CHAPTER 5
INFRASTRUCTURE ELEMENT

SUMMARY

The purpose of the Infrastructure Element of the Plan is to plan for necessary sewer, potable water, solid waste, stormwater management facilities and services correlated to future land use projections through the year 2050. Included in the task of assessing the current and future infrastructure, there must be provisions to protect and maintain the natural groundwater aquifer recharge. This task has been addressed in *Chapter 5* of the ***Data and Analysis*** that provides the supporting documentation for establishing goals, objectives and policies (GOPs). Since the Plan Elements are integrated with each other, the Infrastructure Element addresses issues that relate to the following Plan elements: Future Land Use; Capital Improvements; Intergovernmental Coordination; and Conservation and Coastal Management. For example, the infrastructure levels of service (LOS) standards identified in this Element are listed in the Capital Improvements Element.

The goals, objectives and policies (GOPs) for each of the five sub-elements are the City's guiding principles for managing the future infrastructure needs. These sub-elements will be implemented through land development regulations, ordinances, and policies.

Potable Water
Potable water service in the City is provided primarily from three central water plants that were originally planned for the ITT Palm Coast development. On July 24, 2003, the City reached an agreement to purchase the Florida Water Services Corporation (FWSC) system. The City of Palm Coast finalized the purchase of the Utility on October 30, 2003. Palm Coast, a public utility provider, owns and operates the central water system, which has a Florida Department of Environmental Protection (FDEP) permitted capacity of 16.5 million gallons a day. The City purchased the utility system to more effectively control the future availability of potable water for its residents. The potable water supply, treatment and distribution systems are maintained and operated by the City's Utility Department. The SJRWMD designated all of Flagler County, including Palm Coast as a "Priority Water Resource Caution Area" in the 2005 District Water Supply Plan, and groundwater availability is a significant concern to the City. The potable water sub-element's GOPs provide guidance as to the minimum LOS standard to be provided by the utility, ensure that future water needs will be planned for, and adequate potable water supply will be available to meet future needs. Development of alternative water supplies, expansion of reuse systems, and continuing conservation efforts, in coordination with the SJRWMD and FDEP will remain top priorities for the City.

Sanitary Sewer
Sanitary sewer service in the City is provided by the City of Palm Coast, which currently owns and operates the system. On July 24, 2003, the City reached an agreement to purchase the FWSC wastewater system. The City of Palm Coast finalized the purchase of the Utility on October 30, 2003. The central sewer system was initially established for the ITT Palm Coast development in 1973. In addition, there are approximately 12 septic systems in the City that handle wastewater flows from individual homes and businesses. The central sewer system in the City has a current permitted treatment capacity of 6.83 million gallons per day. With the return of growth to the City

resulting in the first wastewater treatment plant (WWTP#1) nearing its design capacity, a second wastewater treatment plant (WWTP#2) was constructed with an initial permitted capacity of 2.0 million gallons per day. The plant went online in early 2018 and is currently under construction to be expanded in late 2024 or early 2025 to 4.0 million gallons per day. The design capacity of the plant is 4.0 million gallons per day with the possibility of being rerated to 5.0 million gallons per day. The sanitary sewer sub-element's GOPs establish the minimum LOS standard to allow future development to occur when sewer facilities can accommodate the increased demand. The sanitary sewer sub-element also encourages the phasing out of the septic systems, expansion of reuse systems, and requiring connection to central sewer and reuse systems where available.

Stormwater Management

The City's stormwater drainage system was designed and constructed during 1960s and 1970s as part of a master planned community development by ITT Community Development Corporation. This drainage system followed the Flagler County's natural drainage patterns and incorporated a man-made system of swales, ditches, canals, and ponds to convey, reduce, and control the stormwater run-off generated within the development. The system also incorporates natural wetland areas that are utilized for conveyance and staging purposes. It is comprised of approximately 1,200 miles of roadside drainage swales, 177 miles of ditches, 58 miles of freshwater canals, 26 miles of saltwater canals, and other related stormwater conveyance structures located within City tracts, easements, or street rights-of-way (pipes, catch basins, weirs, etc.).

The City's stormwater drainage system was designed to accommodate build-out of all the platted lots and some of the unplatted lots. Future/continued management of the drainage system shall focus on; a) ensuring that future development of reserved parcels is performed responsibly by enforcing the requirements established in the city's Land Development Code and other state/federal regulations, b) maintenance/replacement of aging stormwater infrastructure and ensuring that the new infrastructure meets current and future stormwater needs, and c) continued maintenance of the existing system.

Natural Groundwater Aquifer Recharge

The Upper Floridan aquifer (UFA) and the Confined Surficial aquifer are the primary sources of potable water for the City. Groundwater from the CSA is extracted via fifty-one production wells that deliver groundwater to WTP#1 and WTP#3. Groundwater from the UFA is extracted from sixteen production wells located within a 2.7-mile radius of WTP#2. The wells supplying WTP#2 are operated to prevent up coning of saline water. Wellfield operations follow a wellfield operating plan that was designed to maintain water quality in the two sources. Specific to WTP#2, the UFA wellfield is operated in a manner to minimize the potential for water quality degradation by up coning of saline water. This is based on the concern for saltwater intrusion in this portion of the UFA that could affect Palm Coast and other surrounding users like Flagler Beach, Bunnell , Flagler County, and the Florida Governmental Utility Authority (FGUA) and the Florida Governmental Utility Authority (FGUA) Any additional future wells that may be constructed to extract water from this portion of the UFA have to be operated in accordance with the wellfield operation plan to prevent over-pumping of any well and minimize the potential for water quality degradation.

Groundwater quality can be affected by many activities such as discharges from underground and aboveground petroleum and chemical storage tanks, stormwater run-off, and faulty septic tanks. The proximity of the aquifer to the land surface may also affect overlying wetland systems if water

withdrawals are not properly managed. The majority of the City is in an area of low to moderately-low recharge to the Floridan aquifer. The SJRWMD has completed the development of a groundwater model for the Palm Coast aquifer to assess the potential for current and projected hydrologic and environmental impacts. Recharge function of land can be maximized by specific land development regulations to limit impervious surfaces, protect wetlands, preserve more open space, and promote higher water quality treatment standards for stormwater where appropriate. The natural groundwater aquifer recharge sub-element's GOPs provide objectives and policies for maintaining aquifer or enhancing aquifer recharge, coordinating with SJRWMD and other regulatory agencies, and developing regulations to establish wellhead protection.

Solid Waste

The City relies on a contracted hauler for solid waste collection and disposal services. Volusia County is the solid waste repository for the City and will continue to accommodate the City's solid waste disposal needs until 2026. Flagler County also has a public yard trash and construction and demolition debris landfill facility available to Palm Coast. There are two other solid waste landfills operated by private providers, Flagler C&D landfill and LCD of Flagler landfill. There are approximately 43 small quantity hazardous waste generators in the City. All are private businesses, which must abide by Federal and State requirements for hazardous waste collection and disposal. The solid waste sub-element's GOPs provide guidance for ensuring current and future efficiency of solid waste collection and disposal services, protection of environmental resources of the community, requiring recycling, and regulating illegal dumping.

GOAL 5.1: POTABLE WATER SERVICE

Protect the health, safety, welfare of the public while assuring a sufficient, dependable, and high-quality potable water supply, meeting the needs of Palm Coast on a timely basis, at a reasonable cost and, at a minimum, in compliance with all Federal and State regulatory requirements.

FINDING: The City's water system consists of three water treatment plants. The first plant, water treatment plant #1, is a lime softening plant that went into operation in 1979 and expanded in 1981. It is currently permitted for 6.0 million gallons a day (mgd). A second plant, water treatment plant #2, began operation in 1992 and has a FDEP permitted capacity of 7.58 mgd. The third plant, water treatment plant #3, came online in 2008 with an initial capacity of 3.0 mgd. The entire system currently has a treatment capacity of 16.58 mgd. As the system ages, modification, rehabilitation, renewal, and/or replacement of components of the existing water systems may be required. To meet the future potable water consumer demands, expansion of the existing system is required. This expansion program must meet the future water demands of the citizens and businesses of the City.

Objective 5.1.1 - Potable Water Facilities and Level of Services

Maximize the use of existing facilities, correct facility deficiencies, and enhance and/or expand the ability to increase the capacity of the facilities as well as construction of new facilities in order to meet or exceed adopted LOS standards.

Policy 5.1.1.1 - Based on historic data and projected growth patterns, the City shall adopt and impose the following LOS standards for potable water as the basis for determining the availability of facility capacity and planning for demand to be generated by development:

A. 237.5 gallons per ERU per day LOS shall be utilized.
B. The Equivalent Residential Unit (ERU) shall be based on 2.5 persons per capita/day.
C. A minimum pressure of 20 pounds per square inch shall be maintained. An average pressure of not less than 50 pounds per square will be maintained at each point of entry to the distribution system from each water plant.
D. Twenty-Five (25) percent of the maximum-day water demand shall be held in storage capacity.

