

3. INFRASTRUCTURE ELEMENT

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PURPOSE

The purpose of the Infrastructure Element (IE) is to identify and ensure provision of adequate potable water, sanitary sewer, solid waste and drainage resources, facilities and services to support the future population and development projected within the Future Land Use Element (FLUE) of the Town of Davie Comprehensive Plan (Comp Plan). The objective of the IE Data, Inventory, and Analysis (DIA) Report is to inventory and evaluate existing potable water, sanitary sewer, solid waste, natural groundwater aquifer recharge and drainage resources within the Town. In addition, the DIA Report determines the projected demands on these facilities and resources given future service demands and facility levels of service to adequately serve the projected demand. This information serves as the foundation for goals, objectives, and policies of the IE. Data and analysis for each of the four sub-elements contained within the Infrastructure Element DIA is provided in the following order:

- A. Potable water;
- B. Sanitary sewer;
- C. Solid waste; and,
- D. Drainage and natural aquifer recharge.

POTABLE WATER

This section evaluates the potable water system serving the Town of Davie.

Geographic Service Area

Potable water is provided to Town residents via six separate utility providers: Town of Davie, City of Sunrise, Broward County, City of Hollywood, City of Fort Lauderdale and Tindall Hammock Irrigation and Soil Conservation District (THISCD). The Town of Davie Utilities' service area includes the majority of eastern Davie and the Hard Rock Hotel complex on the Seminole Tribe of Florida Reservation. THISCD provides potable water to a small portion of the Town in the northeast sector of the Town, between Davie Road and SR 7. Broward County provides water to the Pine Island Ridge community, and a small portion at Griffin Road and Orange Drive east of SR7. Fort Lauderdale provides water along SR 84 in the area previously known as Hacienda Village east of SR 7. Hollywood provides water to an area north of Stirling Road west of Florida's Turnpike and a small area south of Stirling Road and north of Davie Road extension. Potable water is provided to the remainder of the Town (predominantly the western portions of the Town) by the City of Sunrise Utilities.

Water Source

The Biscayne Aquifer and Floridan Aquifer is currently the City's source of potable water. The Town has added a Reverse Osmosis facility to draw water from the Floridan Aquifer. This facility is further described under the "Alternative Water Supply Plan" section below.

Water Treatment Plant (WTP)

The Town of Davie's potable water system includes two water treatment facilities, System III and System V. The permitted allocation is 7.24 MGY, or approximately 19.847 MGD.

System III has a rated capacity of 4.0 MGD, and is located south of Stirling Road at the end of N.W. 76th Avenue. There are two 2.0 million gallon finished water storage tanks, and one 142,000 gallon clearwell located on the property. System V has a rated capacity of 6MGD and is located on the north side of SW 30th Street near College Avenue.

Potable Water Level of Service

The currently adopted level of service (LOS) standard for potable water in the Town of Davie Comp Plan is 145 gallons per capita per day (gpcd).

Storage Capacity

As referenced above, the Town's water treatment plants include four finished water storage tanks, with a total capacity of 10 million gallons.

Existing Potable Water Demand

In 2010 there was approximately 1,603 MG of treated water supplied with an average day treated water demand of 4,099 MG from the Town of Davie's WTP.

Projected Potable Water Demand

Projecting potable water demand for the Town of Davie involves calculation of the population, usage rate, and capacity for all six utility providers within the Town: Town of Davie, City of Sunrise, Broward County, City of Hollywood, City of Fort Lauderdale, and Tindall Hammock Irrigation and Soil Conservation District (THISCD). As a result, all supply figures and data must incorporate the demands and capacities of all six utilities as provided in the tables below. The first table shows the demand projections for the Town of Davie utility service area, while the second table shows the demand projections for all other utility service providers within the Town.

