

INTRODUCTION

The purpose of the Public Facilities and Services Element is to identify future demand for necessary public facilities and services and to correlate the adequate delivery of these services with future growth projections. Its primary goal serves to protect investments while maximizing use of the City's existing sanitary sewer, potable water, solid waste, and stormwater drainage facilities by protecting the quality of its surface and groundwater and ensuring the availability of safe and adequate facilities to meet the current and future needs of residents and visitors. Through its objectives and policies, the Public Facilities and Services Element establishes level of service standards, provides for stormwater management planning, identifies requirements of wastewater and potable water facilities, and outlines recycling and solid waste reduction goals. In addition to the City's infrastructure, the Element also emphasizes and establishes criteria for its valuable public services such as its fire-rescue department, police and law enforcement department, animal rescue services as well as its airport, marina, and golf course.

The element contains eleven (11) objectives of which six (6) incorporate measurable levels of service standards including the delivery of wastewater treatment services, solid waste, stormwater management, potable water, fire-rescue services, and police and law enforcement services. Levels of Service (LOS) are established for each type of public facilities as required by Ch. 163, Florida Statutes, and policies have been adopted to ensure that all future development within the City must be able to meet the adopted LOS for all public facilities. In addition to those listed with level of service standards, the element contains objectives related to ground water resources, recycling, animal rescue services, the Fernandina Beach Harbor Marina, and the City Golf Course. The inclusion of these services into the City's *Comprehensive Plan* came directly from the 2009 adopted Evaluation and Appraisal Review (EAR) report recommendations. Revisions also included removal of an outdated objective which called for a Water Supply Facilities Work Plan and the shifting of two (2) objectives in their entirety (Water Quality + Water Conservation and Managing Surficial Aquifer Recharge) to the Conservation and Coastal Management Element.

Recommendations Incorporated from the 2009 EAR Report

As a result of the EAR report recommendations, the City has included policies which serve to:

- 1) Address all City owned services and facilities, not just those required by Florida Statutes;
- 2) Encourage energy efficiency and sustainable construction in the design and construction of new housing and in the rehabilitation of existing housing;
- 3) Identify service aspects of the City provides both quantitative and qualitative level of service standards;
- 4) Establish the need for a waste management plan including re-use and recycling strategies and goals;
- 5) Provide incentivizes use of low impact development (LID) and energy and water conservation strategies for new and infill development projects;
- 6) Require use of low impact development (LID) and energy and water conservation strategies for all city projects;
- 7) Better address stormwater planning and coordination activities;
- 8) Identify and map locations of existing septic tanks;
- 9) Establish policies to eliminate use of septic tanks within the City; and
- 10) Evaluate the ability to utilize reclaimed water for uses other than drinking water.

WASTEWATER TREATMENT SYSTEMS OBJECTIVE

The purpose of this objective is to ensure that public facilities are available to meet the existing and future needs of Nassau County. The ability of the City to provide wastewater treatment will play an important role in shaping future land use patterns, influencing the timing, location, and intensity of development.

Existing Facilities and Conditions

Municipal sanitary sewer facilities are large-scale systems, which generally provide service to City's densely populated areas. There is one (1) municipal sewage treatment plants currently serving the City. This facility is comprised of three components, which perform the basic functions of collection, treatment, and disposal of sewage.

Table PFSE-1 lists the municipally-owned and operated wastewater treatment facilities which serve the incorporated areas (and in some cases unincorporated areas) in Nassau County. Service areas for each municipality are shown on PFSE-1.

Table PFSE-1 Municipal Wastewater Treatment Facilities, Nassau County

Facility	Provider	Location	Capacity MGD
City of Fernandina Beach WWTP	City of Fernandina Beach	1007 S. 5 th Street, Fernandina Beach	3.5

The City of Fernandina Beach operates a 3.5 MGD (million gallons per day) wastewater treatment plant that discharges effluent to the Amelia River. According to the City of Fernandina Beach, this plant currently serves a population of approximately 11,900 persons. The average daily flow (ADF) for this system in 2009 was 1.53 MGD.

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The collection system is composed of a network of sewer pipes, which collect sewage (also called wastewater) from individual establishments and convey it to a central location for treatment. The collection network is generally laid out in a pattern roughly analogous to the branching pattern of a tree.

A municipal treatment plant serves a fairly large geographic area and treats the sewage to remove solid and organic materials. The treatment plant is the component of the City’s sanitary sewer facility, which functions to remove solid and organic materials from the sewage. There are a large number of processes, which can accomplish this, but they should generally be grouped into one of three categories depending on the proportion of materials removed. The three levels of treatment are Primary, Secondary, and Tertiary Treatment:

Primary Treatment- This refers to the removal of between 30 to 35 percent of the organic materials and up to 50 percent of the solids from the sewage. This is also referred to as physical treatment because screens and settling tanks are the most common methods used to remove the solids.

Secondary Treatment- Following primary treatment, additional steps are taken so that between 80 and 90 percent of organic materials and solids is removed. This level of treatment usually requires multiple steps involving one biological process and one or more processes for removal of suspended solids.

Tertiary Treatment- Sewage may also contain quantities of synthetic organic compounds or inorganic chemicals, which may create pollution problems, if not removed. Tertiary (or advanced) treatment adds steps to primary and secondary processes to remove these pollutants. The most common tertiary processes remove compounds of phosphorus and nitrogen. The effluent of advanced treatment processes often approaches potable water purity and may be suitable for landscape irrigation or other non-potable uses.

Small Treatment Systems

Small treatment systems, or “package” plants are generally privately owned and operated used to serve isolated development and are usually partially or completely pre-assembled by the manufacturer prior to shipment to the site of use. Package plants are available in a range of capacities up to one million gallons per day, and may be designed to provide any level of treatment, but plants providing secondary treatment are most commonly used.

According to DEP, five (5) small (or “package”) wastewater plants exist within municipal limits. These facilities are listed in Table PFSE-2 below. Most of treatment plants are operating at designed capacity and generally are performing satisfactorily. While inspection of these facilities by the DEP Northeast District in Jacksonville has noted performance violations at various times, these violations usually are related to maintenance procedures and can be controlled through improved management of the facility.

Table PFSE-2 Licensed Small Wastewater Treatment Systems, Fernandina Beach

Lic. #	Name	Location	Class	Capacity (MGD)
FLA011689	Amerada Hess Corp	Fernandina Beach	Industrial Wastewater	0.024
FLG110345	Fernandina Beach Ready Mix Plant	Fernandina Beach	Concrete Batch GP	n/a
FL0001104	Jefferson Smurfit Corp- Fernandina Beach Mill	Fernandina Beach	Industrial Wastewater	37.5
FL0032654	Marsh Cove WWTF	Fernandina Beach	Domestic WWTP	0.099
FL0000701	Rayonier, Inc.	Fernandina Beach	Industrial Wastewater	26.31

Source: Florida Dept. of Environmental Protection

Septic Systems

Septic systems are usually used to serve single housing units, although relatively large-scale systems have proven successful. The system consists of two components, the septic tank and the drain field. The tank receives wastewater from the home and provides a period of settling, during which time a significant portion of the suspended solids settle out. The settled solids are gradually decomposed by anaerobic bacteria in the tank. The remaining liquids are discharged by displacement through underground drainage pipes into the drain field and percolate into the soil where microorganisms and filtration processes purify the liquids. A modified onsite sewage disposal system improves on the septic tank design by providing aeration and promoting more efficient treatment. These systems, called aerobic treatment systems, are capable of 95 percent or higher treatment and are utilized in coastal zones or larger commercial facilities.

Septic tanks generally require cleaning every three to five years to remove accumulated solids. These solids, called septage, are generally transported to an approved land spreading sites or regional sanitary sewer facilities for treatment.

