

Appendix C

Watershed Management

Sarasota County Comprehensive Plan

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APPENDIX C: WATERSHED MANAGEMENT**Section I. Wastewater Treatment Facilities in Sarasota County**

WASTEWATER FACILITY		LAND USE SERVED	CAPACITY MGD	AVG. FLOW MGD
SARASOTA COUNTY OWNED				
1	Atlantic	res./comm.	1.7500	0.4300
2	Bee Ridge (Expansion underway)	res./comm.	7.0000	1.4900
3	Central County	res./comm.	4.0000	1.3300
4	Gulf Gate	res./comm.	1.8000	1.5800
5	Meadowood	res./comm.	0.9840	0.6000
6	Nokomis Community Park	school/gvt	0.0068	0.0000
7	Plantation (Inactive)	res./comm.	0.6600	0.1800
8	Proctor Road	residential	0.0250	0.0100
9	South Gate	res./comm.	1.8600	1.1400
10	Venice Gardens	res./comm.	2.0000	1.4800
FRANCHISED / PRIVATE UTILITIES				
11	Aqua Utilities Florida, Inc. (Fruitville)	res./comm.	2.4000	0.2540
12	Beekman Place Utilities	residential	0.0900	0.0380
13	Lake Forest Condominium	residential	0.0300	0.0000
14	Medical Center of Sarasota	res./comm.	0.0150	0.0000
15	Siesta Key Utility Authority	res./comm.	2.7000	1.5700
16	Sylvan Lea	residential	0.0300	0.0100
17	Woodbridge Estates	residential	0.0150	0.0100
MUNICIPALITIES				
18	City of North Port	res./comm.	3.7000	1.2100
19	City of Sarasota	res./comm.	10.2000	6.1400
20	City of Venice / East Side	res./comm.	6.0000	1.5500

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Section I. Wastewater Treatment Facilities in Sarasota County

WASTEWATER FACILITY	LAND USE SERVED	CAPACITY MGD	AVG. FLOW MGD	
OTHER WASTEWATER TREATMENT FACILITIES				
21	2224 South Trail WWTF	comm./ind.	0.0030	0.0000
22	Arbors MHP	m.h.p.	0.0300	0.0200
23	Bahia Vista Estates MHP	m.h.p.	0.0400	0.0200
24	Camelot Lakes MHP	m.h.p.	0.1680	0.1100
25	Fairwinds Condominium Village	residential	0.0150	0.0100
26	Florida Pines MHC	m.h.p.	0.0105	0.0000
27	Happy Haven MHP	m.h.p.	0.0075	0.0100
28	HealthSouth of Sarasota	health care	0.0100	0.0100
29	Japanese Gardens MHP	m.h.p.	0.0480	0.0300
30	Kings Gate Club MHP	m.h.p.	0.0500	0.0200
31	Kings Gate RV Park	m.h.p.	0.0400	0.0300
32	Lake Tippecanoe	other res.	0.0400	0.0200
33	Lake Village MHP	m.h.p.	0.0450	0.0220
34	Lyons Cove Condominium	other res.	0.0050	0.0000
35	Manasota Beach Gardens	other res.	0.0098	0.0010
36	Manatee Community College	school/gvt.	0.0140	0.0100
37	Myakka MHP	m.h.p.	0.0083	0.0100
38	Myakka River State Park	school/gvt.	0.0150	0.0000
39	New Gate School	school/gvt.	0.0084	0.0000
40	Oak Ford	residential	0.0600	0.0300
41	Oakwood Gardens Condominium	other res.	0.0090	0.0000
42	Oscar Scherer State Recreation Area	school/gvt.	0.0150	0.0000
43	Our Lady of Perpetual Help	other res.	0.0082	0.0000
44	Park Place Villas	other res.	0.0080	0.0000
45	Peterson Manufacturing	comm./ind.	0.0033	0.0000

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WASTEWATER FACILITY	LAND USE SERVED	CAPACITY MGD	AVG. FLOW MGD
46 Polynesian Village MHP	m.h.p.	0.0400	0.0200
47 Ramblers Rest RV Resort	m.h.p.	0.0500	0.0200
48 RPC-Florida, LLC	comm./ind.	0.0033	0.0000
49 Sarasota Memorial Hospital	comm./ind.	0.0250	0.0000
50 Spanish Lakes MHP	m.h.p.	0.0600	0.0300
51 TriState MHP	m.h.p.	0.0100	0.0100
52 Venetian MHP	m.h.p.	0.0300	0.0100
53 Venice Campgrounds	m.h.p.	0.0100	0.0100
54 Venice Ranch MHP	m.h.p.	0.0350	0.0200
55 Yoders Restaurant	comm./ind.	0.0050	0.0000

