FOX CREEK - BASIN MASTER PLAN

FINAL REPORT

June 1999

Sarasota County PUBLIC WORKS - SEU Planning

Kimley-Horn and Associates, Inc.

Engineers ◆ Planners ◆ Surveyors

SARASOTA COUNTY

STORMWATER MANAGEMENT RESOURCE TECHNOLOGIES INC.

Southwest Florida Water Management District

2379 Broad Street, Brooksville, Florida 34609-6899
(352) 796-7211 or 1-800-423-1476 (FL only)
SUNCOM 628-4150 TDD only 1-800-231-6103 (FL only)
World Wide Web: http://www.swfwmd.state.fl.us

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7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 or
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115 Corporation Way
Venice, Florida 34292-3524
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Lecanto Service Office
3600 West Sovereign Path
Suite 226
Lecanto, Florida 34461-8070
(352) 527-8131
SUNCOM 667-3271

9-17-9-24

MEETING ATTENDEES
VENICE SERVICE OFFICE

PROJECT NAME: Shire Street

DATE: 9-17-09 **TIME:** 10:30

NAME	REPRESENTING	PHONE
MADHK	SWFWMD	486 1212
Wm Wimbish	Thompson Lake Preservation Group	488-6586
Carolyn Eastwood	Sarasota County Stormwater	378-6148
KIRK BAGLEY	SARACO STORMWATER	378-6148
Sandra Newell	Sarasota Co. Stormwater	378-6148
K. C. Wetherell	SHIRE ST COMM.	485-4866
FORREST GRESSINGER	" " "	488-5219
Stephen M. Swan	StormTec	378-618~~6~~48
[illegible]	SWFWMD	[illegible]
Michael Hanson	Boyle Eng. Corp.	577-8858

NOTES:

	2-YR EXIST.	2-YR PROP.		
09000	3.64	3.64	0.00	~~3.64~~
09120	3.82 ┐	3.95	1.78	FOX CREEK
09510	3.85 ┘	4.09 ~~4.07~~	2.05	
09512	3.99 ┐	4.16	3.25	
09514	4.04 ┘	~~5.00~~	3.38	
09515	4.15 ┐	~~5.~~	3.51	
09520	4.18 ┘	4.36	3.56	
09522	4.29 ┐	—	3.81	
09530	4.32 ┘	—	3.87	
09532	4.51 ┐	4.44	4.02	
09540	4.57 ┘	—	4.13	
09542	5.00 ┐	4.57	4.54	
09550	5.04 ┘	4.58	4.61	LAKE
09552	5.04	4.59	4.64	

9510	TO	95120	~~=~~	-0.11	TO	-2.26
9514	TO	9512		-0.02	TO	0.63
9520	TO	9515		1.33	TO	-0.04
9530	TO	9522		0.74	TO	0.9
9540	TO	9532		1.02	TO	0.88
~~9550~~ 9550	TO	9542		1.40	TO	1.25

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.1

FOX CREEK BASIN MASTER PLAN
EXISTING CONDITIONS @ LOW TIDE
2 YEAR, 24 HOUR STORM

********** Node Maximum Conditions - 002Y24H **********

*(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
09000	BASE	0.00	0.00	0.00	0.0000	30731.83	17.43	296.04	0.00	0.00
09001	BASE	13.19	10.79	12.40	0.0004	56357.06	12.25	16.02	13.19	7.39
09002	BASE	14.59	10.77	12.40	0.0003	121356.85	12.50	17.74	14.58	5.61
09003	BASE	14.60	10.73	12.80	0.0012	9158.26	14.46	5.88	14.66	5.87
09004	BASE	14.03	10.50	12.90	0.0002	61431.21	13.00	14.84	13.91	11.12
09005	BASE	15.87	10.46	13.00	0.0001	54454.61	12.75	4.93	13.97	2.90
09006	BASE	16.27	10.21	12.90	0.0002	79624.33	13.00	18.74	13.59	10.94
09008	BASE	15.43	10.95	13.00	0.0002	90312.22	12.50	15.56	13.55	7.67
09009	BASE	14.20	11.17	13.00	0.0004	24931.49	12.50	8.41	13.61	6.00
09010	BASE	15.81	10.73	12.40	0.0001	57028.89	12.75	12.18	13.26	8.09
09011	BASE	16.36	10.79	12.40	0.0001	66068.89	12.75	8.37	13.38	2.70
09012	BASE	16.43	10.79	12.40	0.0001	277336.10	13.00	20.00	17.89	6.76
09013	BASE	15.88	10.70	12.28	0.0001	59022.28	15.79	15.14	16.77	15.29
09013A	BASE	15.83	10.69	0.00	0.0001	1513.73	16.61	3.73	16.64	3.74
09013B	BASE	14.69	10.59	0.00	0.0003	2296.75	16.64	3.74	16.67	3.76
09013C	BASE	14.66	10.59	0.00	0.0002	8447.71	14.56	7.83	14.68	7.82
09014	BASE	15.93	10.27	12.40	0.0001	30813.04	12.50	3.29	16.78	1.03
09016	BASE	15.08	10.06	12.40	0.0001	206252.42	13.34	31.98	15.08	29.54
09016B	BASE	15.04	10.08	0.00	-0.0046	5145.27	14.68	7.82	14.76	7.80
09017	BASE	13.64	11.07	12.84	0.0001	80166.91	12.25	10.46	13.52	4.33
09017A	BASE	13.11	11.02	0.00	0.0003	3022.27	13.18	6.17	13.23	6.19
09018	BASE	13.76	11.06	12.90	0.0001	106396.29	12.75	11.87	13.60	8.36
09019	BASE	17.43	10.54	12.45	0.0002	151278.93	13.11	16.71	17.79	6.85
09019A	BASE	17.47	10.54	0.00	0.0002	25925.37	12.25	4.90	12.29	2.97
09020	BASE	16.76	10.37	13.00	0.0002	87448.15	12.75	10.91	15.70	3.34
09020A	BASE	16.70	10.37	0.00	0.0002	32336.61	12.50	7.64	12.60	4.14
09021	BASE	16.66	10.16	12.17	0.0003	82819.74	12.25	14.44	12.94	2.19
09022	BASE	16.26	10.10	12.07	0.0002	85634.62	12.89	16.49	16.26	10.48
09023	BASE	17.14	10.38	12.45	0.0002	58883.79	12.52	6.21	18.76	1.65
09023A	BASE	17.14	10.38	0.00	0.0002	69877.80	12.25	5.51	29.64	0.08
09023B	BASE	17.14	10.38	0.00	0.0002	25482.92	12.50	6.46	12.53	3.87
09024	BASE	17.20	10.28	13.00	0.0006	18214.44	17.30	7.25	17.86	7.31
09025	BASE	16.27	9.96	12.07	0.0002	100629.99	14.94	20.56	16.27	20.08
09026	BASE	14.28	12.18	13.00	0.0001	50052.15	13.00	2.08	14.00	1.58
09027	BASE	14.46	10.58	13.00	0.0011	11966.14	14.17	6.25	14.46	6.24
09028	BASE	18.72	10.12	12.00	0.0005	43915.70	14.75	3.24	16.49	2.38
09029	BASE	14.73	12.81	14.00	0.0000	76062.01	13.00	1.79	14.73	1.02
09030	BASE	19.69	10.20	13.00	0.0001	142948.78	12.75	4.80	28.37	1.23
09031	BASE	13.48	12.17	13.00	0.0001	29345.85	13.00	2.37	13.48	2.02
09032	BASE	14.33	12.18	13.00	0.0000	81507.50	12.42	3.23	14.33	2.09
09033	BASE	13.24	12.34	13.00	0.0001	80497.94	12.25	3.75	13.24	1.45
09034	BASE	14.33	11.57	13.00	0.0000	130460.03	12.25	2.03	14.33	0.49
09035	BASE	15.43	10.18	12.21	-0.0053	918.80	16.77	12.60	16.76	13.78
09036	BASE	16.25	10.06	13.00	0.0001	62341.62	12.25	5.16	20.00	0.81
09037	BASE	12.39	10.14	13.00	-0.0010	16821.75	12.25	5.50	12.39	4.67
09120	BASE	17.56	1.78	9.00	-0.0005	95107.60	17.37	287.52	17.56	287.31
09130	BASE	18.08	2.31	9.00	0.0005	76333.61	18.70	204.51	19.38	206.02

Hour 113 when sim stopped

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [2]

FOX CREEK BASIN MASTER PLAN
EXISTING CONDITIONS @ LOW TIDE
2 YEAR, 24 HOUR STORM

********** Node Maximum Conditions - 002Y24H **********

●(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
09132	BASE	18.30	2.74	12.00	0.0006	70665.11	18.53	204.25	18.70	204.51
09134	BASE	18.33	2.87	12.00	0.0007	59159.33	18.36	204.17	18.53	204.25
09136	BASE	18.35	3.67	12.00	0.0010	38458.29	18.25	204.19	18.36	204.17
09140	BASE	19.10	4.22	12.00	-0.0020	15951.58	24.68	115.86	24.77	115.93
09146	BASE	24.32	4.35	12.00	0.0900	11272.67	24.63	115.82	24.68	115.86
09148	BASE	24.45	4.91	12.00	0.0011	11066.98	24.57	115.81	24.63	115.82
09151	BASE	26.81	5.31	17.00	0.0231	3006.85	30.46	63.47	30.47	63.48
09152	BASE	30.46	7.51	17.00	-0.0023	5403.33	30.45	63.47	30.46	63.47
09154	BASE	30.45	9.25	17.00	0.0016	7891.25	30.39	63.47	30.45	63.47
09156	BASE	30.43	9.56	17.00	-0.0015	13900.50	30.30	63.47	30.39	63.47
09158	BASE	30.35	10.37	16.00	0.0003	41357.68	30.07	63.48	30.30	63.47
09510	BASE	13.57	2.05	7.00	0.0056	8798.48	14.93	83.22	14.78	83.60
09512	BASE	15.25	3.25	7.00	0.0028	2444.22	15.42	77.85	15.25	76.35
09514	BASE	15.27	3.38	7.00	0.0045	2355.76	15.37	73.03	15.42	73.11
09515	BASE	15.29	3.51	7.00	0.0120	3453.64	12.28	78.46	15.37	73.03
09520	BASE	15.29	3.56	7.00	-0.0128	3167.54	15.33	73.02	12.28	78.46
09522	BASE	15.33	3.81	7.00	-0.0081	1573.93	15.41	65.35	15.43	65.35
09530	BASE	15.35	3.87	9.00	-0.0112	1509.40	15.51	63.18	15.52	63.18
09532	BASE	15.37	4.02	9.00	0.0053	2688.29	15.47	63.17	15.51	63.18
09540	BASE	15.39	4.13	7.00	0.0010	2657.12	15.62	60.05	15.65	60.07
09542	BASE	15.44	4.54	9.00	-0.0019	1887.55	15.60	59.88	15.63	59.89
09550	BASE	15.45	4.61	8.00	0.0061	176462.25	14.02	73.09	15.60	59.88
09552	BASE	15.43	4.64	8.00	-0.0250	368.85	13.54	34.75	14.02	34.94
09560	BASE	13.26	4.32	8.00	-0.0100	161.14	13.25	4.00	13.55	5.48
09562	BASE	15.28	3.59	8.00	0.0116	192.61	14.25	6.70	14.25	6.70
09564	BASE	15.33	4.03	8.00	0.0040	185.92	13.25	3.81	13.27	3.79
09570	BASE	15.53	5.12	8.00	0.0031	6405.60	15.00	12.79	15.84	12.79
09580	BASE	14.00	6.86	10.00	0.0018	6154.65	13.03	18.42	13.54	23.33
09582	BASE	13.08	8.25	10.00	0.0002	4282.06	13.01	10.57	13.08	10.56
09584	BASE	13.25	9.29	12.00	0.0006	119.32	13.25	7.99	13.25	7.99
09590	BASE	13.72	5.57	10.00	0.0003	2991.68	13.50	4.30	13.65	4.29
09591	BASE	0.00	5.81	0.00	0.0000	113.00	0.00	0.00	0.00	0.00
09612	BASE	17.35	4.94	16.00	0.0006	5123.00	16.99	79.16	17.02	79.13
09618	BASE	16.99	5.92	16.00	0.0006	10469.74	16.94	79.16	16.99	79.16
09624	BASE	16.95	6.76	16.00	0.0008	21627.20	16.80	79.19	16.94	79.16
09626	BASE	16.83	7.58	14.00	0.0007	99355.86	16.33	79.55	16.80	79.19
09628	BASE	16.48	8.28	16.00	0.0004	21871.71	16.17	59.55	16.34	59.47
09630	BASE	16.40	8.52	16.00	0.0004	6338.07	16.12	59.58	16.17	59.55
09632	BASE	16.74	8.95	16.00	-0.0006	9018.28	17.00	31.47	17.10	31.50
09640	BASE	19.21	10.12	13.00	0.0002	213211.31	14.65	33.02	18.78	23.43
09710	BASE	30.34	10.37	17.00	0.0003	11791.26	66.79	3.68	66.65	3.74
09718	BASE	19.23	9.89	17.00	0.0004	44355.15	19.13	36.10	19.23	36.10
09720	BASE	19.22	9.91	17.50	0.0004	50218.16	18.32	34.20	18.44	34.11
09722	BASE	19.10	9.92	17.50	0.0004	17602.28	18.19	31.74	18.25	31.70
09732	BASE	18.70	10.04	17.50	0.0004	34402.26	18.01	31.82	18.19	31.74
09734	BASE	18.65	10.08	17.50	0.0004	37366.21	18.33	23.48	18.50	23.43
09736	BASE	18.72	10.10	17.50	0.0004	36508.44	19.23	17.85	19.42	17.94

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [3]

FOX CREEK BASIN MASTER PLAN
EXISTING CONDITIONS @ LOW TIDE
2 YEAR, 24 HOUR STORM

********** Node Maximum Conditions - 002Y24H **********

@(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
09738	BASE	18.86	10.11	17.50	0.0004	20294.18	20.02	6.88	20.12	6.98
09740	BASE	19.27	10.13	13.00	0.0002	390292.44	14.25	19.84	21.53	18.20
09801	BASE	22.49	16.66	17.00	0.0000	211213.47	21.71	3.19	22.49	3.18
09801B	BASE	22.23	16.84	0.00	0.0000	270947.22	14.25	4.01	22.22	1.46
09802	BASE	30.42	15.43	17.00	-0.0023	689578.29	20.28	20.62	21.61	17.65
09802B	BASE	31.20	15.37	17.00	-0.0006	3436.09	21.61	17.65	21.62	17.62
09802C	BASE	29.95	15.44	0.00	0.0062	13207.50	20.26	9.34	20.36	9.28
09802D	BASE	28.35	15.48	0.00	0.0021	10727.71	20.01	9.39	20.26	9.34
09802E	BASE	28.22	15.48	0.00	0.0021	11320.31	19.75	9.44	20.01	9.39
09803	BASE	47.77	17.25	17.50	0.0000	656274.27	21.25	2.14	47.77	0.56
09804	BASE	39.59	17.22	18.00	0.0000	702029.81	21.50	3.05	39.59	1.52
09805	BASE	31.36	15.36	17.00	0.0000	1630198.57	26.01	38.09	31.20	33.67
09805B	BASE	31.71	15.12	16.00	-0.0014	2613.00	31.20	33.67	31.21	33.67
09806	BASE	29.41	16.32	17.00	0.0000	2251304.75	17.75	15.07	29.41	10.54
09807	BASE	31.93	16.16	17.00	0.0000	1190017.98	23.50	8.43	31.93	7.08
09808	BASE	29.87	16.03	17.00	0.0000	490879.71	28.16	9.37	29.87	9.28
09809	BASE	31.79	15.09	16.00	0.0000	683704.51	30.36	50.19	31.79	49.74
09809B	BASE	33.42	14.83	17.00	0.0000	20193.81	31.79	49.74	31.85	49.70
09810	BASE	59.22	15.81	17.00	0.0000	1263100.46	20.50	8.81	35.67	4.31
09811	BASE	62.75	15.81	17.00	0.0000	921346.00	26.56	7.77	24.71	3.88
09812	BASE	61.00	16.53	17.00	0.0000	447301.10	20.00	3.37	0.00	0.00
09813	BASE	62.48	15.81	17.00	0.0001	622711.01	24.56	6.53	0.00	0.00
09814	BASE	27.14	15.36	16.00	0.0000	489146.40	19.75	3.90	27.14	3.36
09815	BASE	26.83	16.18	16.50	0.0000	251978.97	23.00	1.46	26.83	1.40
09816	BASE	33.58	14.80	16.00	0.0000	874221.81	31.09	56.78	33.56	55.48
09817	BASE	33.78	13.60	16.00	0.0000	196951.47	33.18	57.47	32.40	63.40
09817B	BASE	33.79	13.55	16.00	0.0123	953.47	32.40	63.40	33.73	57.41
09818	BASE	33.80	13.50	16.00	0.0001	318820.78	32.93	63.30	33.74	63.16
09818A	BASE	113.48	11.82	17.00	0.0003	113.12	33.80	0.01	0.00	0.00
09818B	BASE	39.27	11.97	16.50	0.0000	3079.92	0.00	0.00	42.09	0.00
09818C	BASE	33.98	13.10	16.00	0.0003	10611.50	33.46	34.61	33.56	34.60
09818CX	BASE	33.83	13.39	15.00	0.0004	1164.43	33.42	34.61	33.46	34.61
09818D	BASE	38.39	11.97	17.00	0.0005	18043.95	33.54	34.60	33.76	34.56
09819	BASE	26.74	14.26	16.00	0.0000	220671.15	24.06	4.04	26.74	3.85
09820	BASE	31.87	15.00	15.50	0.0000	786388.84	29.76	5.11	31.87	4.18
09821	BASE	31.86	15.00	15.50	0.0000	1886520.26	24.50	7.40	32.12	6.89
09822	BASE	49.29	14.81	16.00	0.0000	679992.51	29.93	5.45	49.29	1.76
09823A	BASE	33.67	12.53	16.00	0.0001	12192.51	33.80	28.54	33.95	28.55
09823B	BASE	32.73	11.79	15.50	0.0003	25693.84	32.04	31.08	32.29	31.04
09825	BASE	55.50	14.38	15.00	0.0000	984688.39	19.25	4.53	0.00	0.00
09828	BASE	37.90	14.66	15.00	0.0001	1070751.08	31.11	8.85	37.90	6.90
09829	BASE	39.10	13.96	15.00	0.0000	855992.49	36.22	5.47	39.10	5.06
09830	BASE	39.52	13.75	15.00	0.0000	431046.71	37.35	4.54	39.52	4.15
09831	BASE	39.38	12.21	15.00	0.0000	80294.05	39.05	9.58	39.38	9.56
CB2-100	BASE	15.00	11.50	9.30	0.0001	0.00	0.00	0.00	0.00	0.00
CB3-100	BASE	15.00	12.00	9.50	0.0001	0.00	15.46	1.38	0.00	0.00
CB4-000	BASE	0.00	2.50	2.50	0.0000	6025.77	15.59	62.37	0.00	0.00

