

The following is an excerpt from a permit application submitted to the United States Environmental Protection Agency by 6 applicants: Sarasota County, City of Sarasota, Town of Longboat Key, City of North Port, City of Venice, and Florida Department of Transportation. The application is for a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit that requires communities who own or operate drainage systems to reduce the amount of pollution flowing to the waters of the United States by performing certain pollution prevention activities.

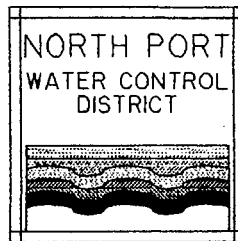
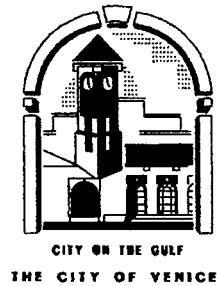
This excerpt is Part II of the application submitted in 1993 and includes studies of stormwater pollution from different land use types and also includes estimated (by use of a spreadsheet model called Watershed Management Model) wet season and dry season pollutant load as well as the Event Mean Concentration of stormwater.

NPDES MUNICIPAL SEPARATE STORM SEWER SYSTEM PART 2 PERMIT APPLICATION

SUBMITTED BY:



AND
CO-APPLICANTS:



JULY 1993

**CAMP DRESSER & MCKEE INC.
SARASOTA, FLORIDA**

SARASOTA COUNTY NPDES MS4
PART 2 PERMIT APPLICATION

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APPENDIX

Revised Ordinance and Interlocal Agreement

Requirement:

40 CFR 122.26 (d) (2) (iii)

Characterization data. When "quantitative data" for a pollutant are required under paragraph (d)(2)(iii)(A)(3) of this paragraph, the applicant must collect a sample of effluent in accordance with 40 CFR 122.21(g)(7) and analyze it for the pollutant in accordance with analytical methods approved under 40 CFR part 136. When no analytical method is approved the applicant may use any suitable method but must provide a description of the method. The applicant must provide information characterizing the quality and quantity of discharges covered in the permit application, including:

(A) Quantitative data from representative outfalls designated by the Director (based on information received in part 1 of the application, the Director shall designate between five and ten outfalls or field screening points as representative of the commercial, residential and industrial land use activities of the drainage area contributing to the system or, where there are less than five outfalls covered in the application, the Director shall designate all outfalls) developed as follows:

- (1) For each outfall or field screening point designated under this subparagraph, samples shall be collected of storm water discharges from three storm events occurring at least one month apart in accordance with the requirements at §122.21(g)(7) (the Director may allow exemptions to sampling three storm events when climatic conditions create good cause for such exemptions);*
- (2) A narrative description shall be provided of the date and duration of the storm event(s) sampled, rainfall estimates of the storm event which generated the sampled discharge and the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event;*
- (3) For samples collected and described under paragraphs (d)(2)(iii)(A)(1) and (A)(2) of this section, quantitative data shall be provided for: the organic pollutants listed in Table II; the pollutants listed in Table III (toxic metals, cyanide, and total phenols) of appendix D of 40 CFR part 122, and for the following pollutants:*

<i>Total suspended solids (TSS)</i>	<i>pH</i>
<i>Total dissolved solids (TDS)</i>	<i>Total Kjeldahl nitrogen</i>
<i>COD</i>	<i>Nitrate plus nitrite</i>
<i>BOD₅</i>	<i>Dissolved phosphorus</i>
<i>Oil and grease</i>	<i>Total ammonia plus organic</i>
<i>Fecal coliform</i>	<i>nitrogen</i>
<i>Fecal streptococcus</i>	<i>Total phosphorus</i>

40 CFR 122.26 (d) (2) (iii)

WET WEATHER CHARACTERIZATION

Sarasota County and Co-applicants selected seven sites (Figure 1) within Sarasota County to establish monitoring stations and collect stormwater event samples during the wet weather characterization phase. Sites were selected based on the homogeneity of land use, size, suitable outfall structure, and safety of sampling personnel. Land uses were selected to generally reflect the percentage of that land use within the County as a whole. Sites (with the exception of the open land use) were inspected and approved by EPA prior to sampling.

A total of three events were to be collected from each site, with analytical data from storms at least one month apart. Initially, a 72-hour antecedent dry period (with no events greater than 0.10 inches) was required for each collected event. This was later modified (by January 26, 1993 Memorandum No. 6) to a 36-hour antecedent dry period, but only for the months of June through September; so this modification did not alter the Sarasota County collection program to date. Samples were to be collected either for the entire event or for three hours. Sampling was typically initiated by rainfall amounts of greater than 0.1 inches within a one-hour period, together with water levels sufficient to allow collection (generally 0.063 feet or 0.75 inches in depth).

Rainfall amounts to be sampled were detailed in the Part I MS4 permit application (May 22, 1992) and are reproduced below in Table 1, together with additional months calculated according to the same formulae. Total rainfall criteria were established as the monthly average of daily totals plus or minus 50 percent at the beginning of the wet season (June). As the wet season progressed, the allowable range was expanded to plus or minus 75 percent for July and to plus or minus 100 percent for August in an attempt to ensure completion of all sampling prior to May, 1993. For months subsequent to August, after the wet season ended, criteria included 95

TABLE 1

MONTHLY CRITERIA FOR ACCEPTABLE RAINFALL AMOUNTS

Modified from Table 4-16

Part I Permit Application, May 22, 1992

<u>Month</u>	<u>Acceptable Amounts</u>
June	0.38 in to 1.14 in
July	0.19 in to 1.33 in
August	0.10 in to 1.52 in
September	0.10 in to 2.45 in
October	0.10 in to 1.99 in
November	0.10 in to 2.20 in
December	0.10 in to 1.52 in
January	0.10 in to 1.95 in
February	0.10 in to 1.98 in
March	0.10 in to 2.35 in
April	0.10 in to 1.89 in
May	0.10 in to 2.25 in

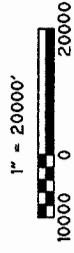
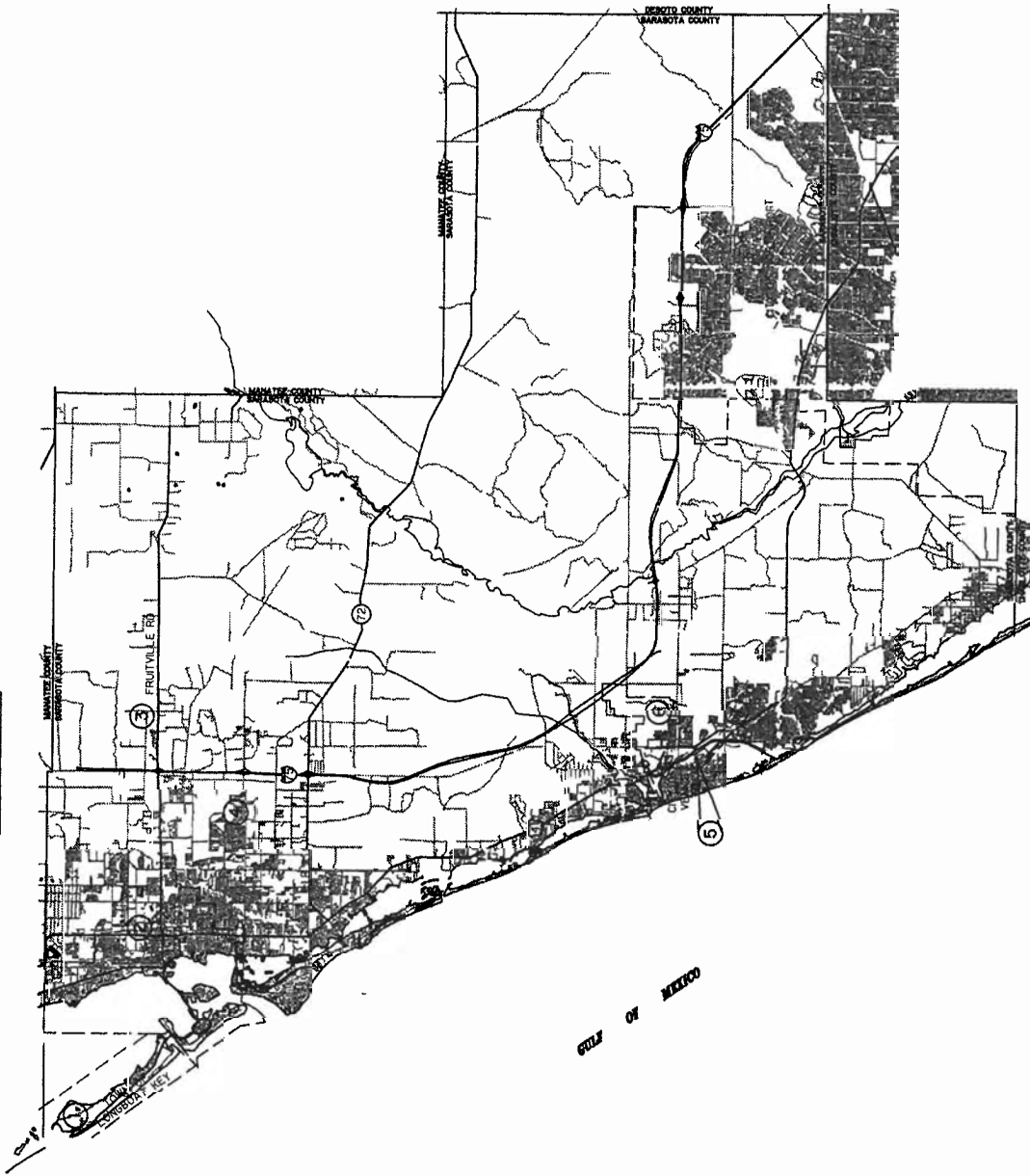
percent of all rainfall events historically received in the respective months. Sampled events were within these criteria except as noted in the storm descriptions.