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Septic tanks may cause problems in certain areas where water tables are high due to either proximity to surface water bodies or where located in low areas or a combination of both. This results in the drainfield being located too close to the water table and a lack of adequate depth of unsaturated soil to treat the effluent. Chapter 64E-6.006 (2) F.A.C. requires that the water table elevation at the wettest season of the year is at least 24 inches below the bottom surface of the drainfield. This requirement has resulted in the mounding of many newer drainfields in order to meet the minimum separation of drainfield and high water tables. Problems occur more where septic tanks are old and drainfields have not been mounded pursuant to more recent State requirements. Areas that experience flooding are also likely to have problems with septic tanks.

Effluent Disposal Methods

Effluent and sludge are the waste products of the treatment process. Effluent is the treated wastewater, which flows out of the treatment plant. Effluent disposal options include discharge to a water body, storage within percolation ponds for evaporation and percolation, irrigation reuse or injection into deep aquifers. Sludge refers to the accumulated solid residues of the treatment process. Prior to final disposal, sludge is usually subjected to an additional biological treatment process to remove pathogens and physical dewatering processes to facilitate transportation and disposal. Common disposal methods include burial in solid waste landfills and land application as a soil conditioner for ornamental or similar agricultural purposes. In addition, the placement of septage on permitted land spreading sites is a permitted activity by the Dept. of Health (DOH).

Reclaimed Water and Reuse

Reclaimed water is treated wastewater that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility.

Reuse is the deliberate application of reclaimed water, in compliance with Florida Department of Environmental Protection (DEP) and water management district rules, for a beneficial purpose. Reclaimed water can be used for a wide range of beneficial purposes, including the following:

- Landscape irrigation (irrigation of golf courses, parks, highway medians, playgrounds, residential properties, etc.)
- Agricultural irrigation (including irrigation of nurseries/ornamentals and edible crops)
- Aesthetic uses (decorative ponds, pools, and fountains)
- Ground water recharge
- Industrial uses (for cooling, process, or wash waters)
- Wetlands creation, restoration, or enhancement
- Toilet flushing
- Fire protection (use in hydrants or sprinklers)
- Other use purposes

The encouragement and promotion of water conservation and reuse of reclaimed water, as defined by the Florida Department of Environmental Protection (DEP), are state objectives and are considered to be in the public interest. In response to this objective, the DEP, the water management districts, and the Public Service Commission (PSC) have implemented a comprehensive reuse program designed to encourage and promote reuse of reclaimed water.

Existing Regulatory Framework

Federal

The Federal Water Pollution Control Act (FWPCA) is the controlling national legislation relating to the provision of sanitary sewer service. The goal of this Act is the restoration and/or maintenance of the chemical, physical, and biological integrity of the nation's waters. The Act established the national policy of implementing area wide waste treatment and management programs to ensure adequate control of sources of pollutants. Under Section 201 of the FWPCA, grants were made available to local governments to construct facilities to treat "point sources" of pollution, which include effluent from sewage treatment processes. The U.S. Environmental Protection Agency is responsible for implementing the Act.

State

The Department of Environmental Protection (DEP) is responsible for ensuring that the state carries out responsibilities assigned to it under the FWPCA. DEP has adopted rules for the regulation of wastewater facilities in Chapter 62-600, Florida Administrative Code (F.A.C.). These rules apply to facilities, which treat flows exceeding 10,000 gallons per day for domestic establishments, 3,000 gallons per day for food service establishments, where the sewage contains industrial or toxic or hazardous chemical wastes. Additional state regulatory authority may be found in Chapters 373 and 403, Florida Statutes, as well as DEP rules Chapter 62-4, 62-302, 62-610 which address reuse water conservation, and water quality.

The Department of Health regulates septic tank and drain field installation within the state. These requirements have been adopted by rule in Chapter 64E-6 F.A.C.

Assessment of Wastewater Treatment Needs

Level of Service

Table PFSE-3 summarizes the presently adopted levels of service (LOS) for all regional wastewater treatment systems in Nassau County.

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Table PFSE-3 LOS for Fernandina Beach Wastewater Treatment System

Provider	LOS gpd per ERU*
City of Fernandina Beach	300

*ERU- Equivalent Residential Unit

Source: Fernandina Beach Proposed EAR-based Amendments

Conservation of Water Resources

In order to ensure a healthy economy and quality of life for its residents the City needs to treat its wastewater in methods that will protect and conserve its water resources in order to meet the future needs of the City’s population and the needs of the environment, commercial, and industrial activities.

The City should coordinate with the SJRWMD to adopt policies that will promote public education about water conservation; promote the reuse of treated effluent for irrigation purposes; promote the use of low-impact development techniques; and provide more specific well head protection standards.

SOLID WASTE FACILITIES OBJECTIVE

Waste collection is a very important aspect of City’s service to its citizens and tourists. Proper and timely collection and disposal of waste assures protection of the general public’s health, safety, and welfare.

Existing Regulatory Framework

Federal

The *Resource Conservation and Recovery Act* (RCRA) was adopted by Congress in 1976 and serves as the Federal legislation which regulates the disposal of municipal solid waste by setting minimum standards for waste disposal facilities. It also established resource recovery as a national priority and mandated that efforts to better utilize and manage the recycling of wastes were needed.

State

Chapter 403, Part IV, Florida Statutes, known as the 1988 Solid Waste Management Act, greatly altered the management of solid waste for local governments within the state. The act required local governments to start recycling programs in order to reduce the amount of waste being deposited into landfills by thirty percent (30%). The act also addresses the disposal of various other wastes such as lead-acid batteries, used oil, and tires. House Bill [HB] 851 passed by the 2002 Florida Legislature and signed by the Governor on May 30, 2002 modifies the solid waste management goals found in Section 403.706, Florida Statutes. Recycling programs shall be designed to recover a significant portion of at least four of the following materials from the waste stream prior to final disposal; newspaper, aluminum cans, steel cans, glass, plastic bottles, cardboard, office paper, and yard trash.

Chapter 62-701, Florida Administrative Code, outlines specific state requirements regarding the operation and closure of landfills, solid waste permits, and the handling of special wastes. This rule also regulates the disposal and classification of waste, and prohibits the disposal of yard wastes in landfills with liners.

The Florida Department of Environmental Protection (DEP), Division of Waste Management works to implement state and federal laws to protect the environment from the improper handling and disposal of solid and hazardous wastes. This includes regulatory programs for waste facilities and pollutant storage systems, and non-regulatory activities such as financial and technical assistance for recycling and waste reduction. The Division also oversees and contracts for the cleanup of sites contaminated with petroleum products, dry-cleaning solvents, or other hazardous wastes. There are three bureaus within the Division of Waste Management – the Bureau of Petroleum Storage Systems, the Bureau of Solid and Hazardous Waste and the Bureau of Waste Cleanup.

Existing Solid Waste Management System

Municipal Solid Waste (MSW) Disposal

In order to provide suitable service, the City utilizes intergovernmental and public-private partnerships. The City depends upon private companies to collect and transport waste products throughout the jurisdiction for disposal. In September 2009, Nassau County closed its only Class I landfill (the West Nassau Landfill, located north of the Town of Callahan) and signed an Interlocal agreement with Camden County, Georgia to transport Nassau County’s solid waste to Camden County’s landfill for disposal. An agreement was also signed with Waste Management, Inc., to allow the county to dispose of its waste at its Chesser Island Road facility in Charlton County, Georgia. The City’s solid waste collection is picked up through a contract with Advanced Disposal.

Recycling

Thanks to public awareness and participation in a variety of areas, the amount of solid waste generated in the City going into landfills is constantly being reduced. The City offers curbside recycling pick-up once each week. Additionally, the City maintains a recycling collection site located near its utility billing department. At present, the City is able to accept #'s 1 + 2 Plastics, Glass, Aluminum Cans,

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Cardboard, and White Paper at its recycle center. Twice each year, in the spring and fall, the City hosts a recycling and hazardous waste event allowing residents an additional opportunity to dispose of recyclable materials. The City is seeking measures to increase the number of recyclable products that may be accepted. Over the past five (5) years, the City has maintained a log of the recycled materials collected. Table PSFE-4 describes the total tonnage of materials successfully diverted from regional landfills which on average has equaled nearly 360 tons annually.