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [4]

FOX CREEK BASIN MASTER PLAN
EXISTING CONDITIONS @ LOW TIDE
2 YEAR, 24 HOUR STORM

********** Node Maximum Conditions - 002Y24H **********

*(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
CB4-090	BASE	15.59	3.97	8.00	0.0034	8412.60	15.54	62.38	15.59	62.37
CB4-092	BASE	12.92	7.19	7.00	0.0003	139729.55	12.00	22.56	12.92	4.16
CB4-093	BASE	15.04	5.28	7.00	0.0006	13326.64	12.23	13.20	15.04	12.94
CB4-094	BASE	12.29	6.97	9.00	0.0006	5030.85	12.00	4.35	12.29	3.05
CB4-100	BASE	15.60	3.98	8.00	-0.0110	13468.61	15.71	48.18	15.80	48.22
CB4-102	BASE	12.03	4.16	6.00	0.0005	351.69	12.00	2.60	12.03	2.58
CB4-105	BASE	12.88	6.90	8.00	0.0003	8884.23	12.25	1.98	12.88	0.90
CB4-110	BASE	15.82	4.05	11.00	0.0131	1931.31	13.72	53.67	20.28	41.39
CB4-120	BASE	15.88	4.06	7.00	-0.0135	2138.70	20.28	41.28	13.72	53.67
CB4-130	BASE	16.11	4.11	11.00	0.0058	1837.59	20.51	37.54	20.51	37.59
CB4-140	BASE	16.61	4.21	7.00	0.0003	150297.66	19.74	31.23	20.54	34.27
CB4-150	BASE	19.76	5.46	10.00	0.0004	7768.28	20.21	25.96	20.35	26.01
CB4-160	BASE	20.06	6.30	9.00	0.0005	198673.86	15.10	28.72	20.21	25.96
CB4-161	BASE	19.38	6.51	13.00	0.0005	15126.02	18.44	23.59	18.58	23.50
CB4-162	BASE	14.41	7.08	14.00	0.0004	9381.91	13.98	8.86	14.30	8.68
CB4-163	BASE	14.08	7.70	14.00	0.0005	7827.52	13.62	9.02	13.98	8.86
CB4-164	BASE	13.43	8.46	14.00	0.0006	6818.90	13.59	8.99	13.62	9.02
CB4-165	BASE	14.03	8.63	14.00	0.0006	6755.95	18.42	5.57	18.55	5.59
CB4-166	BASE	18.87	8.98	14.00	0.0003	6285.32	18.85	4.94	19.06	4.94
CB4-167	BASE	21.91	10.23	14.00	0.0002	6049.43	20.30	4.33	20.51	4.31
CB4-168	BASE	20.54	10.70	14.00	-0.0004	11213.27	19.75	4.34	20.30	4.33
CB4-169	BASE	20.49	10.72	12.00	-0.0031	333077.15	14.39	8.54	0.00	10.38
CB4-170	BASE	20.48	10.72	14.00	0.0003	8155.46	14.37	2.72	14.47	2.24
CB4-171	BASE	13.86	11.07	14.00	-0.0004	4669.72	13.69	2.62	14.37	2.72
CB4-172	BASE	15.46	12.49	15.00	-0.0002	2802.77	14.57	2.08	13.89	2.32
CB4-173	BASE	14.64	13.11	15.00	0.0002	6086.74	13.66	1.18	14.67	1.12
CB4-174	BASE	14.75	13.17	15.00	0.0002	6850.20	13.57	0.77	14.98	0.68
CB4-175	BASE	14.77	13.18	15.00	0.0002	11194.35	12.89	0.62	15.01	0.30
CB4-176	BASE	14.59	13.16	15.00	0.0002	10309.74	12.50	0.96	12.53	0.29
CB4-177	BASE	14.37	12.90	15.00	-0.0003	5982.71	69.04	0.03	70.43	0.03
CB4-180	BASE	18.74	7.25	13.00	0.0005	10070.87	18.55	16.90	18.74	16.89
CB4-181	BASE	16.03	7.71	10.00	0.0002	152063.26	14.00	13.30	16.03	9.82
CB4-182	BASE	19.81	7.69	13.00	0.0008	12205.78	20.42	9.57	20.80	9.63
CB4-183	BASE	20.14	8.06	13.00	0.0005	6757.03	20.25	9.52	20.47	9.53
CB4-184	BASE	20.29	8.88	13.00	0.0008	6029.83	20.17	9.46	20.30	9.46
CB4-185	BASE	20.40	9.65	13.00	0.0007	5795.59	20.24	9.27	20.40	9.27
CB4-186	BASE	20.48	10.60	11.00	0.0002	174980.46	15.41	13.68	20.48	12.41
CB4-187	BASE	20.40	10.62	13.00	0.0002	18255.41	15.40	13.93	15.47	12.74
CB4-188	BASE	20.44	10.70	13.00	0.0004	17259.03	15.47	12.26	15.52	11.73
CB4-189	BASE	20.48	10.72	12.00	0.0005	127868.34	15.12	12.89	15.54	9.57
CB4-190	BASE	20.41	10.72	12.00	0.0004	25855.10	14.00	17.58	14.44	16.07
CB4-191	BASE	19.61	10.75	15.00	0.0002	5892.55	13.91	4.82	13.97	4.79
CB4-192	BASE	13.95	11.98	15.00	0.0005	6821.02	13.61	4.66	13.95	4.59
CB4-193	BASE	13.79	12.26	15.00	0.0005	9639.05	13.21	4.74	13.68	4.44
CB4-194	BASE	13.56	12.45	15.00	0.0005	8585.03	13.00	4.92	13.30	4.48
CB4-195	BASE	13.56	12.47	15.00	0.0004	5952.93	12.25	2.16	12.38	1.14
CB4-196	BASE	13.56	12.47	15.00	0.0005	5192.46	12.37	1.46	13.26	0.64

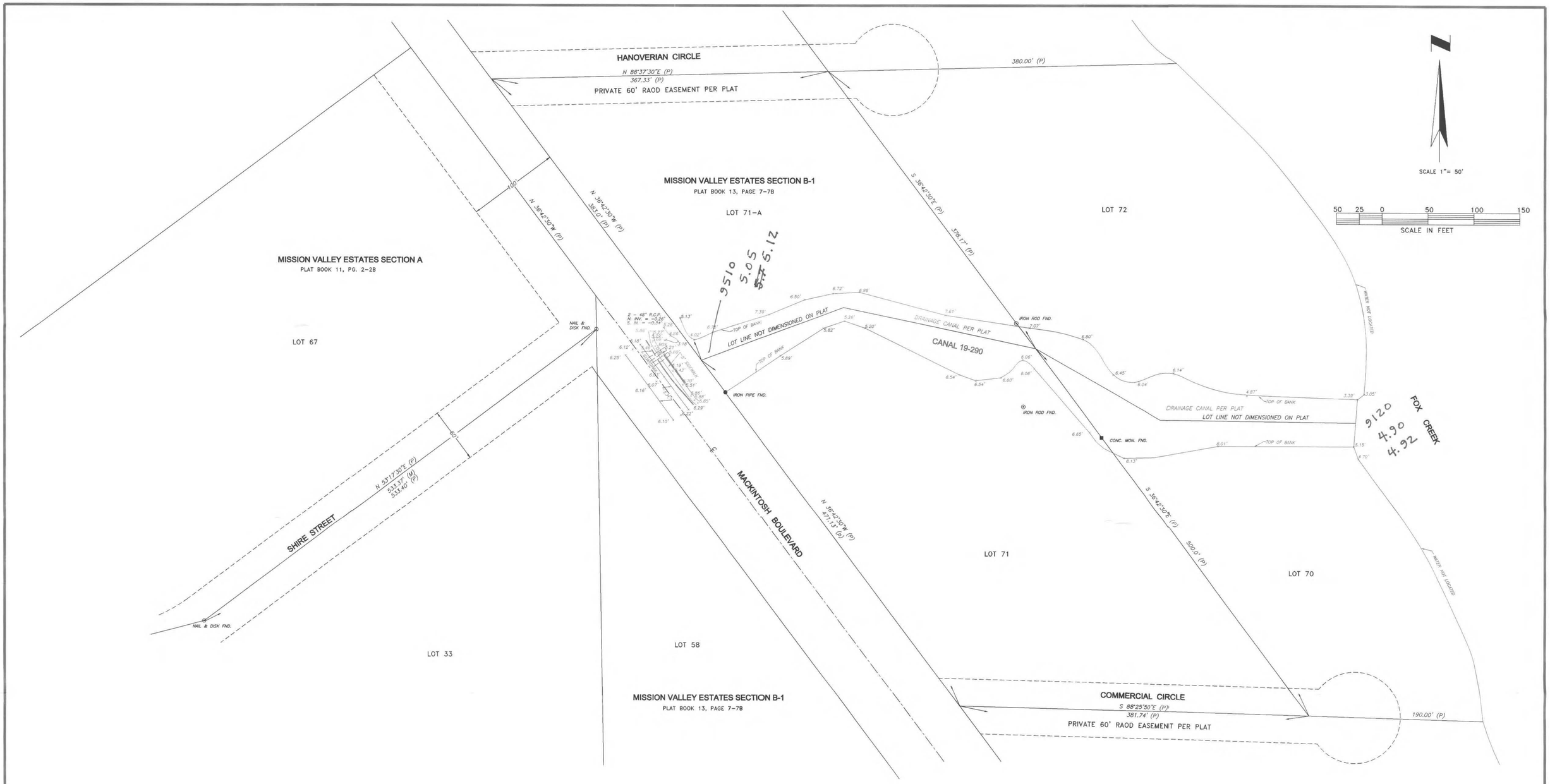
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [5]

FOX CREEK BASIN MASTER PLAN
EXISTING CONDITIONS @ LOW TIDE
2 YEAR, 24 HOUR STORM

********** Node Maximum Conditions - 002Y24H **********

@(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
CB4-197	BASE	13.56	12.45	15.00	0.0004	4822.08	12.25	1.13	12.21	0.51
CB4-200	BASE	15.50	5.59	8.00	-0.0017	98212.13	13.80	11.02	16.26	8.91
CB4-210	BASE	15.14	5.67	8.00	0.0013	6823.42	13.75	5.89	13.87	5.62
CB4-220	BASE	15.10	5.68	7.00	0.0024	3109.27	13.00	1.90	13.03	1.73
CB4-300	BASE	12.84	5.81	7.00	-0.0010	53351.05	12.52	27.21	12.84	23.73
CB4-310	BASE	12.55	6.48	9.00	-0.0017	1135.99	12.53	24.07	12.55	24.02
CB4-320	BASE	12.51	7.02	10.00	0.0008	411.97	12.51	18.86	12.52	18.86
CB4-330	BASE	12.52	7.27	11.00	0.0007	585.52	12.51	18.51	12.52	18.50
CB4-340	BASE	12.51	7.68	12.00	0.0007	740.40	12.50	18.17	12.51	18.14
CB4-350	BASE	12.50	8.25	12.50	-0.0025	179.23	12.50	17.40	12.50	17.38
CB4-360	BASE	12.50	8.35	13.00	0.0071	133.22	12.25	3.85	12.26	3.78
CB4-500	BASE	16.56	4.23	9.00	-0.0031	183.09	14.25	3.71	14.25	3.70
CB4-520	BASE	14.62	6.12	8.50	0.0006	50547.53	12.25	18.14	14.62	2.92
CB4-600	BASE	12.06	6.78	8.50	0.0004	512.61	12.02	2.70	12.05	2.68
CB4-605	BASE	24.03	7.31	11.00	0.0005	433.43	12.14	1.16	12.18	1.15
CB4-610	BASE	24.02	7.32	8.50	-0.0004	295.84	12.14	1.17	12.14	1.16
CB4-612	BASE	24.02	7.41	9.00	0.0003	154.52	24.00	1.08	24.00	1.08
CB4-614	BASE	24.30	7.54	11.00	-0.0004	1258.64	24.25	1.07	24.28	1.07
CB4-615	BASE	24.77	7.64	11.00	0.0005	2782.46	25.22	1.45	25.01	1.04
CB4-616	BASE	24.68	7.64	8.00	0.0001	101436.93	12.00	5.81	25.22	0.50
CB4-618	BASE	22.52	7.74	11.00	-0.0102	2124.34	16.89	1.44	17.06	1.43
CB4-620	BASE	20.34	7.77	9.00	0.0005	87768.07	12.25	20.72	17.89	1.30
CB4-630	BASE	41.04	7.26	8.00	0.0002	91031.21	12.50	7.71	0.00	0.00
CB4-640	BASE	41.49	7.26	9.00	0.0002	128344.78	14.00	4.01	17.00	0.31
CB4-700	BASE	12.51	6.61	8.00	-0.0064	117.05	12.50	7.35	12.51	7.33
MVE-P1	BASE	12.53	12.43	13.00	0.0002	85055.44	12.30	22.68	12.53	21.48
MVE-P2	BASE	12.53	12.44	13.20	0.0002	18409.56	12.25	10.84	12.50	10.21
MVE-P3	BASE	13.51	11.38	13.20	0.0004	75338.94	12.25	18.82	13.49	6.88
MVE-SP	BASE	12.26	12.67	13.10	0.0001	2003.58	12.25	2.75	12.26	2.74
MVE-WA	BASE	12.93	11.53	12.80	0.0002	92061.38	12.46	16.67	12.93	12.46
MVE-WB	BASE	20.34	10.73	12.80	0.0003	39053.01	12.75	10.26	12.93	6.43
MVE-WC	BASE	17.09	11.03	12.80	0.0003	184263.52	12.82	30.32	15.76	5.60
STH-100	BASE	26.78	12.46	13.00	0.0002	1345492.67	14.75	10.61	17.02	3.41
STH-200	BASE	26.75	12.46	12.43	0.0002	24.59	17.01	4.81	0.00	0.00
09901	SORWDS	12.72	5.09	6.50	0.0002	21462.82	12.65	27.03	12.72	26.94
09902	SORWDS	12.72	5.24	6.50	0.0003	42191.01	12.34	28.12	12.71	25.75
09903	SORWDS	12.68	5.32	6.50	0.0003	162508.27	12.25	74.46	12.63	62.32



ABBREVIATION LEGEND

T.B. TOP OF BANK	EASE. = EASEMENT
E.P = EDGE OF PAVEMENT	C.M. = CONCRETE MONUMENT
REF. = REFERENCE	P.R.M. = PERMANENT REFERENCE MONUMENT
F.B. = FIELD BOOK	U.G.T.E. = UNDERGROUND GENERAL TELEPHONE ELECTRIC
PG. = PAGE	R.C.P. = REINFORCED CONCRETE PIPE
NO. = NUMBER	G.T.E. = GENERAL TELEPHONE ELECTRIC
AVE. = AVENUE	P.B. = PLAT BOOK
P.L.S. = PROFESSIONAL LAND SURVEYOR	SEC. = SECTION
F.S. = FLORIDA STATUTES	TWP. = TOWNSHIP
I.P. = IRON PIPE	RNG. = RANGE
FND. = FOUND	F.A.C. = FLORIDA ADMINISTRATIVE CODE
P.O.B. = POINT OF BEGINNING	

DESCRIPTION

That part of Canal 19-290 that lies between Lots 70, 71, 71A and 72, MISSION VALLEY ESTATES SECTION 1-B, recorded in Plat Book 13, Page 7 of the Public Records of Sarasota County, Florida.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THIS MAP OF SURVEY REPRESENTS AN AS-BUILT SURVEY OF THE LANDS AS SHOWN AND DESCRIBED HEREON, THAT THE SURVEY WAS RECENTLY PERFORMED UNDER MY DIRECTION, THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND THAT THE SURVEY MEETS THE MINIMUM TECHNICAL STANDARDS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL LAND SURVEYORS IN CHAPTER 61G17, F.A.C. PERSUANT TO SECTION 472.027, F.S.

