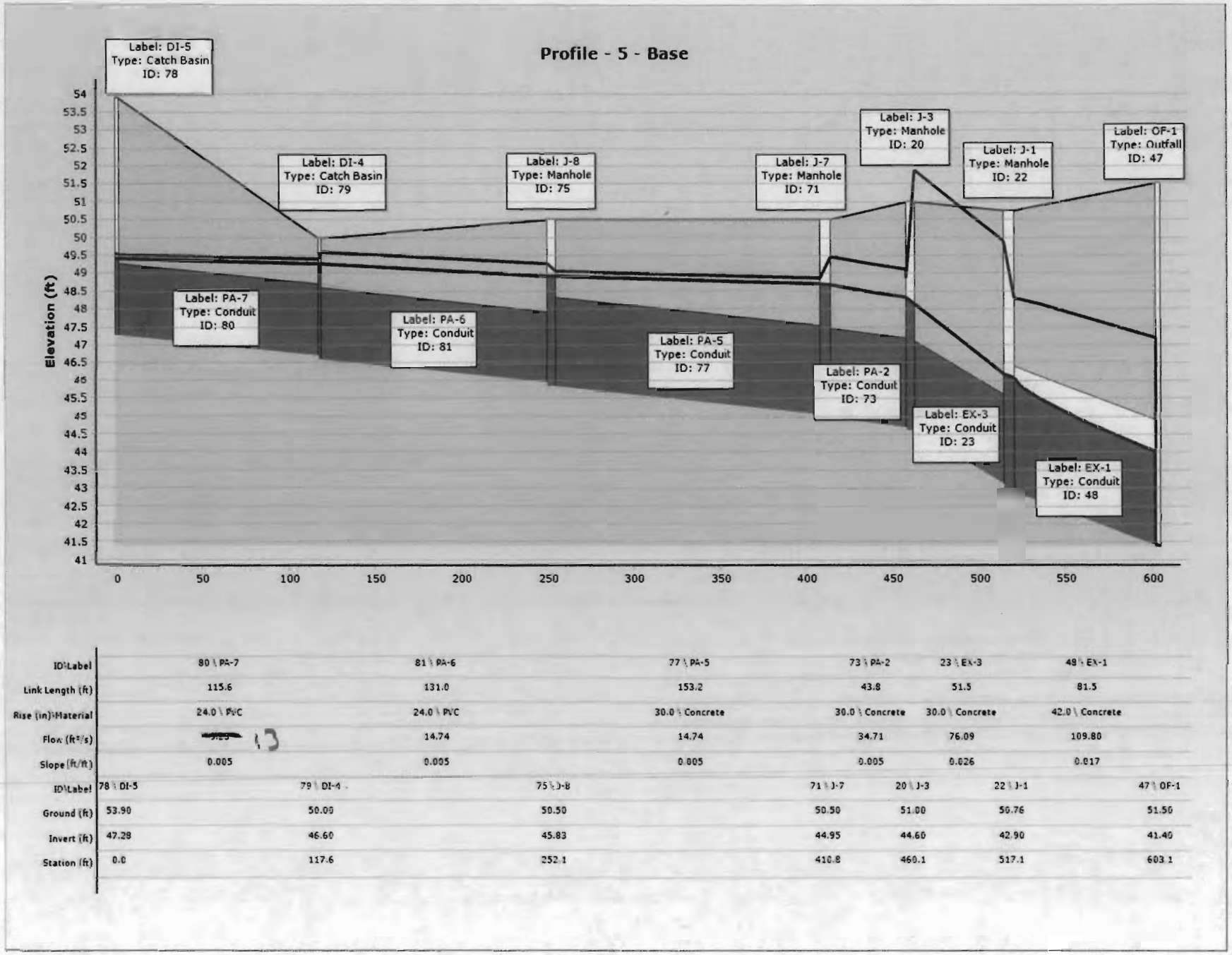
ID\Label	89 \ DI-1	16 \ J-5	18 \ J-4	20 \ J-3	22 \ J-1	47 \ OF-1
Ground (ft)	51.00	51.40	49.39	51.00	50.76	51.50
Invert (ft)	48.28	45.49	45.02	44.60	42.90	41.40
Station (ft)	0.0	50.0	244.5	418.3	475.3	561.3

SYSTEM A



ID\Label		70 \ PA-4		72 \ PA-3	73 \ PA-2	23 \ EX-3	48 \ EX-1	
Link Length (ft)		161.1		90.7	43.8	51.5	81.5	
Rise (in)\Material		24.0 \ Concrete		30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	42.0 \ Concrete	
Flow (ft³/s)		10.55		19.97	34.71	76.09	109.80	
Slope (ft/ft)		0.005		0.005	0.005	0.026	0.017	
ID\Label	67 \ DI-3		69 \ DI-2		71 \ J-7	20 \ J-3	22 \ J-1	47 \ OF-1
Ground (ft)	49.67		49.50		50.50	51.00	50.76	51.50
Invert (ft)	46.43		45.51		44.95	44.60	42.90	41.40
Station (ft)	0.0		164.6		259.3	308.6	365.6	451.6