Both grab and flow-weighted composite samples were to be collected and analyzed according to the protocols detailed in the Characterization Plan (Section 4.4 Part I Permit Application, May 22, 1992) and reproduced in Table 2. Holding times for the specific analyses are also listed. Due to the extremely short holding times for bacteriological parameters (6 hours), EPA relaxed the storm requirements to allow applicants to collect grab samples for these parameters (i.e., fecal coliform and fecal streptococci) from separate storms than the remaining parameters.

The pervious area and high groundwater tables common to the area provide for an extended recession limb of most storm event hydrographs, particularly in basins with a low percentage of impervious area. This was noted especially in the open and low density land uses. In many cases it was difficult to identify the "end" of the event for purposes of determining whether sampling was complete. Accordingly, for the purpose of calculating runoff totals, events were considered to be complete once either successive flow measurements differed by less than 2 percent or when three successive level measurements each differed by less than 0.008 feet (0.1 inch).

A summary description of storms collected, those accepted by EPA and other pertinent information appears in Table 3. Analytical data appear in Tables 4 through 9. It should be noted that the organic compounds listed in Tables 7 through 9 are only those compounds which were detected. The overwhelming majority of samples were below detection limits for almost all of the organic compounds.

SARASOTA COUNTY



- ① LONGBOAT KEY - HIGH DENSITY RESIDENTIAL
- ② EAST AVE. - INDUSTRIAL
- ③ RICHARDSON ROAD - LOW DENSITY RESIDENTIAL
- ④ BELL MEADE DRIVE - MEDIUM DENSITY RESIDENTIAL
- ⑤ INDIAN AVE. - COMMERCIAL
- ⑥ VENICE WELLFIELD - OPEN
- ⑦ BRIARWOOD ROAD - MEDIUM DENSITY RESIDENTIAL

NPDES MS4 PART II
SARASOTA COUNTY
WET WEATHER SAMPLING LOCATIONS
 Figure No. 1

TABLE 2
ANALYTICAL METHODOLOGIES, PRESERVATIVES AND HOLDING TIMES

ANALYSIS	SAMPLE TYPE	CONTAINER	PRESERVATIVE	HOLDING TIME	METHODOLOGY
Volatiles	Grab	G, teflon	4 °C* (HCl to pH < 2)	3 days (7 days)	EPA 624
Acid and Base/Neutrals	FWC	G, teflon	4 °C*	7 days until extract	EPA 625
Pesticides and PCBs	FWC	G, teflon	4 °C*	7 days until extract	EPA 608
Toxic Metals	FWC	P	HNO ₃ to pH < 2	6 months	**
Mercury	FWC	P	HNO ₃ to pH < 2	28 days	EPA 245.1
Total Cyanide	Grab	P	4°C-NaOH to pH > 12	14 days	EPA 335.2, 335.3, SM 4500-CN
Total Phenols	Grab	G	4°C-H ₂ SO ₄ to pH < 2	28 days	EPA 420.1, 420.2
Total Suspended Solids	FWC	P	4°C	7 days	EPA 160.2
Total Dissolved Solids	FWC	P	4°C	7 days	EPA 160.1
Chemical Oxygen Demand	FWC	P	4°C-H ₂ SO ₄ to pH < 2	28 days	EPA 410.4
Biochemical Oxygen Demand	FWC	P	4°C	48 hours	EPA 405.1
Oil and Grease	Grab	G	4°C-H ₂ SO ₄ to pH < 2	28 days	EPA 413.1
Fecal Coliform	Grab	P	4°C*	6 hours	SM 909C
Fecal Streptococcus	Grab	P	4°C*	6 hours	SM 910B
pH	Grab	P	None-analyze on site	not applicable	EPA 150.1
Total Kjeldahl Nitrogen	FWC	P	4°C-H ₂ SO ₄ to pH < 2	28 days	EPA 351.2
Nitrate-Nitrite-Nitrogen	FWC	P	4°C-H ₂ SO ₄ to pH < 2	28 days	EPA 353.2
Ammonia Nitrogen	FWC	P	4°C-H ₂ SO ₄ to pH < 2	28 days	SM 4500-NH ₃ H
Dissolved Total Phosphorus	FWC	P	4°C-H ₂ SO ₄ to pH < 2	Filter immediately 28 days	EPA 365.4
Total Phosphorus	FWC	P	4 °C- H ₂ SO ₄ to pH < 2	28 days	EPA 365.4

* Residual chlorine not expected to be present.

** Graphite furnace, except for zinc.

EPA 204.2, 206.2, 206.3, 210.2, 213.2, 218.2, 220.2, 239.2, 249.2, 270.2, 272.2, 289.1.

FWC = Flow Weighted Composite

G = Glass

P = Polyethylene

Teflon = Teflon lined Septa or Cap.

TABLE 3
DESCRIPTION OF STORMS COLLECTED DURING
WET WEATHER CHARACTERIZATION
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site 001

8/21/92 Acceptable
 9/24/92 Insufficient sample, but selected parameters analyzed due to fresh asphalt
 10/ 2/92 Acceptable, but no pesticide data
 11/27/92 Acceptable
 4/ 1/93 FWC only for first flush, rainfall above upper criteria for April
 4/ 5/93 Acceptable, initial runoff masked by tidal backwater

Site 002

8/29/92 Bacteria only
 9/ 3/92 Bacteria only
 9/25/92 FWC collected under backwatered conditions, but flow still downstream
 11/27/92 Acceptable
 1/ 8/93 Acceptable, FWC for first portion of storm before backwater
 1/25/93 FWC with gap in collection times
 2/22/93 Acceptable
 4/ 9/93 Additional storm

Site 003

10/ 2/92 Acceptable, but no pesticide data
 1/26/93 Acceptable
 2/26/93 Acceptable
 4/ 1/93 FWC with gap in collection times, water depths greater than primary device
 Acceptable so long as pesticide data all less than limit of detection

Site 004

8/22/92 Acceptable
 9/25/92 Acceptable
 11/27/92 Acceptable

Site 005

8/22/92 Bacteria only
 10/ 2/92 Acceptable, but no pesticides
 1/14/93 Acceptable, FWC from first portion of storm
 1/25/93 Additional storm, FWC with gap in collection times
 3/ 3/93 Acceptable
 4/ 5/93 Acceptable, initial and latter portion of storm processed as two FWC samples
 4/ 9/93 Additional storm

Site 006

9/13/92 Acceptable, water depths greater than primary device, but consistent
 10/02/92 Additional storm, no pesticide data
 3/13/93 Acceptable, water depths greater than primary device, but consistent
 3/17/93 Additional storm, gap in FWC collection times
 4/15/93 Acceptable

Site 007

9/13/92 Acceptable
 1/ 8/93 Initial portion of storm collected
 1/14/93 Acceptable
 2/22/93 Bacteria only
 2/26/93 Additional storm, initial and latter portion of storm processed as two FWC samples
 3/ 3/93 Acceptable

TABLE 4
BACTERIOLOGICAL, DEMANDS, AND SOLIDS CONCENTRATIONS IN STORMWATER
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Grab Time (hhmm)	FWC End Time(a) (hhmm)	pH Field (SU)	Fecal Coliform (#/100ml)	Fecal Streptococcus (#/100ml)	Oil and Grease (mg/l)	Biochem. Oxygen Demand (mg/l)	Chemical Oxygen Demand (mg/l)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)
001	8/21/92	1545	1612	6.45	1300	960	3.0	6.7	78	52	62
001	9/24/92	1619	-	-	-	-	2.9	-	-	-	-
001	10/ 2/92	1049	1423	6.70	7900	6400	<0.1	4.6	20	46	88
001	11/27/92	0713	1006	6.13	11000	15600	6.1	11.6	100	56	60
001	4/ 1/93	0150	0204	6.55	-	-	2.0	30.4	138	93	59
001	4/ 5/93	0128	0204	6.86	-	-	1.8	32.0	1190	22	87
002	8/29/92	1154	-	5.30	70800	57600	-	-	-	-	-
002	9/ 3/92	1329	1355	6.59	17800	13000	-	-	-	-	-
002	9/25/92	1858	2021	6.99	104000	89000	3.9	7.5	72	68	60
002	11/27/92	0934	1303	6.77	11600	7600	7.4	9.0	72	109	168
002	1/ 8/93	1643	1718	7.75	28200	16400	11.6	11.7	226	435	135
002	1/25/93	2023	2102	6.94	11900	13800	3.3	7.9	48	73	256
002	2/22/93	1611	2015	7.06	700	10600	10.4	13.3	157	210	219
002	4/ 9/93	1149	1306	7.01	-	-	8.3	10.8	131	155	312
003	10/ 2/92	1402	1840	6.25	3400	10600	1.0	6.4	77	4	214
003	1/26/93	0237	0433	6.46	11700	8900	<0.1	26.2	157	3	298
003	2/26/93	1309	1548	6.89	6000	9100	1.7	9.6	78	4	507
003	2/26/93	1051	-	-	1700	9600	-	-	-	-	-
003	4/ 1/93	0319	0622	6.51	-	-	0.1	21.6	68	19	86
004	8/22/92	1634	1736	7.13	>250	48000	7.4	7.0	61	139	50
004	8/22/92	1634	1736	-	-	-	3.8	7.3	61	143	46
004	9/25/92	2039	2207	6.14	89000	33000	3.2	9.4	86	94	84
004	11/27/92	1059	1232	6.77	47200	6100	1.8	6.5	48	21	70
005	8/22/92	1642	-	-	2800	33000	-	-	-	-	-
005	10/ 2/92	1305	1756	7.89	3100	9800	6.6	5.8	43	74	34
005	1/14/93	1430	1510	7.12	700	3800	10.5	14.6	141	160	131
005	1/25/93	1330	1944	7.22	600	8100	7.3	14.5	100	73	58
005	3/ 3/93	2214	2345	6.74	200	1000	9.2	1.2	53	46	54
005	4/ 5/93	-	0446	-	-	-	-	29.2	19	11	25
005	4/ 5/93	0101	0127	6.72	-	-	6.1	33.6	461	101	67
005	4/ 9/93	1111	1525	7.36	-	-	7.7	7.0	54	30	97
006	9/13/92	1640	2028	7.24	14100	10400	0.7	6.6	51	25	122
006	10/ 2/92	1301	1538	7.73	2500	2300	1.5	10.3	75	16	268
006	3/13/93	0210	0427	6.89	8300	6750	0.2	13.2	380	21	78
006	3/17/93	1252	1614	7.10	3950	5700	0.3	58.0	285	2	278
006	4/15/93	2228	0046	7.14	-	-	0.9	56.6	161	2	213
007	9/13/92	1655	1841	7.16	23400	18100	0.8	9.5	33	11	30
007	1/ 8/93	1805	1913	7.33	2000	5600	2.6	9.0	70	19	41
007	1/14/93	1527	1741	7.01	1900	9100	1.8	8.8	195	15	23
007	2/22/93	1708	-	7.49	775	6100	-	-	-	-	-
007	2/26/93	1045	1113	7.21	1450	2600	3.9	18.0	63	50	31
007	2/26/93	-	1431	-	-	-	-	10.0	38	12	31
007	3/ 4/93	2219	2256	7.79	100	1350	3.7	5.2	44	40	34