DATE OF SURVEY: 5-5-2000

6.21.00

G.M. FOSNESS, COUNTY SURVEYOR — DATE
PROFESSIONAL SURVEYOR AND MAPPER #4149
STATE OF FLORIDA
1301 CATTLEMEN ROAD
SARASOTA, FLORIDA 34232-9631

SURVEYOR'S NOTES

1. BEARINGS SHOWN HEREON ARE BASED ON THE WEST LINE OF LOT 71, MISSION VALLEY ESTATES SECTION B-1, RECORDED IN PLAT BOOK 13, PAGE 7 OF THE PUBLIC RECORDS OF SARASOTA COUNTY, FLORIDA, BEARING BEING N 36°42'30"W.
2. ELEVATIONS SHOWN HEREON ARE BASED ON SARASOTA COUNTY BENCH MARK 381-C, ELEVATION BEING 5.13 FEET.
3. THIS MAP WAS PREPARED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE OR AN ATTORNEY'S OPINION OF TITLE, THEREOF, ANY DEED OVERLAP OR HIATUS OR ANY RECORDED OR UNRECORDED RIGHTS-OF-WAY AND OR EASEMENTS MAY NOT BE SHOWN.
4. ANY REPRODUCTION OF THIS MAP SHALL NOT BE "CERTIFIED A TRUE COPY" WITHOUT MY SIGNATURE AND DATE THEREOF IN INK, TOGETHER WITH MY EMBOSSED SEAL ON SAID COPY.
5. THIS AS-BUILT SURVEY IS PERFORMED TO OBTAIN HORIZONTAL AND VERTICAL DATA SO CONSTRUCTED IMPROVMENTS MAY BE LOCATED AS SHOWN.
6. IMPROVEMENTS SUCH AS, BUT NOT LIMITED TO, UNDERGROUND UTILITIES, LANDSCAPE FEATURES, ETC., HAVE NOT BEEN LOCATED EXCEPT AS SHOWN.
7. THIS IS NOT A BOUNDARY SURVEY.

LEGEND

◎ = STORM MANHOLE

AS-BUILT SURVEY

SARASOTA COUNTY PUBLIC WORKS BUSINESS CENTER
CONSTRUCTION SERVICES , SURVEY OPERATIONS

SHIRE STREET OUTFALL
CANAL 19-290

SHIRE STREET EAST TO FOX CREEK

	BY	DATE		
DRAWN	T.S.O.	6-12-00	Jeri Owen	6-21-00
CHECKED	W.W.	6-20-00	SUBMITTED	DATE
COMPARED	P.F.L.	6-20-00	PROJ. NO.	JOB NO. 42300
REF: F.B. 440, PG. 51			SCALE: 1"= 50'	SHEET 1 OF 1

FILE I:\SURVEY\SHIRE\2\SHIREDITCH.DWG

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LIST OF EXHIBITS

APPENDICIES

BIBLIOGRAPHY

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FOX CREEK

COMPREHENSIVE BASIN MASTER PLAN

FINAL REPORT

Prepared for:
SARASOTA COUNTY STORMWATER ENVIRONMENTAL UTILITY
1301 Cattlemen Road
Sarasota, FL 34232

Prepared by:
KIMLEY-HORN AND ASSOCIATES, INC.
8586 Potter Park Drive, Suite 100
Sarasota, FL 34238

Reviewed and Edited by:
SARASOTA COUNTY STORMWATER ENVIRONMENTAL UTILITY
AND
STORMWATER MANAGEMENT RESOURCES TECHNOLOGIES, INC.

May, 1999

1.0 EXECUTIVE SUMMARY

1.1 OVERVIEW

The Fox Creek watershed encompasses 3,327 acres and is located in the central portion of coastal Sarasota County. An aerial of the entire Fox Creek watershed is provided as EXHIBIT 1. The watershed is generally bordered by Laurel Road to the south, the Seminole-Gulf Railway to the southwest, and State Road 681 to the northwest. Interstate 75 traverses the watershed in a northwest to southeast direction. The northern, rural portion of the watershed is currently used for cattle grazing. Calusa Lakes subdivision and the greater part of Mission Valley Estates subdivision lie within the southern half of the watershed.

The Fox Creek watershed discharges into Shakett Creek, which ultimately empties into Donna Bay. It is bounded by the South Creek watershed to the north and northwest, the Cow Pen Slough watershed to the east, and a small Coastal Basin (CB4) to the southwest. Drainage from the basin is served by the Fox Creek and three east-west lateral ditches. Lower Fox Creek extends northward from Shakett Creek approximately 1,750 feet upstream of the I-75 Bridge. It meanders considerably through his area. With the exception of areas of Brazilian pepper along its banks and a few significant sediment deposits, lower Fox Creek appears to be in a relatively natural condition.

The headwaters of the watershed consist of man-made ditches, which connect segments of historic slough systems to Fox Creek. These systems extend north to the South Creek watershed where overflows are received from the South Creek Basin during major storm events. In addition, cross-basin overflows occur during the 100-year design event from Cow Pen Slough, and to coastal basin CB4.

1.2 BACKGROUND

Historical land uses in the present day Fox Creek watershed reportedly have included turpentining and cattle grazing. While the upper portion of the watershed has remained undeveloped, the lower watershed consists primarily of low-density residential development.

With both rural and urban development have come alterations to the storage and conveyance of surface waters in the watershed. Dredge and fill activities have primarily involved the linking of low-lying areas to Fox Creek. Previous drainage improvements were undertaken by either mosquito control districts or private development interests.

Recent flood producing rainfall events in 1992, 1993, 1995 and 1997 have spurred an interest by both Sarasota County and affected property owners to accurately determine, predict, and quantify the dynamics of stormwater flow throughout the watershed. Specifically, the Palmer Ranch was interested in establishing the limits of the 100-year floodplain in their rural lands contained in the upper watershed, the Calusa Lakes developer was interested in resolving some severe street flooding problems, and Sarasota County was interested in addressing any remaining level of service deficiencies particularly in the vicinity of Shire Street.

Initial studies conducted by Kimley-Horn and Associates, Inc. quantified existing flooding in the Fox Creek watershed. In particular, the limits of the 100-year floodplain in the rural portion of the basin and a detailed assessment of the degree of street flooding in Calusa Lakes was quantified. Additional studies were subsequently authorized by the developer of Calusa Lakes that were utilized to design, permit, and construct improvements to address the LOS deficiencies in Calusa Lakes. Both off-site (emergency overflow canal along I-75) and on-site (lake expansion, swale construction, storm pipe installation, etc.) improvements have been completed (or are approved to be completed) by the developer of Calusa Lakes which will address street LOS deficiencies in Calusa Lakes.

As the sole source of all authoritative studies of the Fox Creek basin, KHA was authorized by Sarasota County to update the previous analyses to include a detailed evaluation of the Shire Street Lateral and finally to compile all previous analyses into a comprehensive basin master plan report which identifies existing LOS deficiencies and evaluates alternative solutions. This work has subsequently been reviewed and updated by Stormwater Management Resource Technologies, Inc. and the Sarasota County Stormwater Utility.

1.3 ASSESSMENT

This study is a compilation of extensive research relative to flood protection and water quality in the Fox Creek watershed. Research included: (1) review of relevant development plans from the Sarasota County Transportation Department; (2) review of previous drainage studies; (3) review of basin master plan reports for neighboring basins of South Creek and Cow Pen Slough; (4) review of FDOT plans for I-75; (5) review of field survey data and field reconnaissances; (6) review of Southwest Florida Water Management District (SWFWMD) contour aerials for the study area; (7) review of citizens complaints; (8) interviews with residents in the Fox Creek drainage basin; (9) interviews with Sarasota County Stormwater maintenance personnel; and (10) communications with other agencies. A public meeting

was conducted on October 6, 1997 in order to gain additional insights from the local community. Written comments received during this public meeting are provided in APPENDIX A.

The meeting was well attended, particularly by residents of Mission Valley subdivision. Of particular concern to these residents is the flooding of the Shire Street area between Mackintosh Road and Lake Thompson. The flooding of Shire Street has been documented as being extensive and severe. Both structure flooding and street flooding has been observed in excess of the County's level of service standards. Some residents attribute the flooding to the placement of a "dam" downstream of Lake Thompson. This "dam" was effectuated when a local resident partially blocked one end of their driveway culvert. This restriction has since been removed but some residents understandably do not want a similar flow restriction to be re-instated. To that end, staff received several petitions from residents objecting to the placement of a "dam" if it would impede drainage, create breeding places for mosquitoes, cut off navigational access, or result in increased flood levels or reduced flood storage. These are legitimate concerns that must be addressed as part of the final design solution.

Secondly, several residents expressed concern over the build-up of excessive vegetation and sediment within the lower portion of Fox Creek. Sarasota County does not currently have an easement over Fox Creek. Although Sarasota County did obtain property owner permission to access and clear some of the undesirable vegetation in December of 1999, a permanent public drainage easement is needed to allow for routine and scheduled maintenance.

Finally, representatives with the Calusa Lakes Homeowners Association cited on-site and off-site stormwater improvements, which had recently been completed to address, flood protection level of service deficiencies associated with their private streets. Since Calusa Lakes had funded these improvements, it was questioned whether it was appropriate for them to now assist in the funding of improvements to address flooding in Mission Valley. The distinction between the street flooding in Callus Lakes and that associated with Shire Street is that public facilities (Mission Valley Boulevard and Mackintosh Boulevard) contribute to the level of service deficiencies in the Shire Street area. There are no known public facilities that drain through the private stormwater system within Calusa Lakes.

These public comments were reviewed and considered prior to the second public meeting held on December 2, 1998. At this meeting, staff presented the proposed projects and the preliminary assessment rates. As was the case at the first public meeting, there was considerable discussion on the design

options for the Shire Street project; as well as requests regarding future maintenance and access for Fox Creek itself. Staff believes that most concerns have been addressed.

1.3.1 Flood Analysis Study Area

In all, 174 minor subbasins were delineated for the analyses, including 94 subbasins within the Fox Creek watershed, 77 subbasins of which lie within the neighboring coastal basin CB4 to the southwest, and 3 subbasins of which lie within the Sorrento Woods subdivision to the south. For evaluation purposes, the 94 Fox Creek Subbasins were divided into four major subbasins corresponding to the four primary stormwater conveyance facilities located within the Fox Creek watershed. These facilities include the Fox Creek Main (consisting of both the lower/natural and the upper/man-made segments), the Shire Street Lateral, the South Lateral, and the North Lateral. A basin/subbasin map for the Fox Creek watershed is provided as EXHIBIT 2.

The hydraulic network was constructed using topographic aerials and data collected from an extensive field survey. In all, 223 nodes, 73 culverts, 108 channel segments, 89 weirs, and 34-drop structures formed the hydrodynamic stormwater routing network. A complete listing of input and output for the flood analyses is provided in APPENDIX B.

1.3.2 Water Quality Analysis Study Area

Land use designations and best management practices type and coverage were determined for each of the 94 subbasins in the Fox Creek study area. Approximately, 35% of the Fox Creek study area is presently developed with 52% of the developed area containing stormwater best management practices. Specifically, of the two major existing developments in the basin, Calusa Lakes is serviced by stormwater treatment facilities while Mission Valley does not a contain a quantifiable best management practices program. A listing of these land use and best management practices characteristics is provided within APPENDIX C. An existing land use map is provided as EXHIBIT 3.

1.4 RESULTS

1.4.1 Existing Flood Protection Level of Service (FPLOS) Deficiencies

The existing conditions flood analyses performed for the Fox Creek watershed and subsequent surveying revealed potentially two habitable structure FPLOS deficiencies located east of Sweetland Street and north of Shire Street. Field surveying of finished floor elevations revealed that while these two structures were located below the simulated flood level for the July 1995 storm, only one is situated

below the computed flood level for the 100-year design storm. Therefore, only one structural LOS deficiency was identified.

In addition, one neighborhood roadway FPLOS deficiency was identified at Shire Street near Lake Thompson. EXHIBIT 4 identifies historical flood prone areas based upon the Sarasota County Soils Survey. EXHIBIT 5 provides a delineation of the 100-year riverine (and tidal) floodplain.

1.4.2 Recommended Alternatives to Address Existing FPLOS Deficiencies

Based upon the flood analyses and project evaluations, it is recommended that in order to address existing FPLOS deficiency and property flooding within the Shire Street/Lake Thompson area, several culverts between Lake Thompson and Mackintosh Boulevard need to be upsized.

1.4.3 Existing Water Quality Level of Service (WQLOS) Deficiencies

The existing conditions water quality analysis indicates that the pollutant loading rates for the Fox Creek watershed fall generally within the median range, when compared with those computed for other Basin Master Plans in Sarasota County. Unit pollutant loadings in the Fox Creek Watershed are most comparable with those of the Forked Creek and Cow Pen Slough watersheds.

Therefore, it is recommended that the water quality in the Fox Creek watershed be maintained or improved through implementation of best management practices for new development and routine maintenance of existing stormwater best management practices.

1.5 CONCLUSIONS

A Stormwater Improvement Program (S.I.P.) was developed to address FPLOS deficiencies within the Fox Creek Basin. EXHIBIT 6 identifies the recommended S.I.P. for Fox Creek. The various components of this S.I.P. and preliminary estimates of probable cost are inventoried in TABLE 1.5.

FOX CREEK - STORMWATER IMPROVEMENT PROGRAM

PROJECT	[1]REAL PROPERTY ACQUISITION ($)	CONSTRUCTION COST ($)	TOTAL COST ($)
Replace and enlarge culverts @ Mackintosh Blvd	0	80,000	80,000
Replace and enlarge 5 driveway culverts between Mackintosh and Lake Thompson	0	5@$40,000	200,000

Total	0	280,000	280,000

TABLE 1.5

[1] Assumes local residents will dedicate public drainage easements to Sarasota County.

2.0 INTRODUCTION

2.1 PURPOSE

The purpose of the Fox Creek Basin Master Plan is to identify existing Level of Service Deficiencies with respect to flood protection and water quality for the purpose of developing a Stormwater Improvement Program; establishing the limits of the regulatory floodplain for future planning purposes; and identifying long range real property needs for the routine maintenance of the "public drainage system".

2.2 AUTHORIZATION

This Basin Master Plan for Fox Creek was authorized by the Sarasota Board of County Commissioners on April 24, 1997 pursuant to purchase order no. P706984. This Basin Master Plan is required pursuant to the Stormwater Component of the Sarasota County Comprehensive Plan.

2.3 COORDINATION WITH FEDERAL, STATE AND LOCAL AGENCIES

Copies of this report have also been provided to the Southwest Florida Water Management District (SWFWMD), as well as the Sarasota County Development Services, Environmental Services, and Growth Management Business Centers. Two additional copies have also been provided to the County Administrator's office.

3.0 BACKGROUND

3.1 HISTORIC FLOODING

EXHIBIT 4 identifies those areas that have historically been susceptible to flooding based upon soils defined as either depressional or frequently flooded by the Sarasota County Soils Survey. Once inundated for significant durations throughout the year (i.e. wet season), some of these areas have to varying degrees been dredged or filled. Regardless, these areas may remain relatively low and are still susceptible to flooding following heavy rainfall. In all, some 49 historic floodprone areas are contained within the Fox Creek Watershed. These areas are numbered and highlighted in light blue on EXHIBIT 4 and brief descriptions of each are provided below. A summary of these areas is also provided in TABLE 3.1.

1. Large isolated area, which underlies Shire Street, and residential areas adjacent to it. Lake Thompson has been excavated in the center portion of this area and lot fill has been placed throughout the area. This historical low-lying area has been hydraulically connected to Fox Creek by a man-made ditch.
2. Developed area in Mission Valley Estates west of Sweetland Street, between Pacer Street and Trotter Street.

3.-4. Small developed areas located in Mission Valley Estates between Shetland Circle and Suffolk Circle and west of Mission Valley Boulevard.