SYSTEM A

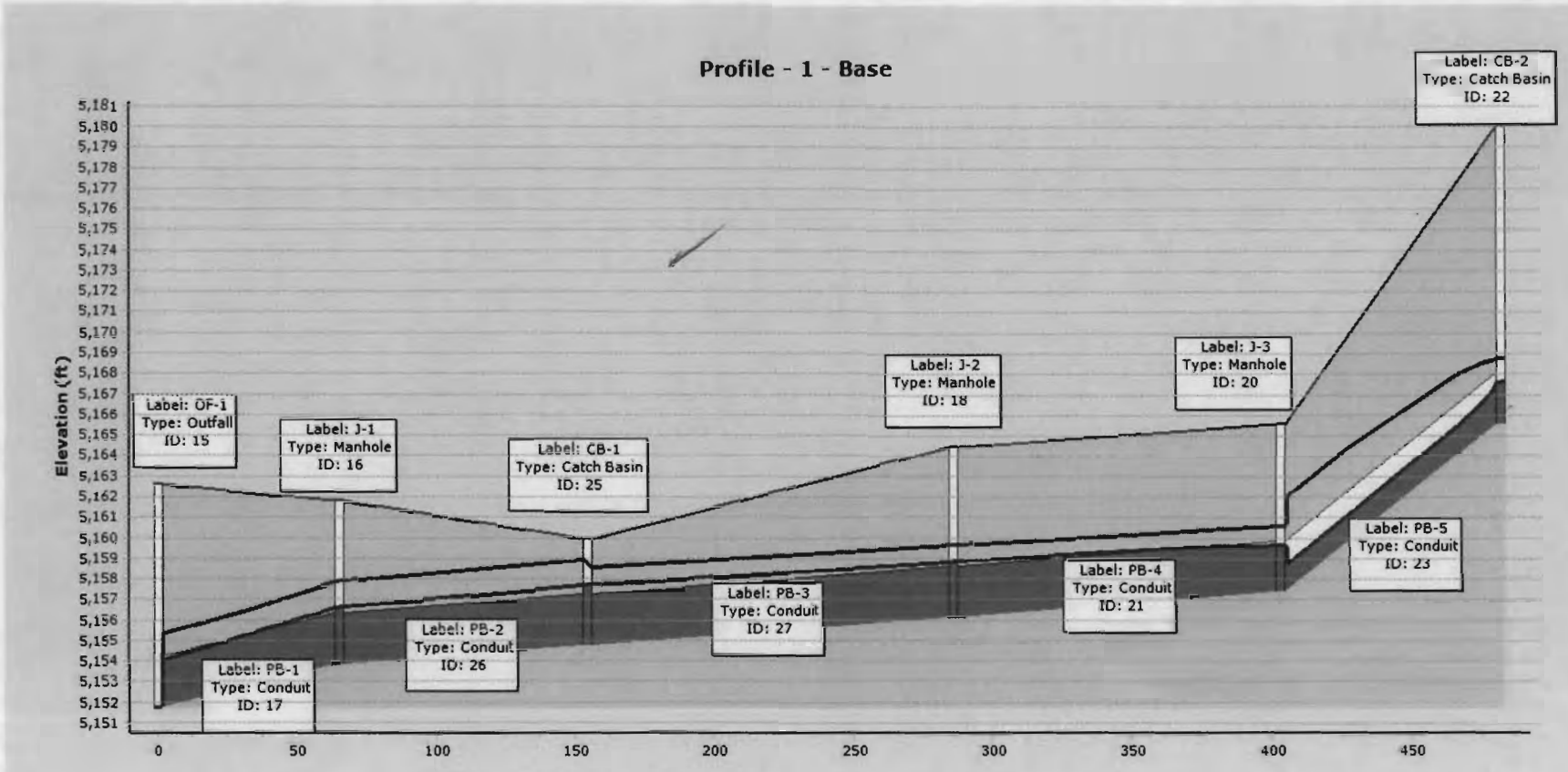


ID\Label		80 \ PA-7	81 \ PA-6	77 \ PA-5	73 \ PA-2	23 \ EX-3	49 \ EX-1
Link Length (ft)		115.6	131.0	153.2	43.8	51.5	81.5
Rise (in)\Material		24.0 \ PVC	24.0 \ PVC	30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	42.0 \ Concrete
Flow (ft³/s)		[illegible] 13	14.74	14.74	34.71	76.09	109.80
Slope (ft/ft)		0.005	0.005	0.005	0.005	0.026	0.017
ID\Label	78 \ DI-5	79 \ DI-4	75 \ J-8	71 \ J-7	20 \ J-3	22 \ J-1	47 \ OF-1
Ground (ft)	53.90	50.00	50.50	50.50	51.00	50.76	51.50
Invert (ft)	47.28	46.60	45.83	44.95	44.60	42.90	41.40
Station (ft)	0.0	117.6	252.1	410.8	460.1	517.1	603.1

SYSTEM B

Label	Start Node	Stop Node	Length (Unified) (ft)	Diameter (in)	Flow / Capacity (Full) (%)	Total Flow (ft^3/s)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Velocity (Average) (ft/s)	Slope (ft/ft)
PB-5	J-3	CB-2	79	30	-50.9	36.38	5,165.57	5,157.38	14.63	-0.104
PB-4	J-2	J-3	117	30	-85.1	36.38	5,157.38	5,156.11	9.77	-0.011
PB-3	CB-1	J-2	132	30	-87.1	36.38	5,156.11	5,154.74	7.41	-0.01
PB-2	J-1	CB-1	89	30	-106.3	44.38	5,154.74	5,153.82	9.04	-0.01
PB-1	OF-1	J-1	65	30	-111.7	44.38	5,153.82	5,151.74	9.04	-0.032

SYSTEM B



ID\Label		17 \ PB-1		26 \ PB-2		27 \ PB-3		21 \ PB-4		23 \ PB-5	
Link Length (ft)		62.0		86.0		129.0		114.0		76.0	
Rise (in)\Material		30.0 \ CMP		30.0 \ Concrete		30.0 \ Concrete		30.0 \ Concrete		30.0 \ CMP	
Flow (ft³/s)		44.38		44.38		36.38		36.38		36.38	
Slope (ft/ft)		-0.032		-0.010		-0.010		-0.011		-0.104	
ID\Label	15 \ OF-1		16 \ J-1		25 \ CB-1		18 \ J-2		20 \ J-3		22 \ CB-2
Ground (ft)	5162.60		5161.81		5160.00		5164.43		5165.57		5180.00
Invert (ft)	5151.74		5153.82		5154.74		5156.11		5157.38		5165.57
Station (ft)	0.0		65.0		154.0		286.0		403.0		482.0

Headwater Required

for ponds near arroyo

BASIN	Q (REQ) [cfs]	H (ft)	Q(PROV) [cfs]
1	9.2	0.40	9.5670
3	5.5	0.20	6.7649
Desilt			
6&7	8.7	0.35	8.9491
4	9.4	0.40	9.5670

- ponds near golf course

Orifice Equation

Q = CA SQRT(2gH)

		Diameter (ft)=
C =	0.6	
Diameter (in)	24	2.00
Area (ft^2)=	3.142	
g =	32.2	
H (Ft) =	Depth of water above center of orifice	
Q (CFS)=	Flow	