(a) Flow-weighted composite ending time.

TABLE 5
NUTRIENT CONCENTRATIONS IN STORMWATER
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Grab Time (hhmm)	FWC End Time(a) (hhmm)	Total Kjeldahl Nitrogen (mg/l)	Total Phosphorus (mg/l)	Nitrate-Nitrite-Nitrogen (mg/l)	Ammonium Nitrogen (mg/l)	Dissolved Total Phosphorus (mg/l)
001	8/21/92	1545	1612	1.00	0.35	0.427	0.108	0.19
001	9/24/92	1619	-	-	-	-	-	-
001	10/ 2/92	1049	1423	0.09	0.12	0.169	0.031	0.10
001	11/27/92	0713	1006	0.44	0.22	0.108	0.078	0.07
001	4/ 1/93	0150	0204	0.74	0.21	0.200	0.145	0.06
001	4/ 5/93	0128	0204	0.33	0.08	0.758	0.096	0.03
002	8/29/92	1154	-	-	-	-	-	-
002	9/ 3/92	1329	1355	-	-	-	-	-
002	9/25/92	1858	2021	0.49	0.36	0.158	0.005	<0.05
002	11/27/92	0934	1303	0.85	1.24	0.155	0.066	0.15
002	1/ 8/93	1643	1718	2.32	1.25	0.393	0.136	0.38
002	1/25/93	2023	2102	0.34	0.26	0.172	0.073	0.08
002	2/22/93	1611	2015	1.90	1.10	0.280	0.079	0.13
002	4/ 9/93	1149	1306	1.18	0.46	0.206	0.103	0.09
003	10/ 2/92	1402	1840	1.41	0.12	<0.005	0.006	0.08
003	1/26/93	0237	0433	0.76	0.11	0.017	0.027	0.11
003	2/26/93	1309	1548	0.81	0.20	0.051	0.051	0.14
003	2/26/93	1051	-	-	-	-	-	-
003	4/ 1/93	0319	0622	0.48	0.35	0.077	0.015	0.21
004	8/22/92	1634	1736	1.45	0.46	0.174	0.031	0.24
004	8/22/92	1634	1736	1.82	0.45	0.170	0.033	0.23
004	9/25/92	2039	2207	1.22	0.46	0.266	0.023	0.10
004	11/27/92	1059	1232	0.60	0.35	0.092	0.035	0.18
005	8/22/92	1642	-	-	-	-	-	-
005	10/ 2/92	1305	1756	0.20	0.08	0.047	0.006	<0.05
005	1/14/93	1430	1510	0.72	0.29	0.238	0.062	<0.05
005	1/25/93	1330	1944	0.17	0.12	0.098	0.044	0.05
005	3/ 3/93	2214	2345	0.54	0.13	0.124	0.127	0.05
005	4/ 5/93	-	0446	0.13	0.06	0.074	<0.005	0.02
005	4/ 5/93	0101	0127	2.18	0.30	0.411	0.225	0.11
005	4/ 9/93	1111	1525	0.57	0.11	0.251	0.085	0.05
006	9/13/92	1640	2028	0.83	0.28	0.063	0.025	0.16
006	10/ 2/92	1301	1538	1.06	0.22	0.012	<0.005	0.17
006	3/13/93	0210	0427	0.52	0.20	0.053	<0.005	0.10
006	3/17/93	1252	1614	0.41	0.14	<0.005	<0.005	0.15
006	4/15/93	2228	0046	0.68	0.13	0.017	0.032	0.09
007	9/13/92	1655	1841	0.55	0.65	0.320	0.005	0.59
007	1/ 8/93	1805	1913	0.35	0.53	0.267	0.069	0.51
007	1/14/93	1527	1741	<0.05	0.16	0.084	<0.005	0.09
007	2/22/93	1708	-	-	-	-	-	-
007	2/26/93	1045	1113	0.98	0.24	0.205	0.205	0.13
007	2/26/93	-	1431	0.16	0.11	0.124	0.124	0.07
007	3/ 4/93	2219	2256	0.90	0.28	0.154	0.234	0.16

(a) Flow weighted composite ending time.

**TABLE 6
CYANIDE, PHENOLS, AND TOTAL RECOVERABLE METAL CONCENTRATIONS IN STORMWATER
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION**

3A-9

Site	Date	Grab Time (hhmm)	FWC End Time(a) (hhmm)	Cyanide, Total (mg/l)	Phenols, Total (mg/l)	Antimony (ug/l)	Arsenic (ug/l)	Beryllium (ug/l)	Cadmium (ug/l)	Chromium (ug/l)	Copper (ug/l)	Lead (ug/l)	Mercury (ug/l)	Nickel (ug/l)	Selenium (ug/l)	Silver (ug/l)	Thallium (ug/l)	Zinc (ug/l)
001	8/21/92	1545	1612	<0.020	<0.050	4	<2	<0.1	1.6	6.1	30	18	<0.2	2	<4	<0.5	<1	86
001	9/24/92	1619	-	-	-	18	<2	<0.1	0.6	1.5	8	2	<0.4	<1	<4	<0.5	<2	45
001	10/ 2/92	1049	1423	<0.010	<0.005	<6	<2	<0.1	0.3	1.7	27	3	<0.4	<1	<4	<0.5	<2	43
001	11/27/92	0713	1006	<0.005	<0.050	18	<2	<0.1	1.0	5.1	21	18	<0.1	3	<4	<0.5	<1	71
001	4/ 1/93	0150	0204	<0.005	<0.050	9	<2	<0.1	0.7	8.7	30	24	<0.2	3	<2	<0.5	<0.3	118
001	4/ 5/93	0128	0204	<0.005	<0.050	9	<2	<0.1	0.3	2.6	7	8	<0.2	<2	<2	<0.5	<0.3	65
002	8/29/92	1154	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-	-	-
002	9/ 3/92	1329	1355	-	-	-	<2	<0.1	0.9	5.8	18	24	<0.3	2	<4	<0.5	-	111
002	9/25/92	1858	2021	<0.010	<0.005	<6	<2	<0.1	1.1	3.5	17	17	<0.4	<1	<4	<0.5	<2	79
002	11/27/92	0934	1303	<0.005	<0.050	<2	5	<0.1	1.5	7.0	17	27	<0.1	2	<4	<0.5	<1	127
002	1/ 8/93	1643	1718	<0.005	<0.050	<1	3	0.2	3.6	28.2	52	103	<0.4	7	<4	<0.5	<1	449
002	1/25/93	2023	2102	<0.005	<0.050	<1	<2	<0.1	1.2	4.0	9	14	<0.4	2	5	<0.5	<1	105
002	2/22/93	1611	2015	<0.005	<0.050	2	3	0.1	1.3	9.0	29	46	<0.2	4	<4	<0.5	<1	255
002	4/ 9/93	1149	1306	<0.005	<0.050	<2	<2	<0.1	0.9	9.6	18	36	<0.2	4	3	<0.5	<1	181
003	10/ 2/92	1402	1840	<0.010	<0.005	<6	5	<0.1	0.6	1.5	2	<1	<0.4	<1	<4	<0.5	<2	11
003	1/26/93	0237	0433	<0.005	<0.050	6	7	<0.1	1.9	1.5	2	1	<0.4	<1	<4	<0.5	<1	29
003	2/26/93	1309	1548	<0.005	<0.050	6	3	<0.1	0.5	1.4	2	3	<0.2	<1	<4	<0.5	1	43
003	2/26/93	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
003	4/ 1/93	0319	0622	<0.005	<0.050	<1	<2	<0.1	1.0	2.0	4	2	<0.2	<2	<2	<0.5	<0.3	23
004	8/22/92	1634	1736	0.010	<0.005	<1	2	<0.1	0.5	4.3	6	19	<0.2	3	<4	<0.5	<1	58
004	8/22/92	1634	1736	-	-	<1	<2	<0.1	0.5	2.7	6	15	<0.2	2	<4	<0.5	<1	47
004	9/25/92	2039	2207	<0.010	<0.005	<6	3	<0.1	0.7	3.6	8	29	<0.4	5	<4	<0.5	<2	152
004	11/27/92	1059	1232	<0.005	<0.050	<2	<2	<0.1	1.2	1.8	6	8	<0.1	<1	<4	<0.5	<1	75
005	8/22/92	1642	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
005	10/ 2/92	1305	1756	<0.010	<0.005	<6	<2	<0.1	0.7	8.0	5	28	<0.4	2	<4	<0.5	<2	45
005	1/14/93	1430	1510	0.011	<0.050	<1	<2	<0.1	1.3	16.4	16	60	<0.4	4	<4	<0.5	<1	189
005	1/25/93	1330	1944	<0.005	<0.050	1	<2	<0.1	0.6	8.1	6	26	<0.4	<1	<4	<0.5	<1	82
005	3/ 3/93	2214	2345	<0.005	<0.050	<1	<2	<0.1	0.6	4.9	5	19	<0.4	<1	<4	<0.5	1	61
005	4/ 5/93	-	0446	-	-	<1	<2	<0.1	0.5	2.8	3	6	<0.2	<2	<2	<0.5	<0.3	18
005	4/ 5/93	0101	0127	<0.005	<0.050	<1	2	<0.1	0.5	8.4	11	31	<0.2	3	<2	<0.5	<0.3	92
005	4/ 9/93	1111	1525	<0.005	<0.050	<2	5	<0.1	0.4	6.2	8	17	<0.2	4	<2	<0.5	<1	69