5. Small developed area located in Mission Valley Estates north of the intersection of Mackintosh Boulevard and Ewing Street.
6. Small developed area located in Mission Valley Estates south of Mustang Street, between Mackintosh Boulevard and Ewing Street.
7. Small developed area located in Mission Valley Estates west of Mackintosh Boulevard and south of Mission Valley Boulevard.
8. Small developed area northwest of Mission Valley Boulevard near the entrance to Mission Valley Golf and Country Club.

9.-11. Developed areas along the north side of Mission Valley Estates and the south side of Calusa Lakes. Lateral ditch to Fox Creek has been excavated through these areas.

12. Large contiguous area spanning in an east-west direction from the southeast portion of Mission Valley Golf and Country Club, across Tocabaga Lane to Calusa Lakes Boulevard and then south along, and including Calusa Lakes Boulevard. While a portion of this historical system has been preserved within

Calusa Lakes, the remaining portion has either been excavated to create stormwater lakes or filled to create roadways.

13. Area located in the approximate center of Mission Valley Golf and Country Club. The majority of this area has been dredged in favor of a stormwater lake and drainage ditches.

14. Portion a large forested area located northwest of Mission Valley Golf and Country Club. Historically this system extended to the west but it has been split by the Seminole Gulf Railroad, which forms the westerly boundary of the Fox Creek watershed. The very eastern portion of this system has been excavated in favor of a stormwater lake and drainage ditch.

15. Large contiguous area spanning from the northeast corner of Mission Valley Golf and Country Club, into Calusa Lakes across Tocobaga Lane, and continuing in a northwest direction across the Calusa Lakes golf course and Timacua Trail. The westerly portion of this area, located in Mission Valley Golf and Country Club has been converted into a stormwater lake and golf course. Significant portions of this area have been preserved within Calusa Lakes but the remainder has been converted into residential lots, roads, and stormwater lakes, as well as a part of the Calusa Lakes golf course.

16. Small isolated area in Calusa Lakes located southeast of White Feather Lane. The majority of this area appears to have been preserved by Calusa Lakes.

17. Significant isolated area in Calusa Lakes. The majority of this area has either been preserved or converted to stormwater lakes. Residential lot fill may have encroached on its northeast fringe.

18. Small isolated area in the eastern portion of Calusa Lakes. The majority of this area has been converted to either stormwater lake or golf course.

19. Isolated wetland located east of Calusa Lakes and north of Rustic Road.

20.-22. Isolated area located in the northeast portion of Calusa Lakes. While significant portions of these areas have been preserved, some excavation associated with stormwater lakes and fill associated with residential lots and roads have occurred along their fringes.

23.-29. Isolated wetland areas located north of Calusa Lakes and west of I-75 within the Palmer Ranch.

30.-32. Isolated areas located along the I-75 corridor which have been at least partially filled in association with the interstate. The remainder of these systems have not been impacted and are located either in the Palmer Ranch or I-75 median.

33.-35 Isolated wetland areas located north of Calusa Lakes and west of I-75 within the Palmer Ranch.

36.-44. Isolated wetland areas located east of I-75 and along the upper Fox Creek within the Palmer Ranch. Most of these areas appear to be connected to the upper Fox Creek system by man-made ditches or in the case of area 44, borrow pit lake.

45. Large contiguous area forms the upper Fox Creek corridor in its entirety. Encompassing over 400 acres, the only apparent alteration to this system is a drainage ditch, which has been excavated through its center, probably for mosquito control.

46.-49 Isolated wetland areas located between the two upper Fox Creek branches within the Palmer Ranch.

SUMMARY OF HISTORICAL FLOOD PRONE AREAS

Historical Flood Prone Area	Area (in acres)	Dredged (i.e. excavated)	Filled (i.e. developed)	Maintained (i.e. undeveloped)	Existing Flood Prone Area
1	36.79	X	X		X
2	5.45		X		
3	3.28		X		
4	2.20		X		
5	2.18		X		
6	3.20		X		
7	2.34		X		
8	1.08		X		
9	7.27	X	X		
10	3.27	X	X		
11	4.18	X	X		
12	42.53	X	X	X	X
13	8.72	X		X	X
14	9.56	X		X	X
15	31.30	X	X	X	X
16	2.38			X	X
17	10.64	X	X	X	X
18	1.41	X		X	X
19	4.73			X	X
20	9.27	X	X	X	X
21	10.02	X	X	X	X
22	1.89			X	X
23	0.96			X	X
24	5.68			X	X
25	2.23			X	X
26	16.03			X	X
27	7.10			X	X

TABLE 3.1

SUMMARY OF HISTORICAL FLOOD PRONE AREAS (CONTINUED)

Historical Flood Prone Area	Area (in acres)	Dredged (i.e. excavated)	Filled (i.e. developed)	Maintained (i.e. undeveloped)	Existing Flood Prone Area
28	2.31				X
29	12.96			X	X
30	3.32		X	X	X
31	6.44		X	X	X
32	31.37		X	X	X
33	13.10			X	X
34	5.50			X	X
35	3.16			X	X
36	1.35			X	X
37	8.50			X	X
38	3.54			X	X
39	9.05			X	X
40	6.08			X	X
41	3.74			X	
42	9.56	X		X	X
43	32.21			X	X
44	2.85	X		X	X
45	404.36	X		X	X
46	3.79			X	X
47	5.82			X	X
48	8.03			X	X
49	5.51			X	X

TABLE 3.1 (CONTINUED)

Flooding problems within the developed portions of the watershed (Mission Valley Estates and Calusa Lakes Subdivisions) are documented within the County's Initial Response Tracking (IRT) system, which records resident's complaints. Copies of the IRT reports for the Fox Creek Watershed are provided in APPENDIX A. Several areas throughout Mission Valley Estates are identified in the IRT reports as being susceptible to yard, street, and structure flooding. Yard flooding was reported at three locations west of Mission Valley Boulevard, two of which are within Coastal Basin No. 4. In addition, several reports of yard flooding came from residences east of Mission Valley Boulevard, between Shire Street and Dartmoor Circle. More significantly, two neighborhood roads (Percheron Circle and Shire Street) and two habitable structures (1051 and 1081 Shire Street) were reported to have been flooded in July of 1995.

In addition, residents of the Calusa Lakes subdivision reported severe, chronic street flooding within Calusa Lakes. However, privately initiated improvements including the recently completed Fox Creek - North Lateral Emergency Overflow Canal, and various internal improvements currently under construction in the Calusa Lakes subdivision are expected to reduce this flooding to acceptable levels.

3.2 PRIOR STUDIES

Although very little information is available relative to water quality within Fox Creek, the watershed has been the subject of several authoritative flood studies conducted in recent years, which provided the basis for the information used for the flood analyses contained herein. In November of 1994, Kimley-Horn and Associates, Inc. (KHA) completed a comprehensive drainage study of the Fox Creek study area, which utilized the adICPR Version 1.4 software. This drainage study was updated by KHA in December of 1995 to assess the Calusa Lakes emergency overflow canal and the culvert enlargements at Rustic Road, and again in August of 1996 to include a detailed analysis of the Shire Street Lateral. The Fox Creek Drainage Study was updated again in November of 1996 to include an analysis of the various internal drainage improvements within Calusa Lakes. Finally, the analysis was updated in December of 1998 by Stormwater Management Resource Technologies, Inc. to include an additional driveway culvert that had been installed in the Shire Street Lateral.

A list of the prior studies, which were obtained and reviewed for the Fox Creek Master Plan, is provided below:

1. 1959 - State of Florida, Department of Transportation Drainage Map

Although these early drainage maps did not encompass the entire Fox Creek Watershed, they do indicate that the westerly portion of what is now Mission Valley Estates historically drained to the west toward the Seminole-Gulf Railroad.

2. March 1987 - Sarasota County Stormwater Master Plan

(Included as part of Shakett Creek Basin)

Design Discharge = 0.16 cfs per acre, (25 year storm)

3. 1993 - National Pollution Discharge Elimination System (NPDES) Permit Application of Sarasota County

(Included as part of Shakett Creek Basin)

Shakett Creek Basin drainage area delineated as 3,555 acres (5.55 SM)

1990 Population - 4,270

Dwelling Units - 2,260

SHAKETT CREEK POLLUTANT LOADING (STORMWATER AND BASEFLOW)			
Parameter	Loading (lb/yr)	Annual Yield Rate (lb/acre/yr)	Annual EMC'S (mg/L)
BOD	191,800	30	8.8
COD	1,241,000	180	60
TSS	3,386,200	480	160
TDS	5,284,000	750	240
Total-P	7,600	1.1	0.3
Dissolved-P	3,900	0.6	0.2
TKN	29,700	4.2	1.4
NO2 & NO3	9,000	1.3	0.4
PB	610	0.1	0.03
CU	570	0.08	0.03
ZN	1,600	0.2	0.07
CD	30	0.004	0.001

4. 1994 - Fox Creek Drainage Study Prepared by Kimley-Horn and Associates, on behalf of Sarasota County, Palmer Ranch Enterprises, Inc., and Amden, Inc.
Drainage area delineated as 3200+/- acres.

5. 1995 - Fox Creek Drainage Study Updated by Kimley-Horn to include an analysis of the Fox Creek North Lateral Emergency Overflow Canal and the Rustic Road culvert enlargements.

6. 1996 - Fox Creek Drainage Study Updated by Kimley-Horn to include an analysis of the Calusa Lakes internal drainage improvements.

7. 1996 - Fox Creek Drainage Study Updated by Kimley-Horn to include an analysis of the build-out of Unit 7 of Calusa Lakes.

8. 1996 - Fox Creek Drainage Study Updated by Kimley-Horn to include a detailed analysis of the Shire Street Lateral.

9. 1997 - Fox Creek Comprehensive Basin Master Plan Draft Final Report prepared by Kimley Horn and Associates, Inc.

3.3 PREVIOUS IMPROVEMENTS

Four primary stormwater conveyance facilities are located within the Fox Creek watershed. These facilities include Fox Creek (consisting of both natural and man-made components), the Shire Street Lateral, the South Lateral, and the North Lateral. Lower Fox Creek extends north from Shakett Creek to approximately 1,750 feet upstream of the I-75 bridge, where it intersects with the north lateral ditch. This section of Fox Creek contains considerable meandering and appears to be in its natural condition. Upper Fox Creek consists of man-made ditches connecting segments of a historic slough system. This system extends to the basin ridgeline and into the South Creek watershed. At this location, Upper Fox Creek receives overflows from the South Creek Basin during major storm events.

The Shire Street Lateral extends westerly approximately 3,700 feet from its confluence with Fox Creek. This man-made ditch serves approximately 316 acres, all within the Mission Valley Subdivision. Several roadway and driveway culverts exist along the length of the lateral ditch. During major storm events, hydrologic connections exist at the upstream terminus of this lateral with the drainage ditch for the

Seminole-Gulf Railway. Therefore, the Shire Street Lateral also accommodates overflow runoff from the Seminole Gulf Railroad during major storm events.

The South Lateral is a man made ditch which extends westerly approximately 5,200 feet from its confluence with Fox Creek. This lateral serves approximately 381 acres, which includes the majority of Calusa Lakes subdivision, and portions of Mission Valley Estates and Mission Valley Golf and Country Club.

The North Lateral also extends westerly from Fox Creek, for a distance of approximately 8,300 feet, where it ties into the upstream end of the stormwater management system for the Mission Valley golf course. This man-made ditch serves approximately 537 acres, including portions of Calusa Lakes subdivision. In order to relieve flooding within Calusa Lakes, an emergency overflow canal was constructed in 1996 along the I-75 west right-of-way line by the developers of Calusa Lakes. This canal allows stormwater to by-pass segments of the North Lateral and Fox Creek during major storm events.

A chronology of previous improvements within the Fox Creek watershed located is provided below:

Date	
1960	Mission Valley Estates residential subdivision platted.
1960-1980	Upper Fox Creek Main improved. Upper Fox Creek excavated and extended to improve drainage and to connect isolated wetland sloughs at headwaters of Fox Creek watershed.
1978	I-75 constructed, with bridge over Fox Creek.
1987	Replacement of Shire Street side drain culverts between Lake Thompson and Mackintosh Boulevard with twin 48" culverts or equivalent.
1991-1997	Calusa Lakes subdivision constructed.
1996	Fox Creek North Lateral Emergency Overflow Canal constructed. Included improvements to Fox Creek North Lateral Ditch, and addition of culverts under Rustic Road. These improvements were authorized and permitted by Sarasota County and the SWFWMD, respectively.
1997	Calusa Lakes internal drainage improvements constructed including: • Excavation of new stormwater lakes and expansion of existing stormwater lakes, totaling 9.1 acres of new lake area. • Addition or replacement of 19 lake equalizer culverts. • Construction of 1,300 feet of swales.

4.0 INVESTIGATION METHODS

4.1 DATA SOURCES

4.1.1 Flood Protection

In addition to the prior studies previously inventoried other data sources were reviewed in the initial phases of the Fox Creek Basin Master Plan. These data sources include SWFWMD 1-foot contour aerials and construction plans for the I-75 Bridge over Fox Creek.

4.1.2 Water Quality

A detailed pollutant loading analysis for the Fox Creek watershed was conducted using the Watershed Management Model developed for the Sarasota County NPDES permit application. The land use maps developed in association with the NPDES permit application were reviewed along with 1994 aerials, plat maps, and zoning maps.

4.2 FLOOD ANALYSIS

In order to accurately assess the effects of basin modifications or improvements, it is first necessary to develop a watershed model, which can simulate the observed response from actual storm events with a reasonable degree of accuracy. Since no gage data and limited high water marks are available within the Fox Creek watershed, the model predictions were verified through interviews with residents following the flood events of 1992 and 1995 and model simulations of the July, 1995 storm event.

4.2.1 Methodology

Hydrologic Model The existing conditions model involved the delineation of 174 subbasins, including 94 subbasins within the Fox Creek Basin, as depicted on EXHIBIT 2 (BASIN/SUBBASIN MAP). The delineation was completed using one foot contour SWFWMD aerials, development plans, and field survey data. Consistent with the previous Fox Creek drainage studies, simulations were conducted using the SCS curve number and unit hydrograph method contained within the ICPR computer model.

Rainfall losses were determined by computing weighted curve numbers for the pervious and non-directly connected impervious areas. The portion of the basin area, which is directly connected impervious, was specified and is considered independently by the model. The retention storage, S, was computed by the following relationship:

$$S = \frac{1000}{CN} - 10 \qquad \text{Eq. 1}$$

Initial abstraction, I_a, was computed as 20% of the watershed retention storage, S:

$$I_a = 0.2S \qquad \text{Eq. 2}$$

Employing equations 1 and 2, rainfall volumes (P) were converted to runoff volumes (R) by the following standard SCS equation:

$$R = \frac{(P-0.2S)^2}{P + 0.8S} \qquad \text{Eq. 3}$$

The times of concentration were computed using the Kinematic Wave Formula, consistent with the guidelines prescribed by the SCS in Technical Release No. 55.

The design storms were based on the 24-hour, SCS type II, modified for Florida rainfall distribution, as published in the SWFWMD permit information manual. Model runs were completed for 4.25, 6.0, 7.0, 8.0, and 10.0 inches of rainfall corresponding to the 2, 5, 10, 25, and 100 year design storm events, respectively. For the design events, average antecedent moisture conditions were modeled (AMC 2).

Hydraulic Model The unsteady flow hydraulic routing model ICPR Version 2.1 was used for the hydraulic analyses. ICPR is based on the node/link (or node/reach) concept. Nodes were placed at all major inflow points to the main conveyance system, and as necessary to define the geometry of the main channels. In addition, storage nodes were placed at all major wetlands, stormwater lakes, and low-lying areas. Stage/area information for the storage nodes was obtained by digitizing contour areas at one-foot intervals on the SWFWMD aerials, or from subdivision design plans.

Cross-basin connections were modeled, as necessary, in order to quantify the cross-basin inflows and outflows, and their effects on flood stages within the Fox Creek Basin. These connections are identified on EXHIBIT 2 (BASIN/SUBBASIN MAP). The most significant connections exist at the north end of the basin (Nodes 09801B, 09802C, 09802E, and 09806) at the common ridge with the South Creek basin. Fox Creek receives significant overflows from South Creek for all design storm events. These overflows were quantified by merging the Fox Creek Model with the most recently available South Creek Basin Master Plan model prepared by Parsons Engineering Science, Inc. Model results for the 2, 5, 10, 25, and 100 year simulations were used to generate "boundary flow" or *.BDQ files for input into the Fox Creek model.

Significant cross-basin flow also occurs along the southwestern basin boundary (nodes 09552, 09580, 09590, 09591, and 09740), at the common ridge with coastal basin, CB4. These flows were quantified intrinsically in the model by incorporating the entire Coastal Basin 4 into the analysis. The nodes and reaches in the model associated with Coastal Basin 4 are identified by a "CB4" prefix.

Cow Pen Slough contributes some minor flow to Fox Creek as well. This flow, which occurs at nodes 09154 and 09817, was quantified by the National Resources Conservation Service (NRCS) as part of the Cow Pen Slough Basin Master Plan. The peak discharge rates from Cow Pen Slough to nodes 09154 and 09817 are approximately 10 and 3 cfs, respectively, for the 100-year event. The Cow Pen Slough overflow hydrographs are included in the 100 year boundary flow file (there are no overflows for lesser storm events).