**Table 1: Town of Davie Service Area
Estimated Population and Future per Capita Demand**

Year	Projected Population	GPD	Population-Based Avg. Day Demand (MGD)	Peak Factor	Total Max. Day Demand (MGD)
2015	29,627	145	4.30	1.503	6.46
2020	31,915	145	4.63	1.503	6.96
2025	33,526	145	4.86	1.503	7.30
2030	34,899	145	5.06	1.503	7.61

Source: Broward County Planning and Redevelopment Division 2014 Municipal TAZ Data

**Table 2: Town of Davie Service Providers' Utility Service Area
Estimated Population and Future per Capita Demand**

UTILITY	YEAR	POPULATION	WATER DEMAND (MGD)
BROWARD ⁽¹⁾ 192 gpd	2015	523	0.13
	2020	528	0.14
	2025	525	0.14
	2030	532	0.14
FT. LAUDERDALE ⁽²⁾ 170 gpd	2015	528	0.10
	2020	530	0.10
	2025	527	0.10
	2030	534	0.10
HOLLYWOOD ⁽³⁾ 114 gpd (low) 140 gpd (high)	2015	1,768	0.20 low / 0.25 high
	2020	2,005	0.23 low / 0.28 high
	2025	2,111	0.24 low / 0.30 high
	2030	2,156	0.25 low / 0.30 high
SUNRISE ⁽⁴⁾ 116 gpd	2015	57,500	6.67
	2020	59,500	6.90
	2025	60,100	6.97
	2030	59,800	6.94
Tindall Hammock Irrigation and Soil Conservation District (THISCD) ⁽⁵⁾	2015	1,706 ERC	.469
	2020	2,331 ERC	.641
	2025	2,616 ERC	.719
	2030	2,901 ERC	.798

(1) Broward County Water Supply Facilities Work Plan (2014)

(2) City of Fort Lauderdale 10-Year Water Supply Facilities Work Plan (2014)

(3) City of Hollywood Water Supply Plan Potable Water Sub-Element (2015)

(4) DRAFT City of Sunrise 10-Year Water Supply Facilities Work Plan (2014)

(5) DRAFT THISCD 10-Year Water Supply Facilities Work Plan Update (2015)

In combination with the other utility providers serving the Town, there is sufficient potable water capacity to serve the Town's projected population through the end of the planning period. This is due in large part to a new 6 MGD reverse osmosis treatment plant that was recently constructed along with a 3.50 MGD water reclamation facility. The retirement of the old plant and the development of the new plant will result in a net increase of 4 MGD. Thus, the capacity of the Town's water supply system will be 10.0 MGD, which is well in excess of the amount needed to serve the Town's projected population through the new long range planning horizon of 2030.

Reducing Demand through Conservation

The Town currently employs several water conserving methods, including distributing educational materials, requiring water-conserving devices for new construction and redevelopment, encouraging xeriscape© landscape techniques and discouraging the use of potable water for irrigation. In order to further these goals, policies have been added to the Goals, Objectives and Policies of this Infrastructure Element to encourage the continued use of these water conservation measures, and to develop and implement new water conservation measures. These measures are expected to lead to the reduction of the per capita demand for potable water.

Alternative Water Supply Plan (AWSP)

The Town has developed an Alternative Water Supply Plan (AWSP) based upon the development of a new reverse osmosis (RO) water treatment plant and associated facilities along with a 3.50 MGD water reclamation facility. The newly constructed plant expands the potable water system by maintaining some of the existing Biscayne Aquifer water supply sources, and adding capacity from the alternative resource of the Floridian Aquifer. With the addition of this 6 MGD reverse osmosis treatment plant, approximately 33% of the Town's water is supplied by alternative sources.

Based upon recent water usage rates and the above referenced modified population projections, the potable water demand at the end of the 2030 planning period will be sufficient to provide satisfactory LOS and meet demand throughout the planning period.