Source: Sarasota County Water Resources

APPENDIX C: WATERSHED MANAGEMENT**Section 2: Community Potable Water Systems**

FACILITY	LAND USE	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLON)	STORAGE (GALLONS)
COUNTY OWNED AND OPERATED				
Sarasota County Utilities	res/comm	22,100,000	12,420,057	14,000,000
Sarasota County Utilities	res/comm	2,510,000	1,219,917	3,260,000
COUNTY DEPENDENT FRANCHISES				
Dolomite Utilities	res/comm	N/A	229,167	N/A
Kensington Park Utilities	res/comm	N/A	457,167	N/A
Siesta Key Utilities	res/comm	N/A	1,906,750	N/A
United Water Southgate	res/comm	N/A	991,000	N/A
ENGLEWOOD WATER DISTRICT				
Englewood Water District	res/comm	5,550,000	2,257,667	7,600,000
MUNICIPAL SYSTEMS				
North Port, City of	res/comm	4,400,000	1,246,250	1,000,000
Sarasota, City of	res/comm	12,000,000	7,252,094	5,430,000
Venice, City of	res/comm	4,000,000	2,305,417	3,100,000
OTHER				
Arbors Mobile Home Park	m.h.p.	38,000	20,745	26,000
Bay Lake Mobile Home Park	m.h.p.	50,000	29,000	30,000
Camelot Lakes	m.h.p.	200,000	125,650	245,000
Fairwinds Condo	other res.	18,000	8,350	16,000
Florida Pines Mobile Home Court	m.h.p.	18,000	7,065	5,400
Japanese Gardens	m.h.p.	80,000	39,965	45,000
Kings Gate Club	comm/ind	60,000	32,030	30,000
Lake Tippecanoe	other res.	60,000	40,558	25,000
Lake Village Mobile Home Park	m.h.p.	72,000	30,737	80,000
Myakka Mobile Home Park	m.h.p.	17,000	7,889	2,200

APPENDIX C: WATERSHED MANAGEMENT**Section 2: Community Potable Water Systems**

FACILITY	LAND USE	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLON)	STORAGE (GALLONS)
Pine Shores Trailer Park	m.h.p.	53,000	23,358	29,100
Ramblers Rest Resort	m.h.p.	75,000	27,508	28,000
Sarasota Bay Mobile Home Park	m.h.p.	12,000	4,564	4,000
Spanish Lakes Mobile Home Park	m.h.p.	94,000	51,300	43,000
Sun-N-Fun Resort	m.h.p.	195,000	64,042	195,000
Venice Ranch Mobile Home Estates	m.h.p.	35,000	14,583	20,000
Windward Isles Mobile Home Park	m.h.p.	39,500	23,000	20,250
TOTAL		52,835,900	33,920,812	37,157,690

Source: Drinking Water Program Inventory, Sarasota County Public Health Unit, January 2004

APPENDIX C: WATERSHED MANAGEMENT**Section 3: Non-Community Potable Water Systems**

FACILITY	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLONS)	STORAGE (GALLONS)
American Pantry	1,500	396	400
Ashton Mennonite Church	7,000	75	250
Bee Ridge Professional Center	9,500	250	1,000
Briandi's Restaurant	9,600	487	150
Gulf Breeze Inn	7,200	309	150
Captain Eddie's Seafood	3,000	396	150
Casey Key Marina	9,000	205	1,200
Casperson's Beach	7,200	2,209	232
Church of the Holy Spirit	4,000	85	120
Club 41	3,000	639	150
Coastal Mini Mart	2,000	223	162
Country Club Apartments	3,000	2,500	1,300
Courthouse Plaza Warehouse	800	400	120
Crazy Pappa's	3,500	600	82
Disabled American Veterans	4,800	250	200
Elks Lodge #2495	3,000	504	150
Englewood Racquet Club	7,200	251	400
Farm Stores #1657	2,500	450	82
Four Bays Plaza	7,200	643	284
Foxfire Golf Club	6,000	406	120
Foxfire Golf Club -- Oak	3,000	70	150
Fraternal Order of Eagles	3,000	938	340
Frosted Mug	2,000	158	20
Anita's Restaurant	1,700	154	500

