CITY OF MACCLENNY
2025 COMPREHENSIVE PLAN

INFRASTRUCTURE ELEMENT

Section D

Prepared by

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PLANNERS & ENGINEERS

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CITY OF MACCLENNY
2025 COMPREHENSIVE PLAN

INFRASTRUCTURE ELEMENT

GOALS, OBJECTIVES AND POLICIES

GOAL 4 **THE CITY OF MACCLENY SHALL PROVIDE SANITARY SEWER, SOLID WASTE, DRAINAGE AND POTABLE WATER FACILITIES AND SERVICES TO MEET EXISTING AND FUTURE POPULATIONS AND IN A MANNER WHICH PROTECTS THE NATURAL FUNCTIONS OF THE CITY'S NATURAL RESOURCES.**

Objective 4.01 **The City shall maintain a Concurrency Management System which includes procedures to ensure that at the time a development permit is issued, adequate facility capacity is available or will be available when needed to serve the development. All system improvements for replacement, expansion or increase in capacity of facilities shall comply with the adopted Level of Service standards for the facilities.**

Policies

4.01.01 The City shall use the following Level of Service standards as the basis for determining the availability of facility capacity and the demand generated by development.

Facilities	Level of Service Standards
Sanitary Sewer	113 gallons per capita per day, with a peak factor of 1.35
Solid Waste	7.08 pounds per capita per day
Potable Water	154 gallons per capita per day with a peak factor of 1.2
Drainage: Water Quantity:	Peak post-development run-off rates shall not exceed peak pre-development rates
Drainage: Closed Conduits:	10-year frequency, 24-hour duration; IDF curve zone 3, FDOT Drainage Manual 1997
Drainage: Open Channels:	25-year frequency, 24-hour duration; IDF curve zone 3, FDOT Drainage Manual 1997
Drainage: Water Quality:	All new development or redevelopment shall meet the requirements of 40C-40, 62-25 and 62-302
Drainage: Stormwater Discharge Facilities:	Permits for construction of new stormwater facilities shall follow Chapter 62-25.040, Florida Administrative Code, or Other applicable state law.
Drainage: Wetland Stormwater Discharge Facilities:	Permits for wetland stormwater discharge shall follow Chapter 62-25.042, Florida Administrative Code.

Any development that is exempted by state law from the above drainage standards and that is adjacent to or drains directly into a surface waterbody, canal or stream shall first allow the runoff to enter a grassed swale or other conveyance that is designed to percolate 80 percent of the runoff from a 3-year, 1-hour design storm within 72 hours after the storm event.

The Florida Administrative Code citations refer to these regulations as they exist at the time of adoption of this Comprehensive Plan. In order to ensure that these Level of Service standards are maintained, methodologies for determining available capacity and demand shall incorporate appropriate peak demand coefficients for each facility and for the type of development proposed.

4.01.02 All improvements for replacement, expansion or increase in capacity of facilities shall be compatible with the adopted Level of Service standards for facilities.

4.01.03 The City with its consulting engineers will develop procedures to update facility demand and capacity information as building permits are issued.

Policy

4.01.04 The City shall not issue a development order or development permit without affirmation from the City Engineer that adequate water supplies to serve the development will be available no later than the anticipated date of issuance of a certificate of occupancy or its functional equivalent.

Objective 4.02 **The City shall maintain a five-year schedule of capital improvement needs for new public facilities as well as corrections to existing deficiencies, to be updated annually in conformance with the review process for the Capital Improvements Element of this Plan.**

Policies

4.02.01 Proposed capital improvements will be evaluated and ranked according tot he following priority level guidelines:

Level One – whether the project is needed to protect public health and safety, to fulfill the City legal commitment to provide facilities and services, or to preserve or achieve full use of existing facilities and correct existing deficiencies;

Level Two – whether the project increases efficiency of use of existing facilities, prevents or reduces future improvement costs, provides service to development areas lacking full service or promotes in-fill development; and

Level Three – whether the project represents a logical extension of facilities and services within a designated service area.

4.02.02 Projects shall be undertaken in accordance with the schedule provided in the Capital Improvements Element of the Plan.