Policy 5.1.1.2 – When the City's potable water facility reaches 80 percent of the SJRWMD consumptive use permit (CUP) and/or FDEP permitted plant capacity, the City shall consider revising the Capital Improvements Plan, initiate FDEP permit modification or renewal procedures, or seek a modification to increase the allocation under the CUP that will, at a minimum, offer reasonable assurances that plans have been initiated to increase permitted and/or plant capacity.

Policy 5.1.1.3 – The Water Supply Facilities Work Plan (WSFWP) is adopted and included as Exhibit 5.1 of the City's Comprehensive Plan. The City shall make appropriate changes to the Comprehensive Plan, LDC, and other policies and regulations in order to implement the WSFWP.

Policy 5.1.1.4 –The City shall update and revise the WSFWP within 18 months following the SJRWMD adopting or updating a Regional Water Supply Plan. The plan, at a minimum, shall identify new or proposed water supply facilities that are necessary to serve existing and new development through 2050 to cover at least a 10-year planning period. An update to the 2017 North Florida Regional Water Supply Plan (NFRWSP) was adopted by the St. Johns River Water Management District (SJRWMD) Governing Board on December 12, 2023, covering a planning period to 2045. The City's WSFWP shall be updated and adopted by June 12, 2025.

Policy 5.1.1.5 – The City shall work with the SJRWMD to coordinate and maintain a system to monitor and evaluate potable water consumption rates, groundwater quality, pumping levels, and static water levels.

Policy 5.1.1.6 – The City may establish a citizen advisory group to provide recommendations to the City regarding potable water issues including, but not limited to, the following: water conservation, protection of aquifer recharge areas, wellfield protection, alternative water supply, and re-use. If established the advisory group may conduct meetings as needed and provide input on potable water issues at the City's request.

Policy 5.1.1.7 - The City shall take all necessary actions to ensure that emergency procedures are sufficient to ensure minimal disruption in service to customers in the event of a natural disaster or other emergencies. The City Utility shall review, update, revise as necessary and submit a recertification for the America's Water Infrastructure Act program and Emergency Response Plan every five years. The next 5-Year Cycle recertification deadline submission date is March 31, 2025.

Policy 5.1.1.8 - The City shall require all new development, except as provided in Policy 5.1.1.9, which requires site plan or subdivision approval, to connect to the potable water system if central service is available within one (1) mile. For residential development, which does not require site plan or subdivision approval, the City shall require the residential development to connect to the potable water system if central service is available within 150 feet. If service is not available in either instance, the City shall require connection within one (1) year from the date that central service becomes available.

Policy 5.1.1.9 – The City recognizes the importance of promoting sustainable and low-impact recreational activities within natural areas while ensuring public health and safety and understands certain uses may not be appropriate to connect to the potable water system for central services as determined by the City. To achieve this balance, the City may permit these activities and/or uses to be exempt from connecting to the City's central potable water system. Low impact recreational uses may include tent camping facilities, natural park facilities and nature-based ecotourism. To qualify, the proposed use shall meet the following conditions:

A. The use shall have minimal water demands that can be met through alternative water sources, such as well source, bottled water, or bulk water source.
B. Water supply shall be adequate to properly run sanitation facilities.
C. Environmental Assessment may be required to evaluate potential impacts on the natural environment and ensure that it does not pose a significant risk to water quality, wildlife, or sensitive ecosystems.
D. The proposed use and alternative potable water source must comply with all applicable local, state, and federal regulations, including obtaining necessary permits and approvals.

Policy 5.1.1.10 - The City shall take all steps practicable and feasible in order to review and comment on master utility plans for public and private potable water facilities in existing and future service areas in and adjacent to the City for consistency with the City's Plan.

Policy 5.1.1.11 – The City shall not require annexation as a condition to receive potable water service in the annexation policy exception areas defined in *Ordinance #2007-03, §IV, 02/20/07*.

Policy 5.1.1.12 - The City shall actively seek and apply for grants and other funding opportunities to support the development, expansion, and improvement of potable water facility infrastructure. The City shall identify potential funding sources, including state and federal grants, to enhance its water supply systems, treatment facilities, and distribution networks.

Objective 5.1.2- Aquifer Sustainability

The City shall provide adequate public potable water sources proportionate with growth, to service the needs of the City within the constraints of the production capacity of the aquifer, while avoiding unacceptable impacts to water resources and related natural systems.

Policy 5.1.2.1 –In coordination with the Northeast Florida Regional Council (NEFRC), Department of Commerce (DOC), SJRWMD and any other pertinent entities, the City shall identify long-term water supply strategies consistent with the City's consumptive use permit, and shall consider the latest final version of the SJRWMD Water Supply Plan to update (as applicable) the WSFWP.

Policy 5.1.2.2 – The City shall participate in the water supply planning process in conjunction with the SJRWMD and other pertinent entities, with the objective to develop a regional water supply plan that will reasonably ensure adequate quantity and quality of potable water resources needed to meet future needs without creating water use conflicts or unacceptable impacts to natural resources.

Policy 5.1.2.3 – The City shall coordinate with the SJRWMD and other pertinent entities to evaluate additional potential water supply sources and recovery technologies for the City potable water service area when considering new or expanding facilities. Water supply sources and recovery technologies may include, but shall not be limited to: reuse, use of surface water and stormwater harvesting (when permitted and practicable), reverse osmosis, membrane softening, and desalinization. The NFRWSP did identify the City as an area with potential

water shortages through the 2045 planning horizon provided water conservation, implementation of management measures and implementation of water resource and water supply development projects identified in the NFRWSP are completed. The NFRWSP findings indicate that the City may continue utilizing the CSA and UFA as its source of potable water. An alternative water supply source was identified, therefore the City will explore to develop brackish water as an alternative water source after other alternatives have been exhausted and will continue conservation efforts and efforts to maximize the amount of reclaimed water available for reuse.

FINDING: Provide a safe water supply at a level sufficient to meet the requirements of existing and future users. To accomplish this, correct existing facility deficiencies, maximize and optimize utilization of existing facilities and expand the water supply system in a coordinated fashion to provide sufficiency and prevent urban sprawl.

Objective 5.1.3 - Existing Facilities and Urban Sprawl

Maximize the use of the existing facilities reasonably, discourage urban sprawl, and coordinate future expansion plans consistent with current needs and to accommodate development at the densities and intensities permitted in the Future Land Use Element of the Plan.

Policy 5.1.3.1 – Where appropriate**,** the City shall require developers to submit a report for all LOS-based potable water systems expansion projects prior to issuance of a development order which demonstrates that development projects are consistent with **Objective 5.1.3**.

Policy 5.1.3.2 – The City shall designate urban densities or intensities on the Future Land Use Map only in areas that have sufficient existing or planned capacity for potable water facilities and wastewater facilities where connection is available consistent with Policies 1.1.1.2 and 1.1.3.2. For the purposes of this Plan, any residential density exceeding one (1) dwelling unit per acre shall be deemed to be an urban density.

Policy 5.1.3.3 - The City is encouraged to maximize the use of existing potable water facilities in the planned service areas by system expansion and upgrades, rather than developing "satellite systems" which promote urban sprawl.

FINDING: Appropriate water resource planning is essential to the continued operations of existing potable water facilities. The St. Johns River Water Management District (SJRWMD) designated Flagler County, including Palm Coast, as a "Priority Water Resource Caution Area" in the 2005 District Water Supply Plan which means that water sources may not be adequate to serve future uses, while sustaining the water resource and the natural systems.

Objective 5.1.4 - Water Conservation

Continue and expand the City's water conservation program in order to maintain a low per capita consumption of potable water.

Policy 5.1.4.1 - The City shall implement the following water conservation strategies by enforcing the LDC:

A. Implementation of low water use landscapes through the use of native and drought tolerant plants.
B. Water efficient irrigation design and installation standards.
C. Require the use of water conserving plumbing fixtures, where appropriate.
D. Utilize reuse water for irrigation, where appropriate.
E. Require the use of stormwater for landscape irrigation, where appropriate.
F. Consider the use of artificial turf for use in sport arenas, commercial applications and residential uses that traditionally use grass.

Policy 5.1.4.2 - The City, in cooperation with the SJRWMD and other relevant organizations, shall implement a joint water conservation public education program.

Policy 5.1.4.3 - The City shall develop an economically feasible water reuse plan and shall coordinate with the applicable regulatory agencies and developers, to the greatest extent practicable, regarding the installation and usage of reuse water facilities.

Policy 5.1.4.4 - The City shall comply with emergency water conservation measures mandated by the SJRWMD.

Policy 5.1.4.5 - The City shall continue to implement the following water conservation measures:

A. Technological, Procedural, and/or Programmatic Improvements Management

1. Water Treatment Plant Technologies
2. Water Use Monitoring
3. Water Conservation Plumbing Retrofitting Kits for Residential Customers, if available.
4. Indoor Conservation Programs
5. Develop and Enforce Water Efficient Landscape Ordinance (in cooperation with SJRWMD)
6. Irrigation Design Requirements
7. Requiring Individual Metering
8. Requiring the Use of Low-Volume Plumbing Devices

B. Customer and Employee Education
C. Use of Conservation based Rate Schedule

Policy 5.1.4.6 - The City shall consider alternative means to conserve water including, but not limited to, irrigation meters, re-use of stormwater, surface water pumps, and identifying other alternative potable water resources.