APPENDIX C: WATERSHED MANAGEMENT**Section 3: Non-Community Potable Water Systems**

FACILITY	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLONS)	STORAGE (GALLONS)
Gator Creek Golf Club	20,000	2,503	700
Grappin Clinic	2,880	500	120
Kenmar	4,000	3,316	150
Knight's Trail Park	2,000	971	672
Laurel Mobile Home Park	3,950	2,077	82
Mama Mia's Restaurant	2,500	1,259	120
Meadows Trailer Park	8,640	2,468	120
Myakka Methodist Church	5,000	50	120
Myakka River Oyster Bar & Inn	32,000	421	120
Myakka River State Park – RO	50,000	9,774	20,000
Nokomis Groves	14,000	958	300
Nokomis Motor Inn	21,600	700	900
Myakka Pines Golf Club	7,200	1,634	682
North Port Elks Lodge	3,000	1,125	366
Oak Ford Golf Club	2,000	830	120
Osprey Village Shopping Center	3,000	420	120
Palmer Road House	4,000	192	82
Payless Oil #6	12,000	552	250
Pelican Alley	4,000	1,955	550
Pizza Hut	8,250	692	240
Pour House Bar	2,500	183	50
Rosie's	3,000	489	80
St. Margrets of Scotland	1,500		120
Sarasota Golf Club	35,500	1,630	200
Scott Paint Plaza	5,500	50	100
Christian Healing Center	5,000	500	150

APPENDIX C: WATERSHED MANAGEMENT**Section 3: Non-Community Potable Water Systems**

FACILITY	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLONS)	STORAGE (GALLONS)
Shamrock Park	40,000	505	14500
Shoprite Mowers	7,200	500	82
Snook Haven	3,000	1,352	300
South Bridge Plaza	3,500	77	200
South County Plaza	7,200	971	150
South Venice Yacht Club	1,100	150	1,100
Speedway – Starvin Marvin	4,800	227	150
Pop’ Golf and Batting Center	2,500	60	120
Superbowl	12,000	1,073	3,100
Tatum Ridge Golf Rest Station	3,000	277	120
Tides Inn Motel	6,500	2,000	250
Trinity Presbyterian Church	2,000	409	264
Unity Church on the Gulf	8,500	500	120
Venice Apostolic Church	2,000	150	120
Venice Bible Church	14,400	300	300
Venice Campground Trailer Park	28,800	5,656	5,000
Venice Chrysler Plymouth	2,000	500	162
Venice Church of Christ	3,000	300	40
Warm Mineral Springs	12,000	1,664	2,600
Warm Mineral Springs Inn	31,120	3,500	960
Wingate Plaza	3,500	300	276
Gentle Dental	5,760	947	150

Source: Drinking Water Program Inventory, Sarasota County Public Health Unit, January 2004

APPENDIX C: WATERSHED MANAGEMENT**Section 4: Non-Transient Non-Community Potable Water Systems**

FACILITY	DESIGN CAPACITY (GALLONS)	AVERAGE DAILY FLOW (GALLONS)	STORAGE (GALLONS)
AAA Auto Club of the South	3000	618	300
Bayfront Trailer Court	43,200	2,637	1,500
Christ United Methodist Church	4,800	902	800
1872 S. Tamiami Trail	3,000	1,292	300
Hap's Honda	2,000	441	200
Holiday Center (non community)	10,800	673	150
King's Gate Travel Trailer Park	60,000	15,574	30,000
Loral Data Systems	78,000	26,814	10,000
Matthews Currie Ford	38,000	1,715	570
Newgate School	4,000	811	120
Pac-Tec	8,000	3,537	120
Pepsi-Cola of Sarasota	2,500	875	82
Peterson Manufacturing Company	17,000	10,395	240
Phoenix Professional Center (non community)	2,400	559	150
Playschool Nursery	3,000	630	82
Restwood Lodge	7,000	3,483	1,000
Sarasota International Trade Ctr.	64,800	7,394	250,000
Scott Paint	98,000	2,152	2,220
Senior Friendship Center	36,000	1,517	500
Shamrock Child Care	7,200	222	200
Southern Spring & Stamping	8,200	1,008	500
Venice Lincoln Mercury	9,600	732	200

