
INFRASTRUCTURE ELEMENT

DATA INVENTORY AND ANALYSIS

POTABLE WATER

This section evaluates the potable water system serving the Town of Surfside. Potable water facilities are defined in Rule 9J-5.003, F.A.C. as “a system of structures designed to collect, treat, distribute potable water, water wells, treatment plants, reservoirs and distribution mains.”

Miami Dade County Water and Sewer Department Geographic Service Area

The Town of Surfside’s potable water is provided by a system operated by the Miami-Dade County Water and Sewer Department (MDWASD) which provides service for approximately two million customers in Miami-Dade County. The MDWASD water service area illustrated in Figure 2-1 (Appendix B-Miami-Dade County Water Supply Facilities Plan) is interconnected and functions as a single service area. The Town of Surfside is serviced by the Hialeah-Preston Water Treatment Plant service area which includes the northern part of Miami-Dade County.

The water is distributed to residents and commercial business by approximately 11 miles of cast iron pipe installed in 1938. Primary mains feeding the system run under the Town’s streets and vary in size from 6-inch to 16-inches in diameter, which feed three-inch and four-inch water lines located along the rear property lines.

Water Source

The Hialeah-Preston Water Treatment Plant (WTP) located at 200 W. 2nd Avenue and 1100 W. 2nd Avenue; both plants are interconnected with adjacent facilities with a main source of water from the Biscayne Aquifer. The WTP’s are currently being modified and will receive ground water from five Upper Floridan Aquifer wells by 2010. The wells will be located in Miami Springs Wellfield and the Northwest Wellfield according to MDWASD.

Water Treatment Plant (WTP)

The Hialeah and Preston Plants are currently fed by forty five wells, including the Northwest Wellfield and the Hialeah/Preston on-site wells. The quantity of water available to serve MDWASD’s North District, as reflected in permitted withdrawal allocations, provides more than adequate capacity.

The Hialeah WTP was originally designed in 1924 with a total capacity of 10 mgd. By 1935, the plant’s capacity was 40 mgd. In 1946, capacity was increased to 60 mgd. There are plans to re-rate and upgrade the Hialeah WTP to a capacity of 70 mgd, if necessary. The source of water for the Hialeah WTP comes from the Hialeah-Miami Springs Wellfields, supplemented by the Northwest Wellfield. The Hialeah WTP has a current rated capacity of 60 mgd.

The John E. Preston Water Treatment Plant was originally designed as a 60 mgd plant in 1968 and upgraded to 110 mgd in 1980. The plant was rerated to a total capacity of 130 mgd in 1984. The plant reached its present capacity of 165 mgd and 185mgd in 2005 with the addition of air stripping capacity. The main source of water for the Preston WTP is from the Northwest wellfield.

Potable Water Level of Service

In order to maintain level of service town-wide, a water maintenance program will be implemented in 2010. Currently, construction documents are being prepared for a Town-wide replacement of the water mains, meters, and fire hydrants. The program will evaluate the existing infrastructure and replace pipes in poor condition and in need repairs.

The Town of Surfside currently coordinates with MDWASD and the South Florida Water Management District to meet existing and projected demands based on level of service (LOS). Town's projected water demands shown in Table 4-1 were developed by incorporating the County's average per capita value of 155 gpcd.

Table 4-1
Water Supply Level of Service

PROJECTED WATER SUPPLY			
Year	2010	2015	2030
Population	5,280	5,483	5,680
Proposed Per Capita (gallons per day finished water)	155	155	155
(all potable volumes are finished water)	MGD	MGD	MGD
Potable Water Demand (daily average)	0.82	0.850	0.88

Source: Calvin, Giordano & Associates, Inc., 2009.