(a) Flow-weighted composite ending time.

TABLE 6 (continued)
CYANIDE, PHENOLS, AND TOTAL RECOVERABLE METAL CONCENTRATIONS IN STORMWATER
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Grab Time (hhmm)	FWC End Time(a) (hhmm)	Cyanide, Total (mg/l)	Phenols, Total (mg/l)	Antimony (ug/l)	Arsenic (ug/l)	Beryllium (ug/l)	Cadmium (ug/l)	Chromium (ug/l)	Copper (ug/l)	Lead (ug/l)	Mercury (ug/l)	Nickel (ug/l)	Selenium (ug/l)	Silver (ug/l)	Thallium (ug/l)	Zinc (ug/l)
006	9/13/92	1640	2028	<0.010	<0.005	<1	<2	<0.1	0.5	1.4	<1	<1	<0.3	<1	<4	<0.5	<1	<10
006	10/ 2/92	1301	1538	<0.010	<0.005	<6	2	<0.1	0.7	1.4	<1	<1	<0.4	<1	<4	<0.5	<2	<10
006	3/13/93	0210	0427	<0.005	<0.050	<1	<2	<0.1	<0.2	1.7	2	2	<0.4	<2	<2	<0.5	<0.3	7
006	3/17/93	1252	1614	<0.005	<0.050	<1	<2	<0.1	0.2	1.8	1	<1	<0.4	<2	4	<0.5	1	7
006	4/15/93	2228	0046	<0.005	<0.050	<2	<2	<0.1	<0.2	1.5	<1	<1	<0.2	<2	<2	<0.5	<1	<10
007	9/13/92	1655	1841	<0.010	<0.005	<1	<2	<0.1	0.9	0.9	3	4	<0.2	2	<4	<0.5	<1	27
007	1/ 8/93	1805	1913	<0.005	<0.050	<1	<2	<0.1	0.8	1.5	3	9	<0.4	<1	<4	<0.5	<1	42
007	1/14/93	1527	1741	<0.005	<0.050	<1	<2	<0.1	0.4	2.4	6	12	<0.4	4	<4	<0.5	<1	30
007	2/22/93	1708	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
007	2/26/93	1045	1113	<0.005	<0.050	<1	<2	<0.1	0.4	2.2	5	21	<0.2	<1	<4	<0.5	<1	62
007	2/26/93	-	1431	-	-	<1	<2	<0.1	<0.2	2.1	2	7	<0.2	<1	<4	<0.5	1	21
007	3/ 4/93	2219	2256	<0.005	<0.050	6	<2	<0.1	0.5	1.6	4	13	<0.4	2	<4	<0.5	<1	45

(a) Flow-weighted composite ending time.

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TABLE 7
LISTING OF THE ONLY ACID AND BASE/NEUTRAL EXTRACTABLE COMPOUNDS DETECTED IN STORMWATER SAMPLES
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Phen- anthrene (ug/l)	Benzo(a)- anthracene (ug/l)	3,4-Benzo- fluoranthene (ug/l)	Benzo(ghi)- perylene (ug/l)	Benzo(k)- fluoranthene (ug/l)	Bis(2-ethyl- hexyl) phthalate (ug/l)	Chrysene (ug/l)	Fluoranthene (ug/l)	Pyrene (ug/l)
001	8/21/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
001	9/24/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
001	10/ 2/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
001	11/27/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
001	4/ 1/93	<5	<5	<5	<5	<5	7	<5	<5	<5
001	4/ 5/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	8/29/92	-	-	-	-	-	-	-	-	-
002	9/ 3/92	-	-	-	-	-	-	-	-	-
002	9/25/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	11/27/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	1/ 8/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	1/25/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	2/22/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
002	4/ 9/93	<5	<5	6	<5	<5	6	5	9	6
003	10/ 2/92	<5	<5	<5	<5	<5	8	<5	<5	<5
003	1/26/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
003	2/26/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
003	2/26/93	-	-	-	-	-	-	-	-	-
003	4/ 1/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
004	8/22/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
004	8/22/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
004	9/25/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
004	11/27/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
005	8/22/92	-	-	-	-	-	-	-	-	-
005	10/ 2/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
005	1/14/93	11	7	12	16	11	10	16	21	15
005	1/25/93	<5	<5	<5	<5	<5	<5	<5	7	5
005	3/ 3/93	<5	<5	<5	<5	<5	<5	<5	6	<5
005	4/ 5/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
005	4/ 5/93	8	<5	6	<5	<5	<5	6	16	11
005	4/ 9/93	<5	<5	<5	<5	<5	<5	<5	5	<5

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TABLE 7 (continued)
LISTING OF THE ONLY ACID AND BASE/NEUTRAL EXTRACTABLE COMPOUNDS DETECTED IN STORMWATER SAMPLES
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Phen- anthrene (ug/l)	Benzo(a)- anthracene (ug/l)	3,4-Benzo- fluoranthene (ug/l)	Benzo(ghi)- perylene (ug/l)	Benzo(k)- fluoranthene (ug/l)	Bis(2-ethyl- hexyl) phthalate (ug/l)	Chrysene (ug/l)	Fluoranthene (ug/l)	Pyrene (ug/l)
006	9/13/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
006	10/ 2/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
006	3/13/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
006	3/17/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
006	4/15/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	9/13/92	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	1/ 8/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	1/14/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	2/22/93	-	-	-	-	-	-	-	-	-
007	2/26/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	2/26/93	<5	<5	<5	<5	<5	<5	<5	<5	<5
007	3/ 4/93	<5	<5	<5	<5	<5	<5	<5	<5	<5

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TABLE 8
LISTING OF ALL SAMPLES WITH DETECTABLE CONCENTRATIONS OF PESTICIDES
WET WEATHER CHARACTERIZATIONS
SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Heptachlor Epoxide (ug/l)	4,4'-DDE (ug/l)
001	8/21/92	0.1	<0.1
001	9/24/92	-	-
001	10/ 2/92	-	-
001	11/27/92	<0.05	<0.05
001	4/ 1/93	<0.1	<0.1
001	4/ 5/93	<0.1	<0.1
002	8/29/92	-	-
002	9/ 3/92	-	-
002	9/25/92	<0.05	<0.05
002	11/27/92	<0.05	<0.05
002	1/ 8/93	<0.05	<0.05
002	1/25/93	<0.2	<0.2
002	2/22/93	<0.1	0.15
002	4/ 9/93	<0.1	<0.1
003	10/ 2/92	-	-
003	1/26/93	<0.2	<0.2
003	2/26/93	<0.1	<0.1
003	2/26/93	-	-
003	4/ 1/93	<0.05	<0.05
004	8/22/92	<0.1	<0.1
004	8/22/92	<0.1	<0.1
004	9/25/92	<0.05	<0.05
004	11/27/92	<0.05	<0.05
005	8/22/92	-	-
005	10/ 2/92	-	-
005	1/14/93	<0.2	<0.2
005	1/25/93	<0.2	<0.2
005	3/ 3/93	<0.1	1.7
005	4/ 5/93	<0.1	0.11
005	4/ 5/93	<0.1	<0.1
005	4/ 9/93	<0.1	<0.1
006	9/13/92	<0.05	<0.05
006	10/ 2/92	-	-
006	3/13/93	<0.05	<0.05
006	3/17/93	<0.05	<0.05
006	4/15/93	<0.05	<0.05
007	9/13/92	<0.05	<0.05
007	1/ 8/93	<0.05	<0.05
007	1/14/93	<0.2	<0.2
007	2/22/93	-	-
007	2/26/93	<0.1	<0.1
007	2/26/93	<0.1	<0.1
007	3/ 4/93	<0.1	<0.1