Source: Drinking Water Program Inventory, Sarasota County Public Health Unit, January 2004

Section 5: Sarasota County's Watershed's Hydrologic Setting and Water Budget:

The basic Water Budget is given as:

$$P \pm \text{OIE} = \text{ET} + \text{R} + \text{GR} \pm \text{DeltaS}$$

Where:

P = Precipitation

OIE = Outside Imports/Exports (i.e. water supply and irrigation inputs from other watersheds)

ET = Evapotranspiration

R = Runoff (surface and subsurface)

GR = Ground Water Recharge

DeltaS = Change in storage

Sarasota County's hydrologic setting includes an average annual rainfall of 54 inches (although this can vary significantly from year to year) and a unique geologic feature known as the Venice Clay. This Venice Clay layer lies generally between 50 to 100 feet below the surface, is about 30 feet thick, and encompasses essentially the entire County. The Venice Clay layer is effective in limiting recharge to the deeper, water producing aquifers where wells are typically located. Conversely, pumping from these water-producing aquifers below the Venice Clay layer has minimum impact on water levels on the surface (i.e. lakes and wetlands). This has important implications from a water budget standpoint in that recharge losses are minimal. Recharge to the surficial aquifer located above the Venice Clay Layer is either lost to evapotranspiration (ET) or appears as delayed runoff.

Since the confining Venice Clay layer minimizes the ground water recharge of the deeper aquifers from the surface, and considering that the change in surface storage for a "stable" watershed over an extended period of time is either negligible, the water budget equation for Sarasota County can be simplified as follows:

$$P \pm \text{OIE} = \text{ET} + \text{R}$$

Measuring the amount of water that flows by a given location actually reflects the total amount of runoff, TR, including that which is imported or exported into or out of the watershed. Therefore, direct measurements can yield the total amount of freshwater including surface, sub-surface, and outside inputs that a given watershed contributes to the receiving water body. For an urban watershed with no surface water withdrawals or diversions, one would expect contributions of surface water (due to impervious surfaces) as well as wastewater and irrigation contributions to be greater than a natural watershed.

As indicated by the water budget equation, the various parameters that can effect the amount of freshwater that ultimately flows out of the watershed into the bays and estuaries is a function of the amount of precipitation, P, evapotranspiration, ET, aquifer recharge, GR, and other imports or exports of water, OIE, such as irrigation water originating from outside the surface of the watershed or ground water deep beneath it.

Precipitation, P

The long-term average annual precipitation in the Sarasota County area is 54 inches. However, this annual precipitation may vary widely depending upon natural drought and wet cycles. It is assumed that this long-term annual average is relatively constant and independent of land use changes in the watershed.

Evapotranspiration, ET

The amount of the water budget “lost” to evapotranspiration can vary between 30 to 60 inches per year. Evapotranspiration may vary depending upon the amount of water available, both vertically and the percent of the watershed that is horizontally under water. So the greater the aerial extent of lakes and wetlands in a watershed and the deeper the water in these wetlands and lakes or the higher the water table in the water column, the greater the potential for evapotranspiration.

As a watershed urbanizes, the aerial extent of water bodies such as wetlands has historically decreased. In addition, impervious surfaces are created that prohibit the ability of the watershed to absorb water into the surficial water table, particularly during the dry season. As a result, there is less water available for evapotranspiration. Therefore, urban/suburban land use changes would tend to reduce the amount of evapotranspiration in a watershed. In general, this water budget component would be converted to runoff.

Aquifer Recharge, GR

Due to the confining Venice Clay layer, aquifer recharge is primarily limited to the surficial water table. As a watershed is developed and impervious surfaces are added, it is essentially the surficial water table that is not recharged and desensitized to otherwise natural fluctuations. However, studies in Sarasota County have indicated that even in natural or rural watersheds, much of the water that is absorbed into the surficial water table does appear as sub-surface runoff during the wet season.

Section 6 Analysis of Water Quantity

The installation of man-made drainage canals alters the hydrology of an area by inducing greater rates of surface and sub surface runoff. The drainage canals typically link into natural creek or river systems, which in turn empty into the saltwater bays of the area. Thus, more of the rain falling within the County is transported to the Gulf and lost as a water resource than would be the case if there were no canals. As a consequence, the water table is lowered below natural levels and the estuary systems of the bays are impacted by changes in freshwater flows and the timing of those flows, while the capacity of the canal system, although adequate for agriculture, has been found, in some cases, to be inadequate for developed urban conditions.