The Town's AWSP program is based on three elements: 1) the existing Biscayne Aquifer supplies; 2) Floridan Aquifer supplies treated via reverse osmosis (because these supplies are brackish water prior to treatment); and 3) five additional water system interconnections (i.e. to the City of Sunrise system, Broward County, City of Hollywood, City of Fort Lauderdale and the Tindall Hammock Irrigation and Soil Conservation District system in the sub-region). The program includes interim water supply measures until the system is completed. Included in these interim measures are: amendment to the Land Development Code to require irrigation quality utilities within new developments (purple pipe) for non-potable purposes; a water conservation program; and water system replacements.

Statute Updates

In order to ensure the maintenance of potable water concurrency and to ensure compliance with bills enacted by the Florida Legislature in the 2002, 2004, 2005, and 2011 sessions to address the state's water supply needs, new policies have been added to the Goals, Objectives and Policies of the Capital Improvements, Infrastructure, and Intergovernmental Coordination Elements, regarding the development of alternative water supplies and incorporation of a Water Supply Facilities Work Plan with a minimum planning horizon of 10 years.

SANITARY SEWER

This section evaluates the sanitary sewer system serving the Town of Davie. Sanitary sewer facilities are 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.

Treatment Facilities and Capacity

The Town currently operates a one (1) million gallons per day (MGD) wastewater treatment plant, and two (2) 2.0 MGD treatment plants, with a total capacity of 5.0 MGD of average annual daily flow (AADF).

The effluent from the treatment facility is pumped through a 7 mile long force main to the City of Hollywood Wastewater Treatment Plant, which also receives effluent from Cooper City's wastewater treatment plant. These effluents are mixed in the combined effluent pipe at Davie's pump station before being sent to Hollywood's re-use system, or being discharged to the ocean via their ocean outfall.

The Town's adopted LOS is 110 gallons per capita per day (gpcd). Based upon the projected average daily flows for the years 2005-2020 provided in Table 2 below, the current capacity of 5 MGD will be exceeded by the year 2010. Therefore, the Town is currently expanding the wastewater treatment plant to increase its capacity by 2 MGD by 2009, and has provided \$10,000,000 in funding in FY 2008. A new 6.0 MGD wastewater treatment unit is scheduled for construction in an area in the central portion of the town in or near the South Florida Educational Center. However, the initial phase of the wastewater treatment plant will add 4 MGD to this system's capacity. Thus, the Town will achieve a wastewater treatment capacity of 13 MGD upon completion of the new plant in 2013. The remaining 2 MGD capacity of the new plant will be completed in phase two. Based upon the projected average daily flows provided below, this capacity will be sufficient to meet demand throughout the planning period.

The service area of the Town of Davie's wastewater treatment facilities do not coincide with the Town limits. Instead, like the potable water service areas, Ferncrest Utilities, Broward County, City of Hollywood, City of Fort Lauderdale and the City of Sunrise provide wastewater treatment services to the portion of their service areas contained within the Town of Davie. Although it is important to note the design capacities and demand of the other utility providers, it is the responsibility of those providers to ensure they maintain an adequate level of service throughout their planning periods. Specifically, Ferncrest Utilities has a design capacity of 0.60 MGD, and the City of Sunrise Utilities has a total wastewater treatment plant design capacity of 25 MGD. While all of the Ferncrest service area is contained within the limits of the Town of Davie, only about 25% of the Sunrise Utilities service area is within Davie. Thus, only 25% of Sunrise's total design capacity for wastewater treatment, or 6.25 MGD, is available for the portion of the service area in Davie.

Geographic Service Area

The Town of Davie's sanitary sewer system includes a geographic service area that includes the majority of eastern Davie and the Seminole Tribe of Florida Hard Rock Hotel complex on the Reservation. Ferncrest Utilities provides sanitary sewer to a small portion of the Town in the northeast sector of the Town, between Davie Road and SR 7. Sanitary sewer is provided to the remainder of the Town (predominantly the western portions of the Town) by the Broward County, City of Hollywood, City of Fort Lauderdale and the City of Sunrise Utilities.