TABLE 9
 LISTING OF THE ONLY VOLATILE ORGANIC COMPOUNDS
 DETECTED IN STORMWATER SAMPLES
 WET WEATHER CHARACTERIZATIONS
 SARASOTA COUNTY PART II NPDES PERMIT APPLICATION

Site	Date	Benzene (ug/l)	Ethyl- benzene (ug/l)	Toluene (ug/l)	Methylene Chloride (ug/l)	Trichloro- ethane (ug/l)
001	8/21/92	<1	<1	<1	6	1
001	9/24/92	<1	<1	<1	3	<1
001	10/ 2/92	<1	<1	<1	1	<1
001	11/27/92	<1	<1	1	<1	<1
001	4/ 1/93	<1	<1	<1	<1	<1
001	4/ 5/93	<1	<1	<1	<1	<1
002	8/29/92	-	-	-	-	-
002	9/ 3/92	-	-	-	-	-
002	9/25/92	<1	<1	<1	2	<1
002	11/27/92	<1	<1	<1	<1	<1
002	1/ 8/93	<1	<1	<1	<1	<1
002	1/25/93	<1	<1	<1	<1	<1
002	2/22/93	<1	<1	<1	<1	<1
002	4/ 9/93	<1	<1	<1	<1	<1
003	10/ 2/92	<1	<1	<1	1	<1
003	1/26/93	<1	<1	<1	<1	<1
003	2/26/93	<1	<1	<1	<1	<1
003	2/26/93	<1	<1	<1	<1	<1
003	4/ 1/93	<1	<1	<1	<1	<1
004	8/22/92	1	1	<1	<1	<1
004	8/22/92	-	-	-	-	-
004	9/25/92	<1	<1	<1	1	<1
004	11/27/92	<1	<1	<1	<1	<1
005	8/22/92	-	-	-	-	-
005	10/ 2/92	<1	<1	<1	<1	<1
005	1/14/93	<1	<1	<1	<1	<1
005	1/25/93	<1	<1	<1	<1	<1
005	3/ 3/93	<1	<1	<1	<1	<1
005	4/ 5/93	-	-	-	-	-
005	4/ 5/93	<1	<1	<1	<1	<1
005	4/ 9/93	<1	<1	<1	<1	<1
006	9/13/92	<1	<1	<1	<1	<1
006	10/ 2/92	<1	<1	<1	<1	<1
006	3/13/93	<1	<1	<1	<1	<1
006	3/17/93	<1	<1	<1	<1	<1
006	4/15/93	<1	<1	<1	<1	<1
007	9/13/92	<1	<1	<1	<1	<1
007	1/ 8/93	<1	<1	<1	<1	<1
007	1/14/93	<1	<1	<1	<1	<1
007	2/22/93	-	-	-	-	-
007	2/26/93	<1	<1	<1	<1	<1
007	2/26/93	-	-	-	-	-
007	3/ 4/93	<1	<1	<1	<1	<1

Descriptions of the individual storms sampled follow Table 9, according to land use, and include all events collected and processed. Each event is illustrated as a flow hydrograph (indicated by the square symbol) superimposed on a bar graph of 5 minute rainfall totals. Even when storms do not rigidly meet criteria (entire event, or three hours of collection) these data are presented as well since, in most cases, the samples collected emphasized the initial portions of the storm. Analytical results from samples taken during the first flush or when runoff rates were higher, may well reflect water quality which is worse than when collected under the specified criteria.

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY

The high density residential land use site consists of a basin 2.9 acres in area, with approximately 78 percent Directly Connected Impervious Area (DCIA). The residential units were constructed in 1970 and consist of multistory apartment buildings, pool area, covered parking for residents, and a landscaped open area bordering Sarasota Bay. The site is located at 3800 Gulf of Mexico Dr., on the barrier island of, and in the Town of, Longboat Key. The sampling site captures the runoff from approximately 1/2 of the parking, roadways, and roof surfaces of the entire development, but from little of the landscaped area. At the site, the drainage consists of a 12 inch Reinforced Concrete Pipe (RCP) with a slope of 0.33 percent. The above dimensions, together with a roughness coefficient of 0.012, were used in Manning's equation for the computation of flow from level measurements.

Runoff from the sampling site flows to the east and discharges into Sarasota Bay through a bell-shaped RCP. The outlet is partially submerged under normal high tides and extreme high tides also produce backwater conditions at the sampling site on occasion. Storms which occurred during tidal backwater conditions were not sampled.

LONGBOAT KEY - August 21, 1992

A rainfall event of 0.62 inches was sampled on August 21, 1992. The total rainfall event duration was 55 minutes, from 15:20 until 16:20. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 2.16, 1.36, and 1.02 inches per hour, respectively. The maximum flow rate was 2.05 cfs (0.76 feet in depth) during the event.

Antecedent rainfall for the 72-hour period prior to 15:20 was 0.00 inches. The most recent rainfall event (>0.1 inches) prior to the sampling was 0.50 inches, received between 10:50 and 14:15 on August 15, 6 days prior. No previous analytical data had been reported for this site.

Sampling routines initiated at 15:32, grab samples were collected at 15:47, and flow-weighted composites were secured between 15:34 and 16:14, or for a total period of 42 minutes. The sampled event produced a total of 2,210 cf of runoff. Composite samples were collected between 67 and 2,180 cf, or until 99 percent of the cumulative runoff had occurred. Grab samples were collected after 1,600 cf of runoff.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 08-21-92

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 0.62 (inches)
 Maximum Intensity:
 5 min: 2.16 (inches/hr)
 15 min: 1.36 (inches/hr)
 30 min: 1.02 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 2.05 (cfs)
 Max Flow Depth: 0.76 (feet)
 Total Sampled Vol: 67-2,180 (cf)
 Total Runoff Vol: 2,210 (cf)
 Baseflow Runoff Vol: 0 (cf)

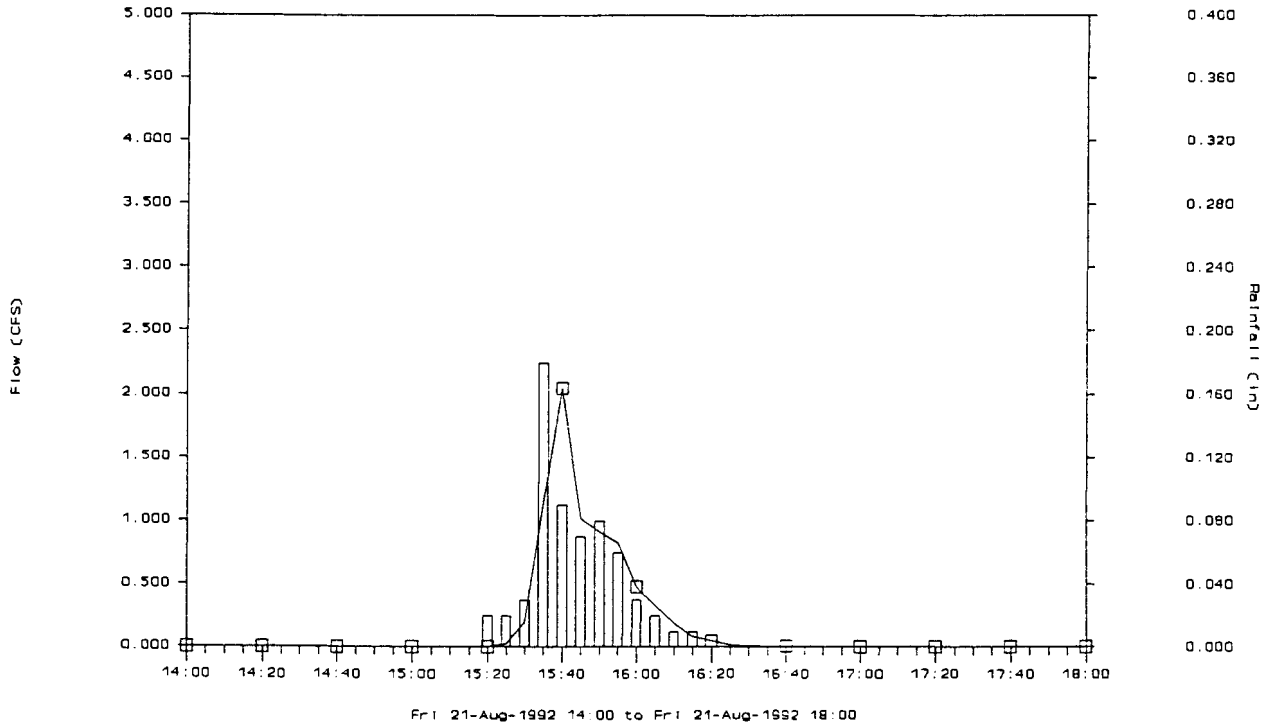
Antecedent Precipitation

24 Hour: 0.00 (inches)
 48 Hour: 0.00 (inches)
 72 Hour: 0.00 (inches)
 Last rain >0.1": 6 (days)

Grab Sample Time: 15:47 (hhmm EST)
 Flow Weighted Sample Times: 15:32-16:14 (hhmm EST)

Composite Flow Interval: 90 (cf)
 No. of Samples: 23

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



LONGBOAT KEY - September 24, 1992

A rainfall event of 0.20 inches was sampled on September 24, 1992. The total rainfall event duration was 15 minutes, from 16:05 until 16:20. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 1.08, 0.76, and 0.40 inches per hour, respectively. The maximum flow rate was 1.09 cfs (0.49 feet in depth) during the event.