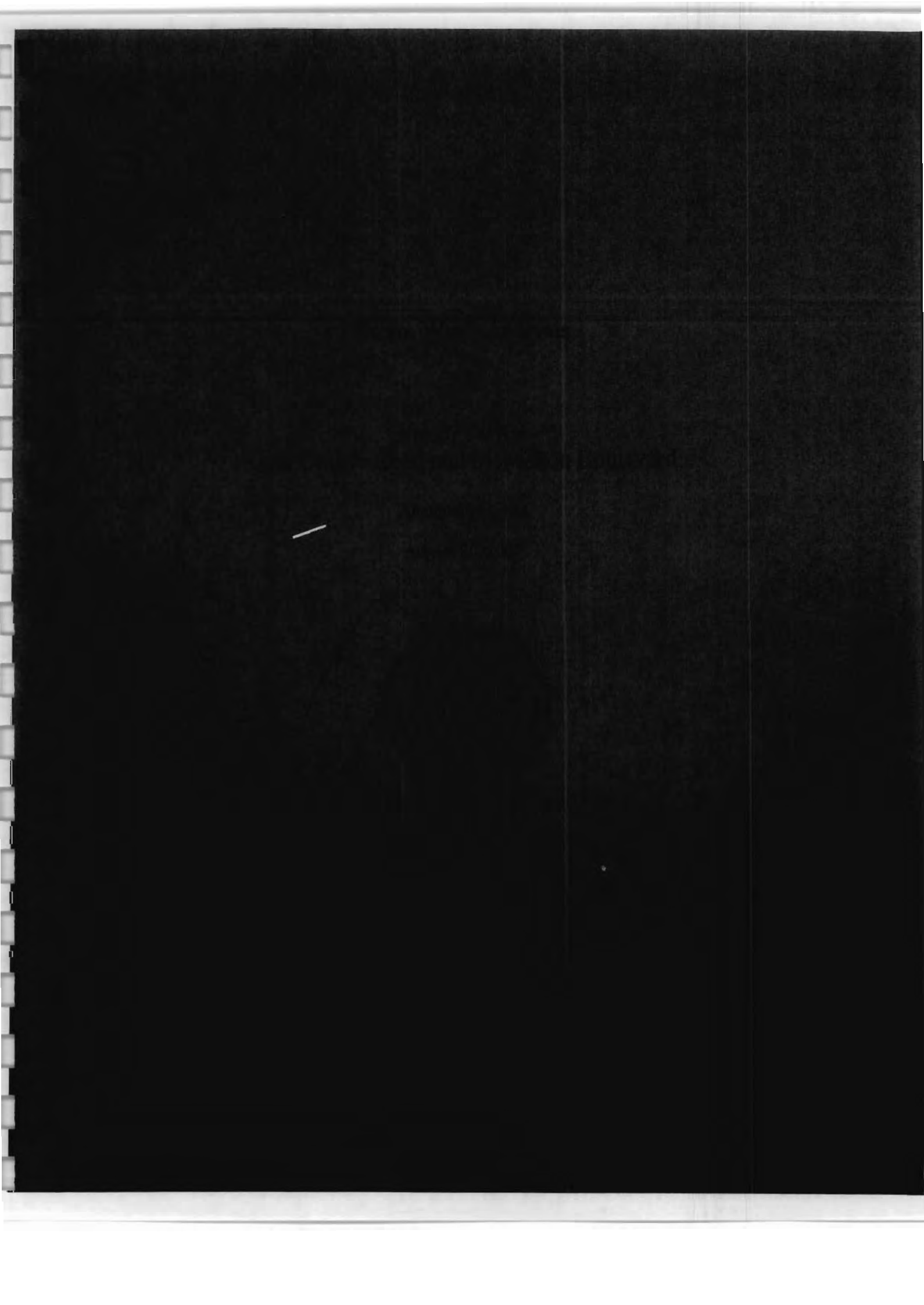
Water Quality Basins

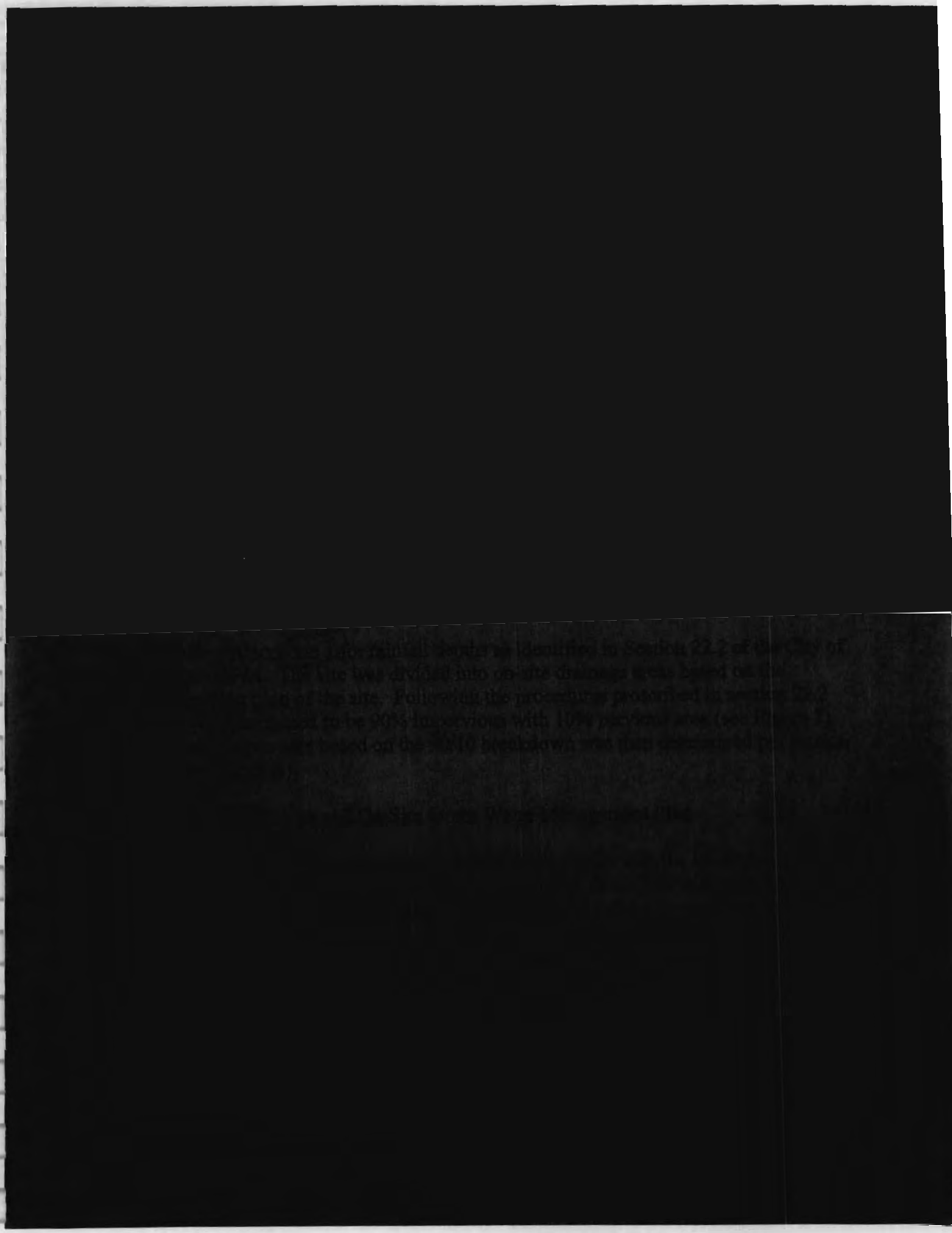
SILT VOLUME REQUIREMENT - 1" RUNOFF → 1" of silt to pond

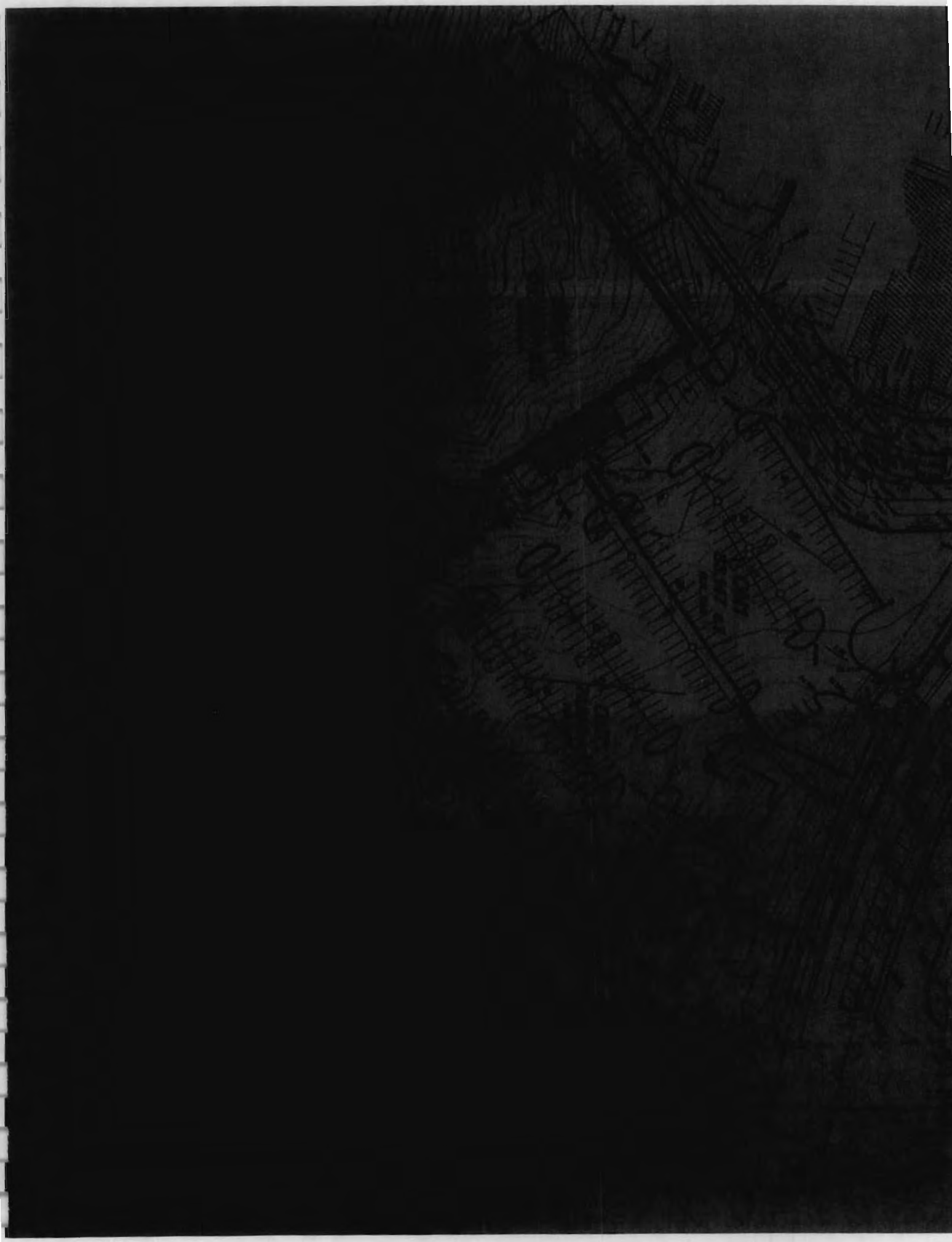
BASIN	AREA (SF)	AREA (AC)	VOLUME REQ (CF)	Pond Dimensions			
				Depth	Length	Width	Vol(provided)
6&7	99815.0	2.2914	8318	3.05	35	79	8433
4	99017.4	2.2731	8251	3	35	79	8295