Current Facility Demand

Wastewater service demands are expected to continue to increase moderately over the next ten years, as projected below.

Sanitary Sewer Level-of-Service (LOS)

The Town's adopted LOS in the Comp Plan for sanitary sewer facilities is 110 gpcd. Although the Town's LOS and the City of Sunrise has an adopted LOS of 127 gpcd. Since Ferncrest Utilities is not a public entity, they are not required to have an adopted LOS. However, they do utilize a rate of 145 gpcd for consumptive use permitting purposes. Please note, though, that neither Ferncrest nor Sunrise Utilities are responsible for the provision of a satisfactory level of sanitary sewer service to their respective service areas. Therefore, the calculations below are based solely on the Town of Davie Utilities average flows and capacities.

Septic Tanks

Septic tanks serve as a form of sanitary sewer collection, treatment, and disposal for some single family residential land uses within the Town of Davie. The Town continues to pursue elimination of septic tanks through the ongoing funding of providing sewer

connections to those still on septic tank. The current capital projects program has identified a need for approximately \$3,000,000 per year over the next five (5) years for the sewerage of unsewered areas. These funds are to be provided through individual assessments.

Sanitary Sewer System Analysis

As noted above, treatment services for the Town's sanitary sewer system are provided by the Town of Davie's Utility Department, with ultimate discharge provided by the City of Hollywood. The Town's adopted LOS standard is 110 gpcd. Based upon the population projections for the Davie Utilities service area of 38,044, the Town will need to provide a total of 4.18 MGD capacity at the end of the planning period. The wastewater demand projections and capacity needs based upon the population projections are presented in Table 3.

Table 3. Town of Davie Wastewater Capacity & Demand, 2005 – 2018

Year	Average Daily Flow (MGD)	Capacity (MGD)	102% of Previous Year's ADF (MGD)
2005	3.93	5 MGD	4.01
2010	5.77	7 MGD	5.89
2015	8.12	11 MGD	8.28
2018	9.54	11 MGD	9.73

Source: Town of Davie Utilities Department, 2008

SOLID WASTE

This section addresses solid waste services for the Town of Davie.

Service Providers

Waste Management, Inc. provides removal of both trash and solid waste, under a franchise agreement, to residents and businesses within the Town. Under the auspices of the Interlocal Agreement for a Resource Recovery System, Waste Management hauls the Town's processable solid waste to the South Wheelabrator Plant for incineration, and the ash is then landfilled. Nonprocessable solid waste is hauled to the Broward Interim Contingency Landfill located in Fort Lauderdale. Recyclables are collected by Broward County Waste and Recycling Services, and hauled to the Materials Recovery Facility (MRF) located within Davie. The MRF was opened in 1993, and processes more than 450 tons of recyclables per day.

The Interlocal Agreement was entered into in 1991 with a 20 year term. Therefore, the agreement is set to expire in 2011. At that time the Town will have the option to either extend the agreement, enter into a new agreement, or develop their own solid waste disposal system.

Level of Service

The Town of Davie's adopted residential LOS standard for solid waste is 8.9 pounds per unit per day. According to Broward County Waste and Recycling Services, the Resource Recovery System has the capacity to process 1.6 million tons of solid waste per year, via the two waste-to-energy facilities (Wheelabrator North and Wheelabrator South). In addition, there is 4.5 million cubic yards of capacity at the Broward Interim Contingency (BIC) landfill which serves as the final disposal point for all non-processable (i.e. non-burnable) and non-recyclable solid waste. Waste Management, Inc. provides removal of both trash and solid waste, under a franchise agreement, to residents and businesses within the Town. Approximately 115,939 tons of trash and solid waste were collected in Davie in 2006-2007.

Existing and Projected Demand

The above referenced figure for tons of solid waste collected in Davie equates to 231,878,000.00 pounds (115,939 tons x 2,000 pounds/ton).