Objective 5.1.5 – Development of Alternative Water Supplies

Continue to explore the development of alternative water supplies to meet future water needs.

Policy 5.1.5.1 – The City shall utilize alternative water supply sources, if feasible, when improving or expanding the City's water system.

Policy 5.1.5.2 – The City shall investigate the use of advanced treated wastewater as an alternative source for aquifer storage. Continue to recover and treat concentrate for delivery as potable water, to expand the reclaimed water distribution system where economically feasible and determine the degree of influence the stormwater collection system has on the wetland and aquifer systems in the Palm Coast wellfields.

GOAL 5.2: SANITARY SEWER FACILITIES

Protect the health, safety and welfare of the public by ensuring wastewater treatment facilities and services are environmentally sound, effective, and meet the City's current and future demands.

FINDING: During the calendar year of 2023, the average day flow through wastewater treatment plant #1 was 6.7 mgd representing 98% of the plants' design capacity of 6.83 mgd. The second wastewater treatment plant began construction in October 2016 and was placed online in 2018. The initial plant capacity was 2.0 mgd with expansion to 4.0 mgd planned for in 2024. Plant #2 in currently under expansion to that 4.0 mgd permitted capacity level and is expected to be completed in late 2024 or early 2025. Total system design capacity will then be 10.83 mgd while average day flows are projected at 7.8 mgd. This represents approximately 72 percent of the total permitted treatment capacity. The total system permitted design capacity will be 10.83 mgd, the projected Max three-month average day flow is not expected to exceed this design capacity until 2030. Expansion of wastewater treatment plant #1 is currently planned for 2028.

Objective 5.2.1 - Sanitary Sewer Facilities and Level of Service

Maximize the use of existing facilities, correct facility deficiencies, and have the ability to increase capacity of facilities in order to meet or exceed adopted LOS standards.

Policy 5.2.1.1 - The City shall require new developments to meet or exceed adopted level of service (LOS) standards. The City will provide evidence that sanitary sewer facilities and services will maximize the use of existing facilities, correct facility deficiencies, and have the ability to increase capacity of facilities in order to meet or exceed adopted LOS standards.

Policy 5.2.1.2 - The City shall adopt and enforce the following minimum LOS standards for wastewater as the basis for determining the availability of facility capacity and planning for the demand generated by a development:

A. An average daily flow of 82 gallons per capita per day LOS shall be utilized.
B. A maximum daily flow of 93 gallons per capita per day LOS shall be utilized.
C. The Equivalent Residential Unit (ERU) shall be based on 2.5 persons per ERU.

Policy 5.2.1.3 - When the City's sanitary sewer facility reaches 80 percent of regulatory permitted and/or plant capacity, the City shall develop capital improvement plans, initiate FDEP permit modification, or renewal procedures to provide reasonable assurances that plans have been initiated to increase permitted and/or plant capacity to meet sanitary sewer demands and that adopted LOS standards will be maintained.

Policy 5.2.1.4 - The City shall obtain all necessary sanitary sewer FDEP Wastewater Treatment Permits and/or develop relevant reports evaluating opportunities for expansion, replacement and/or sitting of new facilities to ensure that the provision of sanitary sewer facilities and services will be sufficient to accommodate projected growth and development through build-out.

Policy 5.2.1.5 - The City shall require that domestic wastewater programs and facilities shall be designed to service the densities and intensities of development projected in the City's Future Land Use Element and identified by the City's zoning districts.

Policy 5.2.1.6 - The City shall take all steps practicable and feasible in order to review and comment on master plans for public and private sanitary sewer facilities in existing and future service areas for consistency with the Plan.

Policy 5.2.1.7 – The City shall coordinate with the FDEP to develop and maintain a system to monitor and evaluate domestic sanitary sewer facilities.

Policy 5.2.1.8 – The City shall ensure that all current and future sanitary sewer facilities shall meet all applicable Federal and State regulations and shall, at a minimum, be operated consistent with all State and Federal standards and in full compliance with respective permits as issued by regulatory agencies.

Policy 5.2.1.9 - The City of Palm Coast shall also actively seek and apply for grants and other funding opportunities to support the development, expansion, and improvement of sanitary sewer system infrastructure. The City shall identify potential funding sources, including state and federal grants, to enhance its sewer collection systems, treatment facilities, and disposal systems.

FINDING: Relative to wastewater treatment plant expansions, portions of the collection and disposal systems will need to be upgraded and expanded. The collection system includes gravity and force main lines, lift stations, and private effluent pumping systems (PEP).

Objective 5.2.2 - Existing Facilities and Urban Sprawl 

Maximize the use of existing facilities, discourage urban sprawl, and coordinate future expansion plans consistent with current needs and to accommodate development at the densities and intensities permitted in the City's Future Land Use Element.

Policy 5.2.2.1 - The City shall maximize the use of existing facilities and maintain an inventory of all necessary sanitary sewer facilities located in the City.

Policy 5.2.2.2 – The City shall ensure that improvements for replacement, expansion or increase in capacity of facilities shall be compatible with the adopted LOS standard for those facilities.

Policy 5.2.2.3 – The City shall designate urban densities or intensities on the Future Land Use Map only in areas that have sufficient existing or planned capacity for sanitary sewer facilities and where connection is available as set forth in State law and City regulations. The City shall minimize the use of septic tanks in accordance with the provisions of Objective 5.2.3 and policies implementing that objective. For the purposes of this Plan, any residential density exceeding one (1) dwelling unit per acre shall be deemed to be an urban density.

Policy 5.2.2.4 - The City is encouraged to maximize the use of existing sanitary sewer facilities in the planned service areas, by system expansion and upgrades, rather than developing "satellite systems" which promote urban sprawl.

Policy 5.2.2.5 – The City shall not require annexation as a condition to receive sanitary sewer service in the annexation policy exception areas defined in *Ordinance #2007-03, §IV, 02/20/07*.

FINDING: There are approximately 12 septic systems in operation within the City. The majority of the septic systems are located along the north side of State Road 100, west of Interstate 95 and east of Belle Terre Parkway and in the Whispering Pines Park. Although the current septic systems in the State Road 100 area are legally permitted, many of the systems are old. Whispering Pines Park was platted in 1956 and some of the septic systems were installed prior to the adoption of septic system permit rules and requirements. Improper disposal of wastewater produced in the City could threaten the drinking water supply, wildlife, and other important environmental resources.

Regulations for the proper installation and management of septic systems have improved in the last 10 years. The Flagler County Health Department (FCDOH) ensures that septic systems are constructed and maintained in accordance with State requirements. Provided soil types are suitable and lots are large enough, well and septic can provide an acceptable alternative to central utilities. Allowing well and septic with larger estate lots in outlying areas of the City may provide an incentive to reduce densities and promote greenbelt uses in the outlying areas to define the urban boundary and prevent urban sprawl.

Objective 5.2.3 - Septic Tank Minimization

Limit the use of septic tanks in order to discourage urban sprawl and prevent adverse impacts to groundwater, surface water, and the quality of life.

Policy 5.2.3.1 - The City shall enforce and amend the LDC, as necessary, to be consistent, at a minimum, with all regulatory requirements for the construction, maintenance and use of septic tank systems.

Policy 5.2.3.2 - The City shall take all appropriate actions to eliminate existing septic tank systems on lots that are less than one (1) acre in size and/or pose an environmental hazard or public health threat.

Policy 5.2.3.3 - The City may allow the use of septic tanks for single-family residential areas with lot sizes that contain greater than one (1) acre of contiguous upland area in areas designated as "Greenbelt;" provided, however, that said septic tanks are approved by the regulatory authority to ensure that ground or surface waters will not be polluted.

Policy 5.2.3.4 - The City recognizes the importance of promoting sustainable and low-impact recreational activities within natural areas while ensuring public health and safety and understands septic tanks should be allowed for certain uses as determined by the City. To achieve this balance, the City may allow the use of septic tanks for these activities and/or uses.

Low impact recreational uses may include tent camping facilities, natural park facilities and nature-based ecotourism. To qualify, the proposed use shall meet the following conditions:

A. The use shall have minimal wastewater demands that can be appropriately handled by a septic system designed for the specific site conditions and anticipated usage.
B. The septic system design shall ensure adequate treatment and disposal of wastewater to protect public health and the environment.
C. Environmental Assessment may be required to evaluate potential impacts on the natural environment and ensure that that the septic system does not pose a significant risk to water quality, wildlife, or sensitive ecosystems.
D. The proposed use and septic system installation must comply with all applicable local, state, and federal regulations, including obtaining necessary permits and approvals.

Policy 5.2.3.5 - The City shall ensure that the FCDOH and/or other appropriate regulatory authority, under the terms and conditions of applicable rules and regulations, govern septic tank criteria.