4.02.03 The provision of centralized sanitary sewer and potable water service shall be consistent with the City's growth policies stated in the Future Land Use Element of this Plan and the Future Land Use Map, and to areas where the City has legal commitments to provide facilities and services as of the date of adoption of this Plan.

Objective 4.03 **The City shall work to promote the conservation of potable water resources through the development of Land Development Regulations.**

Policies

4.03.01 The City shall work with the St. Johns River Water Management District in establishing and utilizing potable water conservation strategies and techniques and prohibit the discharge of inadequately treated stormwater runoff into waters of the State.

4.03.02 The City shall establish incentives by January 1, 2012 for customers to install water-conserving devices.

4.03.03 The City shall adopt ordinances requiring the use of water saving devices in new construction and the use of drought resistant naïve vegetation for landscaping.

4.03.04 The City shall adopt a program whereby restrictions are placed on water consumption during times of drought.

4.03.05 The City shall establish water quality standards for stormwater discharge in which shall be set for all new and existing stormwater management systems. The City hereby adopts Chapter 62-25, F.A.C. as standards for water quality. This policy shall no be interpreted to:

1. Mandate that the City require existing facilities to be retrofitted to meet stormwater discharge water quality standards or drainage Level of Service standards.
2. Eliminate any presumptions provided by the state or the regional law or regulatory design and performance criteria to satisfy applicable stormwater discharge water quality standards.

Policies

3. Prevent the City from providing that compliance with adequate locally or regionally established Level of Service standards other than the design and performance criteria in Chapter 62-25, F.A.C., shall also be presumed to satisfy the stormwater discharge water quality standards.
4. Prevent the City from incorporating by reference stormwater management water quality standards exemptions to the extent they appear in state or regional stormwater management water quality laws or regulations.
5. Mandate that the City conduct water quality sampling or testing of stormwater discharge receiving water to implement the standards described in this subsection.

4.03.06 The City will participate in the development of updates to the St. Johns River Water Management District's Water Supply Assessment and District Water Supply Plan and in other water supply development-related initiatives facilitated by the District that affect the City. If required, the City will adopt a water supply facilities work plan that is coordinated with the District Water Supply Plan within eighteen (18) months of an update to the District Water Supply Plan that affects the City.

Objective 4.04 **The City shall protect the natural drainage features from adverse impacts.**

Policies

4.04.01 The City's Land Development Regulations shall be prepared and implemented to include and be consistent with the City's Floodplain Ordinance and the adopted Level of Service standards. It is the intent that the Land Development Regulations shall ensure adequate retention/detention of stormwater runoff to maintain surface water quality, to encourage percolation and reduce impacts to drainage canals, wetlands, surface water and groundwater.

4.04.02 Man-made drainage systems including swales and ditches shall be routinely maintained to prevent the interruption of stormwater flows.

4.04.03 The Master Stormwater Plan shall identify necessary stormwater-related capital improvements.

Objective 4.05 **Future development shall be required to connect with central water and wastewater systems and provide drainage facilities which maximize the use of existing facilities and discourage urban sprawl.**

Policies

4.05.01 Land Development Regulations shall continue to maintain already established criteria for the approval of developments which ensure all new development is logically, economically and safely located near public facilities.

4.05.02 Figure E.2 is the City's water and sewer urban service area boundary. By January 1, 2012, the City shall develop an interlocal agreement which shall:

(a) Develop connection and extension policies for existing and future land uses within the urban service area;

(b) Control land uses within the boundary so as to discourage urban sprawl;

(c) Develop an urban service boundary which is consistent with the Goals, Objectives, Policies, levels of service, capacities and land uses established in both the Baker County Comprehensive Plan and the City of Macclenny's Comprehensive Plan.

Objective 4.06 **The City shall implement measures in the Land Development Regulations which serve to protect the City's wellheads and groundwater resources.**

Policies

4.06.01 The City shall establish a 200-foot protection zone around its existing and future wellheads. The Land Development Regulations shall define incompatible land uses and prohibit those uses within the 200-foot zone.