The following are the projected maximum amounts of residential refuse that would be collected in Davie according to the housing unit estimates and projections included in the FLUE DIA:

- 2008: 181 tons/day (66,065 tons/year)
- 2012: 191 tons/day (69,715 tons/year)
- 2017: 203 tons/day (73,942 tons/year)

The Town's processable solid waste is hauled to the South Wheelabrator Plant, where it is incinerated, and the ash is landfilled. Nonprocessable solid waste is hauled to the Broward Interim Contingency Landfill in Fort Lauderdale. According to the Broward County Waste and Recycling Services, the Resource Recovery System has the capacity to process 1.6 million tons of solid waste per year. This is in addition to the 1.4 million tons per year capacity of the existing landfills. In addition, the two Wheelabrator Plants are expandable by up to thirty-three percent (33%). As the most current county-wide demand figures indicate there is an annual demand of 1.2 million tons per year, it is evident that less than half of the total annual capacity for solid waste is being utilized. Therefore, the County's total capacity under the current system is equal to at least 20 more years. Thus, the County has capacity to carry it through 2028. The Town's new long range planning timeframe is 2018. Thus there are no LOS problems related to solid waste.

DRAINAGE & GROUNDWATER RECHARGE AREAS

Drainage

Drainage facilities are defined in Rule 9J-5.003, F.A.C., as "a system of man-made structures designed to collect, convey, hold, divert, or discharge stormwater, and includes stormwater sewers, detention structures, and retention structures."

The Town of Davie is divided essentially into two basins at SW 100 Avenue. The west basin is controlled by a SFWMD pump station (S-9) located approximately at US 27 and Griffin Road. The eastern basin is controlled by a pump station (S-13) on the C-11 canal. The 100th Avenue divide is an equalizer known as S-13A. This structure can be opened to control local storms or equalize water levels in the east and west basins.

The Central Broward Water Control District, South Florida Water Management district, the Broward County Environmental Protection Department (BCEPD) Water Management Division, and the Tyndall Hammock Drainage District all govern land use with regard to land development of drainage features and groundwater recharge areas.

Drainage System Geographic Service Area

The primary drainage features in the Town are the North New River canal and the South New River canal (C-11 canal) and their tributary canals, man made facilities constructed originally to drain the Everglades. The Town's service area coincides with the Town limits.

According to the South Florida Water Management District (SFWMD), all of Broward County is considered a natural groundwater aquifer recharge area for the Biscayne Aquifer, currently the Town's sole source of water supply. However, the Town recently approved a Capital Improvement Program for the Fiscal Years 2008 through 2012 which included budgeting for a new water treatment plant, which will draw water from the brackish waters of the Floridian Aquifer, and treat the water with a reverse osmosis membrane treatment system.

Level-of-Service Standards

The following represents the Town's adopted LOS standard for its stormwater management system:

1. Federal Emergency Management Administration (F.E.M.A.) criteria for minimum floor elevations of building sites within the flood hazard area, and floodplain protection provisions.
2. Maximum allowable discharges of 3/4" per acre per day for properties west of 100th Avenue and 1 1/2" per acre per day for properties east of 100th Avenue.

Evaluation of Conditions and Drainage System

The Town's drainage system requires constant maintenance of debris and silt management and aquatic weed control. The Tyndall Hammock Drainage District and the Central Broward Water Control District are currently performing these tasks. Water quality regulation is by BCEPD. The Town and the Drainage Districts have adopted the dictates of the county standards and maintain compliance therewith. On site detention

improvements necessary to accommodate development are identified and required in conjunction with plat, site plan and/or building permit review.

Capital Improvements

To address drainage situations throughout the Town, the Five Year Capital Projects Program for 2008-2012, includes several drainage system improvements. Typically these programmed improvements are linked to Town roadway improvements, and consist of the addition of new drainage facilities on existing roadways throughout the Town.