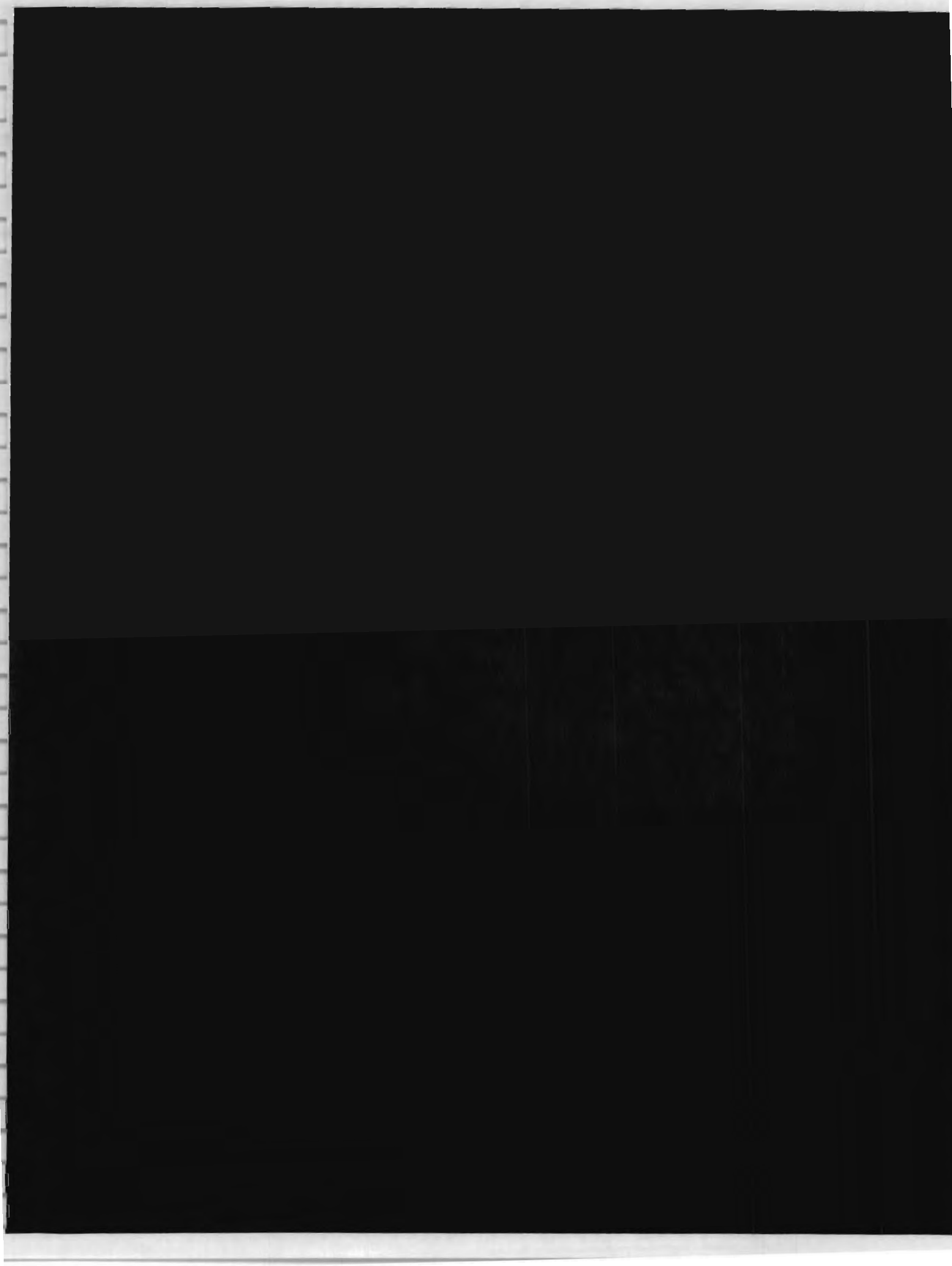
APPENDIX B

(EXCERPT)









Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Section n	Full Capacity (cfs)
P-1	I-1	O-1	0.00	0.00	0.00	0.00	0.00	45.23	87.00	0.016782	42 inch	0.013	150.33
P-2	J-1	I-1	N/A	N/A	N/A	0.00	0.00	31.52	57.00	0.026070	30 inch	0.013	88.72
P-3	J-2	J-1	N/A	N/A	N/A	0.00	0.00	31.52	179.00	0.002849	30 inch	0.013	32.31
P-4	J-3	J-2	N/A	N/A	N/A	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33
P-5	J-4	J-3	N/A	N/A	N/A	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33
P-6	J-5	J-4	N/A	N/A	N/A	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33
P-7	J-6	J-5	N/A	N/A	N/A	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33
P-8	J-7	J-6	4.00	0.00	0.00	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33
P-9	J-8	J-7	4.00	0.00	0.00	0.00	0.00	31.52	200.00	0.002350	30 inch	0.013	29.33

Pipe Report

Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description
42.90	41.44	50.76	45.00	4.36	0.06	45.43	43.32	
44.60	43.00	51.00	50.76	3.90	5.26	46.51	46.38	
45.02	44.60	49.39	51.00	1.37	3.40	47.62	47.27	
45.49	45.02	51.40	49.39	2.91	1.37	48.21	47.84	
54.33	47.57	64.90	51.40	8.57	1.83	56.21	49.01	
62.00	59.00	67.50	64.90	3.50	3.90	63.89	60.31	
78.00	62.00	95.00	67.50	15.00	3.50	79.[illegible]	[illegible]	
82.69	82.39	93.22	95.00	8.63	10.61	[illegible]	[illegible]	
83.69	82.69	95.00	93.22	9.01	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Scenario: Base

Outlet Report

Label	Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Tailwater Condition	Tailwater	
O-1	0+00	45.00	true	45.00	0.00			

APPENDIX C

(EXCERPT)

FUNDING AGREEMENT
FOR CALABACILLAS ARROYO IMPROVEMENTS
AS RELATED TO SPECTRUM HOUSING DEVELOPMENT

This Agreement is made and entered into this 12th day of OCTOBER, 2011, by and between the Albuquerque Metropolitan Arroyo Flood Control Authority ("AMAFCA"), a political subdivision of the State of New Mexico, and Spectrum Acquisition - Albuquerque, LLC, a Colorado Limited Liability Company ("OWNER"), collectively referred to as the "PARTIES".