4.06.02 All future drainage facilities shall be designed so as to meet applicable local an state regulations pertaining to the maintenance of water quality, natural hydroperiods and flows.

4.06.03 If the SJRWMD determines that areas in the City of Macclenny are high recharge areas, the City will coordinate with the District and its programs to amend the Land Development Regulations which will provide for natural aquifer recharge protection. High recharge areas shall receive a level of protection commensurate with their significance to natural systems or their status as current or future sources of potable water.

CITY OF MACCLENNY
2025 COMPREHENSIVE PLAN

INFRASTRUCTURE ELEMENT

DATA AND ANALYSIS

There are four utility systems operated and maintained by the City of Macclenny: potable water, sanitary sewer, stormwater management and solid waste. The City's Public Works Department is responsible for the overall performance of these systems. The City works in cooperation with Baker County that provides landfill capacity for solid waste disposal.

D.1 Identification of Facilities Which Provide Service within the City

Rule 9J-5.011(1)(a), F.A.C.

Sanitary Sewer

The purpose of the treatment process is to produce an effluent that will not harm the environment or public health. Treatment of wastewater is necessary to remove pollutants so that water can either be reused in some way or discharged to surface waters.

Wastewater treatment plants are characterized as either providing primary, secondary or tertiary treatment depending on the type of process used and the level of treatment (purification) of the wastewater that is achieved. If a treatment plant is required by federal, state or local government regulating, it must meet at least secondary treatment standards.

Primary treatment refers to the removal of between 30 and 35 percent of the organic materials and up to 50 percent of the solids from the sewage. This is also commonly referred to as physical treatment because screens and settling tanks are the most common methods used to remove the solids. Secondary treatment processes remove between 80 and 90 percent of total organic materials and suspended solids from sewage. This level of treatment generally requires multiple steps involving one biological process and one or more processes for removal of suspended solids.

Wastewater may also contain large quantities of synthetic organic compounds or inorganic chemicals that 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 phosphorous and nitrogen. The effluent of advanced treatment processes often approaches potable water purity.

After collection and treatment, the wastewater effluent must be disposed of in a manner that will not adversely affect the public's health or the quality of the environment. There are six methods in common use: surface water discharge, deep well injection, high rate land application (percolation), slow rate land application (irrigation, reuse), wetlands discharge, and other forms of effluent reuse.

Solid Waste

The City currently provides service to the entire municipal limits for commercial and residential customers. Presently there are two residential routes collected twice weekly. In addition to the regular routes, two trash trucks are also operated as needed. The purpose of these trucks is to collect bulky items as well as other materials that cannot be placed in the regular trucks. One truck and city-provided containers are used to service the commercial customers' sites in the City five times a week. Commercial establishments are required to have dumpsters by ordinance if they generate a minimum of 4 cubic yards per week or more.

The solid waste generated by the City is sent to the New River Regional Landfill located 2.5 miles north of Raiford in Union County, Florida. The waste materials the landfill accepts are construction and demolition, contaminated soil, dry industrial, municipal solid waste, non-friable asbestos, recyclables, sludge, and yard waste.

Stormwater Management

Proper drainage and management of stormwater runoff is necessary to ensure the quality of natural bodies of water for the protection of the health and welfare of people.

The rapid growth and urbanization have produced many water quality problems in the lakes and streams. Pollution of these natural resources is not contributed to solely by domestic and industrial deposits, rather a combination of many sources.

Some of these sources can be highly toxic and the first few minutes of runoff have been considered comparable to raw sewage. Pollutants may include chemical vapors in the air, household refuse dropped during collection, bird and animal wastes, and lawn and garden pesticides and fertilizers. Pollution from car exhausts, gasoline and oil spills as well as soil erosion also contribute to the contamination process.