The 155 gallons capita per day (gpcd) value is a MDWASD system wide finished water rate which was calculated from taking historical data. In 2007 the actual gpcd value for the Town of Surfside was 206 gpcd. The Town of Surfside is aware of this high gpcd value, and is currently working with MDWASD to implement water efficiency plans, public education, and BMPs to reduce the Town of Surfside's gpcd value. In addition, the planned replacement of the leaking water valves, mains, fire hydrants, meters and service laterals will reduce the total water consumption.

Table 5-2 in the Miami-Dade County Water Supply Facilities Plan indicates that there will be no deficit of finished water through 2030. Therefore, level of service will be met for Surfside in the short term and long term planning periods.

The existing LOS for the Town of Surfside based on MDWASD goals for potable water is as follows:

- A. The regional treatment system shall operate with a rated maximum daily capacity of no less than 2 percent above the maximum daily flow for the preceding year, and an average daily capacity of 2 percent above the average daily system demand for the preceding 5 years.
- B. Water shall be delivered to users at a pressure no less than 20 pounds per square inch (psi) and no greater than 100 psi.
- C. Water quality shall meet all federal, state, and county primary standards for potable water.
- D. MDWASD storage capacity for finished water shall equal no less than 15 percent of the average daily demand.

- E. The level of service (LOS) standard for potable water facilities shall be 155 gallons per capita per day.

Storage Capacity

The finished water storage facilities for the Hialeah-Preston subarea consist of both “in-plant” and remote storage facilities. The total combined storage capacity between both plants is 28.28 MG. Additional information on MDWASD’s capacity improvements can be found in Appendix B (Miami-Dade 20-Year Water Supply Facilities Work Plan).

Water Supply Facilities Work Plan

The purpose of the Town of Surfside 20-Year Water Supply Facilities Work Plan (Work Plan) is to identify and plan for the water supply sources, as well as facilities needed to serve the existing and new development within the local government’s jurisdiction. Chapter 163, Part II, F.S., requires local governments to prepare and adopt Work Plans into their Comprehensive Plans within 18 months after the water management district approves a regional water supply plan. Surfside adopted their Work Plan in December 2008. The Work Plan is developed to coordinate with MDWASD’s 20-Year Water Supply Work Plan.

On a regional level, the Town falls within the South Florida Water Management District (SFWMD) and within the SFWMD’s Lower East Coast (LEC) Planning Area. The *2005-2006 Lower East Coast Water Supply Plan Update* (2005-2006 LEC Plan Update), approved by the SFWMD on February 15, 2007, is one of four, long-term comprehensive regional water supply plan updates the District has developed for its planning areas. The planning horizon for the 2005-2006 LEC Plan Update is 2025.

SANITARY SEWER

The sanitary sewer system is defined as structures or systems designed for the collection, transmission, treatment, or disposal of sewage and may include trunk mains, interceptors, treatment facilities, and disposal systems. The Town’s sanitary sewer system is interconnected with the Miami-Dade County Water and Sewer Department (MDWASD) system. Surfside maintains its own sewer collection system and two pumping stations. By agreement, the Town of Surfside and Bal Harbour share a sanitary force main that connects to the City of Miami Beach transmission system. The tri-party agreement provides for the transmission of sewage via force mains to the MDWASD system and eventually to the treatment plant and disposal.

Geographic Service Area

The Town of Surfside’s sanitary sewer system is part of a system run by MDWASD. The Town’s system is coextensive with the Town’s boundaries. The County system includes unincorporated and incorporated areas of Miami-Dade County inside the 2005 Urban Development Boundary that have an agreement with MDWASD. The system also incorporates a small number of facilities, mostly State or County owned, outside of the Urban Development Boundary.

Treatment Facilities and Capacity

There has been a significant reduction in average flow into the regional system as a result of extensive infiltration and inflow (groundwater and rainwater) prevention projects conducted by MDWASD in recent years. Infiltration and inflow within the sewer system should be kept at a minimum to avoid hydraulic overload to the receiving treatment plant. It is pertinent for an operation and maintenance plan to be part of the county’s sanitary sewer system. As a result, the regional wastewater treatment plants operating capacity can remain in compliance with Miami-Dade County MDWASD and Florida Department of Environmental Protection (FDEP) standards.