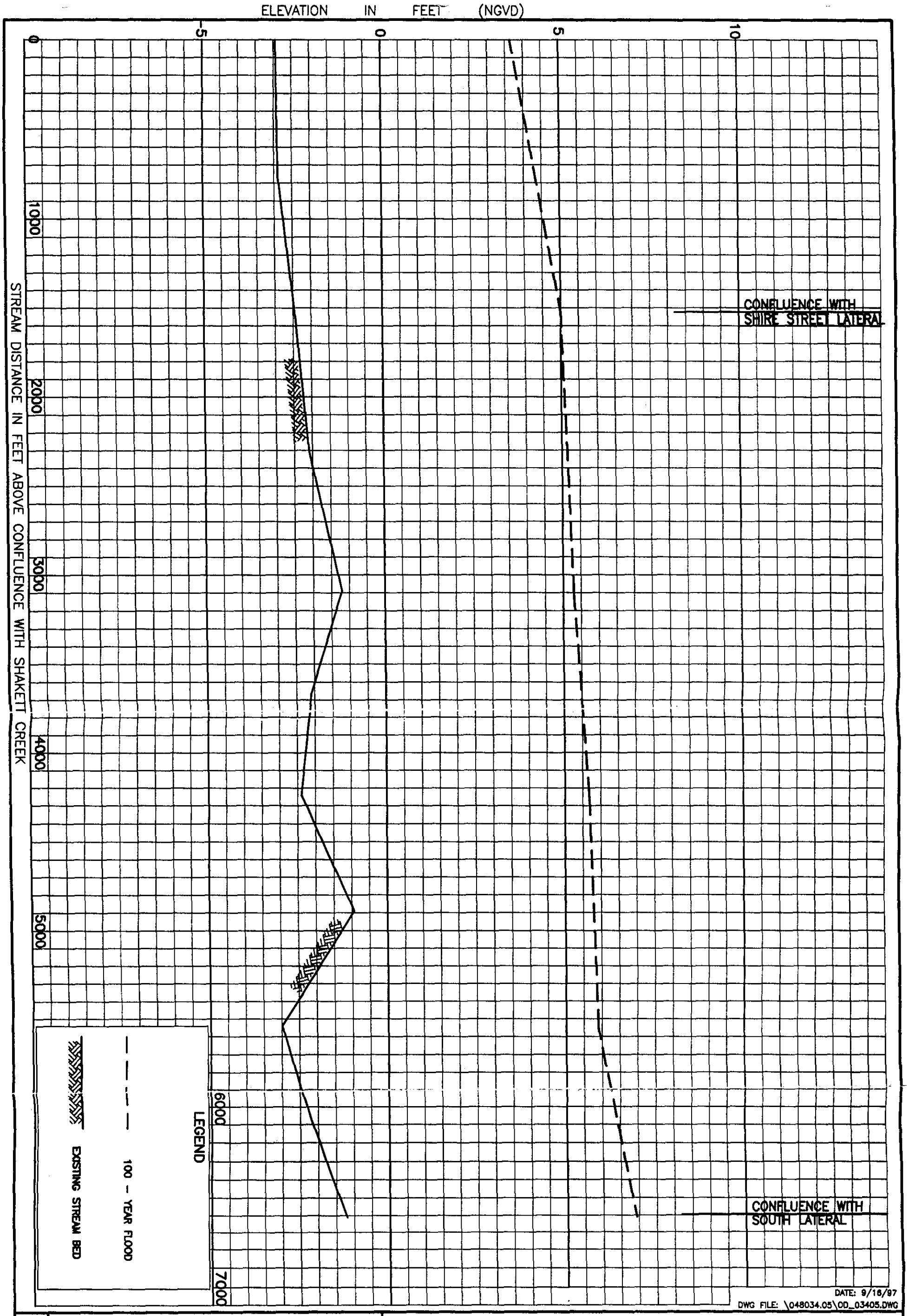
Field survey data, in conjunction with development plans, were used to define the significant hydraulic structures in the basin. Surveyed cross sections were entered for each channel reach. Invert elevations, lengths, widths, etc. were used to define culverts, weirs, and orifices in the model. In all, 223 nodes, 73 culverts, 108 channel reaches, 89 weirs, and 34-drop structures were modeled. In addition, the I-75 bridge over Fox Creek was modeled. The bridge analysis relied on surveyed cross sections to supplement the original bridge construction plans prepared by FDOT.

4.2.2 Results

The results of the flood study can be viewed graphically on EXHIBIT 5 - (100-YEAR FLOODPLAIN MAP) and on the water surface profiles provided for each of the four (4) primary conveyance facilities presented as FIGURES 4.2.2.a through 4.2.2.e.

For the 100-year design storm, the peak discharge rate in the creek at the confluence with Shakett Creek is approximately 943 cfs, or about 0.28 cfs per acre. Because the headwaters of the basin are undeveloped, and contain low relief and significant wetland storage, the discharge rate per acre within Fox Creek generally decreases in an upstream direction, to 0.15 cfs per acre at the confluence with the North Lateral.

The location with the highest peak discharge rate per acre is the Shire Street Lateral outfall, with a peak discharge of 0.86 cfs per acre. The Shire Street subbasin was essentially fully developed prior to the adoption of regulatory controls on stormwater discharges. The predicted peak discharge rates at various points in the basin are summarized for the 100-year event as follows:

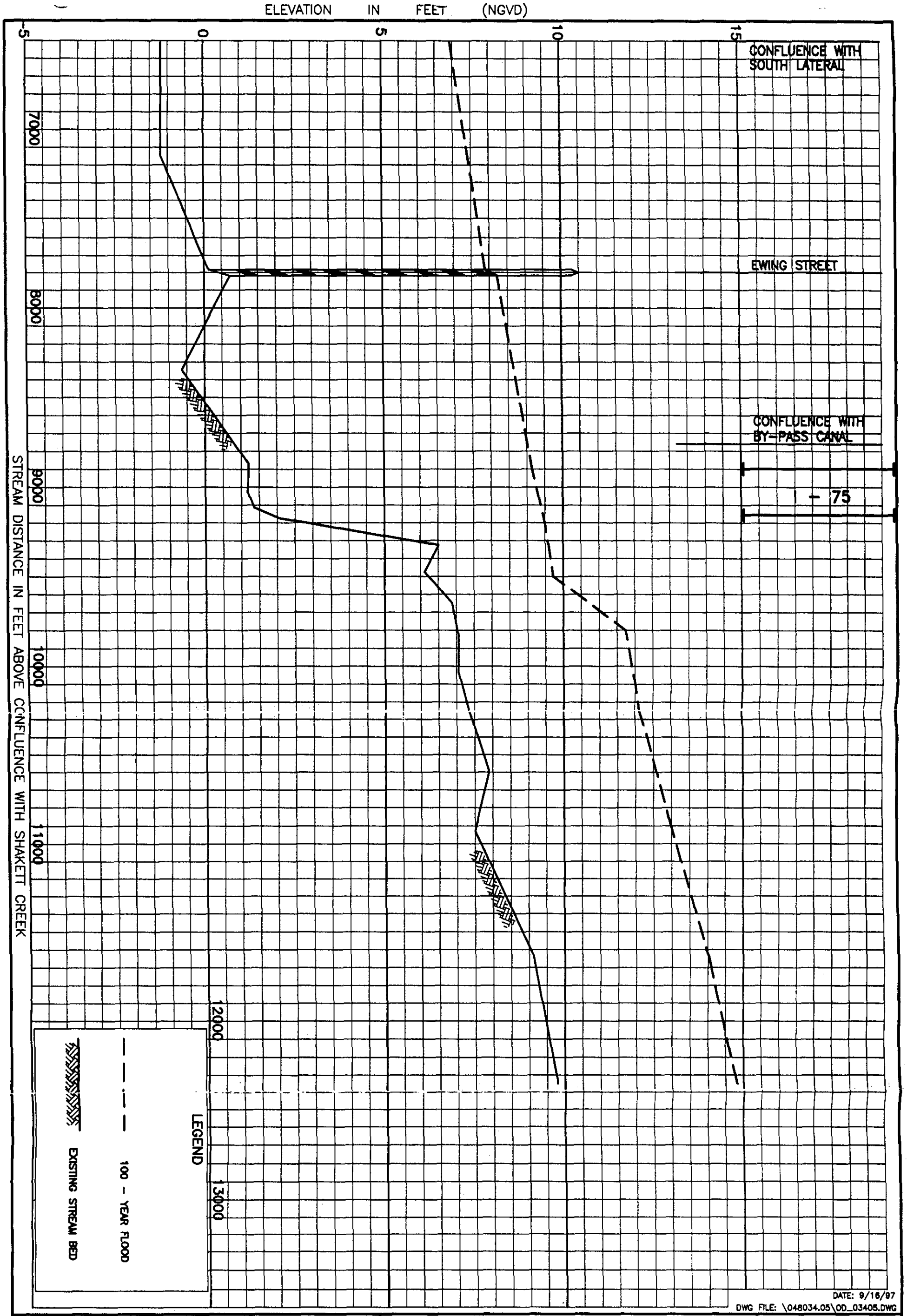


FOX CREEK BASIN MASTER PLAN
LOWER FOX CREEK
WATER SURFACE PROFILE

PREPARED FOR: SARASOTA BOARD OF COUNTY COMMISSIONERS

PREPARED BY: KIMLEY–HORN & ASSOCIATES, INC.

FIGURE 4.2.2.a



FOX CREEK BASIN MASTER PLAN

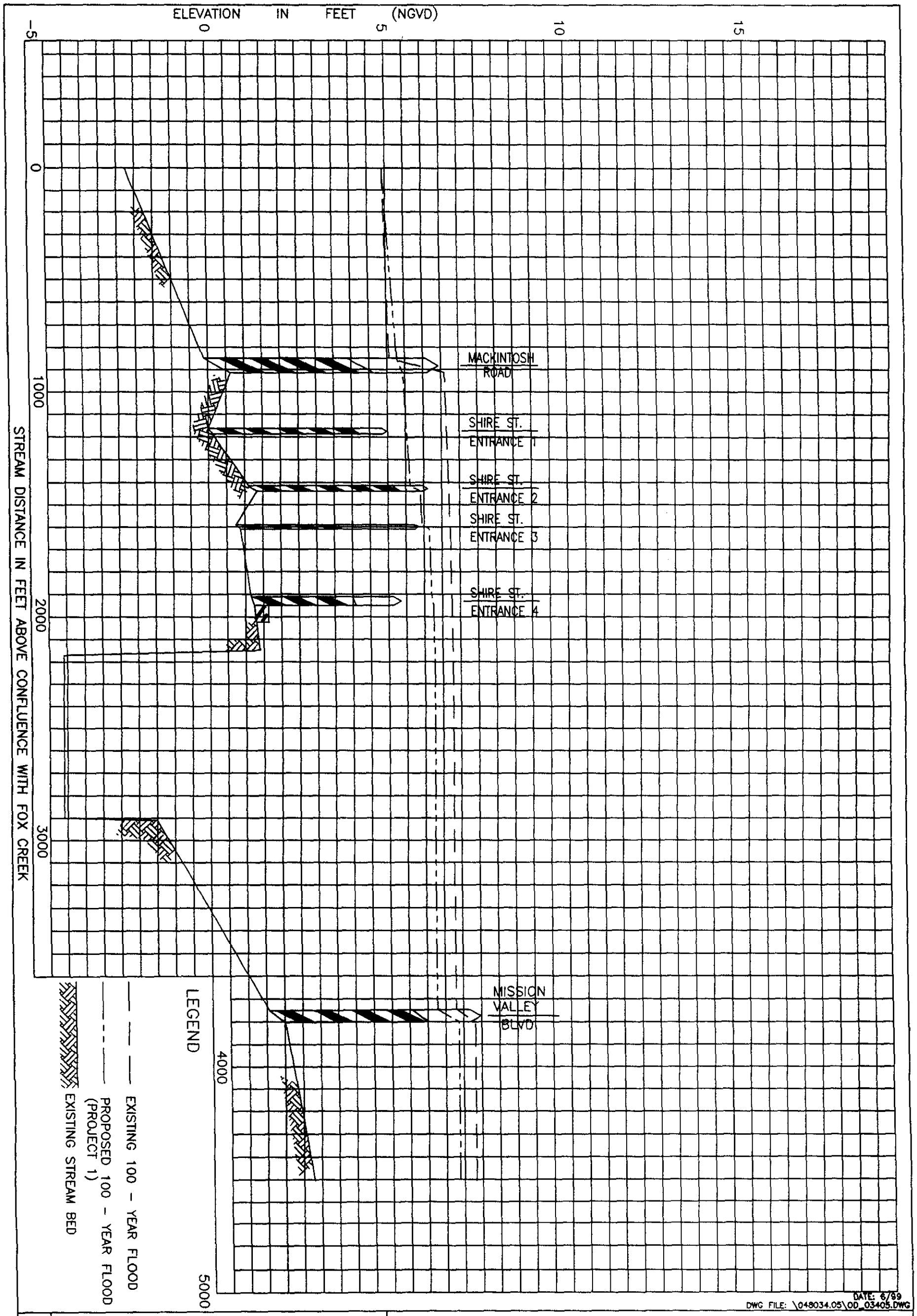
UPPER FOX CREEK

WATER SURFACE PROFILE

SARASOTA BOARD OF COUNTY COMMISSIONERS

PREPARED BY: KIMLEY-HORN & ASSOCIATES, INC.

FIGURE 4.2.2.b

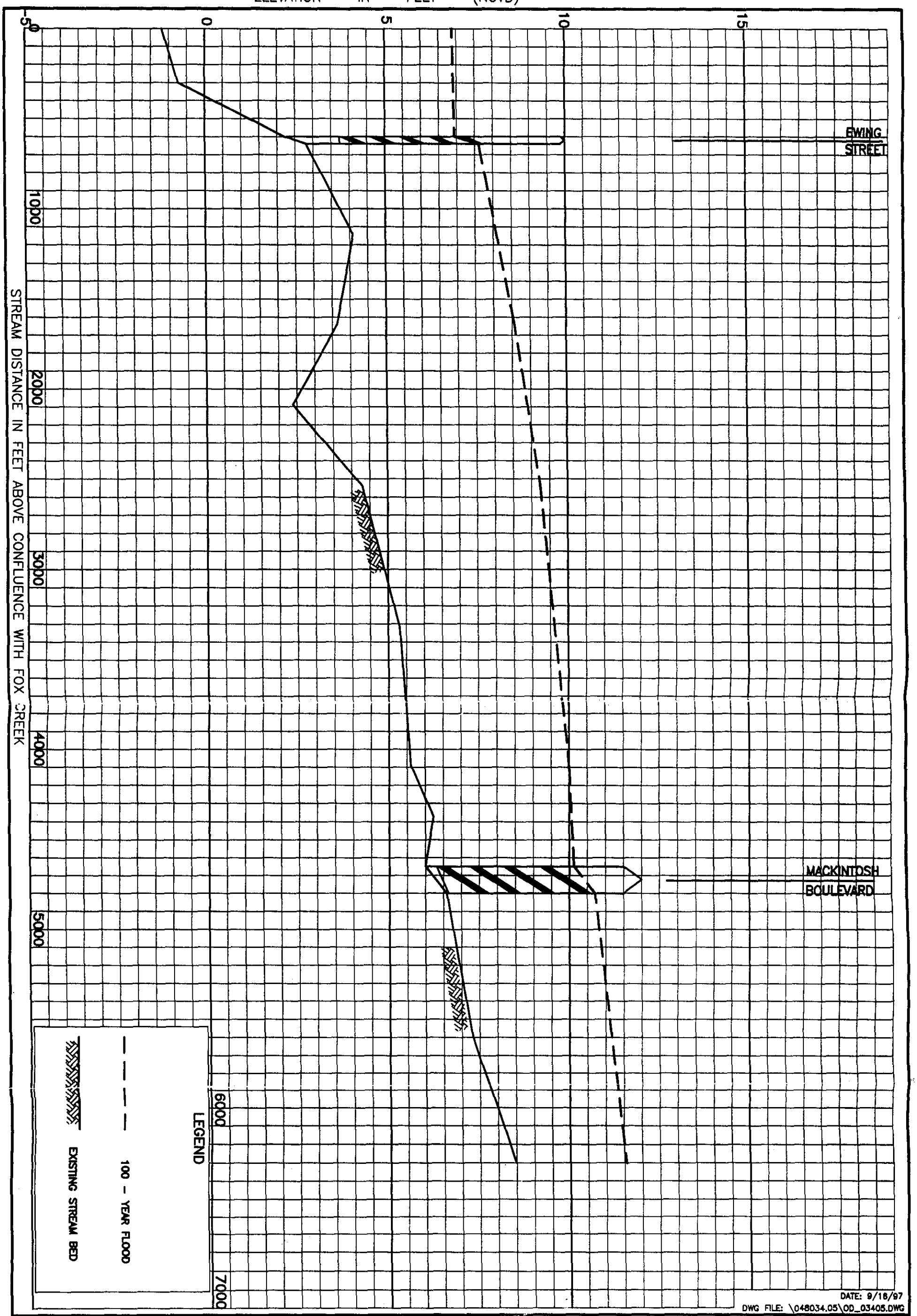


FOX CREEK BASIN MASTER PLAN
SHIRE STREET LATERAL
WATER SURFACE PROFILE

PREPARED FOR: SARASOTA BOARD OF COUNTY COMMISIONERS

PREPARED BY: KIMLEY-HORN & ASSOCIATES, INC.
STORMWATER MANAGEMENT RESOURCE TECHNOLOGIES, INC.