Natural drainage systems are defined by the topography of the area. The largest feature of a natural drainage system is the drainage basin or watershed. The boundary of the basin is called the basin divide where the natural land elevation directs runoff from the basin toward a common major drainage feature, such as a river, bay or lake. The major drainage feature is often called the receiving body and the smaller features are its tributaries. Manmade drainage facilities are artificial constructs designed to store or convey stromwater runoff. Swales, ditches, canals and storm sewers are typical conveyance structures, collecting stormwater runoff and directing it toward downstream receiving either detention or retention facilities. Detention facilities gradually to downstream portions of the drainage system through an outlet structure. Retention facilities are impoundments that release stormwater by evaporation and by percolation into the ground, with no direct discharge to surface waters.

All of the surface water runoff from the City enters directly into the South Prong of the St. Mary's River, Turkey Creek or connecting drainage ditches. The ultimate receiving water body is the St. Mary's River which is classified as a Class III Water Body, therefore the City is within the St. Mary's River Basin. Stormwater runoff from the City combined with the agriculture in the vicinity may be contributing to the elevated levels of phosphorous and inorganic nitrogen found in the South Prong tributary of the St. Mary's River located near Macclenny. The current excellent water quality of the St. Mary's River could deteriorate if continued urban development is coupled with inadequate protection of surrounding surface waters.

Five sub-basins in the area were delineated to better define the stormwater system. Each of these sub-basins contains a portion of the city limits. All of the sub-basin boundaries are depicted in Illustration D.1 on the following page. Drainage patterns in each sub-basin are described below with focus on stormwater problem areas and deficiencies. Flooding and water quality issues are addressed separately for each sub-basin.

Sub-basin 1 contains the northwestern part of the City. The western portion of the former (now closed) Pineview Golf Course and many residential subdivisions are located within this sub-basin. The runoff from a majority of these subdivisions and the western side of the former golf course drains into large roadside ditches along Miltondale Road. These ditches connect to a privately owned livestock-watering pond outside of the city limits through a 42-inch pipe. Once the water elevation in the pond reaches the top of the banks, the pond overflows in the westward direction through a natural channel into the St. Mary's River. During large amount of drainage area contributing to these ditches causes the privately owned livestock pond to periodically wash out due to the high flow velocities. No water quality treatment occurs for the runoff from these areas. Water quality of the runoff from the golf course and residential areas is most likely worsened by traveling through the livestock-watering pond. The runoff from the residential areas within sub-basin 1 located on the west side of SR 23A drains to a large wet ditch which discharges into roadside swales connected to the St. Mary's River. Runoff from the remaining residential areas within the sub-basin are directed into a drainage ditch beginning on the west side of 23A at Wheeler Drive and then turns in the north-south direction until it reaches US 90. This ditch is a state-maintained ditch which empties into the roadside ditches along US 90. This runoff is treated in a large detention pond before directly discharging into the St. Mary's River. Serious flooding conditions have been experienced adjacent to the ditch due to the low capacity and current overgrown vegetation.

Sub-basin 2 contains the north central and northwestern parts of the City. A majority of Barber Plantation PUD (the former Pineview Golf Course), recreational areas, many residential areas, and some undeveloped land are located within this sub-basin. Most of the runoff from this sub-basin ultimately enters a state maintained drainage ditch. This ditch begins north of US 90 on the east side of the city limits. It continues in the north/northwest direction until it turns east at the northern city limits boundary and passes under SR 228 and SR 121. The ditch then extends through the center of Barber Plantation until it reaches the St. Mary's River. Runoff from Barber Plantation directly enters the ditch by overland flow. Runoff from the residential and undeveloped areas east of SR 228 enter the ditch by overland flow or connecting roadside ditches and culverts. Remaining runoff from the residential and recreational areas west of SR 228 enters another drainage ditch via connecting roadside swales and culverts or by direct overland flow. This ditch begins north of Ohio Avenue and continues in the northerly direction until it joins with the state maintained ditch. During large storm

events, localized flooding occurs where Ohio Avenue intersects SR 228 and along the areas adjacent to the southern portion of the ditch.

Sub-basin 3 contains the eastern and southeastern portions of the City. Most of this sub-basin is residential or undeveloped. Stormwater runoff from this sub-basin enters one of the two tributaries to Turkey Creek. Both tributaries begin east of the city limits boundary and join at the southeastern edge of the city limits before crossing under SR 228 and connecting with Turkey Creek.