Beyond the five-year timeframe, the Town will require developments to install adequate systems to maintain the LOS for stormwater drainage. Also, the Town is developing a program to reuse stormwater for non-potable water purposes, such as irrigation. This is a component of the Town's Alternative Water Supply Program (AWSP) and its efforts at water conservation.

Natural Groundwater Aquifer Recharge Areas

The management of surface water and groundwater resources is an important issue to the long-term environmental quality of the Town of Davie. It is generally recognized that many water management issues are addressed and regulated by either regional water management districts or other state and federal agencies. However, land use decisions made by the local government have the potential to impact natural resources, both positively and negatively, as vacant land is developed and the impacts to the environment are mitigated. As such, the Town of Davie should regulate new development within its borders in conformance with best management practices that conserve natural groundwater aquifer recharge areas.

Identification of Prime Recharge Areas

Although the South Florida Water Management District (SFWMD) has not identified any areas within Broward County as groundwater recharge areas for the Biscayne Aquifer, all of Broward is considered a natural groundwater aquifer recharge area for the Biscayne Aquifer. A major source of recharge to the Biscayne Aquifer in the County is the Everglades Water Conservation Areas. The three Water Conservation Areas (2a, 2b, and 3a) total 790 square miles, and comprise approximately 2/3 of the County's total land area. Recharge occurs naturally as stormwater, which is stored and purified in the Conservation Areas, seeps into the aquifer. Other major sources of recharge include the system of canals in the developed areas of the County. The land surface itself is also a major source of aquifer recharge. Generally, soil conditions in the County are conducive to recharge of the Aquifer. With the exception of those areas in southwest Broward with thick muck soils, movement of water into the ground is rapid. Recharge also may be obtained through injection and spray irrigation.

Major Natural Drainage Features

Major natural drainage features are typically defined as those that occur naturally in areas that accommodate the flow of stormwater, including streams, rivers, lakes, and wetlands. However, there are few lands within the Town that are considered wetland areas, according to the National Wetlands Inventory (NWI) conducted by the United States Fish and Wildlife Service. (See Appendix C -Existing Wetlands map)

Existing Natural Drainage and Recharge Area Regulations and Programs.

Additional federal, state, county, and local regulations or programs impacting development and/or resource conservation within the Town of Davie are discussed in the following sections.

Federal Regulations

Section 208 of the Federal Water Pollution Control Act (PL92-500, 1972) serves as the directing federal law with respect to water pollution abatement. In implementing the Act, the United States Environmental Protection Agency (EPA) identified pollutants carried in stormwater runoff as a major source of water contamination. To achieve the pollution abatement goals of the Act, the EPA provided assistance to state and local governments for developing Area Wide Water Quality Management Plans, or “208 Plans” as they are commonly known. These 208 Plans study a broad range of potential water pollution sources, including stormwater, and focus on identifying pollutant sources and abatement needs as well as development of regulatory programs to ensure implementation.

State Regulations

The FDEP has adopted a Stormwater Rule (Chapter 62-25, Florida Administrative Code (F.A.C.)) to fulfill part of the state’s responsibilities under Section 208 of the Federal Water Pollution Control Act. The objective of the rule is to achieve 80 to 95 percent removal of stormwater pollutants before discharging it to receiving waters. Implementation of the stormwater rule is achieved through the permitting process. FDEP has delegated permitting responsibility to SFWMD and Broward County DEP. This rule requires treatment of the first one inch of runoff for sites less than 100 acres in size and the first 0.5 inch of runoff for sites over 100 acres in size. Treatment is generally accomplished through retention or detention with filtration. Retention requires the diversion of the required volume of runoff to an impoundment area with no subsequent direct discharge to surface waters. Pollutants are removed by settling and by percolation of stormwater through soil. Detention facilities are typically within the line of flow for the drainage system. Stormwater from a site passes through the detention facility and is filtered to remove pollutants prior to discharge to a surface water body.

County Regulations

Broward County has an adopted 208 Plan that is administered by BCEPD. Implementation of the plan is accomplished through the county’s stormwater management permitting process.