Antecedent rainfall for the 72-hour period prior to 16:05 was 0.00 inches. The most recent rainfall event (>0.1 inches) prior to the sampling was 0.28 inches, received between 20:05 and 20:50 on September 18, 6 days prior. The previous analytical data reported for this site were from an event on August 21.

Sampling routines initiated at 16:06, and grab samples were collected at 16:21. An insufficient sample was collected to process the flow-weighted composite for all parameters. All parking and roadway surfaces within the basin, however, had recently been resurfaced with asphalt (completed on September 17, 1992), and the grab sample was analyzed for metals, oil and grease, and acid/base/neutral extractable compounds for information on the contributions from fresh road surfaces. The event produced a total of 530 cf of runoff. Grab samples were collected after 510 cf of runoff.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 09-24-92

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 0.20 (inches)
 Maximum Intensity:
 5 min: 1.08 (inches/hr)
 15 min: 0.76 (inches/hr)
 30 min: 0.40 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 1.09 (cfs)
 Max Flow Depth: 0.49 (feet)
 Total Sampled Vol: N/A (cf)
 Total Runoff Vol: 534 (cf)
 Baseflow Runoff Vol: 0 (cf)

Antecedent Precipitation

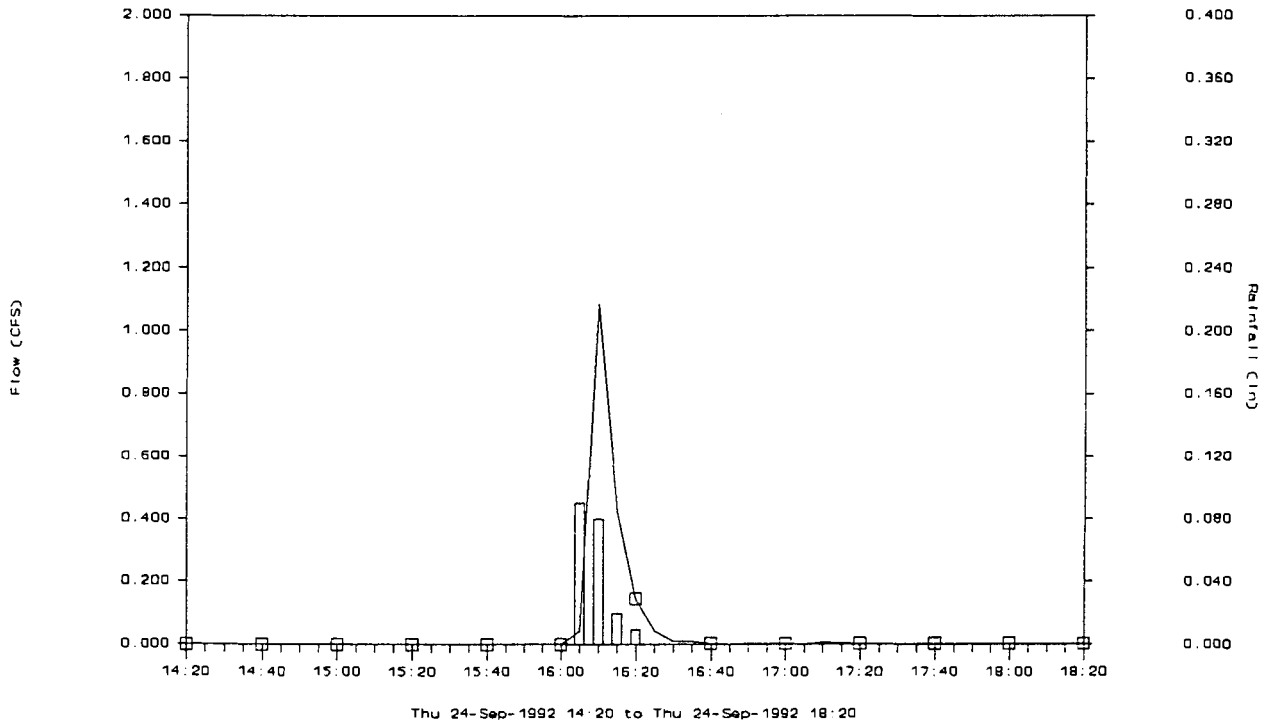
24 Hour: 0.00 (inches)
 48 Hour: 0.00 (inches)
 72 Hour: 0.00 (inches)
 Last rain >0.1": 6 (days)

Grab Sample Time: 16:21 (hhmm EST)
 Flow Weighted Sample Times: N/A (hhmm EST)

N/A = Not applicable

Composite Flow Interval: N/A (cf)
 No. of Samples: N/A

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



LONGBOAT KEY - October 2, 1992

A rainfall event of 2.49 inches, resulting from a frontal weather system, was sampled on October 2, 1992. The total rainfall event duration was 19 hours 50 minutes, from 10:25 until 06:15 on October 3. By 18:25 on October 2, however, high tide produced backwater conditions after 1.59 inches of rain had fallen over a period of 8 hours 40 minutes (illustrated in the following figure). Maximum rainfall intensities during the period without backwater for 5-, 15-, and 30-minute periods were 1.80, 0.68, and 0.60 inches per hour, respectively. The maximum flow rate was 0.79 cfs (0.41 feet in depth) during the event.

Antecedent rainfall for the entire 24-hour period prior to 10:15 totalled 0.12 inches, but was received in numerous small events and with only 0.08 inches generating runoff as follows:

0.01 in	14:50	October 1	no runoff
0.01 in	16:40	October 1	no runoff
0.01 in	21:40	October 1	no runoff
0.06 in	03:05 - 05:20	October 2	runoff probable, but site backwatered during the period
0.01 in	06:15	October 2	no runoff
0.02 in	08:10 - 08:30	October 2	runoff of 65 cf

In the 48-hour period prior to sampling an additional 0.05 inches of rainfall was received, and another 0.02 inches received in the 72-hour period prior. The most recent rainfall event (>0.1 inches) prior to the sampling was 1.73 inches received between 17:00 and 21:20 on September 25, 7 days prior. The previous analytical data reported for this site were from an event on September 24.

Sampling routines initiated at 10:36, grab samples were collected at 10:51, and flow-weighted composites were secured between 10:40 and 14:25, or over a total period of 3 hours 49 minutes.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 10-02-92

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 2.49/1.59* (inches)
 Maximum Intensity:
 5 min: 1.80 (inches/hr)
 15 min: 0.68 (inches/hr)
 30 min: 0.60 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 0.79 (cfs)
 Max Flow Depth: 0.41 (feet)
 Total Sampled Vol: 86-2,030 (cf)
 Total Runoff Vol: 2,530* (cf)
 Baseflow Runoff Vol: 0 (cf)

Antecedent Precipitation

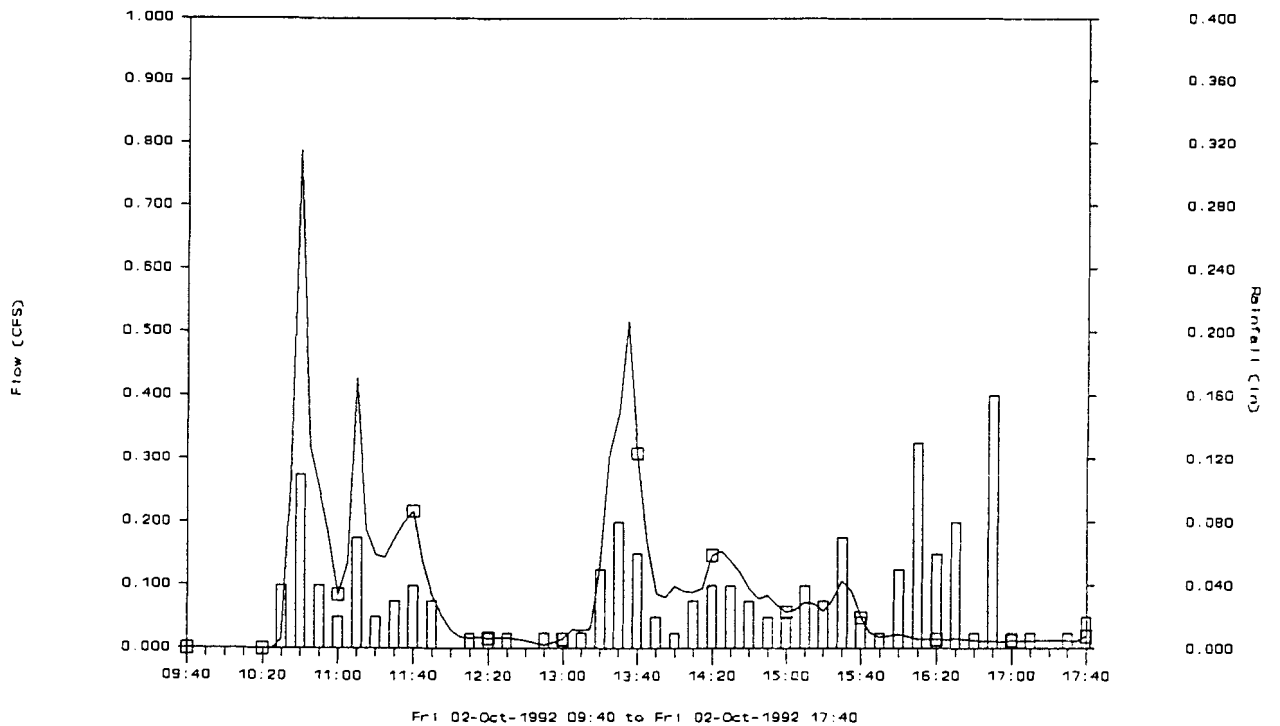
24 Hour: 0.12* (inches)
 48 Hour: 0.17 (inches)
 72 Hour: 0.19 (inches)
 Last rain >0.1": 7 (days)

Grab Sample Time: 10:51 (hhmm EST)
 Flow Weighted Sample Times: 10:36-14:25 (hhmm EST)

*See Text

Composite Flow Interval: 175 (cf)
 No. of Samples: 11

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



The sampled event produced a total of 2,530 cf of runoff until high tide produced a backwater at the sampling site. Composite samples were collected between 86 and 2,030 cf of the cumulative runoff, or until 80 percent of the total runoff before backwatering had occurred. Grab samples were collected at 500 cf of runoff.