Sub-basin 4 contains the south and southeastern parts of the City. Most of the land within the sub-basin is either residential or commercial. Stormwater runoff from this sub-basin enters one of two drainage ditches emptying into Turkey Creek. The first ditch begins south of the intersection of SR 23A and US 90 on the west side of the city limits. It continues in the south direction until it reaches Turkey Creek. This drainage ditch receives the runoff from the northeastern portion of sub-basin 4 which contains Keller Intermediate School and a residential area. The second drainage ditch begins on the west side of SR 121 and continues south after passing under SR 23A until it reaches Turkey Creek. This ditch receives the runoff from a majority of the residential area within this sub-basin and a portion of the runoff from Baker County Middle School. Runoff from this sub-basin enters the two drainage ditches by direct overland flow or connecting roadside ditches and culverts. During large storm events, localized flooding occurs in residential sections south of Keller Intermediate School and east of SR 228. Major flooding also occurs along the areas adjacent to the second drainage ditch.

Sub-basin 5 contains only the very southern extent of the City. The portion of the City within this sub-basin is commercially developed. These businesses have individual stormwater treatment systems for water quality purposes. These systems discharge into roadside swales leading to a tributary of Turkey Creek. This tributary begins south of the city limits boundary and travels in the northwestern direction until it intersects Turkey Creek. There is no reported flooding within this sub-basin.

Potable Water

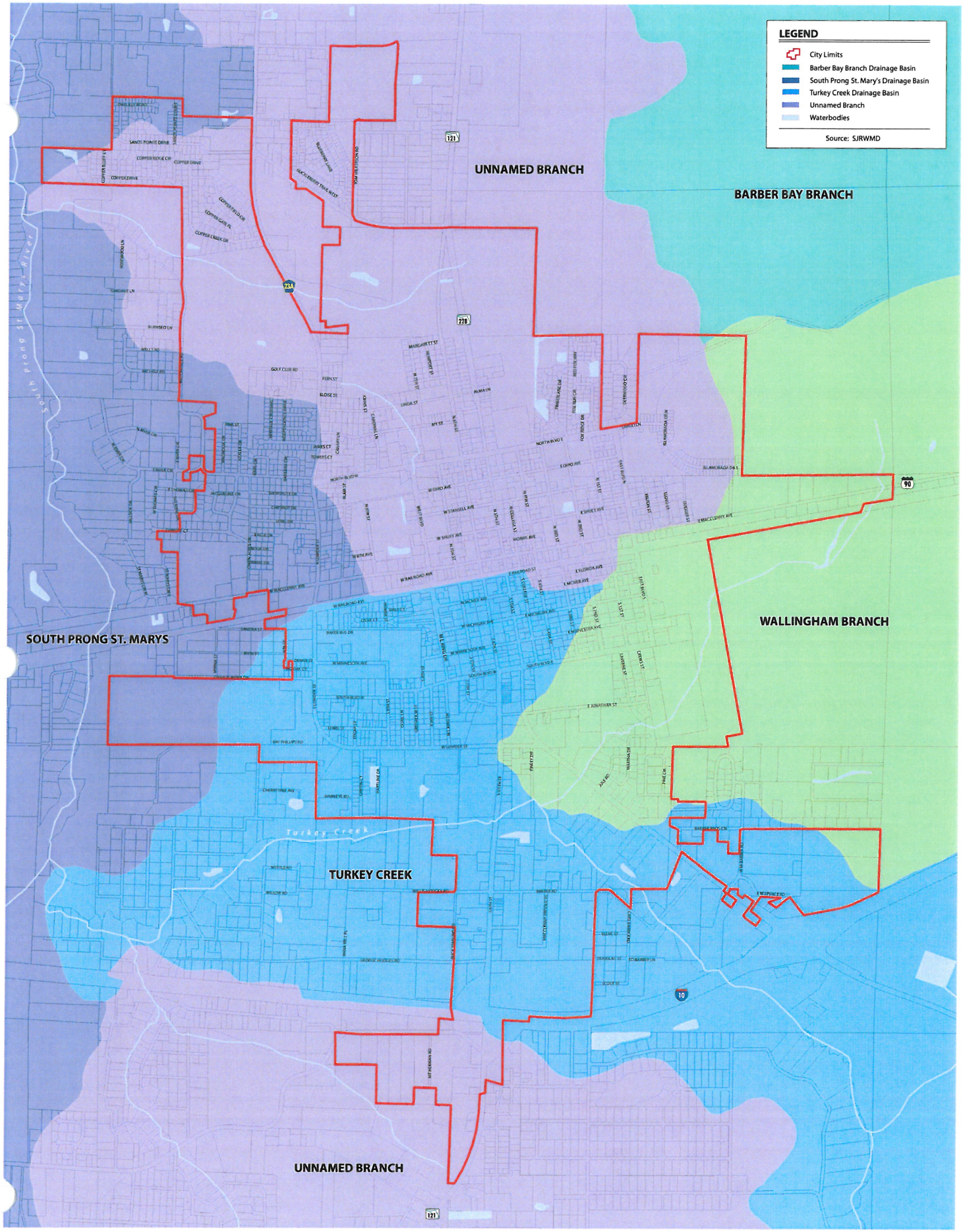
The City has one potable water facility with two wells. This facility is owned and operated by the City of Macclenny. There is a 200-foot radius wellhead protection zone around each of the wells.