RECITALS:

1. **WHEREAS**, the engineering report entitled "Calabacillas Arroyo Prudent Line Study and Related Work, Evaluation of Existing Erosion-Risk Limits between Coors Road and Swinburne Dam," (the "Mussetter Study") prepared for AMAFCA by Mussetter Engineering, Inc., dated December 1998, identified improvements on the Calabacillas Arroyo ("Arroyo") between Unser Boulevard and Coors Road to maintain the Arroyo within the AMAFCA drainage easement. This easement is based on the erosion setback limit ("Simons and Li prudent line") that was established in the 1980's; and

2. **WHEREAS**, as property has developed along the Arroyo, AMAFCA has required construction of the improvements as identified in the Mussetter Study in order to protect adjacent developed properties from erosion and flood damage; and

3. **WHEREAS**, the OWNER plans to develop 13.5 acres adjacent to the Arroyo at the northwest corner of Golf Course Road as a retirement and assisted living facility (the "Development"), which will require the construction of 900 feet of bank stabilization and a grade control structure ("GCS 3c"), collectively referred to as the "Improvements", the location of which are shown on attached Exhibit "A"; and

4. **WHEREAS**, AMAFCA has identified funding previously collected from the developer of Paloma del Sol Subdivision to construct GCS 3b and related bank stabilization upstream of the Development, and has included this construction in its FY 2012 construction schedule; and

5. **WHEREAS**, it will be a time and cost savings benefit to the OWNER, AMAFCA and the public to combine construction of GCS 3c, GCS 3b and related bank stabilization into one project; and

6. **WHEREAS**, the OWNER has indicated a willingness to participate in the funding of the Improvements adjacent to its Development; and

7. **WHEREAS**, AMAFCA Resolution 1982-4, Cost-Sharing with Land Owners, provides for the private sector to share in the cost of flood control facilities; and

8. **WHEREAS**, the OWNER has indicated a willingness to participate in the funding of the Improvements adjacent to its Development; and

9. **WHEREAS**, the cost share of the Improvements, including One Hundred Percent (100%) of the bank stabilization and Thirty-Three Percent (33%) of GCS 3c, have been previously discussed and agreed upon by the OWNER and AMAFCA, as shown in the attached Cost Summary Table, Exhibit "C"; and

10. **WHEREAS**, AMAFCA has the capability to maintain the Improvements after construction.

NOW THEREFORE, IN CONSIDERATION OF THE PROMISES AND COVENANTS CONTAINED HEREIN, THE PARTIES AGREE AS FOLLOWS:

SECTION ONE - AMAFCA AGREES TO:

1.1. Review and, if appropriate, approve the plans for the Improvements as prepared by the OWNER's engineer.

1.2. Incorporate the plans for the Improvements into AMAFCA's construction plan set for GCS 3b, which will hereinafter be referred to as the "Project".

1.3. Provide specifications, cost estimates and bid documents for the Project.

1.4. Obtain a 404 Permit from the U.S. Army Corps of Engineers for the Project.

1.5. Advertise and bid the Project in compliance with the New Mexico State Procurement Code, Chapter 13.

1.6. Provide periodic inspection of the Project during the construction period by its staff to assure that construction is in conformance with the plans and specifications.

1.7. Administer the construction management of the Project, including surveying, testing, and inspection, and cause the Project to be constructed in substantial compliance with the construction drawings and contract documents.

1.8. Issue a Private Storm Drain License for the storm drain serving the Development, which will outfall to the Arroyo.

1.9. Issue an Encroachment Permit for construction of the storm drain within the AMAFCA easement.

1.10. Accept the OWNER's lump sum contribution of Five Hundred Fifteen Thousand Five Hundred Twenty Six Dollars ($515,526.00) ("OWNER's Contribution") as the prorata share for the Project, as outlined in the attached Cost Summary Table, Exhibit "C".

1.11. Fund all construction costs of the Project, including permitting, construction, and construction management services, in excess of the OWNER's Contribution.

1.12. Accept OWNER's Contribution as satisfying AMAFCA's drainage requirements from the OWNER with respect to the Arroyo and the Development, recognizing that local site drainage improvements for the Development will be required

1.13. Maintain the Arroyo within the limits of the existing AMAFCA drainage easement adjacent to the Development until such time as the Project is complete.

1.14. Maintain the Project upon completion and thereafter.

1.15. To approve release of the Certificate of Occupancy if requested before the Project is completed with the understanding that the occupied portion of the Development will be outside of the Simons and Li prudent line.

SECTION TWO - OWNER AGREES TO:

2.1. Cause to be designed, with an engineer's seal and signature, GCS 3c and related bank stabilization along the north bank of the Arroyo adjacent to the Development, as conceptually shown on attached Exhibit "B".

2.2. Provide to AMAFCA a set of construction plans for the Improvements for AMAFCA's review. The OWNER's engineer will the make necessary changes, if required, to obtain AMAFCA's signature for final approval.

2.3. Deliver to AMAFCA the OWNER's Contribution of Five Hundred Fifteen Thousand Five Hundred Twenty Six Dollars ($515,526.00) no later than seven (7) days prior to the bid of the construction contract for the Project. Payment may be made in the form of a check or money order made payable to "AMAFCA". If the OWNER fails to make payment in a timely manner, AMAFCA will not approve the release of the Certificate of Occupancy for the Development.

2.4. Maintain the storm drain connection from the Development to the Arroyo.

SECTION THREE – THE PARTIES AGREE:

3.1. AMAFCA's commitment to provide funding and to construct the Project identified in this Agreement is subject to the availability of funds and consideration of other flood control priorities in AMAFCA's district.

3.2. This Agreement will not set precedent as the basis of cost sharing for future developments within the area of the Musssetter Study.

3.3. This Agreement does not relieve the OWNER of the requirement to construct or to financially guarantee the construction of related drainage facilities or other improvements that may be required by the City of Albuquerque or any other agency for development of the Property.

3.4. Any circumstance which materially affects this Agreement will be promptly and equitably resolved by the PARTIES, and, if necessary, an amendment to this Agreement shall be executed.

3.5. Disputes under the Agreement, which cannot be resolved by the mutual agreement of the PARTIES, will be referred to binding arbitration under the provisions of the New Mexico Uniform Arbitration Act.

3.6. This Agreement may not be assigned by either PARTY without the written consent of the other PARTY, which consent shall not be unreasonably withheld.

3.7. Except as otherwise specifically provided herein, this Agreement shall be governed by and construed and enforced in accordance with the laws of the State of New Mexico.

3.8. All notices with respect to this Agreement shall be in writing and shall be delivered personally, via confirmed telefax, or sent postage prepaid by United States Mail, via certified mail, return receipt requested, to the addresses set forth below or other such addresses as hereafter specified in writing by one PARTY to the other:

AMAFCA	Spectrum Acquisition–Albuquerque, LLC
2600 Prospect N.E.	200 Spruce Street, Suite 6500
Albuquerque, New Mexico 87107	Denver, Colorado 80230
Attn: Executive Engineer	Attn: Mike Longfellow
Fax: (505) 884-0214	Fax: (303) 360-8814

3.9. This Agreement contains the entire Agreement between the PARTIES hereto, and all prior understandings, oral or written, by the PARTIES hereto with respect to this Agreement are hereby null and void. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any PARTY hereto unless set forth in a document duly executed by or on behalf of such PARTY.

3.10. If any provision of this Agreement, or the application thereof to a person or circumstance, shall be determined to be invalid or unenforceable to any extent, the remainder of the Agreement and the application of such provisions to other persons or circumstances shall

not be affected thereby, and such provisions shall be enforced to the greatest extent permitted by law.