Due to laboratory error, the flow-weighted sample from this event was not analyzed for pesticides. The remainder of the analyses were processed normally.

LONGBOAT KEY - November 27, 1992

A rainfall event of 0.68 inches, resulting from a frontal weather system, was sampled on November 27, 1992. The total rainfall event duration was 7 hours 25 minutes, from 07:00 until 14:25, with sporadic rainfall continuing (although with no runoff) from 16:20 until 20:55. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 0.84, 0.56, and 0.36 inches per hour, respectively. The maximum flow rate was 0.60 cfs (0.36 feet in depth) during the event.

Antecedent rainfall for the 72-hour period prior to 07:00 was 0.00 inches. The most recent rainfall event (>0.1 inches) prior to the sampling was 0.23 inches, received between 05:30 and 09:50 on November 18, 9 days prior. The previous analytical data reported for this site were from an event on October 2.

Sampling routines initiated at 07:10, grab samples were collected at 07:15, and flow-weighted composites were secured between 07:14 and 10:08, or over a total period of 2 hours 58 minutes. Flow had declined to less than 0.01 cfs as the last composite sample was collected.

The sampled event produced a total of 1,060 cf of runoff by 13:05. Composite samples were collected between 190 and 980 cf of the cumulative runoff or until 93 percent of the total runoff had occurred. Grab samples were collected at 370 cf of runoff.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 11-27-92

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 0.68 (inches)
 Maximum Intensity:
 5 min: 0.84 (inches/hr)
 15 min: 0.56 (inches/hr)
 30 min: 0.36 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 0.60 (cfs)
 Max Flow Depth: 0.36 (feet)
 Total Sampled Vol: 190-980 (cf)
 Total Runoff Vol: 1,060 (cf)
 Baseflow Runoff Vol: 0 (cf)

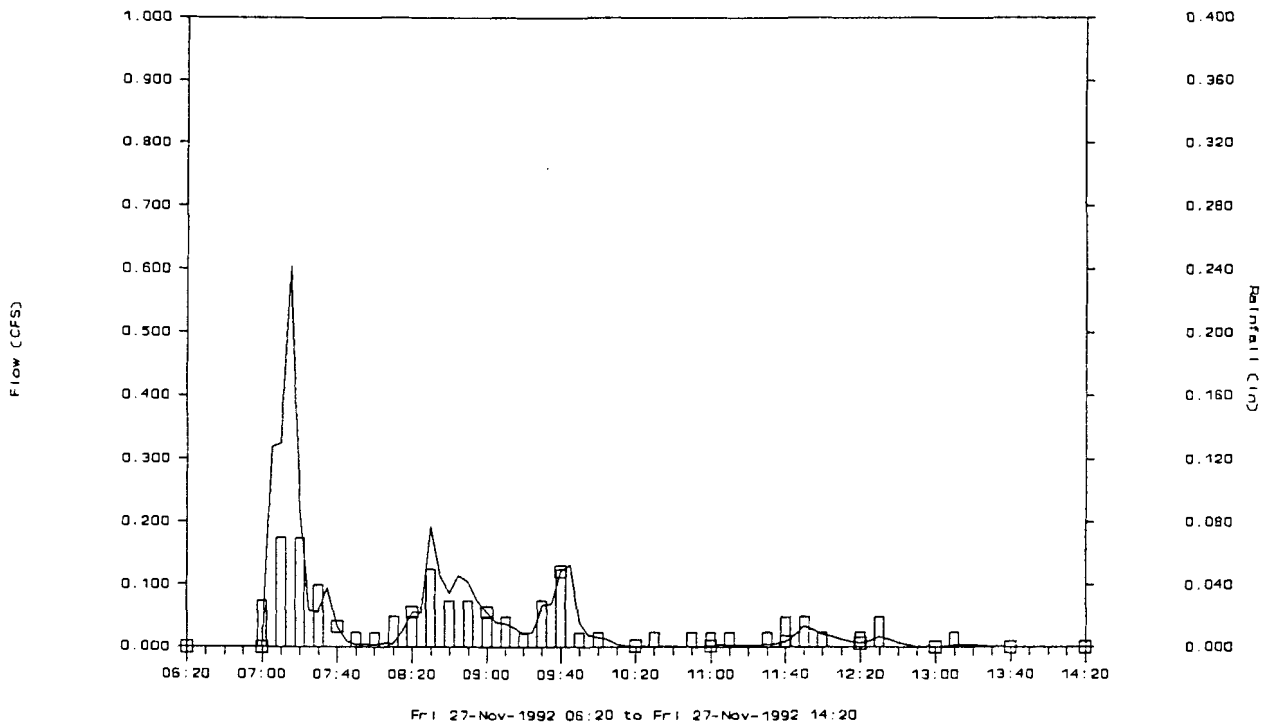
Antecedent Precipitation

24 Hour: 0.00 (inches)
 48 Hour: 0.00 (inches)
 72 Hour: 0.00 (inches)
 Last rain >0.1": 9 (days)

Grab Sample Time: 07:15 (hhmm EST)
 Flow Weighted Sample Times: 7:10-10:08 (hhmm EST)

Composite Flow Interval: 160 (cf)
 No. of Samples: 5

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



LONGBOAT KEY - April 1, 1993

A rainfall event of 2.62 inches, resulting from a frontal weather system, was sampled on April 1, 1993. The total event duration was 6 hours 5 minutes, from 01:35 until 07:40. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 2.88, 2.16, and 1.78 inches per hour, respectively. Maximum flow rates were 2.22 cfs (1.11 feet in depth) during the event. Surcharged conditions (depths > 1.00 feet) existed only for a single 5 minute observation, and were not expected to substantially affect accuracy of flow measurements.

Antecedent rainfall for the 72-hour period prior was 0.00 inches. The most recent rainfall event prior to the sampling was 0.93 inches, received between 09:40 and 22:20 on March 19, 13 days prior. The previous analytical data reported for this site was from an event November 27, 1992.

Sampling routines initiated at 01:44, grab samples were collected at 01:53, and flow-weighted composites were secured between 01:46 and 02:07, or over a total period of 23 minutes. Although sampling did not continue for either three hours or for the entire event, and although rainfall amounts were above the upper criteria for April, samples were processed since the composite sample was collected during the first flush of the storm.

The sampled event produced a total of 8,900 cf of runoff. Composite samples were collected between 420 and 2,580 cf of the cumulative runoff, or until 30% of the runoff had occurred. Grab samples were collected at 1,490 cf of total runoff.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 04-01-93

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 2.62 (inches)
 Maximum Intensity:
 5 min: 2.88 (inches/hr)
 15 min: 2.16 (inches/hr)
 30 min: 1.78 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 2.22 (cfs)
 Max Flow Depth: 1.11 (feet)
 Total Sampled Vol: 420-2,580 (cf)
 Total Runoff Vol: 8,900 (cf)
 Baseflow Runoff Vol: 0 (cf)