Natural Groundwater Aquifer Recharge

Aquifers are water-bearing layers of porous rock, sand or gravel. Several aquifers may be present below one surface location, separated by confining layers of materials that are impermeable or semi-permeable to water.

The source of water in aquifers is rainfall. Under the force of gravity, rainfall percolates downward through porous surface soils to enter the aquifer strata. The rate of aquifer recharge from rainfall may vary from one location to another because of the variable permeability of different soil types.

Development in a recharge area can alter the amount and quality of the aquifer. Covering a recharge area with impervious surfaces such as roads, buildings and parking lots reduces the area available for rainfall percolation. Aquifers can be polluted because of development since stormwater runoff occurs at a faster pace and is unable to percolate in an effective and cleaning manner.



NORTH

0 600 1,200 Feet

April 13, 2010

City of Macclenny

Illustration D.1 Major Water Features Map

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D.2 City Facilities Providing Services to Extrajurisdictional Entities

Rule 9J-5.011(1)(b), F.A.C.

The City provides water and sewer service to places outside the city limits listed below in Table D.1. All other areas that were once located outside the city limits and received municipal sewer service have been annexed into the City. A local ordinance requires hook-up to the City's sewer system if the structure is located within the city limits.

Table D.1
Areas Outside City Limits Served by Utilities

Extra-jurisdictional Location	Potable Water	Sanitary Sewer
Macclenny II	√	
Wal-Mart Distribution Center	√	√
Mulch & More	√	
Greystone Subdivision	√	√
Westside Elementary School	√	√
Baker County High School	√	√
Raiford Road Church		√
Kenneth Keen		√
Fire Station (SR 121 South)		√
Town of Glen St. Mary		√
Super Wal-Mart	√	√
NE Florida State Hospital		√
NE Florida Power Equipment	√	√

The proportion of sewer service provided to these areas is roughly the equivalent of 2.8 percent of the City's total wastewater flows.

D.3 Proportional Capacity of Shared Systems

Rule 9J-5.011(1)(c), F.A.C.

Solid Waste

As of February 25, 2010, the 34-acre New River Regional Landfill has 3,843,242 tons of remaining capacity.

Stormwater Management

The City of Macclenny's Drainage ordinance states that no one may construct any detention and retention ponds without first obtaining a permit from the City building department with approval of designs, plans and specifications.

The design of retention or retention ponds must be in accordance with Florida Department of Transportation, Florida Department of Environmental Protection or St. Johns River Water Management District. The criteria to be applied shall be the most stringent of these three agencies. Retention ponds in which the water depth is greater than six inches one hour after the design storm ceases or greater than two feet in depth, must be constructed of corrugated metal pipe and covered with earth. The pipe or pipes must have the capacity to meet the design storage requirements. Stormwater plans must show the following:

1. Overall drainage layout, including all drainage areas contributing to the detention basin;
2. Hydrographic showing inflow, discharge, storage capability, minimum/maximum design or water depth;
3. Inflow 100-year storm developed conditions;
4. Storage shall be that volume necessary to store the most critical event of the 100-year storm.