Development increases runoff by increasing flow velocity and flow volume due to the presence of impervious surfaces. Flow velocity and volume increase significantly when the path is changed from rough surfaces, such as woodland, grassland, or natural channels to smoother surfaces, such as parking lots, diversions, storm sewers, gutters, and lined channels. The creation of large expanses of impervious surfaces also prohibits water storage in the soils they cover. The impervious surfaces compound the problem, because runoff rates and volumes are increased while natural water storage capacity is lost.

The increased amount of runoff places greater stress on the drainage system, which results in increased chances for flooding during periods of heavy rainfall. The storm in June 1992 resulted in a significant amount of rainfall and subsequent flooding throughout the County. Statistically the storm resulted in 24 hour rainfall amounts which would not be expected to occur more often than once in 25 to 50 years on the average and 3 day total amounts which would not be expected more often than once in 100 years on the average. Significant wide spread flooding also occurred in June 1995.

These concerns are being addressed by the Basin Master Planning Program. The planning process will develop runoff hydrographs and water surface profiles for existing and future (Year 2010) land uses for 2-year, 5-year, 10-year, 25-year and 100 year, 24-hour storm events for each basin. Each Basin Master Plan will also identify improvements needed to the County drainage systems within each basin to provide acceptable level of service standards to the maximum extent practicable for each planning area.

Development of drainage basin master plans was initiated by the County in 1991 when the Board of County Commissioners authorized the preparation of detailed basin master plans for Phillippi Creek and Hudson Bayou. Basin master plans for Matheny Creek and Gottfried Creek were initiated in 1992, and for Forked Creek and Elligraw Bayou in 1993. A plan for Cow Pen Slough was initiated in 1994. In 1995, studies were initiated for both North Creek and South Creek. Studies for Hatchett Creek, Curry Creek, Woodmere basin, Ainger Creek and Holiday Bayou were underway in 1996.

In July 1995, the Board of County Commissioners authorized staff to accelerate the County's Basin Master Planning Program. The Board's action was taken in response to flooding which occurred throughout the County in June 1992 and July 1995.

The Basin Master Plan for Phillippi Creek was completed in December 1994. The Phillippi Creek Basin Master Plan is a watershed wide plan formulated with the goals of improving water quality and preventing flooding of residential structures by 100-year 24-hour storm events. Development of the Plan involved evaluation of several alternatives.

The Celery Fields Regional Stormwater Project is the cornerstone of the Phillippi Creek Basin Master Plan. Such a regional facility provides advantages in control, maintenance and efficiency over individual onsite facilities. Proposed to temporarily store approximately 1,000 acre-feet of stormwater runoff, the facility will reduce flood levels downstream to correct existing level of service deficiencies. Expansion of the facility to service new development in lieu of individual onsite facilities is being considered during project design. New development would fund its share of the expansion.

Since Fiscal Year 1993-1997 the Capital Improvement Plan (CIP) has contained funding for projects located throughout the watershed that are needed to implement the Phillippi Creek Basin Master Plan. The projects include regional stormwater facilities to retain and store flood waters, channel widening projects, and drainage structure enlargement projects to reduce flooding and improve water quality. The projects have been prioritized for construction based on the type and amount of potential flood damages which would be reduced. Actual construction of projects is based on a phasing schedule with construction timed such that improvements in one area will not result in exacerbation of flooding in other areas.

Sarasota County Ordinance No.81-12, Land Development Regulations, provides regulations that guide development as it pertains to attenuation and drainage of surface water runoff. The purpose of the Regulations is to protect and maintain the existing drainage level of service. However, some drainage basins have downstream reaches which do not have the capacity to provide an acceptable level of service under existing conditions. In those cases, Ordinance No. 81-12 provides that post-development runoff may be restricted to less than pre-development runoff levels until deficiencies are corrected to an acceptable level of service.

To further address such areas of known stormwater problems, the Board of County Commissioners passed Sarasota County Resolution No.95-278 in November 1995. This Resolution augments the Land Development Regulations, by designating areas of concern, and establishing allowable peak outflows and critical capacities. Areas with known problems include: portions of the Phillippi Creek Basin, the North Creek Bay Street Subbasin, Elligraw Bayou Basin and the Cow Pen Slough Basin.