FIGURE 4.2.2.c

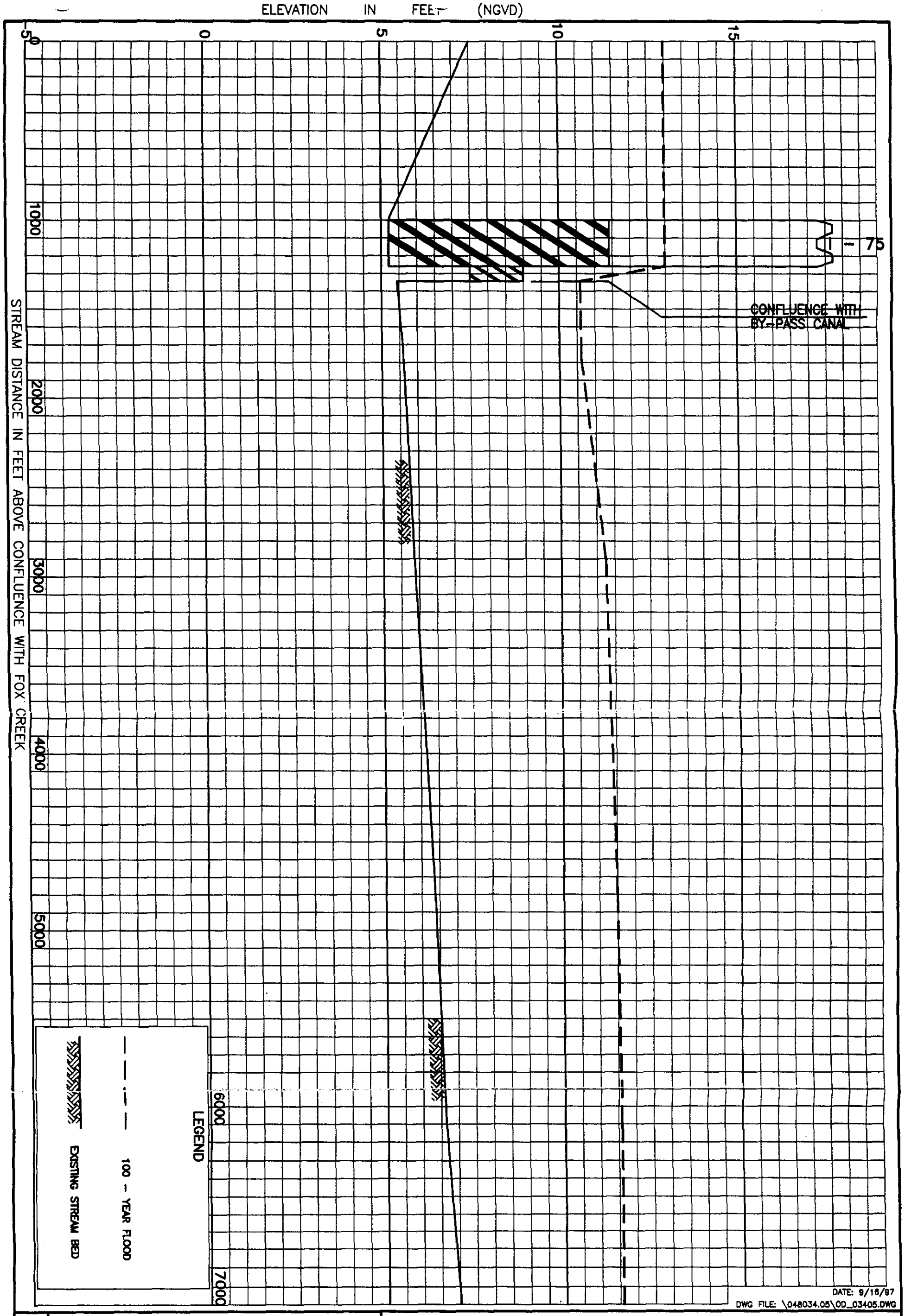


FOX CREEK BASIN MASTER PLAN
SOUTH LATERAL DITCH
WATER SURFACE PROFILE

SARASOTA BOARD OF COUNTY COMMISSIONERS

PREPARED BY: KIMLEY-HORN & ASSOCIATES, INC.

FIGURE 4.2.2.d



FOX CREEK BASIN MASTER PLAN NORTH LATERAL DITCH WATER SURFACE PROFILE	SARASOTA BOARD OF COUNTY COMMISSIONERS PREPARED BY: KIMLEY-HORN & ASSOCIATES, INC.

FIGURE 4.2.2.e

SUMMARY OF DISCHARGES

NODE	LOCATION	PEAK Q	Q/AREA
FOX CREEK MAIN			
09000	Confluence with Shakett Creek	943	0.28
09120	Confluence with Shire Street Lateral	924	0.28
09136	Confluence with South Lateral	685	0.23
09148	Confluence with By-Pass Canal	490	0.21
09151	I-75 Bridge	316	0.15
09158	Confluence with North Lateral	320	0.15
LATERAL DITCHES			
09510	Shire Street Lateral total discharge rate	272	0.86
09612	South Lateral total discharge rate	283	0.74
09720	North Lateral total discharge rate*	120	0.22

*includes diversion into by-pass canal

TABLE 4.2.2.a

Peak stages for all nodes in the basin are presented in TABLE 4.2.2.b. EXHIBIT 5 presents the existing 100-year riverine floodplain. For reference, the 100-year storm surge floodplain is also identified on EXHIBIT 5.

SUMMARY OF PEAK STAGES

Node ID	Node Location	Existing Peak Stage (NGVD)				
		2 Year	5 Year	10 Year	25 Year	100Year
09000	Shakett Creek Boundary Node	3.64	3.64	3.64	3.64	3.64
09001	Calusa Lakes Stormwater Lake # 1	10.79	11.12	11.25	11.36	11.60
09002	Calusa Lakes Stormwater Lake # 2	10.77	11.23	11.52	11.81	12.30
09003	Calusa Lakes Stormwater Lake # 3	10.73	11.13	11.39	11.66	12.11
09004	Calusa Lakes Stormwater Lake # 4	10.50	10.86	11.01	11.18	11.81
09005	Calusa Lakes Stormwater Lake # 5	10.45	10.94	11.24	11.55	12.20
09006	Calusa Lakes Stormwater Lake # 6	10.21	10.76	11.05	11.32	11.83
09008	Calusa Lakes Stormwater Lake # 8	10.95	11.80	12.17	12.44	12.98
09009	Calusa Lakes Stormwater Lake # 9	11.17	11.99	12.33	12.59	13.12
09010	Calusa Lakes Stormwater Lake # 10	10.73	11.11	11.35	11.61	12.14
09011	Calusa Lakes Stormwater Lake # 11	10.79	11.24	11.51	11.79	12.35
09012	Calusa Lakes Stormwater Lake # 12	10.79	11.24	11.51	11.80	12.35
09013	Calusa Lakes Stormwater Lake # 13	10.70	11.04	11.25	11.46	11.95
09013A	Calusa Lakes	10.69	11.01	11.21	11.42	11.90
09013B	Calusa Lakes	10.59	10.91	11.11	11.32	11.85
09013C	Calusa Lakes	10.59	10.90	11.09	11.28	11.73
09014	Calusa Lakes Stormwater Lake # 14	10.27	10.72	10.98	11.25	11.73
09016	Calusa Lakes Stormwater Lake # 16	10.06	10.31	10.51	10.73	11.26
09016B	Calusa Lakes	10.08	10.37	10.63	10.91	11.57

09017	Calusa Lakes Stormwater Lake # 17	11.07	11.33	11.56	11.76	12.18
09017A	Calusa Lakes	11.02	11.23	11.35	11.48	11.81
09018	Calusa Lakes Stormwater Lake # 18	11.06	11.33	11.56	11.77	12.21
09019	Calusa Lakes Stormwater Lake # 19	10.54	11.09	11.34	11.61	12.01
09019A	Calusa Lakes Stormwater Lake # 19A	10.54	11.10	11.35	11.61	12.01
09020	Calusa Lakes Stormwater Lake # 20	10.37	10.91	11.25	11.58	12.24
09020A	Calusa Lakes Stormwater Lake # 20A	10.37	10.92	11.26	11.59	12.26
09021	Calusa Lakes Stormwater Lake # 21	10.16	10.71	11.02	11.34	11.98
09022	Calusa Lakes Stormwater Lake # 22	10.10	10.52	10.73	10.96	11.40
09023	Calusa Lakes Stormwater Lake # 23	10.38	10.93	11.27	11.60	12.28
09023A	Calusa Lakes Stormwater Lake # 23A	10.38	10.93	11.27	11.60	12.27
09023B	Calusa Lakes Stormwater Lake # 23B	10.38	10.93	11.27	11.61	12.28
09024	Calusa Lakes Stormwater Lake # 24	10.28	10.73	10.95	11.20	11.62
09025	Calusa Lakes Stormwater Lake # 25	9.96	10.27	10.42	10.59	10.95
09026	Calusa Lakes Stormwater Lake # 26	12.18	12.28	12.37	12.61	13.13
09027	Calusa Lakes Stormwater Lake # 3A	10.58	10.85	10.99	11.10	11.65
09028	Calusa Lakes wetland near Lake 3	10.12	10.61	10.87	11.12	11.70
09029	Calusa Lakes wetland near Lake 5	12.81	12.87	12.90	12.93	12.98
09030	Calusa Lakes wetland near Lake 8	10.20	10.78	11.07	11.34	11.87
09031	Calusa Lakes wetland south of Lake 9	12.17	12.25	12.35	12.60	13.12
09032	Calusa Lakes wetland east of Lake 9	12.18	12.26	12.37	12.60	13.13
09033	Calusa Lakes wetland near Lake 12	12.34	12.42	12.45	12.49	12.56
09034	Calusa Lakes wetland near Lake 19	11.57	11.61	11.63	11.65	12.01
09035	Calusa Lakes	10.18	10.57	10.82	11.07	11.58
09036	Calusa Lakes Stormwater Lake # 16A	10.06	10.33	10.52	10.74	11.28
09037	Calusa Lakes wetland near Lake 14	10.14	10.60	10.85	11.08	11.56
09120	Fox Creek confluence with Shire St. Lateral	3.82	4.09	4.28	4.48	4.90
09130	Fox Creek	3.92	4.28	4.55	4.78	5.28
09132	Fox Creek	4.03	4.51	4.84	5.12	5.68
09134	Fox Creek	4.08	4.61	4.96	5.27	5.90
09136	Fox Creek confluence with South Lateral	4.43	5.19	5.62	6.02	6.86
09140	Fox Creek d/s of Ewing Street	4.73	5.73	6.25	6.86	7.86
09146	Fox Creek u/s of Ewing Street	4.80	5.85	6.40	7.08	8.19
09148	Fox Creek confluence with by-pass canal	5.22	6.50	7.18	7.92	9.14
09151	Fox Creek u/s of Interstate 75	5.77	7.01	7.66	8.18	9.49
09152	Fox Creek	7.55	8.17	8.64	9.08	9.72
09154	Fox Creek	9.36	10.44	10.85	11.18	11.74
09156	Fox Creek	9.66	10.84	11.28	11.61	12.12
09158	Fox Creek confluence with North Lateral	10.45	11.22	11.96	12.34	12.98
09510	Shire St. Lateral d/s of Mackintosh	3.85	4.15	4.37	4.59	5.05
09512	Shire St. Lateral u/s of Mackintosh	3.99	4.54	5.59	6.27	6.59
09514	Shire St. Lateral entrance # 1 (d/s)	4.04	4.62	5.64	6.32	6.66
09515	Shire St. Lateral entrance # 1 (u/s)	4.15	5.18	5.96	6.40	6.75
09520	Shire St. Lateral entrance # 2 (d/s)	4.18	5.21	5.98	6.42	6.78
09522	Shire St. Lateral entrance # 2 (d/s)	4.29	5.36	6.10	6.43	6.78
09530	Shire St. Lateral entrance # 3 (d/s)	4.32	5.39	6.11	6.43	6.79
09532	Shire St. Lateral entrance # 3 (u/s)	4.51	5.87	6.28	6.46	6.80
09540	Shire St. Lateral entrance # 4&5 (d/s)	4.57	5.92	6.30	6.47	6.81
09542	Shire St. Lateral entrance # 4&5 (u/s)	5.00	5.99	6.33	6.49	6.83
09550	Lake Thompson (a.k.a. Shire Lake)	5.04	6.00	6.34	6.50	6.84

09552	Shire St. Lateral u/s of Mission Valley Blvd.	5.04	6.08	6.50	6.75	7.34
09560	NW corner Mackintosh and Shire Street	4.23	5.26	6.13	6.27	6.59
09562	NE corner Shire Street and Sweetland Street	4.20	5.32	6.11	6.43	6.78
09564	NW corner Shire Street and Sweetland Street	4.54	5.94	6.31	6.47	6.81
09570	North of Shire St., East of Mission Valley	5.51	6.00	6.34	6.50	6.84
09580	North of Shire St., West of Mission Valley	6.96	7.60	7.66	7.70	7.75
09582	South of Suffolk Circle	8.25	8.45	8.53	8.64	8.81
09584	North of Suffolk Circle	9.29	10.02	10.25	10.28	10.31
09590	South of Palomino Circle	5.57	6.37	7.03	7.09	7.34
09591	Interconnect with Coastal Basin No. 4	5.81	6.37	7.03	7.09	7.35
09612	South Lateral d/s of Ewing Street	5.16	5.90	6.10	6.10	6.91
09618	South Lateral u/s of Ewing Street	5.92	6.54	6.81	7.05	7.59
09624	South Lateral	6.76	7.49	7.79	8.06	8.51
09626	South Lateral	7.58	8.23	8.53	8.80	9.22
09628	South Lateral	8.28	9.01	9.32	9.59	10.02
09630	South Lateral d/s of Mackintosh Blvd.	8.53	9.29	9.60	9.86	10.27
09632	South Lateral u/s of Mackintosh Blvd.	8.95	9.61	9.93	10.21	10.70
09640	Mission Valley Golf Course	10.12	10.60	10.85	11.08	11.56
09710	North Lateral u/s of Interstate 75	10.45	11.22	11.95	12.34	12.98
09718	Emergency High Flow Canal (d/s)	9.89	10.07	10.15	10.25	10.44
09720	North Lateral Confluence w/ high flow canal	9.91	10.11	10.20	10.33	10.55
09722	North Lateral	9.92	10.15	10.26	10.40	10.67
09732	North Lateral	10.04	10.39	10.57	10.78	11.24
09734	North Lateral	10.08	10.50	10.71	10.96	11.50
09736	North Lateral	10.10	10.54	10.77	11.06	11.63
09738	North Lateral	10.11	10.57	10.80	11.06	11.63
09740	Mission Valley Golf Course	10.13	10.61	10.86	11.09	11.59
09801	Upper Fox Creek Watershed	16.66	16.69	16.70	16.72	16.74
09801B	Upper Fox Creek Watershed	16.84	17.03	17.12	17.20	17.49
09802	Upper Fox Creek, u/s of trail road	15.53	15.80	15.99	16.21	16.54
09802B	Upper Fox Creek, d/s of trail road	15.43	15.64	15.78	15.95	16.30
09802C	Upper Fox Creek, d/s of trail road	15.58	15.90	16.13	16.38	16.75
09802D	Upper Fox Creek, u/s of trail road	15.72	16.23	16.62	16.83	17.15
09802E	Fox Creek near confluence with South Creek	15.73	16.25	16.64	16.87	17.20
09803	Upper Fox Creek Watershed	17.25	17.30	17.31	17.32	17.35
09804	Upper Fox Creek Watershed	17.22	17.27	17.29	17.32	17.35
09805	Upper Fox Creek, u/s of trail road	15.41	15.60	15.72	15.89	16.22
09805B	Upper Fox Creek, d/s of trail road	15.18	15.53	15.69	15.86	16.20
09806	Fox Creek near confluence with South Creek	16.32	16.36	16.38	16.40	16.45
09807	Upper Fox Creek Watershed	16.16	16.24	16.29	16.33	16.41
09808	Upper Fox Creek Watershed	16.03	16.10	16.12	16.15	16.19
09809	Upper Fox Creek, u/s of trail road	15.14	15.48	15.62	15.77	16.05
09809B	Upper Fox Creek, d/s of trail road	14.92	15.35	15.49	15.62	15.87
09810	Upper Fox Creek Watershed	15.81	16.13	16.30	16.43	16.54
09811	Upper Fox Creek Watershed	15.81	16.13	16.30	16.43	16.55
09812	Upper Fox Creek Watershed	16.53	16.81	16.82	16.83	16.85
09813	Upper Fox Creek Watershed	15.81	16.13	16.30	16.43	16.55
09814	Upper Fox Creek Watershed	15.36	15.38	15.40	15.41	15.43
09815	Upper Fox Creek Watershed	16.18	16.21	16.22	16.23	16.26
09816	Upper Fox Creek, u/s of trail road	14.89	15.30	15.41	15.52	15.70