Potable Water

The City has approximately 500,000 gallons of water storage capacity. The water is treated initially with a chlorine disinfectant and subsequently subjected to an aeration process.

D.4 Public and Private Sanitary Sewer, Solid Waste, Stormwater Management and Potable Water Facilities

Rule 9J-5.011(1)(d) and (e), F.A.C.

Wastewater System and Facilities

The City currently treats wastewater at the Macclenny Wastewater Treatment Plant (WWTP) located on CR 23A west of SR 121. The Macclenny WWTP is an advanced secondary activated sludge domestic WWTP consisting of an influent wastewater pumping station, manual influent bar screening, grit removal chamber, four sequencing batch reactors (SBRs), two traveling bridge filters with automatic backwash, a chlorine contact basin, post aeration basin, dechlorination and two aerobic digesters. Effluent from the WWTP is discharged through an outfall into Turkey Creek, which is a tributary of the south portion of the St. Mary's River. The plant is currently permitted to discharge 1.30 MGD average daily flow (ADF).

Currently wastewater along SR 121 south of I-10 is collected and transferred to the WWTP via the Northeast Florida State Hospital and Race Track lift stations. The existing Northeast Florida State Hospital lift station consists of two 500 gpm dry pit pumps and collects wastewater from the Hospital and transfers the wastewater via a 10-inch force main north along SR 121 to the Race Track transfer station. The Race Track transfer station consists of two 575 gpm submersible pumps and collects wastewater from the hospital lift station and the adjacent commercial and residential units and transfers the wastewater via an 8-inch force main under I-10 north to the City's WWTP. Upon evaluation, the existing collection system would need to be upgraded in phases in order to accommodate future residential and commercial developments.

Wastewater along US 90 west of the City is collected and transferred to the City's WWTP via the Baker County High School lift station. The existing Baker County High School lift station consists of two 400 gpm suction lift pumps and collects wastewater from the high school and adjacent areas. The wastewater is pumped from the lift station via an 8-inch force main to a gravity sanitary manhole located just south of the CSX railroad tracks on West Boulevard. The gravity system ultimately conveys the flow to the City's WWTP. Upon evaluation, it was determined the existing Baker County High School list station can accommodate the future wastewater flow from the proposed Greystone residential subdivision with no modifications.

There is no wastewater collection system on SR 228 south of Interstate 10. A lift station and associated force main is being constructed just north of I-10 on SR 228 to collect wastewater from the Super Wal-Mart shopping center. This lift station and force main will convey wastewater to an existing sanitary manhole located on SR 228 just south of Turkey Creek where the flow will be transferred by the existing gravity system to the existing Pier 6 lift station which transfers flow to the City's WWTP. Upon evaluation it was determined the existing Pier 6 lift station and the Super Wal-Mart lift station require modification in order to accommodate future residential and commercial development. Also, a new lift station and force main are required south of I-10 on SR 228 to convey wastewater flow from the future development to the Super Wal-Mart lift station.

Based on current available capacity of the system and future wastewater flows as shown below, the City WWTP will need to be increased. The demands (gallons per day) were based upon 260 gpd per residential unit and 0.1 gpd per square foot of commercial development.