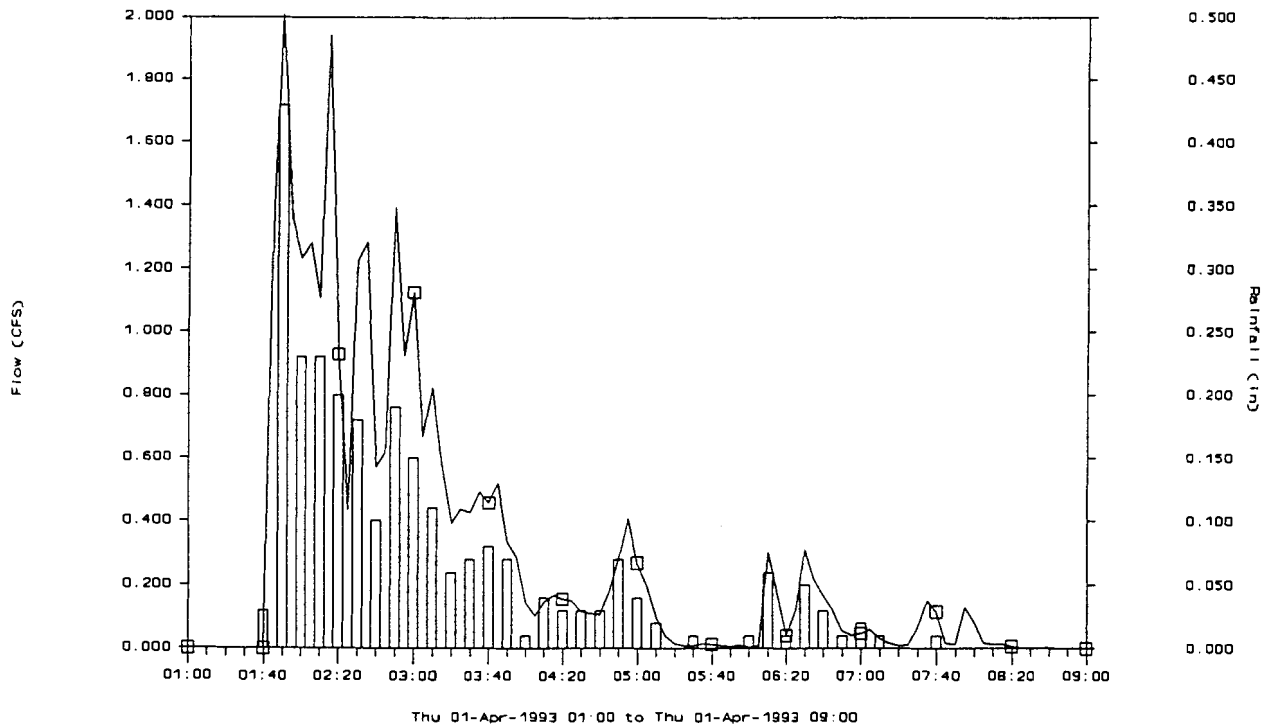
Antecedent Precipitation

24 Hour: 0.00 (inches)
 48 Hour: 0.00 (inches)
 72 Hour: 0.00 (inches)
 Last rain >0.1": 13 (days)

Grab Sample Time: 01:53 (hhmm EST))
 Flow Weighted Sample Times: 01:44-02:07 (hhmm EST))

Composite Flow Interval: 180 (cf)
 No. of Samples: 12

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



LONGBOAT KEY - April 5, 1993

A rainfall event of 0.73 inches, resulting from a frontal weather system, was sampled on April 5, 1993. The total event duration was 3 hours 20 minutes, from 23:15 on April 4 until 02:35, April 5. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 1.08, 0.92, and 0.78 inches per hour, respectively. High tide produced backwater at the sampling site at the initial portion of the event, between 22:40, April 4, and 00:55, April 5. During this period of backwater, rainfall amounts totalled 0.13 inches of the 0.73 event total and intensities were light. The bulk of the rainfall with the highest intensity was received after the tide had fallen and the sampler program initiated. Maximum flow rates were 0.86 cfs (0.43 feet in depth) during the event.

Antecedent rainfall for the 72-hour period prior was 0.00 inches. The most recent rainfall event prior to the sampling was 2.62 inches, received between 01:35 and 07:40 on April 1, 4 days prior. The previous analytical data reported for this site was from an event on April 1.

Sampling routines initiated at 01:21, grab samples were collected at 01:31, and flow-weighted composites were secured between 01:22 and 02:08, or over a total period of 47 minutes.

The sampled event produced a total of 1,590 cf of runoff after tidal backwater had receded. Composite samples were collected between 170 and 1,490 cf of the cumulative runoff, or until 94% of the runoff had occurred. Grab samples were collected at 860 cf of total runoff.

NPDES PART 2 STORM EVENT SUMMARY DATA

SITE NAME: LONGBOAT KEY

SITE ID: 001

STORM DATE: 04-05-93

Site Characteristics

Drainage Area: 2.9 (acres)
 % Impervious: 78 %
 Land Use: High Density Residential

Storm Precipitation Data Summary

Site Precipitation: 0.73/0.60* (inches)
 Maximum Intensity:
 5 min: 1.08 (inches/hr)
 15 min: 0.92 (inches/hr)
 30 min: 0.78 (inches/hr)

Storm Flow Data Summary

Peak Flow Rate: 0.86 (cfs)
 Max Flow Depth: 0.43 (feet)
 Total Sampled Vol: 170-1,490 (cf)
 Total Runoff Vol: 1,590* (cf)
 Baseflow Runoff Vol: 0 (cf)

Antecedent Precipitation

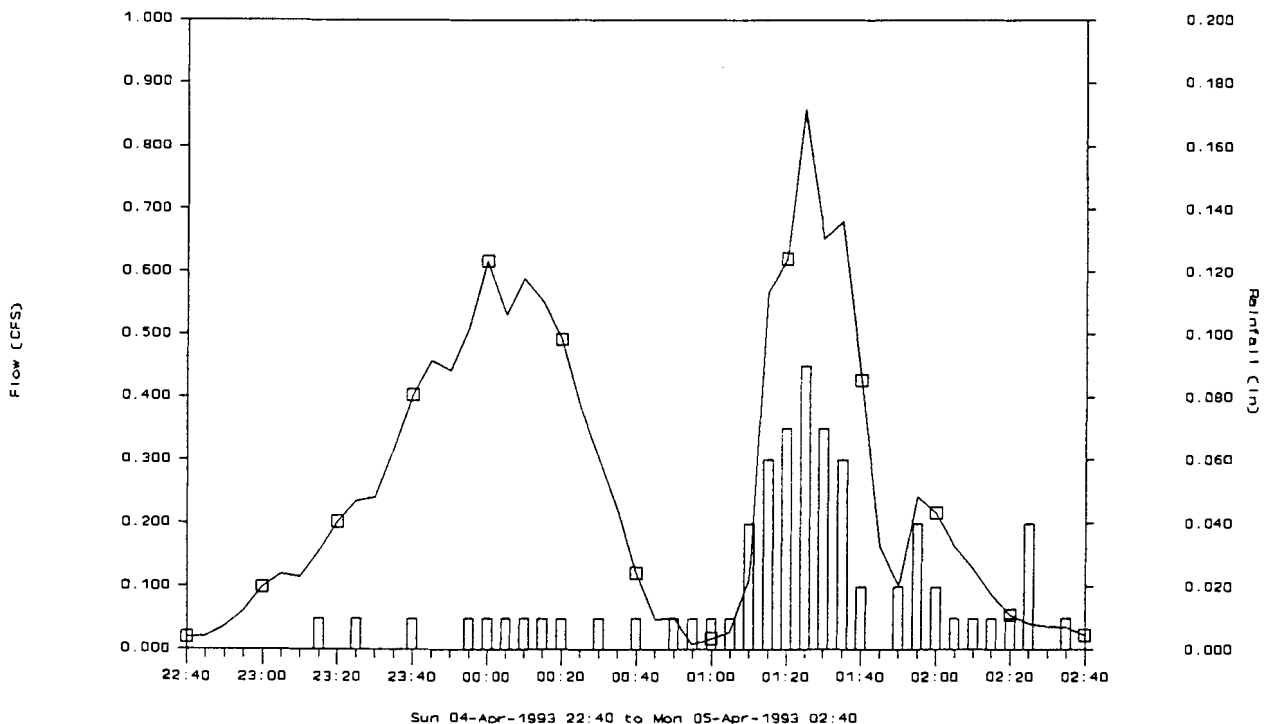
24 Hour: 0.00 (inches)
 48 Hour: 0.00 (inches)
 72 Hour: 0.00 (inches)
 Last rain >0.1": 4 (days)

Grab Sample Time: 01:31 (hhmm EST)
 Flow Weighted Sample Times: 01:21-02:08 (hhmm EST)

*See Text

Composite Flow Interval: 180 (cf)
 No. of Samples: 7

HIGH DENSITY RESIDENTIAL - LONGBOAT KEY



INDUSTRIAL - EAST AVE.

The industrial land use site captures the runoff from a basin 9.5 acres in area, with approximately 70 percent DCIA. The industries represented are small, and include automobile repair and fuel oil storage. Most of the buildings were constructed between 1970 and 1985. The sampling site is at approximately 1800 East Ave., in the City of Sarasota and consists of a 30 inch RCP with a slope of 0.43 percent. These dimensions were used in Manning's equation, together with a roughness coefficient of 0.012, for the computation of flow from level measurements.

Discharge from the RCP flows to the south and falls into a small (10 ft diameter) pool. The pool is connected by a small ditch of some 20 ft in length with a large drainageway flowing from east to west. Depending on water levels in the larger drainageway and rainfall received during the event, the site is frequently subjected to backwatering from the larger ditch. In order to characterize the runoff from the industrial basin alone, some sampled events were restricted to only the runoff from the initial stages of the event, before the larger ditch submerged the sampled outfall. When the backwater conditions occurred, this was typically prior to either the completion of the entire runoff event or before the required 3-hour sampling period had elapsed.

EAST AVE. - August 29, 1992 - Bacteria Only

A rainfall event of 0.49 inches was sampled on August 29, 1992, consisting of three small but closely spaced storms of 0.10, 0.18, and 0.21 inches, respectively. The rainfall event duration of the entire 0.49 inches was 4 hours 45 minutes, from 10:50 until 15:35. Maximum rainfall intensities for 5-, 15-, and 30-minute periods were 1.56, 0.80, and 0.40 inches per hour, respectively. The maximum flow rate was 1.37 cfs (0.37 feet in depth) during the event. A baseflow of 0.03 cfs was present as the event began.

Antecedent rainfall for the 24-hour period prior to 10:50 was 0.01 inches. The 48-hour and 72-hour antecedent rainfall totals were 0.01 inches, as well. The most recent rainfall event (>0.1 inches) prior to the sampling was 0.97 inches, received between 13:05 and 14:50 on August 14, 15 days prior. No previous analytical data were reported for this site.

Sampling routines were initiated at 11:40, with the grab samples collected at 11:55, after 1,230 cf of runoff. The event produced a total of 4,960 cf of runoff, of which 3,890 cf could be attributed to the event, and 1,070 cf to baseflow. An insufficient sample was collected for the analysis of all parameters from the flow-weighted composite, and so the sample was processed for bacteriological parameters alone.