The Town of Surfside is located in the MDWASD Central District Sanitary sewer system; however, as noted in the MDWASD's 2007 Water Supply Facilities Work Plan, MDWASD operates two additional regional wastewater treatment plants in the North and South Districts. Because the system is interconnected, the service districts have flexible boundaries, and some flows from one district can be diverted to other plants in the system.

The Town of Surfside's sewer system is treated by a secondary treatment facility on Virginia Key owned and operated by the Miami-Dade County Water and Sewer Department (MDWASD). The Town's sanitary sewer collection system is divided into two basins. Sanitary sewer pipes range in size from 8 to 15 inches with flows directed to two pump stations. Pump Station 1 receives sewage from the area of Surfside north of 91st Street, which includes the Business District and a majority of the high rise buildings. Pump Station 2 serves the remainder of the Town, including most of the waterfront lots. The sewage is pumped via the force main which runs along Byron Avenue and connects to the City of Miami Beach's system near 74th street. Sewage continues under pressure through MDWASD force mains to Virginia Key.

Current Facility Demand

According to the MDWASD 2006 Comprehensive Annual Financial Report, approximately 689 million gallons of wastewater were treated by the County system from the Town of Surfside and 814 million in 2007.

In FY08, the Town began mapping all sewer and potable water lines within the municipal boundary to enhance maintenance. Also in FY09, the Town identified infiltration issues to the sanitary sewer system and has begun a program to seal manholes and smoke/video testing to identify and repair broken lines. In FY09, existing pump stations were rehabilitated in order to ensure levels of service standards are maintained. Table 4-2A shows projected sewage flow demand for the Town of Surfside and Table 4-2B show current and projected waste water capacity for the entire county.

**Table 4-2A
Projected Sewage Flows**

PROJECTED SEWAGE FLOWS		2010	2015	2030
Year				
Population	5,280	5,483	5,680	
Per Capita (gallons per day finished sewage)	155	155	155	
(all potable volumes are finished sewage)	MGD	MGD	MGD	
Sewage Total Flow (daily average annual)	0.82	0.85	0.88	

Source: Calvin, Giordano & Associates, Inc. 2009

The County's LOS standard requires that the "system" component of the wastewater facility operate below 102 percent of the previous year's average daily flow. A comparison of the projected treatment capacity to the 102 percent of the previous year's average annual daily flow (AADF) requirement, from 2005 to 2020, is presented below. According to the County's data, the capacity of the MDWASD sanitary sewer system will continue to remain below the 102 percent requirement through 2020. The below table confirms the availability of the sanitary sewer system to meet the needs of Surfside in the short term and long term planning period.

Table 4-2B
Miami-Dade County Current Wastewater System Capacity 2005-2020

County WWTP Capacities		Actual County Flow (mgd)	Projected County Flows (mgd)		
	Plant Capacity (mgd)	2005	2010	2015	2020
North	112.5	84.3	83.8	88.5	92.3
Central	143.0	135.3	132.5	139.6	146.4
South	112.5	75.1	76.5	82.6	87.4
Total	368.0	294.7	292.8	310.7	326.0

Source: Miami Dade Water and Sewer Department, 2009

DRAINAGE

Surfside's existing storm drainage system consists of a network of underground storm sewers that collect and direct the stormwater to Indian Creek and Biscayne Bay. A pumping station at the western end of 92nd Street assists the drainage of water from that street by pumping to an outfall. Storm sewers in the system range in diameter from 10 inches to 36 inches.