3.11. This Agreement shall inure to the benefit of and shall be binding upon the undersigned PARTIES and their respective successors and assigns. Whenever in this Agreement a reference to the OWNER is made, such reference shall be deemed to include a reference to successors of the OWNER.

3.12. Each individual signing for each of the PARTIES hereunder warrants and represents that he/she is an authorized agent of such PARTY, on whose benefit he/she is executing this Agreement, and is authorized to execute the same.

3.13. Each PARTY agrees to execute such other and further instruments and documents as may be necessary or proper in order to complete the transactions contemplated by this Agreement.

3.15. In the event of any dispute regarding this Agreement, the prevailing PARTY shall be entitled to reimbursement of its costs and reasonable attorney's fees.

3.16. The OWNER shall indemnify and save harmless AMAFCA from all liability from claims for damages arising out of the negligence of the OWNER in performing his or her duties under this Agreement and for all claims arising pursuant to the design or construction of the Improvements. Each PARTY shall defend, indemnify, and hold harmless the other PARTY, its officers and employees, against all liability, claims, damages, losses or expenses arising out of bodily injury to persons or damage to property caused by, or resulting from, the actions and/or inactions of the indemnifying PARTY's and/or its employees', agents' or subcontractors' own negligent and/or intentional wrongful acts, omissions or performance or failure to perform its obligations and duties under the terms and conditions of this Agreement. No PARTY is required to indemnify any other PARTY for the negligent or intentional acts, errors or omissions of the other PARTY or their employees or agents. Each PARTY's indemnification obligation to the other PARTY shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for each PARTY, pursuant to laws, regulations, or policies of insurance, provided, however, this save harmless and indemnification clause is subject to the immunities, provisions and limitations of the Tort Claims Act (Section 41-4-1 et seq., N.M.S.A. 1979 comp.) and any amendments thereto. This Agreement to indemnify shall not extend to liability, claims, damages, losses or expenses, including attorney's fees, arising out of: 1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the indemnitee, or the agents or employees of the indemnitee; or 2.) the giving of or the failure to give directions or instructions by the indemnitee, or the agents or employees of the indemnitee, where the giving or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property. Nothing herein is intended or can be construed as requiring

AMAFCA to assume any liability resulting from the design or construction of the Improvements.

Executed the day and year first set out above.

Albuquerque Metropolitan Arroyo Flood Control Authority

By: _____
Danny Hernandez, Chairman
Board of Directors

ATTEST:

Bruce M Thomson
Bruce M. Thomson, Secretary/Treasurer

Date: 9/15/11

ACKNOWLEDGMENT

STATE OF NEW MEXICO)
)s.s.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on September 15, 2011, by Danny Hernandez, as Chairman of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision of the State of New Mexico, on behalf of said political subdivision.

My Commission Expires:

10-2-12
(SEAL)

Pamela S. Woodruff
Notary Public

OFFICIAL SEAL
PAMELA S. WOODRUFF
Notary Public
State of New Mexico
My Commission Expires 10-2-12

FUNDING AGREEMENT
FOR CALABACILLAS ARROYO IMPROVEMENTS
AS RELATED TO SPECTRUM HOUSING DEVELOPMENT

Spectrum Acquisition – Albuquerque, LLC

By: _____
Jeffrey D. Kraus, Manager

ACKNOWLEDGMENT

STATE OF COLORADO)
)s.s.
COUNTY OF DENVER)

This instrument was acknowledged before me on OCTOBER 12th, 2011, by Jeffrey D. Kraus, as Manager of Spectrum Acquisition – Albuquerque, LLC, a Colorado limited liability company, on behalf of said company.

My Commission Expires:

1/12/15
(SEAL)