Table PFSE- 4 Recycled Materials Collected by Curbside Pick-up 2006-2010

Year	Tons Collected
2006	313.41
2007	285.54
2008	341.32
2009	409.03
2010	434.31

Source: Advanced Disposal Monthly Reports, 2006-2010

State-wide, Florida generates more than 32 million tons of municipal solid waste annually, almost two tons per resident per year. Although the Solid Waste Management Act passed a 30percent recycling goal more than two decades ago, Florida collectively recycles only 28 percent of its solid waste.

The Energy, Climate Change and Economic Security Act of 2008 established an aggressive recycling goal of 75 percent, the highest of any state. The Act directed DEP to submit a comprehensive program to achieve it. DEP released its report to the Florida Legislature in January, 2010.

The report is based on broad research and contributions of more than 500 stakeholders who participated in four public workshops and ideas were submitted through E-mails and DEP’s Web forum. It explores ways to increase the percent of material recycled in an economically responsible way through heightened public awareness, state leadership, development and expansion of recycling markets as well as increased investments throughout the local government and commercial sectors.

The report outlines initial steps low in financial impact but high in recycling value in order to make the report practical in today’s economic climate. Some of the key recommendations in the report include:

- Require state agencies to meet the 75% goal.
- Require commercial recycling in large counties and cities to include multi-family residential units such as apartments and condominiums, as well as institutional facilities such as schools and hospitals.
- Direct school districts to implement recycling programs.
- Create a Recycling Grants or Revolving Loan program to help local governments reach a 75% recycling goal in their jurisdictions.
- Require construction and demolition debris (C&D) disposal facilities to be modified to incorporate a Materials Recovery Facility (MRF), a specialized plant that receives, separates and prepares recyclable materials for marketing to end-user manufacturers.
- Create a recycling business assistance center to promote markets for the entire spectrum of recyclable municipal solid waste materials, organic and inorganic.

The Legislature will consider these recommendations during the 2010 legislative session. The City should consider adoption of some of these recommended strategies to boost the amount of recycled waste within the City and should support the creation of state funding program to help local governments reach higher recycling goal in their jurisdictions.

Hazardous Waste

Hazardous waste (HW) is solid waste, or a combination of solid wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated or otherwise managed.

HW exhibits one or more characteristics of ignitability, corrosivity, reactivity or toxicity which make it dangerous. Paint products, pool chemicals, household cleaners and pesticides are typical examples. HW cannot be disposed on or in the ground, or in local landfills, septic tanks, or injection wells. When disposed of in the municipal solid waste stream or otherwise improperly managed, these materials have the potential of contaminating the groundwater – and the City’s potable water supply.

A hazardous waste determination must be made of any waste material generated. If the material is hazardous, then it must be recycled, treated, stored, or disposed at a treatment, storage and disposal (TSD) facility authorized by DEP, EPA or another state. There are no TSD facilities identified within Fernandina Beach.

Florida’s hazardous waste regulations for transporters and transfer facilities are more stringent than the federal regulations. DEP’s Hazardous Waste Regulation Section (HWRS) reviews and issues permits and coordinates compliance monitoring and enforcement

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activities at hazardous waste generators, transporters and Treatment, Storage and Disposal (TSD) facilities. Large Quantity Generators (LQGs) and Small Quantity Generators (SQGs) are required to obtain an EPA identification number and to label all hazardous waste containers. In addition, the waste must be stored properly onsite and in limited quantities until shipped off site. The shipper must ensure that the materials are shipped properly to the disposal and storage sites. Also, regardless of quantity, the generator of HW is ultimately responsible for the waste from "cradle to grave", and can be held liable for improper management of HW even though it may have been sent to an authorized HW management facility using a licensed transporter authorized by DEP.

Large Quantity Generators (LQGs) generate 1000 kilograms or more of HW per month or 1 kilogram or more of acute HW (such as some pesticides, toxins or arsenic and cyanide compounds) per month. There are no LQGs identified within Fernandina Beach.

Small Quantity Generators (SQGs) generate 100 - 1000 kilograms of HW per month. As of November 2009, DEP has identified 44 SQGs of hazardous waste. They are listed in Table PFSE-5.

The government does not regulate hazardous wastes generated in the home. In Florida, household hazardous waste collection centers have been established in most communities.

The Florida Legislature initiated the Hazardous Waste Collection Center Grant Program to encourage the establishment of a statewide network of local hazardous waste collection centers. These facilities are intended to provide free collections of non-regulated hazardous waste from households and to provide short-term storage of potentially hazardous waste generated by small businesses. Also, the public awareness component of a collection not only helps citizens to better understand and manage their household hazardous waste, but may help them to learn to reduce the volume they generate.

Table PFSE-5 Small Quantity Generators (SQGs) of Hazardous Waste, Fernandina Beach 2009

EPA ID	Name	Address
FLR000089193	CSX Transportation Inc.	404 Gum St. Fernandina Beach, FL 32034
FLD984179333	Flash Foods #101	2809 Atlantic Ave Fernandina Beach, FL 32034
FLD984179457	Flash Foods #143	2020 Sadler Rd Fernandina Beach, FL 32034
FLD981858046	H & H Tire & Service Center Inc.	925 S 8th St Fernandina Beach, FL 32034
FLR000085704	Hess Corporation #09233	185 SR 200 (A1A) Fernandina Beach, FL 32034
FLD984193615	Huntley Jiffy Food Stores #262	3331 S Fletcher Ave Fernandina Beach, FL 32034
FLR000010181	Island Custom Cabinets	2160#C Sadler Rd Fernandina, FL 32034
FLD981931389	Johnny Auto Electric	Rt 4 Box 80b Hwy A1A Fernandina Beach, FL 32034
FLR000152025	Kmart #7613	1525 Sadler Rd Fernandina Beach, FL 32034
FLD984249920	OB Cannon & Son Inc.	N 8th St (B) Fernandina Beach, FL 32034
FLD004056255	Rayonier Performance Fibers LLC	10 Gum St Fernandina Beach, FL 32034
FLD984234831	Southeast Express Inc.	SR A1A & Waas Rd Fernandina Beach, FL 32034
FLD982173155	Thrift Automotive	Route 4 Box 85a Fernandina Beach, FL 32034
FLR000074336	Wal-Mart #977	1385 Amelia Plaza Fernandina Beach, FL 32034

Source: DEP, Hazardous Waste Regulation Section

Level of Service

Table PFSE-6 summarizes the presently adopted levels of service (LOS) for per capita solid waste landfill disposal in Fernandina Beach, expressed in pounds per person per day, tons per person per year, and the estimated fill rate in cubic yards per year. For calculating the fill rate, a ton of solid waste (2,000 lbs.) is estimated to have a volume of approximately 1.55 cubic yards.

Table PFSE-6 LOS for Solid Waste Landfill Disposal, Fernandina Beach

Measure	LOS
Lbs. per capita/day	5.9 lbs.
Tons per capita/year	1.076 tons
Fill Rate per capita/year (cubic yards)	1.67 cy

The City anticipates continuing with contractual agreements to meet its solid waste level of service standards. This allows the City to achieve set LOS standards based on the agreement in place.

STORMWATER MANAGEMENT FACILITIES OBJECTIVE

Background

Stormwater management is the planned control of surface water runoff resulting from rainfall in order to prevent flooding and pollution. All development creates an impact to overland flow of rain water, and this sub-element provides direction for ensuring that development impacts are mitigated by stormwater management facilities. It establishes policy directions for minimizing the flooding of lands and the degradation of water quality caused by storm events to ensure that the county's potable water is drinkable and that recreational water is suitable for swimming and fishing.