09817	Upper Fox Creek, d/s of trail road	13.66	14.07	14.29	14.51	14.97
09817B	Upper Fox Creek Watershed	13.61	14.02	14.24	14.47	14.94
09818	Upper Fox Creek Watershed	13.56	13.96	14.19	14.43	14.91
09818A	Upper Fox Creek Watershed	12.27	13.61	14.07	14.33	14.82
09818B	Upper Fox Creek Watershed	12.14	13.07	13.50	13.79	14.28
09818C	Upper Fox Creek, u/s of trail road	13.13	13.36	13.47	13.64	13.99
09818CX	Upper Fox Creek, d/s of trail road	13.45	13.87	14.10	14.35	14.84
09818D	Upper Fox Creek Watershed	12.01	12.65	12.84	13.03	13.58
09819	Upper Fox Creek Watershed	14.26	14.37	14.42	14.47	14.94
09820	Upper Fox Creek Watershed d/s of I-75	15.00	15.03	15.05	15.06	15.08
09821	Upper Fox Creek Watershed u/s of I-75	15.00	15.03	15.05	15.06	15.08
09822	Upper Fox Creek Watershed	14.81	14.84	14.85	14.86	14.88
09823A	Upper Fox Creek Watershed	12.72	13.83	14.06	14.31	14.82
09823B	Upper Fox Creek Watershed	11.94	13.09	13.32	13.54	14.04
09825	North Lateral Watershed	14.38	14.56	14.60	14.64	14.69
09828	North Lateral Watershed	14.66	14.70	14.71	14.73	14.75
09829	North Lateral Watershed	13.96	13.99	14.00	14.01	14.02
09830	North Lateral Watershed	13.75	13.86	13.90	13.93	13.98
09831	North Lateral Watershed	12.21	12.46	12.56	12.64	12.79

Table 4.2.2.b

4.3 POLLUTANT LOADING ANALYSIS

4.3.1 Methodology

To be consistent with the Sarasota County NPDES permit, the Watershed Management Model Version 3.30 (WMM) developed by Camp, Dresser, and McKee (CDM) was used for the pollutant loading analysis. This program was provided by Sarasota County and is a spreadsheet model which estimates seasonal and annual nonpoint source loads using direct runoff based upon event mean concentrations (EMC's) and runoff volumes (CDM, 1992). The model required the identification and input of land uses and best management practices coverages for each subbasin to be analyzed. This input information is inventoried in APPENDIX C.

The relevant features of the WMM spreadsheet model are:

- Utilization of the Lotus 1-2-3® spreadsheet program.
- Estimates of annual runoff pollutant load for nutrients, heavy metals, oxygen demand, and solids based upon EMC's land use, % impervious surface, and annual rainfall.
- Estimates of stormwater treatment or load reduction through partial or full-scale implementation of on-site or regional Best Management Practices (BMP's).

A total of fifteen (15) land use categories can be used in the model (i.e., 12 listed and 3 optional). The twelve listed categories are:

- Forest/Open
- Cropland
- Medium Density Single Family (MDSF) Residential
- Commercial/Central Business District (CBD)
- Heavy Industrial
- Wetlands
- Agricultural/Pasture
- Low Density Single Family (LDSF) Residential
- High Density Single/Multi-Family (HDSF/MF) Residential
- Office/Light Industrial
- Water
- Roads

While the WMM projects the average annual pollutant load in a watershed, it is limited in its ability to estimate these loads. It is not appropriate to use the model for analysis of short-term water quality impacts (CDM, 1992). In addition, pollutant loads resulting from incremental development of a watershed will not be appropriately determined by the model (CDM, 1992).

4.3.2 Results

The study area covers approximately 3327 acres, divided into 94 subbasins. The most predominant land use in the Fox Creek study area is pastureland, which comprises approximately 62% of the total acreage. Approximately 28% of the watershed is developed as low density residential. The remaining 10% is divided among major roads (i.e. the I-75 corridor), forest/open land, cropland, and water.

Based on the existing land uses, pollutant loads were estimated using the WMM model for the following surface water constituents:

- Biochemical Oxygen Demand
- Total Suspended Solids
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Total Lead
- Total Zinc
- Chemical Oxygen Demand
- Total Dissolved Solids
- Dissolved Phosphorus
- Nitrate + Nitrite
- Total Copper
- Total Cadmium

The event mean concentrations (EMC's) were modified from the model default values to be consistent with those used in the Cow Pen Slough Basin Master Plan, which were based on the monitoring results of the Sarasota County NPDES MS4 Part 2 Permit (ref.4). APPENDIX C contains a table of the EMC's used herein.

Gross pollutant loads were estimated for each subbasin. As a result of existing mitigative features (i.e. Best Management Practices) in the developed portion of the Fox Creek study area, gross pollutant loadings are reduced prior to their introduction into the surface waters as indicated in TABLE 4.3.2.c. Approximately 18% of the Fox Creek study is treated through Best Management Practices (BMP's). The only BMP identified in the Fox Creek study area is wet detention.

PARAMETER	Gross Unit Loading Rate (lbs/year-acre)	Net Unit Loading Rate (lbs/year-acre)	Percent Reduction due to B.M.P.'s
BOD	29.0	27.1	-6.5%
COD	208	184	-11.5%
TSS	585	515	-12.0%
TDS	332	332	0%
Total-P	0.83	0.71	-14%
Dissolved-P	0.35	0.27	-23%
TKN	3.55	3.28	-7.6%
NO2 & NO3	0.93	0.76	-18.3%
Lead	0.10	0.08	-20%
Copper	0.07	0.06	-14%
Zinc	0.11	0.10	-9.1%
Cadmium	0.003	0.002	-33%

TABLE 4.3.2.a

TABLE 4.3.2.a shows the removal of pollutants through the use of BMP's. As a result of the existing BMP's, the gross pollutant loads for the 12 parameters modeled in the Fox Creek study area are reduced between 0 to 33%. Removal of the TDS load was the lowest for the study area at 0%. Conversely, the gross loading of Cadmium for the Fox Creek study area was reduced by 33%.

An additional observation relative to the BMP efficiencies for wet detention needs to be mentioned. An apparent discrepancy exists between the default values in the users manual and those contained in Version

An additional observation relative to the BMP efficiencies for wet detention needs to be mentioned. An apparent discrepancy exists between the default values in the users manual and those contained in Version 3.10 of the computer model, which was used for the Sarasota County NPDES MS4 Part 2 Permit, as well as several of the previously completed basin master plans within Sarasota County. Upon review of both sets of values by Dr. Nenad Iricanin of CCI Environmental Services, Inc. for previous Basin Master Plans, the default values in the previous version of the computer model were in his professional opinion the more accurate.

The unit pollutant loading estimates determined for the Fox Creek study area were compared with those previously determined for the Shakett Creek watershed as part of Sarasota County's NPDES permit application. The results of the two analyses are presented in TABLE 4.3.2.b. In general, gross pollutant loads estimated for Shakett Creek as part of the NPDES permit application were higher than determined in this study by approximately 30%. This difference is due primarily to differences in the EMC's used in the two analyses. This study utilized EMC's based on the monitoring results from the Sarasota County NPDES application, which are more accurate than those used in the original NPDES permit analysis since they are based on more recent and site-specific data.

It is important to note that the Fox Creek Basin Master Plan study used a "micro" approach to more accurately define the Fox Creek watershed boundary, land uses, and best management practices. In contrast, a broader approach was used to delineate the Shakett Creek watershed and to ascertain it's land uses and existing best management practices for the NPDES permit application.

PARAMETER	NPDES Permit Unit Loading Rate (lbs/year-acre)	Fox Creek Net Unit Loading Rate (lbs/year-acre)	% Difference
BOD	30	27.1	-9.7%
COD	180	184	+2.2%
TSS	480	515	+7.3%
TDS	750	332	-56%
Total-P	1.1	0.71	-35%
Dissolved-P	0.6	0.27	-55%
TKN	4.2	3.28	-22%
NO2 & NO3	1.3	0.76	-42%
Lead	0.1	0.08	-20%
Copper	0.08	0.06	-25%
Zinc	0.2	0.10	-50%
Cadmium	0.004	0.002	-50%

Table 4.3.2.b

5.0 LEVEL OF SERVICE

This section presents water quantity and water quality level of service objectives and deficiencies for the Fox Creek Watershed.

5.1 LEVEL OF SERVICE OBJECTIVES

5.1.1 Flood Protection Level of Service Objectives

The flood protection level of service (FPLOS) objectives proposed for the portion of the Fox Creek drainage basin located in Sarasota County are based upon those adopted by Sarasota County Comprehensive Plan Amendment RU-24.

TABLE 5.1.1 presents the FPLOS standards for the portion of the Fox Creek watershed located in unincorporated Sarasota County. Flood protection and floodplain management within the Fox Creek watershed are also subject to applicable Federal and State regulations as briefly discussed below:

5.1.1.1 Federal Emergency Management Agency (FEMA)

In September of 1992, the Sarasota Board of County Commissioners adopted regulatory requirements for unincorporated Sarasota County pursuant to Ordinance No. 92-055 relative to floodplain management and minimum finished floor elevations. This Ordinance, as adopted, qualifies unincorporated Sarasota County for the Federal Flood Insurance Program. However, regulatory floodplain maps for the Fox Creek Main, adopted by reference, currently only identify 100-year flood prone areas from a tidal surge, since no riverine floodplain, until now, had been determined. As such, the FEMA maps indicate a base flood elevation of 11.0 within the Fox Creek Basin.

5.1.1.2 State of Florida

With respect to flood protection design criteria, the Florida Department of Transportation currently requires control of the 100-year storm pursuant to Chapter 14-86, F.A.C. The Southwest Florida Water Management District currently utilizes the 25-year design storm for flood protection and control but requires compensation for encroachments into, and displacements of, the 100-year floodplain pursuant to Chapter 40D-4, F.A.C.

PROPOSED
FLOOD PROTECTION LEVEL OF SERVICE CRITERIA

FLOODING REFERENCE (BUILDINGS, ROADS AND SITES)		LEVEL OF SERVICE (FLOOD INTERVALS ARE IN YEARS)
I.	BUILDINGS: Pre-FIRM or Post-FIRM structures are at or above the flood water elevation.	
	A. Emergency shelters and essential services	>100
	B. Habitable	100
	C. Employment/Service Centers	100
II.	ROAD ACCESS: roads shall be passable during flooding. Roadway flooding ≤ 6" depth at the outside edge of pavement is considered passable.	
	A. Evacuation	>100
	B. Arterials	100
	C. Collectors	25
	D. Neighborhood	10
III.	The water quantity level of service can be adjusted to allow for greater amounts of flooding of roads and sites if the flooding does not adversely impact public health and safety, natural resources or property. The level of service for improvements to existing roadways may be adjusted based on existing conditions such as adjacent topography and economic impacts.	

ACCEPTABLE FLOODING CRITERIA

ROADWAYS	10-YEAR	25-YEAR	100-YEAR
A. Evacuation	NONE	NONE	NONE
B. Arterial	NONE	NONE	6 inches
C. Collectors	NONE	6 inches	9 inches
D. Neighborhood	6 inches	9 inches	12 inches

TABLE 5.1.1

5.1.2 Water Quality Level of Service Objectives

Currently, water quality is presumed to satisfy level of service standards if the runoff from the first inch of rainfall is treated through stormwater retention or detention facilities designed and constructed in accordance with accepted criteria. This level of service criteria is only applicable to new development. In the case of the Fox Creek basin, an estimated 18% of the watershed has previously been developed without implementation of any stormwater treatment methods. However, this area consists primarily of low-density residential development.

For guidance in establishing more appropriate and site specific water quality level of service objectives for the Fox Creek watershed, two programs/policies were investigated. These include the Sarasota County National Pollution Discharge Elimination System (NPDES) permit program and Florida State Water Policy. A brief description of both of these water quality programs is provided below:

5.1.2.1 Sarasota County's National Pollution Discharge Elimination System (NPDES)

In 1987 the "Federal Water Pollution Control Act", U.S. Public Law 92-500, was amended to stipulate that the existing NPDES permit program also applies to stormwater runoff. In 1990 the Federal Environmental Protection Agency issued regulations for implementation of the amendment. These regulations generally required that the impact of urban development on water quality be reduced to the "maximum extent practicable". Specifically, these regulations require the preparation of an extensive baseline inventory of water quality at certain stormwater discharge points including ditches, paved channels, and man-made canals that discharge into the Waters of the United States, as well as development of a water quality management plan that will meet federal requirements.

Sarasota County was required to obtain a NPDES Permit for the discharge of stormwater into Waters of the United States. In December 1993, unincorporated Sarasota County in cooperation with the incorporated municipalities (i.e. City of Sarasota, City of Venice, City of North Port, City of Longboat Key) and the Florida Department of Transportation submitted a comprehensive stormwater quality management program (permit application) to the U.S. Environmental Protection Agency.

Sarasota County received a NPDES permit from the Federal Environmental Protection Agency in December of 1994. This permit stipulates measures to be implemented to provide reasonable assurance that impacts of existing and future urban development on water quality will be reduced to the "maximum extent practicable".

5.1.2.2 Florida State Water Policy

Florida State Water Policy is contained within Chapter 17-40, Florida Administrative Code. The Southwest Florida Water Management District must develop waterbody specific pollutant reduction goals for non-SWIM bodies on a priority basis according to a schedule provided in the District's Water Management Plan. Priority consideration is to be given to waterbodies that are required to obtain a NPDES municipal stormwater discharge permit. Sarasota County was required to obtain a NPDES permit. The Fox Creek watershed is included within the Sarasota County NPDES permit. The receiving waterbody for the Fox Creek watershed is Shakett Creek, a non-SWIM waterbody.

Pursuant to Section 403.0891, F.S. State Water Policy, the Florida Department of Environmental Protection, the Southwest Florida Water Management District, and Sarasota County are required to cooperatively implement on a watershed basis, a comprehensive stormwater management program designed to minimize the adverse effects of stormwater on land and water resources. Further, programs are to be implemented in a manner that will provide and restore the quality of waters that do not meet state water quality standards and maintain the quality of those waters which meet or exceed state water quality standards. To accomplish these objectives for the Fox Creek watershed, pollutant load reduction goals (estimated numeric reductions in pollutant loadings as needed to preserve or restore designated uses of receiving waters and maintain water quality consistent with applicable state standards) are to be established by the Southwest Florida Water Management District.

In 1993, water quality level of service (WQLOS) criteria were developed during workshops for possible application throughout the State of Florida by the Florida Department of Environmental Protection and the five (5) Water Management Districts. This WQLOS criteria is based upon a system which considers the effectiveness and extent of the BMP's within a watershed. Specifically, the adequacy of water quality treatment for each land parcel is denoted by a multiplier. The multiplier is a numerical measure between 0 and 5, with 5 corresponding to lands with native vegetation which are designated and protected as preservation areas.

A multiplier of 4 denotes areas with an advanced level of stormwater treatment (i.e. no less than 150% of the required stormwater quality treatment).

A multiplier of 3 comprises stormwater treatment systems which improves the quality of stormwater runoff to meet or exceed state water quality standards (i.e. no less than 100% of the required stormwater quality treatment).

A multiplier of 2 consists of a best management practices system, which improves the quality of stormwater runoff but may not meet state water quality standards (i.e. between 50% and 100% of the required stormwater quality treatment volume).

A multiplier of 1 also consists of a limited best management practices system, which improves the quality of stormwater runoff but may not meet state water quality standards (i.e. between 25% and 50% of the required stormwater quality treatment volume).

A multiplier of 0 applies to areas with few if any stormwater best management practices (i.e. less than 25% of the required stormwater quality treatment volume).

A watershed water quality index (WQI) is computed as the area average of multipliers for all lands in the watershed. The watershed WQI is used to determine the water quality level of service (WQLOS) as illustrated in the following table.