April N Cordova
Notary Public

APRIL N CORDOVA NOTARY PUBLIC STATE OF COLORADO

EXHIBIT "A"
Location Map

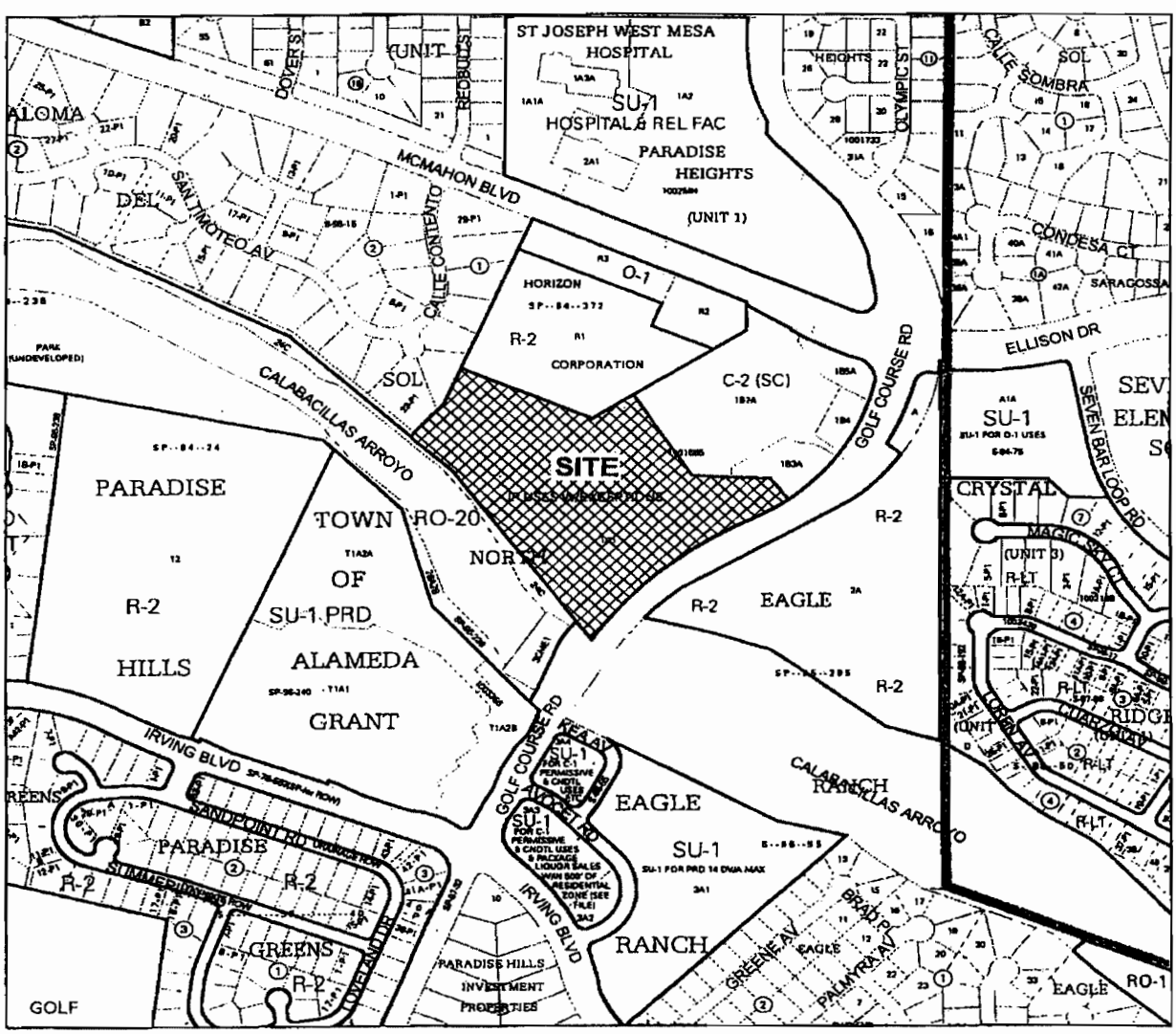


EXHIBIT "B"
Basic Construction Plan

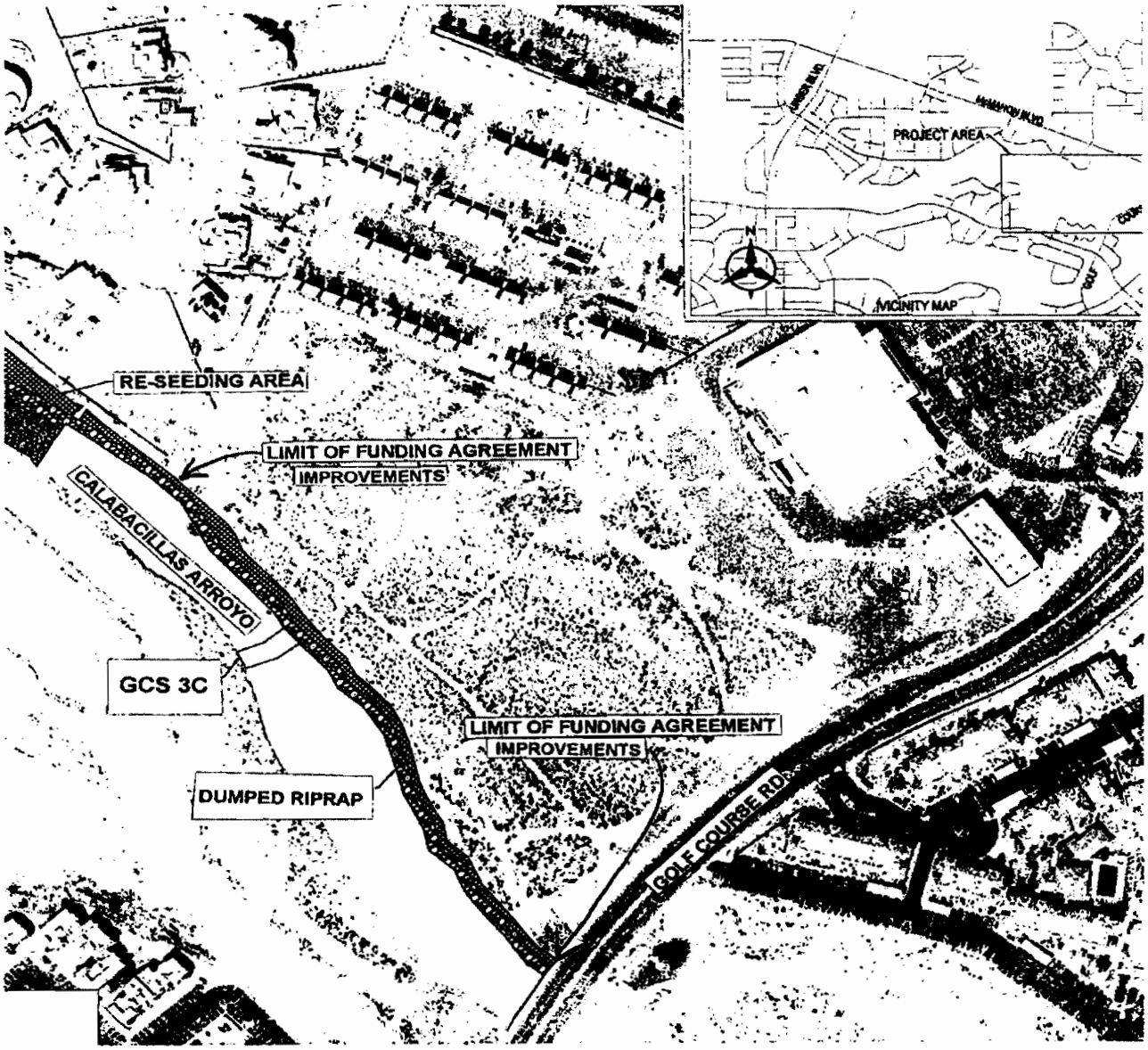


EXHIBIT "C"
Cost Summary Table

North Bank Stabilization		**$269,594**
Grade Control Structure No. 3c ($292,875 x 1/3)		**$ 97,625**
Sanitary Sewer Protection		**$ 5,000**
Habitat Mitigation Contribution		**$ 50,000**
	Subtotal	**$422,219**
	10% Contingency	**$ 42,219**
	Construction Subtotal	**$464,438**
8% Construction Management		**$ 37,155**
3% Testing		**$ 13,933**
Total = Owner's Contribution		**$515,526**

APPENDIX D

(EXCERPT)