Policy 5.2.3.6 - The City shall require connections to central wastewater systems within one (1) year from the date of notice that these services are available and when septic tank systems experience documented operational problems.

Policy 5.2.3.7 - The City shall request that the FCDOH provide technical assistance for the purpose of maintaining health and safety standards for the operation and maintenance of non-centralized private wastewater treatment systems.

Policy 5.2.3.8 - The City shall coordinate with the FCDOH to obtain results from their septic tank inspection program to ensure the effective operation of septic tanks and to reduce the potential for public health and environmental hazards.

Objective 5.2.4 - Public Health and Environment

Encourage the provision, operation and maintenance of sanitary sewer systems that protect the health of the public and the resource values of the natural environment as a high priority.

Policy 5.2.4.1 - The City, in coordination with the appropriate regulatory authorities, shall prohibit the discharge of untreated wastewater into drainage ditches, surface waters, aquifers or wetlands.

Policy 5.2.4.2 - The City shall monitor, as necessary, National Pollution Discharge Elimination System (NPDES) permits for consistency with the policies and criteria of this Plan.

Policy 5.2.4.3 - The City shall expand the use of reuse water for landscape irrigation where such use can be feasibly implemented and permitted by the FDEP, where appropriate.

Objective 5.2.5 – Expansion of Reuse Water System

Expand the reuse water system in order to reduce and/or offset potable water use.

Policy 5.2.5.1 – The City shall continue to explore opportunities to expand the reuse water system in conjunction with wastewater system improvements and/or expansions.

Policy 5.2.5.2 – The City shall require all new residential and non-residential urban related development, which requires site plan or subdivision approval, to connect to the reuse water system if central service is available within one (1) mile. However, the City reserves the right to exempt low impact recreational uses, developments maintaining existing native vegetation that doesn't require irrigation, or other appropriate uses from this mandate.

Policy 5.2.5.3 – The City shall require new development connection to the reuse water distribution system be individually metered.

Policy 5.2.5.4 – The City shall pursue funding opportunities to expand the reuse water system through programs offered by agencies such as FDEP and SJRWMD.

Policy 5.2.5.5 – The City will consider updating the LDC to mandate the installation of water reuse dry lines in new developments where future connection to the existing reuse system is anticipated, in accordance with the City's long-term water reuse plans.

Wastewater Demand Projections (MGD = Million Gallons per Day)

Year	Area	Population	WWTP 1 PROJECT	WWTP 1 CAPACITY	WWTP 2 PROJECT	WWTP 2 CAPACITY	WWTP 3 PROJECT	WWTP 3 CAPACITY	WWTP 4 PROJECT	WWTP 4 CAPACITY	TOTAL PROJECT	TOTAL CAPACITY
2025	Within City	107,402	6.6	6.83	2.0	4.0	-	-	-	-	-	-
	Outside 1	1,223	0.1	-	0.0	-	-	-	-	-	-	-
	Total	108,625	6.7	6.83	2.0	4.0	-	-	-	-	8.7	10.83
2030	Within City	120,609	7.3	10.83	2.4	5.0	-	-	-	-	-	-
	Outside 2	1,431	0.1	-	0.0	-	-	-	-	-	-	-
	Total	122,040	7.4	10.83	2.4	5.0	-	-	-	-	9.8	15.83
2035	Within City	132,387	7.3	10.83	2.7	5.0	0.5	2.0	-	-	-	-
	Outside	2,264	0.2	-	0.0	-	0.1	-	-	-	-	-
	Total	134,651	7.5	10.83	2.7	5.0	0.6	2.0	-	-	10.8	17.83
2040	Within City	142,108	7.4	10.83	3.1	5.0	0.8	2.0	-	-	-	-
	Outside	2,681	0.1	-	0.0	-	0.1	-	-	-	-	-
	Total	144,789	7.6	10.83	3.1	5.0	0.9	2.0	-	-	11.6	17.83
2045	Within City	150,464	7.7	10.83	3.4	5.0	1.0	2.0	-	-	-	-
	Outside	2,889	0.1	-	0.0	-	0.1	-	-	-	-	-
	Total	153,353	7.8	10.83	3.4	5.0	1.1	2.0	-	-	12.3	17.83
2050	Within City	157,883	7.6	10.83	2.9	5.0	1.2	2.0	1.0	2.0	-	-
	Outside	3,098	0.1	-	0.0	-	0.1	-	-	-	-	-
	Total	160,981	7.7	10.83	2.9	5.0	1.3	2.0	1.0	2.0	12.9	19.83

GOAL 5.3: STORMWATER MANAGEMENT

Develop, operate, and maintain a cost effective and efficient surface water management system, which will protect the public and property from flooding while maintaining or improving water quality of receiving water bodies.

FINDING: The predominant type of drainage system within the City consists of a roadside swale system that discharges into a network of ditches, which in turn discharge into freshwater and saltwater canals. The maintenance of the stormwater system is the responsibility of several entities. Most of the stormwater runoff initially originates from residential property. The City currently maintains drainage facilities within the public road right-of-way and maintains the conveyance system from the road right-of-way to a natural or manmade water body. Other entities maintain the outfalls to their final destination, which is either the Atlantic Ocean or the St. Johns River. It is necessary that there is understanding, communication, and coordination by and with each of these entities as to the roles and responsibilities for maintenance of the stormwater drainage system both inside and outside Palm Coast.

In 2019, the City adopted a Stormwater Master Plan that identifies areas of need within its drainage system where stormwater improvements could be implemented to increase flood protection. The Stormwater Master Plan also provided recommendations for capital improvements projects to improve conveyance and capacity. The existing swale, ditch, and freshwater canal drainage systems are highly dependent upon routine maintenance. Routine maintenance will ensure that swales, ditches, and canals remain free from obstructions and functions appropriately.

Objective 5.3.1 - Stormwater Facilities

Identify areas of need where stormwater improvements could be implemented to increase flood protection, maximize the use of existing facilities and protect the functions of natural drainage features, which serve the City.

Policy 5.3.1.1 – The City's Stormwater Master Plan adopted in 2019 provides a comprehensive look at the entire drainage system and identifies areas where capacity, conveyance, and flood protection improvements could be made. Utilization of this Master Plan as a planning/design tool, performing routine maintenance, and the enforcing the City's Land Development Code for new development and redevelopment, shall ensure that the City's drainage system remains functional. The City shall review the recommended drainage projects in accordance with the following priorities:

A. Those improvements, which increase public safety and welfare.
B. Those improvements, which reduce property damage, associated with flooding.
C. Those improvements which maintain or improve the quality of water flowing into receiving creeks, rivers, ponds, canals, and wetlands.
D. Those improvements, which preserve, restore, or enhance natural habitats and wetlands.
E. Those improvements, which reduce maintenance costs for the City.

Objective 5.3.2 - Maximizing Existing and New Facilities

Maximize the functionality and utility of existing and new drainage facilities to accommodate drainage needs of new infill development in order to discourage urban sprawl.

Policy 5.3.2.1 - In order to discourage urban sprawl, the City shall provide incentives, as appropriate, for new infill development projects which provide reductions in volume or discharge rates from their proposed private drainage facilities onto the city's drainage system beyond the minimum requirements. The potential credits and/or discounts from their stormwater fees will be based off adopted Ordinance No. 2011-1 (Stormwater Management Utility). This will help ensure that the city's drainage system remains functional after the construction of new private developments.

Policy 5.3.2.2 - The City shall require development plans to demonstrate, at a minimum, the following:

A. Additional drainage capacity (reduction of discharge volume and/or rates) within the development along volume sensitive areas is provided to ensure that the natural downstream conditions do not become volume impaired.
B. Proper public drainage easements are provided or obtained.
C. Adequate drainage and pipe calculations have been submitted for City review and approval to document that sufficient capacity does exist.
D. All Federal, State, and local regulatory requirements have been satisfied.

Objective 5.3.3 - Correcting Facility Deficiencies

Ensure surface water management facility deficiencies are corrected and that natural drainage features are protected.

Policy 5.3.3.1 – The City shall coordinate with SJRWMD with regards to maintenance of existing stormwater facilities to ensure permit compliance is taking place.

Policy 5.3.3.2 - The City shall continue to educate and inform citizens of their responsibility regarding maintenance of the roadside swale stormwater conveyance systems and enforce City ordinances, where appropriate, to ensure that private routine maintenance is conducted, swale grading is correct and that no unauthorized drainage is occurring.

Policy 5.3.3.3 – As required by the City's, Municipal Separate Storm Sewer System (MS4) through Florida Department of Environmental Protection (FDEP), the City shall continue to update inventory of surface water management systems that significantly outfall into public conveyance systems.

Policy 5.3.3.4 – The City of Palm Coast recognizes the vital role of swales in its stormwater drainage system. Swales are designed to treat, capture and direct stormwater runoff from

roads, driveways, and adjacent properties to outfalls such as ditches and canals, and promote sustainable water management practices.