WQLOS	A	B	C	D	E	F
WQI	WQI = 5	5>WQI≥4	4>WQI≥3	3>WQI≥2	2>WQI≥1	WQI<1

A preliminary assessment of the Fox Creek Watershed resulted in a WQI of 2.29 and a WQLOS of D based upon the following assumptions:

- 15% of watershed is native vegetation, which is protected as preserve areas.
- 18% of watershed is developed with BMP coverage that meets state water quality standards.
- 50% of watershed is either undeveloped or has BMP coverage which provides stormwater quality treatment that improves the quality of stormwater runoff but may not meet state water quality standards.
- 17% of watershed contains existing development with no BMP coverage.
- WQI = 0.15 (5) + 0.18(3) + 0.50 (2) + 0.17 (0) = 2.29

5.2 LEVEL OF SERVICE DEFICIENCIES

5.2.1 Flood Protection Level of Services Deficiencies

Flood protection level of service (FPLOS) deficiencies were estimated by comparing flood elevations computed for the design storm events with contours indicated on SWFWMD aerials, surveyed road elevations, and subdivision design plans. Finished floor elevations were subsequently field surveyed for structures suspected of being floodprone. The field survey verified that one structure located at 1081 Shire Street in Mission Valley has its sunken living room area at elevation 6.37, which is below the 100-year flood elevation. This constitutes a flood protection level of service deficiency.

Portions of two evacuation routes are located within the Fox Creek Watershed. Interstate 75 traverses the watershed, crossing the Fox Creek Main in one location and an isolated wetland-cut channel in another location. In addition, a short segment of State Road 681 borders the basin on the western side. Neither of these two roadway segments were indicated to be FPLOS deficiencies.

No arterial roads currently exist within the Fox Creek Basin. The single collector road in the basin, Mission Valley Boulevard, meets FPLOS criteria. Several neighborhood roads exist within the two platted subdivisions in the basin. Most meet FPLOS criteria in that the depth of roadway flooding does not exceed 12 inches, for the 100-year design storm. However, field surveying did confirm a roadway FPLOS deficiency at Shire Street, near Lake Thompson.

5.2.1.1 Mission Valley Estates Subdivision

As summarized in TABLE 5.2.1.a, no emergency shelters/essential services, employment/services centers, evacuation routes, or arterial roads are located within this subdivision. No collector roads experience FPLOS deficiencies, however, one (1) neighborhood road FPLOS deficiency exists in the Shire Street Lateral Subbasin near Lake Thompson. Although flooding was reported in two habitable structures during the July 1995 storm, the computed flood elevation for the 100-year design storm is slightly below one of the two homes in question. To verify that the model is accurately predicting flood stages, a simulation of the July 1995 storm was conducted. A dimensionless rainfall distribution for the July, 1995 storm was compiled from hourly rainfall amounts obtained from the Sarasota Memorial Hospital Care Center East rain gage within the South Creek watershed. This distribution was adjusted for the 10.5" rainfall amount indicated within the Shire Street Lateral Subbasin using a rainfall hyetograph compiled by Sarasota County for the July, 1995 event. The resulting computed flood elevations exceeded the finished floors of both homes that reported flooding. Therefore, this additional analysis confirmed that:

1. The model is accurately predicting flood stages.
2. The July 1995 storm exceeded the 100-year return period for the geographic area in question.
3. There is one structure FPLOS deficiency in the basin.

5.2.1.2 Calusa Lakes Subdivision

As summarized in TABLE 5.2.1.b, no emergency shelters/essential services, employment/services centers, evacuation routes, arterial or collector roads are located within this subbasin. Several neighborhood roads are susceptable to flooding for the 100-year design storm. However, completed and planned improvements in and around this subdivision implemented by Calusa Lakes are expected to reduce the depth of street flooding such that they would meet FPLOS criteria. No habitable structure FPLOS deficiencies exist within this subdivision.

MISSION VALLEY ESTATES SUBDIVISION
FLOOD PROTECTION LEVEL OF SERVICE DEFICIENCIES

I. BUILDINGS (No. of Structures below)		2-YR	5-YR	10-YR	25-YR	100-YR
A. Emergency Shelters/Essential Services (n/a)						
B. Habitable		0	0	0	1	1
C. Employment/Service Centers (n/a)						
II. ROAD ACCESS (Elevation)	E/P	2-YR	5-YR	10-YR	25-YR	100-YR
A. Evacuation (not applicable)						
B. Arterials (not applicable)						
C. Collectors						
• Mission Valley Boulevard	7.25	5.04	6.08	6.50	6.75	7.34
D. Neighborhood						
• Dartmoor Circle	13.0	5.04	6.00	6.34	6.50	6.84
• Clydesdale Circle	8.33	5.57	6.37	7.03	7.09	7.34
• Highland Circle	10.0	5.04	6.00	6.34	6.50	6.84
• Palamino Circle	6.8	5.57	6.37	7.03	7.09	7.34
• Pinto Circle	6.5	5.04	6.00	6.34	6.50	6.84
• Percheron Circle	7.26	6.96	7.60	7.66	7.70	7.75
• Shire Street	5.26	5.51	6.00	6.34	6.50	6.84
• Suffolk Circle	10.18	9.29	10.02	10.25	10.28	10.31
• Trotter Street	6.5	5.51	6.00	6.34	6.50	6.84
• Shetland Circle	12.0	9.29	10.02	10.25	10.28	10.31
• Pacer Street	12.0	5.51	6.00	6.34	6.50	6.84
• Ewing Street	9.1	4.03	4.51	4.84	5.12	5.68
• Mustang Street	9.5	4.03	4.51	4.84	5.12	5.68
• Sweetland Street	6.0	4.54	5.94	6.31	6.47	6.81
• Mackintosh Boulevard	6.2	4.23	5.26	6.13	6.27	6.59

TABLE 5.2.1.a

FPLOS Deficiency
E/P Edge of Pavement

CALUSA LAKES SUBDIVISION
FLOOD PROTECTION LEVEL OF SERVICE DEFICIENCIES

I. BUILDINGS (No. of Structures below)			2-YR	5-YR	10-YR	25-YR	100-YR
A. Emergency Shelters/Essential Services (n/a)							
B. Habitable			0	0	0	0	0
C. Employment/Service Centers (n/a)							
II. ROAD ACCESS (Elevation)		E/P	2-YR	5-YR	10-YR	25-YR	100-YR
A. Evacuation (not applicable)							
B. Arterials (not applicable)							
C. Collectors (not applicable)							
D. Neighborhood							
Lake No.	Street Name						
1	Tocobaga Lane	11.74	10.79	11.12	11.25	11.36	11.60
2	Timuca Trail	11.79	10.77	11.23	11.52	11.81	12.30
3	Apalachee Lane	12.29	10.79	11.13	11.39	11.66	12.11
3A	Timuca Trail	12.29	10.58	10.85	10.99	11.10	11.65
4	Timuca Trail	12.29	10.50	10.86	11.01	11.18	11.81
5	White Feather Lane	13.16	10.45	10.94	11.24	11.55	12.20
6	Falcon Trace	12.19	10.21	10.76	11.05	11.32	11.83
8	Muskogee Lane	12.63	10.95	11.80	12.17	12.44	12.98
9	Falcon Trace	12.96	11.17	11.99	12.33	12.59	13.12
10	Tocobaga Lane	11.56	10.73	11.11	11.35	11.61	12.14
11	White Feather Lane	11.79	10.79	11.24	11.51	11.79	12.35
12	White Feather Lane	11.79	10.79	11.24	11.51	11.80	12.35
14	Tocobaga Lane	11.79	10.27	10.72	10.98	11.25	11.73
16	Calusa Lakes Blvd.	11.79	10.06	10.31	10.51	10.73	11.26
17	Calusa Lakes Blvd.	12.15	11.07	11.33	11.56	11.76	12.18
18	Calusa Lakes Blvd.	12.29	11.06	11.33	11.56	11.77	12.21
19	Muskogee Trail	12.29	10.54	11.09	11.34	11.61	12.01
20	Calusa Lakes Blvd.	12.59	10.37	10.91	11.25	11.58	12.24

21	Calusa Lakes Blvd.	11.79	10.16	10.71	11.02	11.34	11.98
22	Muskogee Trail	12.24	10.10	10.52	10.73	10.96	11.40
23	Unit 7, Street "B"	12.29	10.38	10.93	11.27	11.60	12.28
24	Muskogee Trail	12.29	10.28	10.73	10.95	11.20	11.62
25	Calusa Lakes Blvd.	11.79	9.96	10.27	10.42	10.59	10.95
26	Falcon Trace	12.96	12.18	12.28	12.37	12.61	13.13

TABLE 5.2.1.b

 FPLOS Deficiency

E/P Edge of Pavement

5.2.2 Water Quality Level of Service Deficiencies

As previously indicated, pollutant load reduction goals have not been established for the Fox Creek watershed. In addition, a water quality index (WQI) of 2.29 corresponding to a level of service D was computed for the Fox Creek watershed. This WQI is based upon 18% of the watershed being developed without best management practices and 20% of the watershed being developed with best management practices, which meet State water quality standards.

To further evaluate water quality for the Fox Creek watershed, TABLE 5.2.2 compares unit pollutant loads with those determined by other Sarasota County Basin Master Plans. TABLE 5.2.2 indicates that pollutant loads for Fox Creek are generally in the median range, indicating average water quality.

COMPARISON OF UNIT POLLUTANT LOADINGS (lb/yr/ac)

Parameter	South Creek (12,671 ac)	Ainger Creek (5,308 ac)	Gottfried Creek (8,831 ac)	Cow Pen Slough (40,472 ac)	Fox Creek (3,327 ac)	Forked Creek (5,855 ac)	Woodmere Creek (1,193 ac)	Elligraw Bayou (460 ac)	Matheny Creek (1,724 ac)
BOD	10	20	22	23	27	24	41	44	51
COD	69	133	148	146	184	167	302	299	357
TSS	228	443	419	557	515	408	461	432	566
TDS	142	270	279	357	332	286	417	521	537
TP	0.32	0.53	0.83	0.74	0.71	0.71	1.25	1.22	1.39
DP	0.12	0.23	0.26	0.35	0.27	0.31	0.52	0.42	0.57
TKN	1.31	2.38	3.20	2.93	3.28	3.02	5.32	5.76	6.47
NO_2+NO_3	0.46	0.71	0.94	1.20	0.76	0.89	1.51	0.95	1.20
Lead	0.04	0.05	0.12	0.02	0.08	0.15	0.18	0.22	0.43
Copper	0.03	0.05	0.06	0.06	0.06	0.08	0.15	0.13	0.18
Zinc	0.08	0.11	0.16	0.21	0.10	0.18	.028	0.24	0.32
Cadmium	0.001	0.002	0.002	0.002	0.002	0.003	0.006	0.007	0.009

TABLE 5.2.2

6.0 ALTERNATIVE SOLUTIONS TO UPGRADING LEVEL OF SERVICE

As part of the draft final report prepared by Kimley-Horn and Associates, Inc., three alternatives were investigated to address the existing FPLOS deficiencies in and around the Shire Street area. The first alternative considered enlarging the existing culverts at Mackintosh Boulevard as well as the 5 driveway culverts between Mackintosh Boulevard and Lake Thompson. This alternative was determined to be an effective way to address the existing FPLOS deficiencies. The project would require securing an additional public drainage easement over the Shire Street Lateral. This easement is also required for routine maintenance of the Shire Street ditch independent of performing any improvements in the area.

A second alternative looked at constructing a secondary ditch between the southeast corner of Lake Thompson and Mackintosh Boulevard, along the rear of 4 of the abutting Shire Street. This would provide an additional outlet for the Shire Street area and would still require enlarging the culverts at Mackintosh Boulevard. It was determined that this alternative would be effective in addressing the existing FPLOS deficiencies. However, subsequent to this proposal, a fifth lot was created from a parent lot split. The additional driveway and home construction on this fifth lot (at the easterly end of Shire Street) makes this alternative very problematic, if not impractical. Considerable real property costs are also expected with this alternative.

The third alternative considered an emergency overflow to and through the Sorrento Woods stormwater management system. This alternative was determined to not be an effective solution to the existing FPLOS deficiencies.

As a result of the second public meeting held on December 2, 1999, a local resident suggested a fourth alternative which would involve constructing a second ditch along the north side of Shire Street between Mackintosh Boulevard and Mission Valley Boulevard to complement the existing ditch on the south side. At first blush this proposal seems to have merit. However, the culverts at Mackintosh Boulevard would still need to be enlarged and up to eleven (11) additional culvert crossings along the north side of Shire Street would be involved. This alternative would also traverse up to nine (9) private properties, thereby requiring the need for potentially significant real property negotiations and costs. In the event of the need for condemnation, it may be difficult to justify the need for a new ditch where one already exists on the south side of the road. A similar concern is likely to arise through the permit process.

From these three alternatives, Alternative 1 was determined to be the most preferable for the following reasons:

1. It was effective in addressing the existing FPLOS deficiencies.
2. The real property needs associated with this project were needed independent of the project, for the routine maintenance of the existing Shire Street Lateral.
3. Alternative 1 was considered less disruptive to the adjacent residents since it would involve significantly less earthwork and temporary construction intrusion into the affected lots than alternative 2.
4. Since alternative 1 involved the modification of an existing stormwater management system as opposed to creation of a new one, it was considered to be more permittable than alternative 2.

7.0 CONCLUSIONS

In conclusion, the Fox Creek Basin Master Plan (BMP) recommends strategies to (1) address existing flood protection level of service (FPLOS) deficiencies, (2) assist in future planning and development, and (3) secure public drainage easement rights for routine maintenance of the drainage infrastructure. Each of these strategies is discussed in more detail herein.

7.1 EXISTING FLOOD PROTECTION LEVEL OF SERVICE DEFICIENCIES

The detailed flood study conducted in association with the Fox Creek Basin Plan revealed that one habitable structure is susceptible to flooding from the 100-year design storm. This residential structure is located at 1081 Shire Street and has reportedly flooded several times since 1992. In addition one neighborhood road, Shire Street was identified as having flood depths in excess of the FPLOS standard of 12 inches for the 100-year design storm. (Refer to EXHIBIT 6).

To address these two FPLOS deficiencies, improvements to the Shire Street ditch between Mackintosh Boulevard and Lake Thompson are recommended. Design and construction costs have already been budgeted at $330,000 in the current Stormwater C.I.P. To minimize the cost of the project so that a justifiable cost-to-benefit ratio can be maintained, staff is negotiating the dedication of public drainage easements with the five potentially affected property owners for the needed improvements within the Shire Street ditch. Three of the property owners have dedicated public drainage easements at the time of this report.

7.2 FUTURE DEVELOPMENT

The majority of the Fox Creek Basin is currently undeveloped. Adoption of the Fox Creek Basin Plan will assure that undeveloped areas situated within the floodplain will be recognized. In addition, the detailed

stormwater management model developed as part of the Basin Master Plan will now provide staff with an invaluable tool to evaluate future development and land use change proposals so that they do not result in adverse increases in off-site flood stages.

A unique potential development condition exists in this Basin. Mission Valley was originally platted as a 5 acre lot subdivision with a compatible, rural drainage system. However because the underlying zoning allows one acre lots approximately 50% of the original 5-acre lots have been, and continue to be, split and subdivided. Therefore, over time the density of Mission Valley may increase as much as five fold without a corresponding change to the original rural drainage infrastructure. To mitigate this anticipated trend, staff is recommending that critical discharge criteria be established for Mission Valley based upon the rural nature of the existing drainage infrastructure. This will require sufficient on-site storage for future development proposals in Mission Valley such that the capacity of the subdivision's existing drainage network is not exceeded.

7.3 SECUREMENT OF PUBLIC EASEMENTS FOR MAINTENANCE

As part of the Basin Plan, the "County Drainage System" within the Fox Creek Basin has been identified and mapped. (Refer to EXHIBIT 7). This "System" constitutes those drainage-courses that presently conduct significant flows and are ultimately expected to require routine maintenance.

In addition, those components of the "System" that are and are not within public drainage easements have been identified. No portion of Fox Creek is currently within a public drainage easement. Since almost all of the properties in the Fox Creek Basin drain through the lower segment, securing public drainage easement rights should be a high priority. Staff has met with the Mission Valley Homeowners Association to seek their assistance in contacting residents along the west side of the creek and anticipates obtaining public drainage easement rights over the east and northern portions when future development plats are recorded.

The upper portion of Fox Creek (north of I-75) is a lower priority. However, it is owned entirely by the Palmer Ranch who has indicated a willingness to grant public drainage easements to the County.

Two lateral ditches parallel the north and south boundaries of Calusa Lakes. A public drainage easement has been dedicated for the northern lateral ditch and the President of the Calusa Lakes Homeowners Association is receptive to granting the County a public easement over the southern lateral ditch.

As previously indicated the Shire Street ditch network lies within an insufficient public drainage easement in terms of width. Staff is currently negotiating to obtain public easements rights over the most critical

section between Mackintosh Boulevard and Lake Thompson at no cost, other than those associated with preparation and recording of said easements.

FUNDING:

At this time, stormwater improvements in the amount of $330,000 are anticipated for the Fox Creek Basin (including both design and construction). In addition $20,000 has been budgeted for obtaining public drainage easements. With a total number of 842 ESU's in the Fox Creek Basin, the unit assessment would be approximately $416/ESU. Over 90% of the residents responding to a survey conducted as part of the public meeting held on October 6, 1997 indicated a preference for a longer term payment schedule for the improvements. Over a 15-year period, it is estimated that annual assessments will range of between $48.00 and $56.00 per ESU.