DRAINAGE STUDY

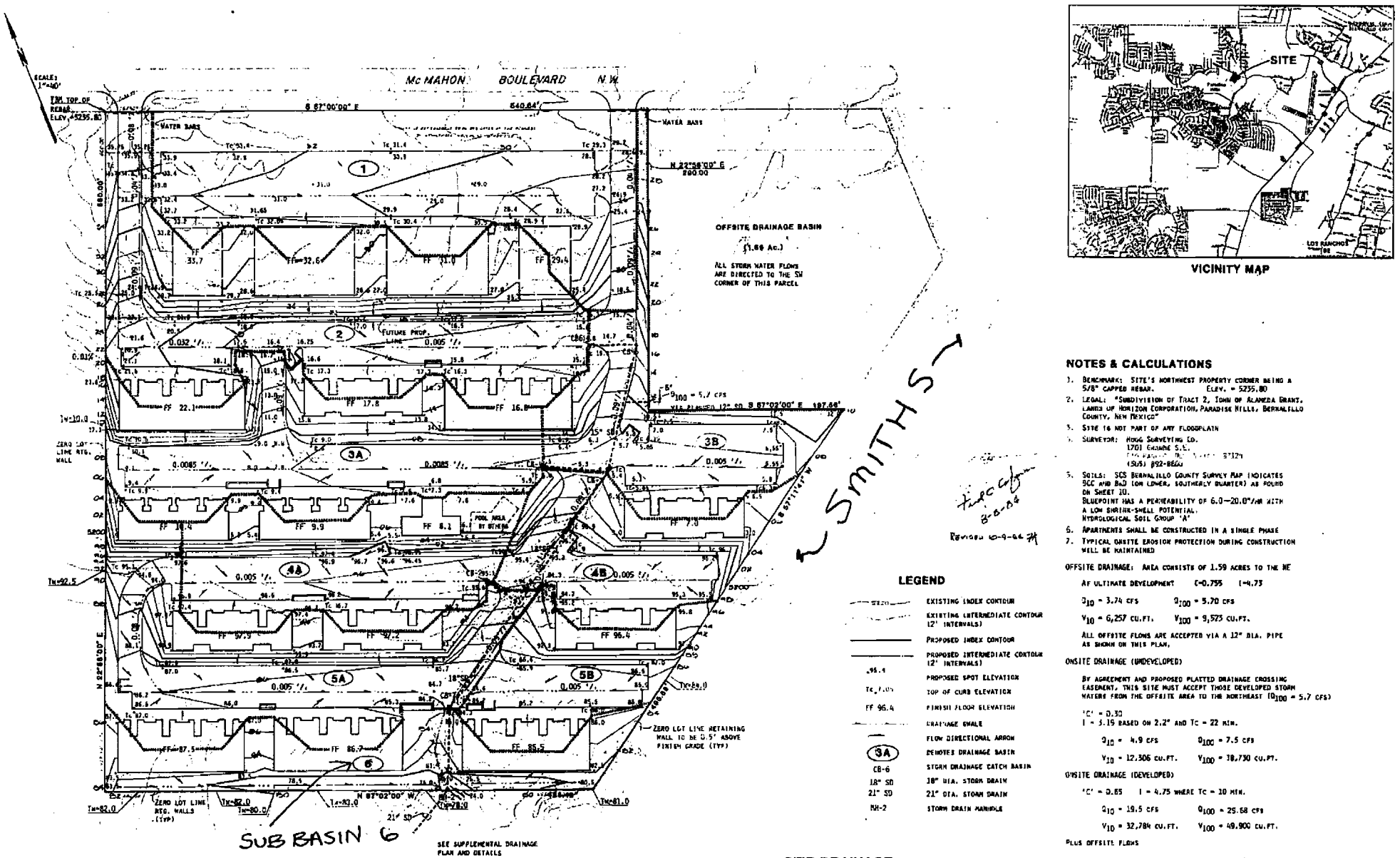
FOR THE

PUERTA DEL SOL APARTMENTS

BERNALILLO COUNTY NEW MEXICO

AUGUST, 1984

Approved as per meeting
AMAFCA Requirements
Dan Soto
10/19/84



LEGEND

5220	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR (2' INTERVALS)
	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR (2' INTERVALS)
95.4	PROPOSED SPOT ELEVATION
Tc 7.0	TOP OF CURB ELEVATION
FF 96.4	FINISH FLOOR ELEVATION
	DRAINAGE SWALE
	FLOW DIRECTIONAL ARROW
3A	DENOTES DRAINAGE BASIN
CB-6	STORM DRAINAGE CATCH BASIN
18" SD	18" DIA. STORM DRAIN
21" SD	21" DIA. STORM DRAIN
MH-2	STORM DRAIN MANHOLE

NOTES & CALCULATIONS

1. BENCHMARK: SITE'S NORTHWEST PROPERTY CORNER BEING A 5/8" CAPPED REBAR. ELEV. = 5235.80
2. LEGAL: "SUBDIVISION OF TRACT 2, TOWN OF ALAMEDA GRANT, LANDS OF HORIZON CORPORATION, PARADISE HILLS, BERNALILLO COUNTY, NEW MEXICO"
3. SITE IS NOT PART OF ANY FLOODPLAIN
4. SURVEYOR: HOGG SURVEYING CO. 1701 GAMMA S.E. [illegible] 87121 (505) 892-8866
5. SOILS: SCS BERNALILLO COUNTY SURVEY MAP INDICATES SCC AND BaD ION LOMER, SOUTHERLY QUARTER) AS FOUND ON SHEET 10. BLUEPOINT HAS A PERMEABILITY OF 6.0—20.0"/HR WITH A LOW SHRINK-SWELL POTENTIAL. HYDROLOGICAL SOIL GROUP 'A'
6. APARTMENTS SHALL BE CONSTRUCTED IN A SINGLE PHASE
7. TYPICAL ONSITE EROSION PROTECTION DURING CONSTRUCTION WILL BE MAINTAINED

OFFSITE DRAINAGE: AREA CONSISTS OF 1.59 ACRES TO THE NE

AT ULTIMATE DEVELOPMENT C=0.755 I=4.73

Q_{10} = 3.74 CFS Q_{100} = 5.70 CFS

V_{10} = 6,257 CU.FT. V_{100} = 9,575 CU.FT.

ALL OFFSITE FLOWS ARE ACCEPTED VIA A 12" DIA. PIPE AS SHOWN ON THIS PLAN.

ONSITE DRAINAGE (UNDEVELOPED)

BY AGREEMENT AND PROPOSED PLATTED DRAINAGE CROSSING EASEMENT, THIS SITE MUST ACCEPT THOSE DEVELOPED STORM WATERS FROM THE OFFSITE AREA TO THE NORTHEAST (Q_{100} = 5.7 CFS)

'C' = 0.30
I = 5.19 BASED ON 2.2" AND Tc = 22 MIN.

Q_{10} = 4.9 CFS Q_{100} = 7.5 CFS

V_{10} = 12,306 CU.FT. V_{100} = 18,730 CU.FT.

ONSITE DRAINAGE (DEVELOPED)

'C' = 0.85 I = 4.75 WHERE Tc = 10 MIN.

Q_{10} = 19.5 CFS Q_{100} = 25.68 CFS

V_{10} = 32,784 CU.FT. V_{100} = 49,900 CU.FT.

PLUS OFFSITE FLOWS

Q_{10} = 23.25 CFS Q_{100} = 35.38 CFS

V_{10} = 39,040 CU.FT. V_{100} = 59,423 CU.FT.

ALL STORM WATERS ARE ACCEPTED INTO THE STORM DRAIN SYSTEM.

Revised 10-9-96 JH

SITE DRAINAGE

EXHIBIT 1

AREA 5A: $(75\times95)+(345\times105)+\frac{1}{2}(65\times85)-4000+2704+860=$
$48677\,\#=1.05$ acre

PAVED $(2800\times2)+2704+860+(85\times24)+(45\times24)+$
$(335\times42)+(75\times24)=28154\,\#=0.646$ ac

% IMPERVIOUS $=.646\div1.05=$ **61.6%**

5B: $(190\times100)-2060+2704=19644\,\#=0.451$ ac

PAVED $2860+2704+(165\times42)=12494\,\#=0.287$ ac

% IMPERVIOUS $=0.287\div0.451=$ **63.6%**

6: $(140\times65)-2704=5996\,\#=0.138$ ac. ←

PAVED $4056\,\#=0.093$

% IMPERVIOUS $=0.093\div0.138=$ **67.5%** ←

7: $(165\times65)-860\ 9865\,\#=0.226$ acre

PAVED $2660\,\#=0.061$ ac % IMPERVIOUS $=0.061\div0.226=$ **27%**

8: $(135\times65)-2680=6095\,\#=0.140$ acre

Paved $3380\,\#=0.078$ ac % IMPERVIOUS $=.078\div.140=$ **55.7%**

9: $(75\times60)=4500\,\#=0.103$ acre

PAVED $676\,\#=0.016$ ac % IMPERVIOUS $=.016\div.103=$ **15.1%**

OFFSITE (0): $(275\times252)=69300\,\#=1.591$ acre

assume fully developed $C=0.65$

AREA 5A: $(75 \times 95) + (345 \times 105) + \frac{1}{2}(65 \times 85) - 4000 + 2704 + 860 =$
$45677^{\#} = 1.05$ acre

PAVED $(2800 \times 2) + 2704 + 560 + (85 \times 24) + (45 \times 24) +$
$(335 \times 42) + (75 \times 24) = 28154^{\#} = 0.646$ ac

% IMPERVIOUS = $.646 \div 1.05 =$ **61.6%**

5B: $(190 \times 100) - 2060 + 2704 = 19644^{\#} = 0.451$ ac

PAVED $2860 + 2704 + (165 \times 42) = 12494^{\#} = 0.287$ ac

%IMPERVIOUS = $0.287 \div 0.451 =$ **63.6%**

6: $(140 \times 65) - 2704 = 5996^{\#} = 0.138$ ac ←

PAVED $4056^{\#} = 0.093$

% IMPERVIOUS = $0.093 \div 0.138 =$ **67.5%** ←

7: $(165 \times 65) - 860\ 9865^{\#} = 0.226$ acre

PAVED $2660^{\#} = 0.061$ ac %IMPERVIOUS = $0.061 \div 0.226 =$ **27%**

8: $(135 \times 65) - 2680 = 6095^{\#} = 0.140$ acre

Paved $3380^{\#} = 0.078$ ac % IMPERVIOUS = $.078 \div .140 =$ **55.7%**

9: $(75 \times 60) = 4500^{\#} = 0.103$ acre

PAVED $676^{\#} = 0.016$ ac % IMPERVIOUS = $.016 \div .103 =$ **15.1%**

OFFSITE (0): $(275 \times 252) = 69300^{\#} = 1.591$ acre

assume fully developed $C = 0.65$