In general, stormwater runoff in Fernandina Beach is rapid. Past studies by the United States Geological Survey (USGS) found that the amount of runoff flowing into the St. Marys and Nassau River basins was often over 50 percent greater than the average for the state as a whole. This high yield of runoff is attributed to the fact that very little of the rain seeps to the Floridian aquifer, and the rain that does not enter the shallow surficial aquifer runs off before much of it has time to evaporate or transpire through vegetation.

The City's drainage system consists of the integration of natural drainage features (creeks, streams, topography) with man-made swales that channel runoff into these natural drainage features to enhance flow and reduce or eliminate flooding. The natural drainage features in City consist of the Egans Creek Greenway and the Intracoastal Waterway (i.e. Amelia River).

Existing Regulatory Framework

Federal

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP). The NFIP was established by Title XIII of the Housing and Urban Development Act of 1968 to provide previously unavailable flood insurance protection to property owners in flood-prone areas. In return for the federally subsidized insurance, local governments who are members of the program must implement flood plain management measures to protect lives and new construction from flooding. The major strength of the NFIP program is the requirement of participating local governments to adopt floodplain management ordinances. This requirement requires local governments assessing flood hazards in the area and implementing a mediation program. The NFIP offers reasonably priced flood insurance in communities that comply with minimum standards for floodplain management. The NFIP's Community Rating System (CRS) is a voluntary incentive program that recognizes community efforts beyond those minimum standards by offering discounts on flood insurance premiums for the community's property owners ranging from 5 percent up to 45 percent based on the credits earned through public information and floodplain management activities undertaken by the local government. The City's class 7 CRS rating results in a greater than 10% discount on flood insurance rates for residents and business owners. The City has had an adopted floodplain ordinance since 1992, which was last updated in 2010. The City will seek to further update its ordinance and take other community actions during the planning period in order to continue participation in the NFIP Community Rating System.

The U.S. Army Corps of Engineers (USACE) regulates dredge and fill activities in waters of the United States, including adjacent and isolated wetlands. The primary functions of the USACE dredge and fill program are to restore and maintain navigability of waterways, and to protect ocean waters from pollutants dumped by vessels. The USACE also considers impacts to adjacent and isolated wetlands of the nation's waters.

State and Regional

The Florida Department of Transportation (FDOT) maintains the stormwater management systems for state maintained roads. Most of these roads are drained by ditches, but some in urbanized area have stormwater conveyance systems.

The Florida Dept. of Environmental Protection (DEP) regulates dredge and fill activities in the State of Florida in accordance with Chapter 403, F.S., and Chapters 62-312 and 62-330, F.A.C. DEP is primarily concerned with maintaining and, where appropriate, improving the quality of the waters of the state, as well as protecting and preserving wetlands, including fish and wildlife which use these areas. DEP requires a dredge and fill permit for such activity in all waters of the state except a water body owned by one person that does not discharge onto other property or waters, or those waters within an artificially constructed stormwater system.

The St. Johns River Water Management District (SJRWMD) has been delegated dredge and fill (wetland resource management) permitting for certain projects which require a stormwater permit, pursuant to Chapter 40C-42, F.A.C. This includes projects which may also require an Environmental Resource Permit (ERP) pursuant to Chapter 40C-4, F.A.C.

As mandated by Chapter 373, Florida Statutes, the Water Management Districts are responsible for managing water and related land resources in Florida. The St. Johns River Water Management District (SJRWMD) has jurisdiction over all or part of 18 counties in northeast and east central Florida, including all of Nassau County.

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Through research and regulation, the SJRWMD promotes the conservation, development, and proper utilization of surface and groundwater. The SJRWMD require permits for well construction, management and storage of waters, stormwater discharge, consumptive use, works of the District, and wells for artificial recharge. In addition, the District has the authority to declare and implement water shortage warnings, water shortages, and water use restrictions. The SJRWMD also has the authority to acquire land for flood control, water storage, water management, and preservation of wetlands, streams and lakes. In Nassau County the District manages 1,586 acres in southwestern Nassau County as part of the Thomas Creek Conservation Area.

The SJRWMD Environmental Resource Permit (ERP) programs are regulated by Chapter 40C-1, F.A.C. (Procedural Rule), Chapter 40C-4, F.A.C. (Environmental Resource Permits), Chapter 40C-40, F.A.C. (General Surface Water Management Permits), and Chapter 40C-41; F.A.C. (Surface Water Management Basin Criteria).

In addition to the ERP program, the Water Management Districts were authorized in 1986 to regulate stormwater discharge. Chapter 62-25, F.A.C., under DEP jurisdiction Chapter 40C-42, F.A.C. governs this program, which is designed to prevent pollution of the waters of the state by discharges of stormwater. The purpose of this program is to ensure that the designated most beneficial of water, as prescribed by Chapter 62-25, F.A.C., are protected. Both general and individual stormwater permits are issued, with specific criteria for each. Additional treatment is required for facilities which directly discharge to Class I, Class II or Outstanding Florida Waters.

The difference between the ERP rule and the stormwater rule is basically quantity versus quality. An ERP permit addresses water quality from stormwater runoff but also looks at impacts to wetlands, and requires the peak runoff after development be less than or equal to the peak runoff prior to development. A stormwater permit focuses on water quality impacts from runoff. The thresholds for each of these permits limit the type and size of development projects which the District reviews.

Areas of Flooding

In Fernandina Beach, localized flooding can result from strong convective storms, common in spring and summer, and general flooding may result from tropical storms in summer and fall or from strong frontal activity in winter.

Soils in Fernandina Beach are sandy and have high percolation rates and are classified as well-drained to excessively well-drained. The rain falling in these areas absorbs into the ground rapidly. The structural alteration of floodplains and wetlands can significantly increase and create drainage problems. Wetlands are extremely valuable for storing floodwaters, augmentation of stream flow, filtering nutrients from polluted water and providing fish and wildlife habitat. They should be protected from development that would interfere with seasonal flows and levels for surface watercourses and groundwater.

Surface Water Quality

Fernandina Beach's surface water resources are, generally, in good condition. The enforcement of State, Federal, and local regulations, coupled with the public's generally increased awareness of the need to conserve and protect water resources have combined to protect these waters from the types of point and non-point sources of pollution which have degraded surface waters in other parts of the state. The primary threats to City's surface waters continue to include non-point source pollution generated by urban and agricultural runoff, leachate from septic tanks and package wastewater treatment plants, and erosion from improper land clearing activities.

Florida's water quality standards, the foundation of the state's program of water quality management, designate the "present and future most beneficial uses" of the waters of the state (Sec. 403.061(10), Florida Statutes). Water quality criteria for surface water and ground water are expressed as numeric or narrative limits for specific parameters, describe the water quality necessary to maintain these uses. Florida's surface water is classified using the following five designated use categories:

- Class I Potable water supplies
- Class II Shellfish propagation or harvesting
- Class III Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife
- Class IV Agricultural water supplies
- Class V Navigation, utility, and industrial use (there are no state waters currently in this class)

The waters in Fernandina Beach are classified by DEP as either Class II or Class III. Class III water quality standards are intended to maintain suitability for sports and recreation, and production of diverse fish and wildlife communities. Management standards for Class II waters are much more restrictive than standards for Class III waters. Class II water standards place more stringent limitations on bacteriological and chemical pollution. Although Class II waters are classified by DEP as suitable for shellfish harvesting, shellfish harvesting has not been allowed in Nassau County because of high levels of fecal coliform found in area waters during the mid-1970s.