To ensure the effective functioning of the swale network, the City shall implement the following measures:

A. The City shall maintain a dedicated swale maintenance program that will ensure proper drainage and prevent the accumulation of debris or obstructions that could impede swale performance.
B. The City shall identify and prioritize areas where swales require targeted improvements, such as the removal of high spots or other issues that impede proper drainage.
C. Where feasible, the City shall explore opportunities to integrate stormwater treatment measures within the swale network.
D. The City shall regularly monitor and evaluate the performance of the swale network, identifying areas of improvement and adapting maintenance strategies as needed. This may involve the use of advanced technologies, such as GIS mapping or remote sensing, to assess swale conditions and prioritize maintenance efforts.
E. The City shall develop and implement public education and outreach programs to raise awareness about the importance of swales and their role in stormwater management.

Policy 5.3.3.5 – The City shall regularly review, update, and enforce the Land Development Code, and the Technical Manual of Engineering Design Standards as it relates to stormwater conveyances and finished floor elevation impacts created by residential property construction.

Objective 5.3.4 - Protect Natural Drainage Features

Protect natural drainage features and ensure that future development utilizes stormwater management systems compatible with existing master surface water management plans.

Policy 5.3.4.1 – The City shall ensure that the Stormwater Management System LOS standards for stormwater quantity and quality, at a minimum, meet or exceed the requirements of the SJRWMD.

Policy 5.3.4.2 – The City shall ensure that stormwater engineering design and construction standards for on-site systems are provided to the City for review prior to the commencement of construction activities.

Policy 5.3.4.3 - The City shall ensure that the quality of post-development runoff from developments shall meet or exceed the receiving water quality criteria established in State Law and other applicable surface water quality standards.

Objective 5.3.5 - Maintain Natural Hydrologic Systems

Maintain the function and integrity of natural hydrologic systems by minimizing development's impact on flood storage capacity, by protecting and/or enhancing the function of existing wetlands, and by reducing the inter-basin diversion of waters from the Lower St. Johns River Basin into the Upper East Coast Basin.

Policy 5.3.5.1 - The City shall enforce land development regulations specifying limitations on encroachment, alteration, and incompatible land uses in design storm event floodplains.

Policy 5.3.5.2 - The City's LDC shall be reviewed periodically and amended as necessary to ensure that it is consistent with the latest available regulations promulgated by the Federal Emergency Management Agency in order to reduce property damage and loss of life due to flooding and to obtain other benefits available to the City.

Policy 5.3.5.3 - The City shall require elevated first floor living area, and when applicable, compensating storage equal in volume to the floodplain impacted for development within a 100-year floodplain.

Policy 5.3.5.4 –Through plan review and enforcement, the City shall continue to minimize any future diversion of waters between the Lower St Johns River Basin to the Upper East Coast Basin.

GOAL 5.4:
NATURAL GROUNDWATER AQUIFER RECHARGE PROTECTION

Contribute, support and monitor State, County, and regional water management district efforts to protect, conserve, and manage the quality and quantity of natural groundwater resources.

FINDING: Groundwater from the Floridan and Confined surficial aquifer systems is the sole source of drinking water available to the residents and businesses of Palm Coast. All of Flagler County, including Palm Coast, is currently identified by the SJRWMD as a "Priority Water Resource Caution Area" (PWRCA). A PWRCA means "existing and reasonably anticipated sources of water and conservation efforts may not be adequate (1) to supply water for all existing uses and anticipated future needs, and (2) to sustain the water resources and related natural systems". In addition, the SJRWMD has identified high recharge areas within the District that contribute to the deeper Floridan wells located in the southwest part of the City. Although no high recharge areas for the Floridan aquifer have been identified in the City, portions of the Confined Surficial aquifer appears to be a prime recharge area because recharge is primarily from rainfall. The SJRWMD has developed a comprehensive groundwater flow model for both of these aquifers. This model is part of a special study designed to more accurately assess future water supply needs of the City. Map CP 5.2 depicts existing and future production wells. The City has amended the LDC to meet or exceed existing Federal and State wellhead protection regulations in order to provide additional assurances that the quality and the quantity of groundwater resources will be reasonably protected.

Objective 5.4.1 - Aquifer Sustainability

Determine the nature and functioning of the aquifer system and identify and utilize the maximum sustainable aquifer withdrawal rate from City's water resources consistent with the SJRWMD PWRCA designation and the City's consumptive use permit.

Policy 5.4.1.1 - The City shall coordinate with developers, SJRWMD and/or other applicable agencies to conduct, if practical and feasible, water supply studies and evaluations necessary to provide for the orderly and environmentally compatible development of the City's water resources which studies shall include, but shall not be limited to, the following criteria:

A. Detailed identification of recharge amounts for the Floridan and Confined Surficial aquifers.
B Determine pre-development groundwater quality and a reasonably accurate estimate of the average rate (quantity) of recharge for wellfield areas.
C. Utilizing new models and studies to guide in the design and land use changes in a manner that will not result in decline in quantity or quality of recharge. This may require use of counter measures to include special stormwater management & stormwater harvesting practices, artificial recharge techniques, and the utilization of BMPs.

D. Determine impacts from the utilization of irrigation wells on the aquifer resource in the City and take legally authorized action according to its findings, in coordination with the SJRWMD.
E. Groundwater monitoring studies on the quality of the aquifer, including continuous evaluation of saline water interface monitoring.
F. Detailed assessment and analysis, including geologic and hydrogeologic features of wetland systems within the PWRCA, to determine (utilizing newer models) the critical interface between aquifer draw down and negative wetland impacts and if innovative mitigation strategies can be utilized to prevent wetland impacts.
G. Participate in the groundwater flow model and study all elements of the water budget in Flagler County including recharge, evapotranspiration, surface water flows, groundwater levels and water use.
H. Freshwater alone may not be able to supply projected increases in demand. Future potable needs are estimated to be much higher and water conservation project options range from groundwater recharge to alternative water supply sources like reclaimed water, indirect potable reuse, surface water and stormwater harvesting should be considered. The City should be encouraged and committed to project implementation to ensure sufficient supply to meet the 2050 water demand, while protecting water resources and associated natural systems.

Policy 5.4.1.2 - The City shall protect aquifer recharge areas through the following actions:

A. Establish standards for the management of hazardous substances.
B. Restrict or prohibit certain land use activities that could adversely affect groundwater resources and require BMPs, where appropriate. The restricted or prohibited land uses activities shall include, but not be limited to, storage tanks of regulated substances, landfills, industrial wastewater facilities, soil treatment facilities, motor vehicle repair facilities, vehicular and equipment washing facilities, cemeteries, and/or other land uses which store or handle toxic or hazardous waste or materials.
C. New development shall use best management practices and performance standards to maximize open space, limit impervious surfaces, promote the use of pervious parking areas, and promote protection of natural vegetation. New development in areas with recharge rates of 8 inches/year and above, according to the *SJRWMD Aquifer Recharge Map*, shall provide at least 25% dedicated open space.

Policy 5.4.1.3 - The City shall continue to support and coordinate with the SJRWMD and its regulatory programs to protect recharge areas within the District.

Policy 5.4.1.4 - The City shall participate in the water supply planning process in conjunction with the SJRWMD and other pertinent entities, with the objective to develop a regional water supply plan.

Objective 5.4.2 - Policies and Best Management Practices (BMPs)

Incorporate policies and require BMPs to help maintain aquifer recharge and function.

Policy 5.4.2.1 - The City shall enforce and amend the LDC, as necessary, to ensure compliance with the rules of the SJRWMD.

Policy 5.4.2.2 - The City shall coordinate with the SJRWMD and investigate the feasibility and/or desirability of incorporating recharge enhancement techniques through water detention, retention ponds, flow diversion, swale systems, effluent reuse, aquifer storage and recovery, and other techniques.

Policy 5.4.2.3 - The City shall coordinate with the SJRWMD to ensure that City regulatory programs do not conflict with the SJRWMD regulatory programs including, but not limited to, water use and surface water management to protect groundwater levels and groundwater flow gradients within and surrounding the City.

Policy 5.4.2.4 - The City shall monitor the effectiveness of the provisions in the LDC, or amend it as necessary, to protect groundwater resources.

Policy 5.4.2.5 - The City shall pursue new techniques and innovative programs that will protect and conserve the City's potable water resource including, but not limited to, the protection of vulnerable wetland systems that may be impacted by consumptive withdrawals.

FINDING: The protection of the groundwater resource supply is increasingly important because of rapid, substantial growth in development and land use changes within the City. Increased development results in the potential for increased contamination and an overall threat to drinking water quality. According to the SJRWMD, the utility provider utilizes wells that draw water from the shallow confined surficial aquifer and from the deeper Floridan aquifer. The shallow confined surficial production zone wells are located north of State Road 100 and west of Belle Terre Parkway. Due to the relatively shallow nature of these production wells, they are more prone, than deeper Floridan wells, to contamination from overlying activities. The City's wellfield protection efforts provide sufficient protection.

Objective 5.4.3 - Aquifer Resource Quality and Quantity Protection

Ensure that groundwater and surface water sources suitable for public supply, commercial, irrigation, or other uses receive appropriate protection relating to quality and quantity.