The Florida Department of Transportation (FDOT) provided storm drainage improvements on Harding and Collins Avenue in the early 1990's. Equipment which currently serves the 92nd Street pump station were replaced by FDOT and maintained by the Town; however, even with these modifications, water may still reach curb level in various locations due to tidal fluctuations. The water level of Biscayne Bay is higher than normal during storm periods and high tide, creating a back up in the outfall pipes. The Harding and Collins storm drainage improvements utilize on-site wells and control structures to provide additional capacity.

In 2002, FDOT completed the Stormwater Pump Station System Operational Evaluation and Recommended Improvements (OERI) Report which provided three alternatives to improve stormwater pump systems along Harding. It was determined that the most feasible alternatives are those that have an appropriate overflow capacity, once the wells reach capacity. This was achieved by introducing an emergency gravity bypass in the event that the pumps fail. The alternative consists of new pump stations at the existing vault locations. These new stations required the existing gravity system to be extended to the Intracoastal Waterway seawalls (at 88th Street and 94th Street), a new 36-inch force main to connected to the existing wells; new pumps, structures, controls, and a new gravity bypass drainage pipe.

In 2006, the Town of Surfside initiated another stormwater project, which consists of retrofitting three of the Town's outfall pipes to reduce pollutants and fresh water entering Biscayne Bay. The proposed facilities at each location will consist of three new stormwater pump stations which pump water into new drainage wells. In order to address pollution concerns for a Florida Department of Environmental Protection (FDEP) drainage well permit, the Town will install Nutrient Separating Baffle Boxes upstream of the pump station to provide treatment before the runoff enters the groundwater which is included in this retrofit project.

The project addresses long-term concerns regarding water backing into the streets and poor water quality in the adjacent Biscayne Bay along the Town's shores. The project directly addresses The Trust for Public Land's Biscayne Bay Accessibility report, supports the SFWMD's Biscayne Bay Partnership Initiative (BBPI), and enhances level of service.

SOLID WASTE

The Town's Public Works Department has three garbage trucks which collect trash and garbage on a weekly basis and haul it to Miami-Dade County's Resource Recovery Plant west of Miami International Airport and other Miami-Dade County landfills. Each year Surfside deposits approximately 6,048 tons of waste material at the County's facility. Based on an estimated 2007 population of 5,159 a volume of just 6 pounds per person per day was calculated. Since 2007, the Town is recycling over 500 tons per year. An increase involvement of private firms in the development of solid waste disposal facilities led to an oversupply of disposal capacity and a reduction in disposal fees. As a result, existing disposal capacity at the North Dade Landfill and the South Dade Landfill and the Resource Recovery Plan appear to have adequate to meet Surfside's needs for the foreseeable future.

Table 4-3
Miami-Dade County Solid Waste Facility Capacity

Data Item / Landfill ID	South Dade Landfill	North Dade Landfill	Resources Recovery Ashfill	Total
Acreage Data:				
FDEP Landfill Type	Class I (Garbage)	Class III (Trash)	Class I (Ash)	N/A
Total Area (Acre)	300	218	80	598
Disposal Area (Acre)	180	180	66	426
Stormwater Management Area + Offices (Acre)	120	38	14	172
Formally Closed Area (Acre)	45	96	26	167
Cell filled in & Closure in progress (Acre)	45	0	20	65
Active Area (Acre)	45	84	10	139
Future Area (Acre)	45	0	10	55
Landfill peak elevation at closure (Feet)	150	138	125	N/A
Landfill average Bottom elevation (Feet)	10	12	10	N/A
Landfill Maximum Depth (+/-Feet)	140	126	115	N/A
Capacity Information				
Tons In Place (June 30, 2006)	13,799,000	10,328,000	4,077,000	28,204,000
Built out capacity in tons	21,184,000	12,581,000	6,582,000	40,347,000
Remaining Capacity in tons	7,385,000	2,253,000	2,505,000	12,143,000
Last year's disposal tonnage (7/1/05-6/30/06)	1,042,000	641,000	159,000	1,842,000
Estimated average disposal rate per year	550,000	360,000	155,000	1,065,000
Years of remaining life at normal disposal rate	13	6	16	N/A

Source: Miami-Dade County, 2009

There is sufficient capacity in Miami-Dade County landfills to meet the Town's needs for solid waste disposal for the short term and long term planning horizons.