The three principal Florida aquifer systems—surficial, intermediate, and Floridian—are all present beneath the entire Nassau—St. Mary's Basin. These aquifer systems are defined and separated based primarily on variations in lithostratigraphy. The primary source of potable water in the basin is the Floridian aquifer, which is deep, confined, and under artesian pressure throughout the area. The intermediate system is mainly a confining unit that occurs in the Hawthorn Group, which in this area includes extensive clay layers. The surficial aquifer system is the "water table" aquifer in the basin. It is used as a potable water supply to a limited extent, but the surficial aquifer is significant to this evaluation because it is the ground water source that directly interacts with surface water bodies, providing base flow to streams, estuaries, and lakes in the basin.

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The basin is not known for significant amounts of spring discharge because the limestone formations are so deeply buried by confining sediments. However, seepage from the surficial aquifer may constitute a significant percentage of water to the overall stream flow in the basin.

A 2005 analysis of base flow conducted by the DEP Ground Water Protection Section for a study site on the St. Mary's River, the ground water component of flow at U.S. Geological Survey flow measurement stations on the St. Mary's River was approximately 50 percent of the total flow. Similar amounts of ground water seepage are expected for other streams in the basin.

Level of Service

For stormwater management, Level of Service (LOS) should be expressed in terms of the carrying capacity required by various components of the system in order to carry away stormwater at various intensities of rainfall with minimum polluting impact on receiving waters or sites. The standard which is commonly accepted in designing drainage facilities is the design storm event. This standard specifies the intensity (rate of rainfall) and duration of the rainfall event.

Stormwater discharge analysis includes generating pre-development and post-development runoff hydrographs; routing the post-development runoff hydrographs through the stormwater storage system; and, sizing the storage system and discharge control structures to limit post-development discharge rate and/or volume to pre-development or existing conditions for the storm events. Stormwater discharge computations include the storm frequency, storm duration, rainfall amount, rainfall distribution, hydrologic soil conditions, surface storage, changes in land use cover and slope conditions, off-site runoff contributing areas, time of concentration, and any other changes in topographic and hydrologic characteristics.

In Fernandina Beach, the allowable stormwater discharge rate and discharge volume from a project is based on the following design and performance criteria, pursuant to Rule 40C-42, F.A.C.:

- Projects which discharge or contribute runoff to downstream areas which are not volume sensitive and have adequate capacity to accept and convey stormwater runoff from the project site without increasing flood levels shall limit peak rates of discharge for developed conditions to pre-developed or existing conditions for the 5-year, 10-year, and 25-year design storm event.
- Projects which discharge or contribute runoff to downstream areas which are volume sensitive and/or do not have adequate capacity to accept and convey stormwater runoff from the project site without increasing flood levels shall provide detention of the 25-year discharge volume for developed conditions such that the volume released from the project during the critical time period is no greater than the volume released under pre-developed or existing conditions during the same time period. For the purposes of this requirement the critical time period shall be the storm duration based on the 24-hour duration rainfall event unless a detailed hydrologic study of the contributing watershed demonstrates otherwise.
- All projects shall meet state water quality discharge standards as regulated by the St. Johns River Water Management District pursuant to Rule 40C-4 F.A.C., and must submit of a copy of a valid St. Johns River Water Management District permit as part of the development review process.

These standards do not apply to projects considered exempt pursuant to Rule 40C-42.0225 F.A.C. However, certain design criteria may still be required for exempt projects by the City's Land Development Code. Exempt projects include single family dwelling units and duplexes which are not a part of a larger common plan of development; agricultural and forestry uses; and maintenance work performed on existing stormwater management systems, provided that such maintenance work does not alter the purpose and intent of the system as constructed.

Stormwater Master Plan

Urban development and road construction have modified the natural drainage of Nassau County. As is the case with most counties and municipalities in North Florida, response to rapid growth was often delayed, and structures and roads were located without concern for the impact of this development on comprehensive stormwater management. These communities now are faced with problems of identifying needs and implementing a comprehensive program to correct the stormwater problems caused by past development and set in place a master plan for managing stormwater to accommodate projected growth.

The 2002 Comprehensive Plan stated that there is a need to develop a master stormwater master plan by September 2006. In December 2006, the City adopted Ordinance 2006-28 extending the date for completion of a master plan to September 2007. The 2009 Evaluation and Appraisal Report (EAR) recommended that the City continue to pursue the development of a stormwater master plan. During the summer of 2010, the City completed the creation of a stormwater master plan which identifies specific areas of the City at greatest risk of flooding and prioritizes projects to resolve the identified risk areas. At this time the City has not implemented the recommendations of the stormwater master plan. The Goals, Objectives and Policies of the proposed 2030 Comprehensive Plan/ EAR based amendments also recommend that the City implement a citywide stormwater master plan.

The implementation phase of the stormwater master plan should develop additional Comprehensive Plan goals and objectives to address both existing needs and long-range prevention-based measures, such as floodplain preservation, zoning regulations, or

regional detention facilities. Once goals and objectives have been finalized, actions are prioritized and implemented through the Schedule of Capital Improvements (SCI), the Land Development Code (LDC), and other methods.

Funding New Stormwater Management Facilities

To effectively implement a stormwater management program, the City needs to investigate sources of funding that can be dedicated exclusively to stormwater management. The use of City general revenue for stormwater management practices could be replaced with dedicated funding sources including sources such as bonds, impact fees, or creation of a stormwater utility.

A stormwater utility would assess a user fee based on the stormwater characteristics (i.e. size and amount of impervious surface area) of a particular parcel. Credits can be given for the use of Best Management Practices (BMPs). A stormwater utility would be sufficient to fund minor projects and ongoing maintenance. However, large-scale projects, such as building a regional stormwater facility, would need to be funded by bonds, development impact fees, or grant funds. It should also be noted that by having an adopted stormwater master plan, the City would be more successful in securing grant funds from state, regional and federal authorities.

Low Impact Development (LID)

Stormwater has been identified as a major source of pollution for all water body types in the United States, and the impacts of stormwater pollution are not static; they usually increase with land development and urbanization. The addition of impervious surfaces, soil compaction, and tree and vegetation removal result in alterations to the movement of water through the environment. As interception, evapotranspiration, and infiltration are reduced and precipitation is converted to overland flow, these modifications affect not only the characteristics of the developed site but also the watershed in which the development is located.

Low Impact Development (LID), as defined by the U.S. Environmental Protection Agency (EPA) is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product.

There are many practices that have been used to adhere to these principles such as bio-retention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. LID can be applied to new development, redevelopment, or as retrofits to existing development. LID has been adapted to a range of land uses from high density ultra-urban settings to low density development.

Traditional approaches to stormwater management typically involve hard infrastructure, such as curbs, gutters, and piping. LID-based designs, in contrast, are designed to use natural drainage features or engineered swales and vegetated contours for runoff conveyance and treatment. In terms of costs, LID techniques can reduce the amount of materials needed for paving roads and driveways and for installing curbs and gutters. Other LID techniques can eliminate or reduce the need for curbs and gutters, thereby reducing infrastructure costs. Also, by infiltrating or evaporating runoff, LID techniques can reduce the size and cost of flood-control structures. Note that in some circumstances LID techniques might result in higher costs because of more expensive plant material, site preparation, soil amendments, under drains and connections to municipal stormwater systems, as well as increased project management costs. Other considerations include land required to implement a management practice and differences in maintenance requirements. In many cases LID practices can offset the costs associated with regulatory requirements for stormwater control.

In 2007, EPA published the report *Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices*. EPA researched and assembled 17 case studies that examined cost savings and additional costs associated with LID designs compared to traditional stormwater management designs. The case studies revealed that LID practices can be both fiscally and environmentally beneficial to communities. Site-specific factors influence project outcomes, but in general, for projects where open space was preserved and cluster development designs were employed, infrastructure costs were lower. In most cases, significant savings were realized due to reduced costs for site grading and preparation, stormwater infrastructure, site paving, and landscaping. Total capital cost savings ranged from 15 to 80 percent when LID methods were used, with a few exceptions in which LID project costs were higher than conventional stormwater management costs.