Policy 5.4.3.1 –The City shall enforce wellhead protection regulations that, at a minimum, comply with the Safe Drinking Water Act and conform to the rules of the FDEP (including, but not limited to, *Rule 62-521, Florida Administrative Code*), the SJRWMD, and other applicable agencies.

Policy 5.4.3.2 –The City shall protect groundwater resources through the following actions:

A. Establish wellhead protection zones that, at a minimum, meet or exceed State and Federal regulatory requirements. The primary wellhead protection zone shall be circular with a fixed 500' radial setback distance around each potable water well. The tertiary wellhead protection zone shall be the area around the favorable water production areas for the Floridan and confined surficial aquifer.
B. Establish standards for the management of hazardous substances.
C. Restrict or prohibit of certain land use activities that could adversely affect groundwater resources in the wellhead protection zones and require BMPs, where

appropriate. The restricted or prohibited land uses activities shall include, but not be limited to, storage tanks of regulated substances, landfills, industrial wastewater facilities, soil treatment facilities, motor vehicle repair facilities, vehicular and equipment washing facilities, cemeteries, and/or other land uses which store or handle toxic or hazardous waste or materials.

D. New development in wellhead protection zones shall use best management practices and performance standards to maximize open space, limit impervious surfaces, promote the use of pervious parking areas, and promote protection of natural vegetation.
E. Cooperate with local governments with land use jurisdiction over wellhead protection zones outside the City to ensure that groundwater resources are protected.
F. Provide wellhead protection zone maps and information about the restricted or prohibited land uses on the City's website in order to educate the public about the regulations.

Policy 5.4.3.3 - The City shall utilize the best available information from technical reports, studies, computer models, and guidance from State and Federal agencies to enforce and amend regulations within the LDC, as needed, for wellfield and aquifer recharge protection which regulations may include, but are not limited to, the following:

A. Requiring development projects, where appropriate, to submit data approved by SJRWMD or licensed professional engineer or geologist that provide assurances that post-development quantity and quality of recharge, at minimum, shall be at least equivalent to pre-development conditions.
B. Providing for a minimum percentage of open space and limitation on the percentage of impervious surface.
C. Establishing stormwater management practices.
D. Requiring application of BMPs, where appropriate, as a proactive procedure for handling and using potential polluting materials and managing stormwater runoff and construction activities.
E. Protecting environmentally sensitive waterways and wetlands through the establishment of policies limiting development and encouraging enhancement in these areas.

Policy 5.4.3.4 - The City shall make reasonable efforts to coordinate with adjacent municipalities in an attempt to facilitate and coordinate measures to protect quality and quantity of groundwater resources.

Policy 5.4.3.5 - A municipal water public supply well may be installed and operated within a radial setback distance of less than 500 feet from existing or proposed adjacent uses if reasonable assurance is provided, inclusive of, but not limited to, the following criteria:

A. Hydrogeological Assessment Requirement – The proposed well site shall undergo comprehensive hydrogeological assessment conducted by a certified hydrogeologist. This assessment shall evaluate hydrogeological characteristics, potential contaminant sources, and suitable design criteria to mitigate against potential future contamination risk.

B. Advanced Well Design Standards – The well designed, certified by either a professional hydrogeologist or a Professional Engineer, shall be designed based on the findings of hydrogeological assessments. This may involve the incorporation of advanced technologies and best practices in the well construction and maintenance aimed at minimizing contamination risk.
C. Water Quality Monitoring – regular testing of well water for applicable quality parameters is mandatory, or as recommended by a hydrogeologist.

GOAL 5.5: SOLID WASTE SERVICES

Ensure current and future efficiency of solid waste collection and disposal services for the City that will meet established requirements, to protect the public health, safety, and environmental resources of the community.

FINDING: The City currently contracts a hauler for solid waste collection and disposal services. The 25-year contractual agreement with Volusia County as the solid waste repository for the City will expire in 2026. Volusia County is contractually obligated to accommodate the City's solid waste at its landfill facilities during this period of time.

Objective 5.5.1 - Manage and Maintain Solid Waste Facilities

Encourage Volusia County to manage and maintain a safe dependable, economical, and efficient solid waste disposal system throughout the planning horizon pursuant to adopted LOS standards in order to correct potential facility deficiencies**.**

Policy 5.5.1.1 - The City's acceptable LOS standard, which shall be used as the basis for determining the availability of facility capacity and the demand generated by a development, is hereby established as follows:

A. 8.6 pounds per capita per day,
B. One (1) year operational capacity in the Volusia County landfills, and
C. A minimum of five (5) years of planned capacity in accordance with the interlocal agreement between the City and Volusia County (although the said interlocal agreement may extend beyond such planning periods).

Policy 5.5.1.2 – The City shall monitor solid waste capacity and availability on an ongoing basis.

Policy 5.5.1.3 – The City shall ensure that if any non-City entity responsible for solid waste disposal services approaches 80 percent of capacity of the adopted LOS standard during the 5-year planning period, the City shall engage such entity in negotiations in order to identify alternative disposal methods or an action that will increase capacity and ensure compliance with the adopted LOS.

Policy 5.5.1.4 – The City shall ensure the continuation of the mandatory collection of solid waste, as appropriate.

Policy 5.5.1.5 - The City shall ensure, through its agreements with private providers, that full-service pickup shall be available within the City.

Policy 5.5.1.6 - The City shall monitor and evaluate the private franchise system for residential and commercial solid waste collection to ensure that the most efficient and cost-effective service is being provided.

Policy 5.5.1.7 – Before expiration of the current Volusia County ILA, or when appropriate, the City shall identify alternative disposal locations and available services to accommodate the City's solid waste demands.

FINDING: The land filling of solid waste, at a facility located outside of the City, will continue to be a necessity for the City in the foreseeable future. Although a 25-year interlocal agreement was executed with Volusia County and landfill capacity will be adequate to meet the City's solid waste needs, the City will enhance recycling policies in order to extend the life of the solid waste facility.

Objective 5.5.2 – Solid Waste Recycling

Policy 5.5.2.1 – The City shall promote public awareness and participation to expand recycling programs by requiring solid waste issues to be addressed in advertised public meetings.

Policy 5.5.2.2 - The City shall implement a recycling program complying with the requirements specified in Section 403.706 (2), Florida Statutes.

Policy 5.5.2.3 – The City shall investigate the use of for-profit and non-profit organizations to enhance the City's recycling program.

Policy 5.5.2.4 – The City shall continue to require solid waste haulers to provide full recycling services to customers.

Policy 5.5.2.5 - The City shall investigate ways to incentivize recycling programs for all residential and non-residential developments.

FINDING: The improper disposal of solid waste presents an unacceptable risk to the environment and to the City's health and safety. Adequate facilities must be provided to ensure proper disposal of all waste materials. A public education program should be developed to inform individuals about the proper methods of disposal and management of waste of all kinds. Applicable regulations requiring proper disposal of waste must be enforced, and enforceable, to deter potential violators.

Objective 5.5.3 Illegal Dumping and Disposal

Implement and enhance programs to address potential problems of illegal dumping of both hazardous and non-hazardous waste materials.

Policy 5.5.3.1 - The City shall revise the solid waste collection ordinance and other such ordinances as may be appropriate to include specific fines and penalties for illegal dumping and related activities.

Policy 5.5.3.2 - The City shall monitor construction sites and vacant lots to prevent or abate illegal dumping activities prohibited by City ordinances.

Policy 5.5.3.3 – The City shall increase public awareness through educational campaigns directed at the general public and businesses regarding illegal dumping and proper disposal of non-hazardous and hazardous waste.

Policy 5.5.3.4 – The City will expand volunteer clean-up programs and support clean-up projects where feasible and appropriate.

Policy 5.5.3.5 –The City shall continue to enforce standards in the LDC to regulate, where appropriate, hazardous waste facilities.

Policy 5.5.3.6 –The City shall cooperate with Flagler County and FDEP to ensure that generators of hazardous waste facilities are inspected and, if applicable, inspection deficiencies are promptly corrected in accordance with all regulatory requirements.

Policy 5.5.3.7 –The City shall coordinate with the appropriate enforcement agencies for the effective enforcement of illegal dumping laws. The City shall, when appropriate, seek administrative inspection warrants, pursue code enforcement proceedings, initiate nuisance abatement actions, and seek other available and appropriate remedies in order to protect the public against illegal dumping, hazardous spills, and contaminated sites.

Exhibit 5.1 – 2035 Water Supply Facilities Work Plan

Introduction

The City of Palm Coast adopted the 2020 Water Supply Facilities Work Plan (WSFWP) in December of 2007 as required by the Florida Legislature. The 2020 WSFWP was prepared for a 14–year (2007 – 2020) planning period. The latest University of Florida Bureau of Economic and Business (BEBR) population projections are significantly lower than the projections that were used in preparing the 2020 WSFWP in 2007. The slower growth of the area due to the recent economic conditions has resulted in significantly lower population projections. This required that the 2020 WSFWP be updated to reflect the current growth conditions. The 2010 WSFWP update was prepared for a 25-year planning period to 2035 reflecting the City's long-term water supply strategy and in conjunction with the Comprehensive Plan Amendment. This update is prepared for a 17-year planning period ending in 2035 and will be adopted into the Palm Coast Comprehensive Land Use Plan as required by the 2017 North Florida Regional Drinking Water Supply Plan.