NATURAL GROUNDWATER AQUIFER RECHARGE

The principal ground water resources for the Lower East Coast (LEC) Planning Area are the Surficial Aquifer System (SAS), including the Biscayne Aquifer, and the Floridan Aquifer System (FAS). The Surficial and Biscayne aquifers provide most of the fresh water for public water supply and agriculture within the LEC Planning Area. The 2005-2006 LEC Plan Update identifies the following:

Although the Biscayne Aquifer is part of the Surficial Aquifer System (SAS), it exists only along the coastal areas in Miami-Dade, Broward and southern Palm Beach counties. The Biscayne Aquifer is highly productive with high-quality fresh water. The extension of the SAS through central and northern Palm Beach County is less productive, but is still used for consumptive uses, including potable water. These aquifers are shallow, generally located within 200 feet of ground surface, and are connected to surface water systems, including canals, lakes and wetlands.

The Biscayne Aquifer and the extension of the SAS into northern Palm Beach County provide more than 1 billion gallons per day of high-quality, inexpensive fresh water for the populations of Palm Beach, Broward and Miami-Dade counties and the Florida Keys portion of Monroe County. This volume is heavily supported, especially during the annual dry season, as well as in periodic droughts, by water from the regional system, primarily the Everglades. During droughts, water from Lake Okeechobee has been required to supplement water from the Everglades to meet the needs of the coastal counties.

The Biscayne Aquifer is designated as a sole source aquifer by the U.S. Environmental Protection Agency (USEPA) under the *Safe Drinking Water Act* because it is a principal source of drinking water and is highly susceptible to contamination due to its high permeability and proximity to land surface in many locations. Protection of the Biscayne Aquifer is provided for through the District's *Basis of Review for Water Use Permit Applications* (SFWMD 2003) and in Chapter 373, Florida Statutes (F.S.), which limit the water availability for consumptive uses.

The Floridan Aquifer System (FAS) exists not just in the LEC Planning Area, but throughout the entire state and portions of adjacent states. The Upper Floridan Aquifer in southeast Florida contains brackish water, and is increasingly being tapped as a source of raw water for treatment with reverse osmosis (RO) to create potable water. Brackish water from the Floridan Aquifer is also blended with fresh water prior to conventional water treatment to expand water supplies during the dry season. Additionally, the Floridan Aquifer is used for seasonal storage of treated fresh water within aquifer storage and recovery (ASR) systems. The Floridan Aquifer has been more extensively developed in the Upper East Coast (UEC) and Lower West Coast (LWC) planning areas of the South Florida Water Management District (SFWMD or District) than in the LEC Planning Area.

From Jupiter to southern Miami, water from the FAS is highly mineralized and not suitable for drinking water without specialized treatment. More than 600 feet of low permeability sediments confine this aquifer and create artesian conditions in the LEC Planning Area. Although the potentiometric surface of the aquifer is above land surface, the low permeability units of the intermediate confining unit prevent significant upward migration of saline waters into the shallower freshwater aquifers.

The top of the Upper Floridan Aquifer is approximately 900 feet in southeast Florida, and the base of the Upper Floridan extends as deep as 1,500 feet. At the base of the Lower Floridan Aquifer, there are cavernous zones with extremely high transmissivities collectively known as the boulder zone. Because of their depth and high salinity, these deeper zones of the Lower Floridan Aquifer are used primarily for disposal of treated wastewater.

The Miami-Dade Water Supply Facilities Work Plan outlines a number of strategies to recharge aquifers with reclaimed water.

Wellfield Protection Areas

There are no wellfield protection areas within the Town of Surfside.