LID can also provide other benefits including improved aesthetics, expanded recreational opportunities, increased property values due to the desirability of the lots and their proximity to open space, increased total number of units developed, increased marketing potential, and faster sales.

POTABLE WATER FACILITIES OBJECTIVE

Background

The purpose of this objective is to ensure that public water supply facilities are available to meet the existing and future needs of the City. The ability of the City to provide potable water will play an important role in shaping future land use patterns and developing annexation strategies. The availability of water influences the timing, location, and intensity of development. Planning for the extension of these services should therefore be considered an integral part of the City's *Comprehensive Plan*.

Existing Facilities

As the largest municipality in Nassau County, the City of Fernandina Beach owns and operates three WTPs rated at a combined capacity of 18.2 MGD. The No. 1 WTP has a capacity of 5.6 MGD and has a 500,000 gallon elevated storage tank and a 680,000 gallon ground storage tank. The No. 2 WTP has a capacity of 8.0 MGD and a 620,000 gallon ground storage tank. The No. 3 WTP has a capacity of 4.6 MGD and a 500,000 gallon ground storage tank. These plants currently serve a population of approximately 11,510 persons.

The current CUP for the City of Fernandina Beach issued by SJRWMD authorizes the use of 2,400.45 MGY (6.575 MGD) of groundwater from the Floridian aquifer for household, commercial/industrial, water utility, essential uses (fire protection) and unaccounted for water losses in 2020. The average daily flow (ADF) for this system in 2009 was 1.81 MGD. Table PFSE-7 lists the municipally-owned and operated water treatment plants (WTP) in the City.

Table PFSE-7 Fernandina Beach Municipal Water Treatment Facilities

Facility	Provider	Location	Capacity MGD
WTP No. 1	City of Fernandina Beach	20 N. 11th Street, Fernandina Beach	5.6
WTP No. 2	City of Fernandina Beach	2203 Ryan Rd, Fernandina Beach	8.0
WTP No. 3	City of Fernandina Beach	3425 Citation Ct, Fernandina Beach	4.6

Sources: *City of Fernandina Beach Utilities Director, 2011*

Small Community Systems

In addition to municipal systems, there is one small community water system licensed by DEP within the City of Fernandina Beach. Small public supply utility systems are classified by SJRWMD as those typically having an average daily flow (ADF) under 0.1 MGD.

Other non-community, or "package"- type systems are often used for commercial, industrial or institutional uses and are classified under that category by SJRWMD. DEP monitors small package water treatment systems to ensure that they have adequate capacity to serve their intended uses and is responsible for advising the County of any major problems.

Table PFSE-8 Licensed Small Public Water Systems in Fernandina Beach

Lic. #	Name	Location	Class	Capacity (MGD)
2451322	Marsh Cove Apartments	Fernandina Beach	Community	0.130

Source: *Florida Dept. of Environmental Protection*

Commercial/Industrial/Institutional Self-Supply

This category includes all permitted commercial/industrial/institutional self-suppliers listed in the SJRWMD Consumptive Use Permit (CUP) database as having an average daily use of at least 0.10 MGD. Nassau County and the City of Fernandina Beach are projected to have a relatively high rate of use (36-38 MGD) in the next 20 years according to the 2008 WSA. This is mainly due to the water use of the two large pulp mills located in Fernandina Beach. Each mill is presently permitted to withdraw over 24 MGD according to their approved CUPs.

Domestic Self-Supply

Domestic self-supply water use refers to water use by individuals not served by a public supply water utility (i.e., a residence with a private well).

According to the Nassau County Health Department, approximately 99% of the population in Fernandina Beach is connected to a regional water system and the remaining 1% of the population uses either a small public system or private water wells (see Table PFSE-9).

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Table PFSE-9 Estimated Population by Water Supply Method, 2009

	Total Pop.	Regional System	%	Small sys. or Well	%
Fernandina Beach	12,055	11,900	99%	150	1%
Nassau County (Total)	72,567	35,870	49%	36,697	51%

Sources: University of Florida, Bureau of Business and Economic Research (BEER), SJRWMD 2008 Water Supply Assessment

Level of Service

Table PFSE-10 summarizes the presently adopted levels of service (LOS) for the municipal potable water systems in Fernandina Beach.

Table PFSE-10 LOS for Municipal Potable Water Systems, Fernandina Beach

Provider	LOS gpd per ERU
City of Fernandina Beach	350

*ERU- Equivalent Residential Unit

Source: Fernandina Beach Proposed 2011 EAR-based Comprehensive Plan Amendments

Projected Demand

The draft 2008 WSA indicates that approximately 51 percent of total county residents will be connected to a regional water system in 2010. Projecting forward, the WSA actually forecasts a decline in the percentage of residents using central systems, dropping to just over 48 percent by 2030.

Table PFSE-11 2008 WSA Projected Population by Water Supply Method 2010-2030

	2010	%	2015	%	2020	%	2025	%	2030	%
Total Population	73,100		80,000		88,200		96,100		104,000	
Regional System	37,062	50.7%	41,200	51.5%	45,423	51.5%	48,338	50.3%	50,128	48.2%
Small System / Self-Supply	36,038	49.3%	38,800	48.5%	42,777	48.5%	47,762	49.7%	53,872	51.8%

Sources: University of Florida, Bureau of Business and Economic Research (BEER), SJRWMD 2008 Water Supply Assessment

Conservation of Water Resources

In order to ensure a healthy economy and quality of life for its residents the City needs to protect and conserve its water resources in order to meet the future needs of the City's population and the needs of the environment, commercial, and industrial activities.

The City should coordinate with the SJRWMD to adopt policies that will promote public education about water conservation; promote the reuse of treated effluent for irrigation purposes; promote the use of native and drought tolerant landscape materials, promote the use of low-impact development techniques; and provide more specific well head protection standards.

WATER SUPPLY PLANNING

The St. Johns River Water Management District (SJRWMD) approved its updated District Water Supply Plan on Feb. 7, 2006. The updated SJRWMD 2005 District Water Supply Plan (DWSP) addresses current and future water demands and traditional and alternative water sources and water conservation required to meet 2030 water supply needs. According to the 2005 DWSP, no Priority Water Resource Caution Areas are identified in Nassau County thereby, excluding the City of Fernandina Beach. The availability of the required water quantity from the surficial and Floridian aquifers substantially exceeds current and projected use within most areas of the County. No water supply development projects listed in the 2005 plan are located in Nassau County.

The 2008 Water Supply Assessment (WSA) is based on a planning period that extends through 2030. In the 2008 WSA, the northeast Florida area is identified as a potential PWRCA. As an identified PWRCA the area may not be able to meet all future water demands without unacceptable impacts to water resources and related natural systems.

Legislative changes to growth management laws were made in 2002, 2004 and 2005 to more effectively address the state's water supply situation by improving the link between local governments' land use plans and water management districts' regional water supply plans. Local governments must address the enhanced water supply planning requirements by demonstrating that future land use

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map amendments are based upon the availability of water supplies and water supply facilities and by completing updates to their comprehensive plans and adopting related amendments.

The Department of Community Affairs requires that counties not lying within the Priority Water Resource Caution Area address the following items as part of the EAR-based amendments to their comprehensive plans. They will be addressed in this plan as follows:

1. *Update the Public Facilities, Conservation, and Future Land Use Elements to reflect the Water Management District's District Water Supply Plan.*

This will be accomplished through the inclusion of updated information from the 2005 DWSP in data and analysis, where appropriate, and in policies specifically addressing the need to reflect the DWSP in the elements listed.

2. *Update the Public Facilities Element to address water needs and sources, water supply development, conservation, reuse, and cooperative planning efforts related to development of multi-jurisdictional water supply facilities, including the development of alternative water sources to supplement traditional sources of groundwater and surface water supplies.*

In addition to new information on water supply being included in the data and analysis for this sub-element, policies will be included in this element to address water supply and development, including, where required, the development of alternative water resources.