Exhibit 5.1 - 2035 Water Supply Facilities Work Plan
Projected Water Demand and Supply by Year

Year	Area	Population	Water Demand (MDG) Finished	Water Demand (MGD) Raw	Water Supply (MDG) Traditional[2]	Water Supply (MDG) Alternative[3]
2025	Within City	107,402	10.20	10.82	-	-
	Outside[1]	7,211	0.69	0.73	-	-
	Total	114,613	10.89	11.54	11.5	0.0
2030	Within City	120,609	11.46	12.15	-	-
	Outside[1]	7,624	0.72	0.77	-	-
	Total	128,233	12.18	12.91	10.7	2.2
2035	Within City	132,387	12.58	13.33	-	-
	Outside[1]	8,061	0.77	0.81	-	-
	Total	140,448	13.34	14.14	9.6	4.5
2040	Within City	142,108	13.50	14.31	-	-
	Outside[1]	8,522	0.81	0.86	-	-
	Total	150,630	14.31	15.17	10.7	4.5
2045	Within City	150,464	14.29	15.15	-	-
	Outside[1]	9,010	0.86	0.91	-	-
	Total	159,474	15.15	16.06	11.6	4.5
2050	Within City	157,883	15.00	15.90	-	-
	Outside[1]	9,526	0.90	0.96	-	-
	Total	167,409	15.90	16.86	12.4	4.5

[1]The projected population and water demand figures reflect both retail customers and bulk water agreements outside city limits.
[2]Traditional water supply includes groundwater from the Confined Surficial Aquifer and Upper Floridan Aquifer and the amounts reflect the allocation requested in the CUP modification application. The existing CUP allocation for 6.875 million gallons per day (MGD) annual average of groundwater from the confined surficial aquifer, 1.512.9 MGY (4.15 MGD, annual average) of groundwater from the upper Floridan aquifer and 1,642.5 MGY (4.5 MGD, annual average) as an alternative water source from the brackish upper Floridan aquifer for public supply use (household, commercial/industrial, irrigation, water utility, bulk exports, membrane treatment through 2050.
[3]Alternative water supply includes brackish groundwater from the Upper Floridan Aquifer and Lower Floridan Aquifer, surface water, treated concentrate and reclaimed wastewater.
[a]The City received a CUP permit with a 2015 allocation of 11.02 MGD.

***

As part of the current Consumptive Use Permit (CUP) modification application, the City is conducting a groundwater hydraulic modeling study to determine the availability of additional groundwater from new alternative ground water supply sources, including brackish groundwater. Due to the City's designation as a Priority Water Resource Caution Area (PWRCA), the City anticipates that alternative water supplies will be needed at some point in the future to meet projected demands. The WSFWP assumes that groundwater sources, including brackish water, will be available to meet the water demands beyond 2050. The WSFWP further assumes that additional water demands beyond 2029 will be met by alternative water supplies.

The attached 2018-2022 short-term work plan (Table 5.1) and the 2023-2035 long-term work plan (Table 5.2) lists the projects necessary to meet the projected demands based on the assumptions discussed above.

Traditional Water Supply

The City owns and operates three (3) water treatment plants (WTPs). WTP No. 1 is classified as a lime-softening treatment plant with a permitted design capacity of 6.0 MGD. WTP No. 2 is classified as a membrane softening treatment plant with a current permitted design capacity of 7.58 MGD. WTP No. 3 is classified as a low-pressure reverse osmosis treatment plant with a permitted design capacity of 3.0 MGD.

The current raw water source supplied to the three water treatment plants is defined as the Traditional Raw Water Supply, which consists of the confined surficial aquifer water for WTP No. 1 and WTP No. 3, and the upper Floridan aquifer water for WTP No. 2. The City is currently permitted for a total of 11.02 MGD from the Traditional Supply. This allocation is only sufficient to meet the City demand until 2023. The City is in the process of modifying the current Consumptive Use Permit (CUP) to add an allocation of alternative Supply to meet the projected demands through 2035. Please note that while the City is currently seeking an alternative source allocation, they plan to seek as much additional fresh water as safely allowed by modeling and the resulting impact analysis.

Reuse Water

Reuse of reclaimed water for irrigation is a form of alternative water supply which replaces ground water or potable water for irrigation of residential and other publicly accessible areas. The City has been implementing reclaimed water reuse projects since 1995. Currently, reclaimed water is being used for irrigation at the Hammock Dunes golf course development, Grand Haven golf course development, Town Center development, several other residential developments along Old Kings Road along with miscellaneous common areas within the City.

City ordinance requires that all new residential and commercial developments use reclaimed water for landscaping irrigation if reclaimed water is available. The implementation of reclaimed water reuse has significantly reduced potable water demands. The City has completed a new reclaimed water pump station at WWTP No. 1 and reclaimed water mains to supply reclaimed water to the developments along Old Kings Road and to Cigar Lake. A reclaimed water distribution pump station along with a filtration system has been constructed at Cigar Lake to pump the stored reclaimed water to Town Center and other reuse sites for irrigation. A reclaimed water main has been constructed along Old Kings Road to the north to provide irrigation water to the Conservatory golf course and the DCDD Creek course. The main continues along Matanzas Woods Parkway to US Highway 1 to supply reclaimed water to future residential and commercial developments along US Highway 1. Currently, reclaimed water from WWTP No.1 is supplied to a distributed spray irrigation system along both sides of US Highway 1 for aquifer recharge and is designed to provide up to one million gallons per day of flow.

The WWTP No. 1 is permitted to reuse up to 11.07 MGD of public access irrigation. The 2016 annual average day usage of reuse water by the existing developments is 3.142 MGD. An additional 879,106,000 was used for aquifer recharge. Future WWTP No. 2, which is scheduled to be placed online in early 2018, will treat wastewater to advanced standards. The reclaimed water from WWTP No. 2 will be used for irrigation of new residential, commercial and golf course developments along US Highway 1 north of Palm Coast Parkway. The projected reclaimed water reuse capacity for WWTP No. 2 is estimated to be about 5.0 MGD when the facility is built out.

Alternative Water Supply

The City has implemented projects to recover the drinking water byproduct (DWB) generated from the WTP No. 2 and WTP No. 3 membrane softening process to be utilized as an additional alternative water source. The DWB is being treated to be utilized as finished drinking water. The City diverting the DWB from WTP No. 3 and blending it with WTP No. 1 raw water prior to treatment at WTP No. 1. At WTP No. 2, the City is treating the DWB produced from the membrane softening process with lime softening followed by microfiltration to recover the DWB as drinking water. Both projects could eliminate the wasteful discharge of DWB to surface waters and could ultimately recover up to about 1.95 MGD of water as drinking water or as raw water.

The City has installed a reuse irrigation system along both sides of US Highway 1 in order to provide up to 1 MGD of reuse for aquifer recharge. The wetland monitoring plan will be utilized to determine the success of this project. The reuse water for this system can be sourced from either WWTP No. 1 or No. 2.

The City has completed an aquifer performance test of the brackish upper Floridan Aquifer system in the northern wellfield. The data acquired from these tests have been modeled to determine the

feasibility of receiving an allocation of brackish water in the CUP. The SJRWMD is reviewing the model outcome and will complete an impact analysis in order to determine an acceptable allocation in early 2018.

The City plans to investigate additional means of aquifer recharge utilizing advanced treated wastewater from WWTP No. 2. This method of indirect potable reuse has the potential of providing up to 2 MGD of additional fresh allocation in advance of utilizing the more costly brackish water in the upper Floridan aquifer.

The City plans to investigate the benefits of adding storage to the stormwater collection system in an effort to mitigate wetland impacts due to withdrawals from the Confined Surficial Aquifer.

Conservation and Reuse Practices

The City's current per capita (88.1 gpdpc) of distributed water use is lower than the majority of jurisdictions within the St. Johns River Water Management District. The City will continue to implement the ongoing water conservation and reuse practices listed below in order to maintain the relatively low per capita use.