3. *Update the Conservation Element to include an assessment of current and projected water needs and sources for at least a 10-year period. This assessment should consider the St. Johns River Water Management District Water Management Plan.*

This assessment will be based upon the data and analysis found in the 2008 WSA and will be submitted with the EAR-based amendments.

4. *Update the Intergovernmental Coordination Element to address cooperative efforts with other local governments, public and private utilities, regional water supply authorities, special districts, and water management districts with regard to potable and reuse water service delivery.*

The Intergovernmental Coordination Element includes policies requiring cooperation between municipalities, adjacent jurisdictions, public and private utilities, the SJRWMD and other regional water supply authorities to address potable water supply and service delivery issues.

GROUNDWATER AQUIFER RECHARGE OBJECTIVE

Background

Natural groundwater recharge is the addition of water to the saturated zone and the downward movement of the water into aquifer systems. As defined by Chapter 9J-5.003, F.A.C., natural groundwater aquifer recharge areas are areas that contribute or provide volumes of water which make a contribution to the storage or regional flow of an aquifer. The two functions of natural groundwater recharge that must be protected are the ability of water to percolate downward to the aquifer and the need to protect water quality. The ability of the land surface to absorb water is related to, among other parameters, the amount of permeable surface areas. Covering the surface with streets, parking areas and structures decreases the available permeable surface.

The SJRWMD recently updated GIS data on Recharge to the Floridian Aquifer. As shown on Recharge Area Map contained in **Appendix A**, one area of recharge occurs on the northern end of Amelia Island within the City. According to information from the SJRWMD, this area encompasses approximately 207,261 acres and extends beyond the municipal boundary.

All areas of natural groundwater recharge in Fernandina Beach are considered by the SJRWMD to be low recharge areas (0-4 in/yr). While the recharge rate per unit area is less in the low recharge areas than other recharge areas, it should be noted that the recharge areas cover significant acreage and contribute a significant volume of the total recharge to the Floridian aquifer.

Existing Regulatory Framework

Federal

The federal government has established quality standards for the protection of water for public use, including operating standards and quality controls for public water systems. These regulations are provided in the Safe Drinking Water Act, which was updated in 1996. This law directed the EPA to establish minimum drinking water standards. The 1996 amendment included new prevention approaches and revisions to the regulatory program.

State and Regional

In the State of Florida, the Department of Health (DOH) and the Department of Environmental Protection (DEP) promulgate regulations that protect aquifer water quality. Chapter 62-528 F.A.C. controls the permitting of underground injection wells. Chapter 62-522 F.A.C. regulates discharges to groundwater and Chapter 62-550 F.A.C. regulates the source and quality of drinking water supplies.

The St. Johns River Water Management District (SJRWMD) is responsible for managing water supplies to meet existing and future demands. Regulation of consumptive use is achieved through a permitting system, through which water resources are allocated among the permitted consumers. The SJRWMD also oversees the permitting and construction of both public and private wells. SJRWMD maintains six groundwater monitoring stations located throughout the Nassau County including: Ft. Clinch (Fernandina), Yulee Fire Tower (Yulee), Fairgrounds (Callahan), Hilliard Elementary School (Hilliard), St. Marys WMA (Boulogne), and Cary State Forest (Bryceville).

Local
The City has adopted policies in its Comprehensive Plan regarding the protection of recharge areas to the Floridian Aquifer through limits on impervious areas and hazardous materials and through requirements for onsite retention and subsequent recharge of treated stormwater runoff. These policies are intended to be implemented through the adopted Land Development Code (LDC).

Groundwater Resources

Three aquifer systems supply groundwater within the County: the surficial, the intermediate, and the Floridian aquifers. The source of water to all of these aquifers in the district is rainfall occurring within or near the district's boundaries. Some of this rainfall runs off to streams that carry it to the ocean. Some of it is returned to the atmosphere as evaporation from open water surfaces and as transpiration by plants. Some rainfall is stored in lowland areas such as lakes. Only a portion of rainfall moves downward from land surface to recharge the aquifers. The Southeastern Geological Society has defined the hydro-geologic nature of these aquifer systems, which may be briefly characterized as follows:

Surficial Aquifer System - The surficial aquifer system consists primarily of sand, silt, and sandy clay. It extends from land surface downward to the top of the confining unit of the intermediate aquifer system, where present, or to the top of the confining unit of the Floridian aquifer system. The surficial aquifer system contains the water table, which is the top of the saturated zone within the aquifer.

Water quality in the surficial aquifer system is generally good. However, in coastal areas like Amelia Island, this aquifer system is prone to saltwater intrusion. The surficial aquifer system is sometimes used as a source of water for domestic self-supply, primarily in coastal areas.

Intermediate Aquifer System - The intermediate aquifer system, also known as the intermediate confining unit, lies between the surficial aquifer system and the underlying Floridian aquifer system. This unit consists of fine-grained deposits of sand and clay layered within thin, water-bearing zones of sand, shell, and limestone, and collectively retards the exchange of water between the other aquifer systems.

The intermediate aquifer system is generally not used as a water source in Nassau County but is used for domestic self-supply in other areas of northeast Florida, including Duval and Clay counties.

Floridian Aquifer System - The Floridian aquifer system is one of the world's most productive aquifers. Composed primarily of limestone and dolomite rock, the Floridian aquifer system underlies the entire state, although it does not contain potable water at all locations. Water in the Floridian aquifer system occurs under confined conditions throughout most of the SJRWMD.

The Floridian aquifer system is divided into sub-regions on the basis of the vertical occurrence of two zones of relatively high permeability. These zones are called the Upper and Lower Floridian aquifers. A less-permeable limestone and dolomitic limestone sequence, referred to as the middle semi-confining unit, generally separates the Upper and Lower Floridian aquifers.

The Upper Floridian aquifer is the primary source of water for public supply water use in Nassau County and for most of the northern and central portions of SJRWMD, where the aquifer contains water that generally meets primary and secondary drinking water standards. Portions of the Lower Floridian aquifer furnish water for public supply in Duval County.

Groundwater Recharge to the Floridian Aquifer

Groundwater recharge to the Floridian aquifer is the addition of water to the Floridian aquifer from the overlying surficial aquifer. Recharge rates to the Floridian aquifer are based on hydraulic pressure differences between the water table of the surficial aquifer and the potentiometric surface of the Floridian aquifer and on the hydrated conductivity of the upper confining unit separating the aquifers.

Recharge to the Floridian aquifer occurs in areas where the elevation of the water table of the surficial aquifer is higher than the elevation of the potentiometric surface of the Floridian aquifer. In these areas, water moves from the surficial aquifer in a downward direction through the upper confining unit to the Floridian aquifer. Recharge also occurs directly from infiltrating rainfall, where the limestone of the Floridian aquifer is at or near land surface. In addition, significant local recharge may occur where sinkholes have breached the upper confining unit.

Discharge from the Floridian aquifer occurs in areas where the elevation of the Floridian aquifer potentiometric surface is higher than the elevation of the water table. In these areas, water moves from the Floridian aquifer in an upward direction through the upper confining unit to the surficial aquifer. Where the elevation of the Floridian aquifer potentiometric surface is higher than land surface, springs and free-flowing artesian wells occur.

Nearly all of the water recharging the Floridian aquifer in the SJRWMD is derived from rainfall in the district. Rainfall percolating downward from land surface to the Floridian aquifer must move through the unsaturated soil zone, the surficial aquifer, and the semi-confining layers to recharge the Floridian aquifer. The amount of water stored in the aquifer systems is determined by a balance between recharge, evapotranspiration, runoff, leakage to or from the adjacent aquifers, natural discharge, and withdrawals from

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water wells. The movement of water through sink holes or lakes of probable sinkhole origin that breach the semi-confining layer can be a significant conduit for recharge, depending on the degree of hydraulic connection to the Floridian aquifer.

Recharge rates to the Floridian aquifer are based on hydraulic pressure differences between the water table of the surficial aquifer and the potentiometric surface of the Floridian aquifer and on leakage of the upper confining unit separating the aquifers. Recharge areas of the Floridian aquifer in the SJRWMD were mapped using a geographic information system to analyze the geologic and hydrologic factors that affect recharge. Recharge rates were mapped by a 4-inch-per-year (in/yr) contour interval.

The Impact of Development on Natural Groundwater Recharge

The population projections indicate that Fernandina Beach's total population will increase to approximately 14,010 by the year 2030. Consequently, groundwater withdrawal rates for domestic and commercial/industrial/institutional use are expected to increase to meet these growth demands. Population growth and land development can significantly impact recharge areas of the Floridian Aquifer. Development increases impervious surfaces which can reduce the amount of available natural groundwater recharge. As a result, the City has introduced policies within its Future Land Use Element and its Public Facilities and Services Element which reduce the amount of allowable impervious surface area for a development site and requirements as well as incentives for developing using low-impact development strategies.

Based on the findings of the SJRWMD draft 2008 Water Supply Assessment (WSA), widespread water level declines are projected for northeast Florida as a result of numerous projected increases in groundwater withdrawals in the area. The declines create a cone of depression in the pressure of water, known as potentiometric pressure, in the Floridian aquifer. The draft assessment also finds that surficial aquifer water levels are projected to decline in some areas of northeast Florida in response to withdrawals from the underlying Floridian aquifer.

Protection of Groundwater Resources

State and federal regulations provide minimum protection of groundwater resources. Each local government must plan carefully to ensure that growth does not adversely impact a groundwater quantity or quality.

The City has adopted policies in its Comprehensive Plan regarding the protection of recharge areas to the Floridian Aquifer through limits on impervious areas and hazardous materials and through requirements for onsite retention and subsequent recharge of treated stormwater runoff. These policies are implemented through the adopted Land Development Code (LDC). The City will need to insure that these regulations are being implemented properly and consistently for applicable development orders issued in recharge areas.

In particular, the LDC sets forth regulations to safeguard potable water supplies by regulating the storage, handling, use or protection of hazardous substances around the public potable water supply wells. The area around a well that must be protected in order to prevent potential pollutants from entering the aquifer around the well is called the "Wellfield Protection Zone". There are a number of approaches for defining a wellhead protection area. These range from a simple arbitrary fixed radius to a very sophisticated numerical flow/transport model which is based upon well pumping rate, porosity of the aquifer, slope of the topography and other parameters. DEP defines the wellhead protection zone as a 500 foot radial setback distance around a potable water wellhead.

ADDITIONAL FACILITIES AND SERVICES OBJECTIVES

Background

To more accurately reflect the range of facilities and services provided by the City. The EAR report recommended that the following services be included: Fire-Rescue, Police and Law Enforcement, Animal Rescue Services, Marina and Golf Course. As new objectives within the Public Facilities and Services Element the revisions establish measurable criteria for reviewing the success and efficiency of such services throughout the next planning horizon. Therefore, a brief description of their services has been included for review of its current institutional capacity.

Fire-Rescue Services

Fernandina Beach Fire-Rescue Department has a long and rich history. The department's roots go back as far as the late 1800's. In 1883, after two devastating fires completely destroyed the city's downtown district, the city council formalized "Hook & Ladder Company One." The tradition of proudly serving this community that began with the members of that first "Hook & Ladder Company" continues today with our current firefighters.

The services that the Fernandina Beach Fire-Rescue Department provides to our residents and visitors include; fire suppression, advanced life support/emergency medical response, hazardous materials incident mitigation, fire prevention, public safety services, ocean rescue, and emergency preparedness. All of the men and women of the Fire-Rescue Operations division are cross-trained to provide fire suppression and emergency medical responses. Each member is professionally trained and certified by the State of Florida as a Firefighter/Emergency Medical Technician or a Firefighter/Paramedic. Additionally, several of its members have received specialty training and hold certifications as Hazardous Materials Technicians, Fire Service Instructors, and Fire Safety Inspectors. Operating out of two fire stations, the Fernandina Beach Fire Department is fully staffed and prepared to respond to emergency and non-emergency service calls 24 hours a day, every day of the year.

Police + Law Enforcement

Since 2005, the Fernandina Beach Police Department has maintained its accreditation by the Commission for Florida Law Enforcement. Accreditation is a coveted award that symbolizes professionalism, excellence, and competence within the law enforcement community. By insuring that proper policies and procedures are in place and that all facets of police operations are maintained within acceptable legal and professional limits, the accreditation process improves the City's ability to prevent and control crime by increasing the efficiency and effectiveness of our delivery of law enforcement services. Citizen confidence in the department's policies and practices, as viewed and documented by its state-mandated oversight board, has provided the Fernandina Beach Police Department with a strong foundation from which to grow its community policing philosophy and to increase active participation of local stakeholders. The Police Department maintains an annual report of its crime statistics. Table PSFE- 12, describes the City's crime statistics between the years of 2004-2010.

Table PFSE-12 City of Fernandina Beach reported Crime Statistics

	2004	2005	2006	2007	2008	2009	2010
Murder	0	0	1	1	0	0	0
Forcible Rape	6	8	2	9	4	4	2
Robbery	6	6	8	7	17	22	15
Aggravated *	8	41	38	36	25	30	26
Violent Crime	20	55	49	53	46	56	43
Burglary	54	73	113	90	87	108	73
Larceny - Theft	297	270	369	294	362	340	274
Motor Vehicle Theft	14	12	28	25	9	10	4
Property Crime	365	355	510	409	458	458	351
Arson	2	0	0	0	0	0	0

"*" - Includes Assault and Battery

Source: Fernandina Beach Police Department Crime Statistics

Animal Rescue Services

The City of Fernandina Beach provides animal control services within the City limits. Services are currently contracted to the Nassau Humane Society (NHS). NHS operates its Adoption Center out of the City's Animal Control facility. Upon entering the shelter, a stray or surrendered animal is held for five (5) business days to allow the owner to reclaim the pet. On the sixth day, the animal is put through a series of tests to determine if it is a candidate for adoption. Healthy, behaviorally-sound animals are then placed into the Adoption Program. All animals in the Adoption Program are sterilized, made current on vaccinations including rabies, wormed, treated for fleas, and dogs are started on heartworm prevention. NHS assumes all costs from this point until adoption.

The Nassau Humane Society's Adoption Center operation is funded solely by donations and run by a small staff with the help of volunteers. All pet owners within the City limits are required to license their pets. NHS employs an Animal Control Officer to work with pet owners and the community in an education process to explain responsible pet ownership. Within the past 2 years, NHS has expanded its facilities to include a dog park and expanded adoption center. The organization anticipates completion of a fully updated facility by 2015.

Fernandina Harbor Marina

In the heart of Fernandina Beach, along the edge of the City's downtown waterfront lies municipally owned and privately operated Fernandina Harbor Marina. The marina is located directly on the Intracoastal Waterway on the Florida/Georgia border. Over the past five (5) years, the marina has undergone a massive facelift including 1,000 linear feet of concrete floating docks, new high-speed gas and diesel fuel pumps, upgraded laundry facilities and a brand new boater's lounge and bait + tackle shop. The City marina also features a maritime heritage museum. The Marina continues to host a number of sport fishing competitions and trade shows each year. In June 2011, the City's marina received accreditation as a "Clean Marina" by the Department of Environmental Protection.

Golf Course

The City owned and operated its municipal golf course since 1956 and recently selected a golf course management company to take over the day-to-day activities associated with maintaining a golf course. The course was expanded twice since it first opened, once in 1959 to include the west nine holes and again in 1972 adding the south nine. Today the City's courses combined feature 27-holes of golf. Recently, the City applied for designation as a National Audubon Golf Course. The anticipated designation illustrates the vibrancy and beauty of the City's golf course facility.