- Technological, Procedural, and/or Programmatic Improvements Management
    - Water Treatment Plant Technologies
    - Water Use Monitoring
    - Free Water Conservation Plumbing Retrofitting Kits for Residential Customers
    - Indoor Conservation Programs
    - Develop and Enforce Water Efficient Landscape Ordinance (in cooperation with SJRWMD)
    - Irrigation Design Requirements
    - Requiring Individual Metering
    - Requiring the Use of Low-Volume Plumbing Devices
- Reuse Conservation Practices
    - Requiring New Development to Install a Reuse Water Distribution System
    - Requiring Connection to the Reuse Water System
    - Requiring Individual Metering
- Customer and Employee Education
- Use of Conservation based Rate Schedule

Table 5.1 – Short Term Work Plan (FY 2023-2027)

Project Name	Purpose of Project	Responsible Party	Funding Source[1]	Fiscal Year Estimated Costs					Estimated Total Cost	Estimated Year of Operation
				2023	2024	2025	2026	2027		
GENERAL IMPROVEMENTS										
Water Mains										
Citation/Old Kings Road/SR100 Water Main Loop	Improve and increase water distribution capacity	City of Palm Coast	UCPF	-	$1,450,000	$3,950,000	-	-	$5,400,000	2025
Citation Extension – WTP#2 to Seminole Woods	Improve and increase water distribution capacity	City of Palm Coast	UCPF	$150,000	-	-	-	-	$150,000	2018
Old Kings Road Water Main Extension (Oak Trails South/PH.2	Improve and increase water distribution capacity	City of Palm Coast	UCPF	-	$175,000	$175,000	-	-	$350,000	On-going
Distribution System Improvements	Improve and increase water distribution capacity	City of Palm Coast	UCPF	-	-	-	-	-	-	-
(Road) WTF #1 - Water Main Relocates - OKR N. Widening Ph. 2 (Kings Way to Frontier)	Improve and increase water distribution capacity	City of Palm Coast	UCPF	$200,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$4,200,000	2027 - 28
PEP System										
PEP Tanks - New	Capacity	City of Palm Coast	UCPF	$6,300,000	$4,000,000	$1,900,000	$1,800,000	$1,700,000	$15,700,000	On-Going
PEP Tanks – Replacements	Capacity	City of Palm Coast	UCPF	$750,000	$750,000	$750,000	$750,000	$750,000	$3,750,000	On-Going
System Upgrades	R and R	City of Palm Coast	UCPF	$750,000	$700,000	$700,000	$700,000	$700,000	$3,550,000	On-Going
Force Mains										
Old Kings Road (Phase 3)	Capacity	City of Palm Coast	UCPF	-	-	$200,000	$200,000	-	-	-
Matanzas Relocate	Capacity	City of Palm Coast	UCPF	-	-	-	-	-	-	-
Ravenwood to WWTP #2 on US1	Capacity	City of Palm Coast	UCPF	-	-	-	$50,000	-	$50,000	Future
OKR - SR100 to future WWTP #3	Capacity	City of Palm Coast	UCPF	$150,000	$1,500,000	$2,000,000	-	-	-	-
OKR Force Main to WWTP #1	Capacity	City of Palm Coast	UCPF	$150,000	$3,800,000	-	-	-	$8,000,000	2025
A1A Force Main Extension (Jungle Hut to Malacompra)	Capacity	City of Palm Coast	UCPF & Flagler Co.	$400,000	$2,400,000	-	-	-	-	-
A1A Force Main Extension (Malacompra to Marineland)	Capacity	City of Palm Coast	UCPF & Flagler Co.	-	$500,000	$3,000,000	$4,500,000	-	-	--
Willow Woods Dryline Sewer	Capacity	City of Palm Coast	UCPF & Flagler Co.	$50,000	-	-	--	-	-	-
Lift Stations and Pump Stations										
Pump Station Upgrades	R and R	City of Palm Coast	UCPF	$250,000	$300,000	$500,000	$500,000	$500,000	2,0500,000	Ongoing
B Pump Station On-Line Generator/Pumps	R and R	City of Palm Coast	UCPF 25% FEMA HMGP 75%	-	$175,000	$100,000	$100,000	$100,000	$475,000	Ongoing
Pump Station Odor Control Systems	R and R	City of Palm Coast	UCPF	$60,000	$350,000	$100,000	$100,000	$100,000	$710,000	Ongoing
OKR South Master Pump Station	Capacity	City of Palm Coast	UCPF	$200,000	$700,000	$700,000	-	-	$1,600,000	2026

Pump Station 34-1 Upgrade	Capacity	City of Palm Coast	UCPF	-	$300,000	-	-	-	$300,000	2024
Hargrove Pump Station	Capacity	City of Palm Coast	UCPF	-	-	-	-	-	-	Future
Pump Station 4-2 & 13-1	Capacity	City of Palm Coast	UCPF	$265,000	-	-	-	-	$265,000	2024
Pump Stations Section 25 (Parkview)	Capacity	City of Palm Coast	UCPF	-	-	-	-	-	-	Complete
Eductor Stations Conversions	R and R	City of Palm Coast	UCPF	$900,000	$500,000	$ 500,000	$500,000	$500,000	$2,900,000	2030
Pump Station 24-2 Modifications & Upgrades	Capacity	City of Palm Coast	UCPF	-	$150,000	$ 800,000	-	-	$950,000	2025
SCADA Conversion to Mission	Operation / Resiliency	City of Palm Coast	UCPF	$30,000	$ 50,000	$ 50,000	$50,000	$50,000	$250,000	Ongoing
US1 Master Pump Station	Capacity	City of Palm Coast	UCPF	-	-	$50,000	$200,000	$200,000	$450,000	2028
OKR Phase II- SS Gravity System Relocation	Capacity	City of Palm Coast	UCPF	-	-	$ 800,000	$ 800,000	-	$1,600,000	2028
General R & R - Wastewater										
A Gravity Pipeline Lining	R and R	City of Palm Coast	EPA 100%	$700,000	$580,000	$4,000,000	$ 3,000,000	$3,500,000	$15,800,000	Ongoing
B Manhole rehabs and Lining	R and R	City of Palm Coast	UCPF 25% FEMA HMGF 75%	-	$600,000	$1,500,00	$1,500,000	$1,500,00	$5,100,000	Ongoing
Construction	R and R	City of Palm Coast	UCPF	$750,000	$1,000,000	$1,000,000	$1,000,000	$ 1,000,000	$4,750,000	Ongoing
Replace submersible pumps	R and R	City of Palm Coast	UCPF	$300,000	$400,000	$400,000	$500,000	$500,000	$2,100,000	Ongoing
B PEP Replacement Pumps and Panels	R and R	City of Palm Coast	UCPF 25% FEMA HMGP 75%	$200,000	$400,000	$400,000	$400,000	$400,000	$1.800,000	Ongoing

A EPA APPROPRIATIONS **B 75% FEMA HMGF APPROPRIATIONS**

Table 5.2 – Long Term Work Plan (FY 2023 - 2035)*

This Long Term Work Plan is based on the 2017 North Florida Regional Water Supply Plan (NFRWSP) completed by the SJRWMD in 2017 and adopted by the City in April 2018. An update to the 2017 NFRWSP covering a planning period to 2045, was adopted by the St. Johns River Water Management District (SJRWMD) Governing Board on December 12, 2023. Consistent with Florida Statutes, the City has 18 months from the adoption of the Regional Water Supply Plan to update its water supply plan based on the Regional Water Supply Plan's findings. The City's WSFWP shall be updated and adopted by June 12, 2025.

Project Name	Purpose of Project	Responsible Party	Funding Source	Estimated Cost	Planning Year	Engineering/ Design Year	Permitting Year	Construction Year
TRADITIONAL WATER SUPPLY COMPONENT								
WTP No. 3 Plant Expansion	Increase the treatment capacity from 3.0 MGD to 6.0 MGD; increase the storage capacity and the higher service pumping capacity and other process equipment	City of Palm Coast	TBD[1]	$4,500,000	2022	2023	2023	2024
North and South Wellfield Property Acquisition	Provide additional well-sites for capacity development	City of Palm Coast	TBD	$2,000,000	2023	-	-	-
Well Construction Replacements	Maintain adequate and sustainable water supply	City of Palm Coast	UCPF	$2,500,000	-	-	-	-
WASTEWATER & REUSE WATER COMPONENT								
WWTP#1 Plant Expansion	Increase plant capacity	City of Palm Coast	TBD	200,000,000	2024	2025	2025	2025
WWTP No. 2 Reuse for Aquifer Recharge – Non-Potable Reuse	Mitigate freshwater withdrawal impacts on wetlands	City of Palm Coast	TBD	$1,700,000	2023	2023	2024	2025
Expand Reuse Transmission to Developments of Regional Impact to the West	Distribution of additional reuse water for irrigation and aquifer recharge	City of Palm Coast	TBD	TBD	2023	TBD	TBD	TBD
Expand WWTP No. 2 to 4.0 MGD	Allow for additional advanced treated wastewater for reuse	City of Palm Coast	TBD	$13,500,000	2022	2022	2022	2023
ALTERNATIVE WATER SUPPLY COMPONENT								
Develop Brackish water supply	Increase raw water capacity	City of Palm Coast	TBD	$4,500,000	2023	2024	2025	2025-2030
WTP No. 3 Plant Expansion	Add 3.0 MGD of brackish source treatment capacity	City of Palm Coast	TBD	$4,500,000	2023	2024	2025	2025-2035

*Additional improvements to the water distribution system will be needed depending on the completion of the system hydraulic modeling.
[1]TBD: Funding source to be determined upon completion of future financial feasibility study