Table D.2
Future Wastewater Flows

Year	Future Residential Units				Residential Flow Increase (gal/day)	Future Commercial Water Demands (gal/day)	Future Average Daily Demand (MGD)
	SR 121	US 90	SR 228	North SR 228			
2010	400	50	-	150	156,000		1.50
2011	450	-	150	-	156,000		1.65
2012	350	-	150	-	130,000		1.78
2013	250	-	200	-	117,000		1.90
2014	250	-	250	-	130,000		2.03
2015	100	-	400	-	130,000	2,000	2.16
2016	-	-	450	-	117,000	50,000	2.33
2017	-	-	350	-	91,000		2.42
2018	-	-	250	-	65,000		2.49
2019	-	-	150	-	39,000		2.53

Source: Darabi and Associates, Inc., January 2007

Water System and Facilities

There are currently three (3) Water Treatment Plants (WTPs) operated by the City: the Main WTP located on Ohio Street, the Enterprise East WTP located east of the City on US 90; and the Macclenny II WTP located southeast of the City. The Main WTP and Enterprise East WTP are connected to the City's water distribution system. The Macclenny II WTP serves a residential subdivision located southeast of the I-10/SR 121 interchange and is not connected to the City's water distribution system. A water system capacity determination was performed by Darabi and Associates, Inc. in January 2007 to determine the actual capacities of the WTPs and suggested permitted capacities as shown in Table D.3 below along with existing permitted capacities and current daily demands. Based on the current available capacity of the system and future demands as shown in Table D.4 below, the system plant capacity will need to be increased during the planning period. The demands (gallons per day) were based upon 260 gpd per residential unit and 0.1 gpd per square foot of commercial development.

Table D.3
Water Treatment Plants Capacities

Wastewater Treatment Plant	Existing Permitted Capacity (MGD)	Suggested Permitted Capacity (MGD) (1)	Average Daily Demand (MGD)	Maximum Daily Demand (MGD)
Main	1.38	2.16	0.728	1.669
Enterprise East	0.25		0.103	0.172
Macclenny II	0.25	0.54	0.071	0.210
Total	**1.88**	**2.7**	**0.902**	**2.051**

Source: Darabi and Associates, Inc., January 2007
(1) City of Macclenny Water System Capacity Determination Report

Table D.4
Future Water Demands

Year	Future Residential Units				Residential Flow Increase (gal/day)	Future Commercial Water Demands (gal/day)	Future Average Daily Demand (MGD)
	SR 121	US 90	SR 228	North SR 228			
2010	400	50	-	150	156,000		1.50
2011	450	-	-	-	156,000		1.65
2012	350	-	150	-	130,000		1.78
2013	250	-	200	-	117,000		1.90
2014	250	-	250	-	130,000		2.03
2015	100	-	400	-	130,000	2,000	2.16
2016	-	-	450	-	117,000	50,000	2.33
2017	-	-	350	-	91,000		2.42
2018	-	-	250	-	65,000		2.49
2019	-	-	150	-	39,000		2.53

Source: Darabi and Associates, Inc., January 2007

In the SR 121 South of I10 Service Area, there is an existing 8-inch water main along SR 121 south of Interstate 10 that extends to Buck Rowe Road that serves residential and commercial units west of SR 121 and in the vicinity of the I-10/SR 121 interchange. The existing 8-inch water main is connected to the City's water distribution system. The residential units located east of SR 121 receive water from the Macclenny II WTP, which is not currently connected to the City's water distribution system. The Northeast Florida State Hospital on SR 121 south of INTERSTATE 10 is supplied water from a WTP and elevated water tank located on the campus. The existing water distribution system would need to be extended along SR 121 south of the Northeast Florida State Hospital to the Blair Nursery property in order to accommodate future development in the vicinity.

In the US 90 West Service Area, there is an existing 12-inch water main along US 90 that extends from Ocean Avenue west to the entrance to Baker County High School that serves commercial units adjacent to US 90. The existing 12-inch water main is connected to the City's distribution system. Upon evaluation, the existing 12-inch water main is not capable of providing the necessary flow and pressure to service the additional future residential units, therefore, improvements are required in order to accommodate future development.

In the SR 288 Service Area there is an existing 8-inch water main along SR 228 north of Interstate 10 that extends to just north of the Super Wal-Mart shopping center. A 6-inch water main extension was constructed along with the Wal-Mart and extends just south of the site situated north of Interstate 10. The existing 8-inch water main and the new 6-inch water main are connected to the City's water distribution system. Upon evaluation the existing distribution system would need to be extended along SR 228 south of Interstate 10 and eventually connected to the Macclenny II WTP in order to accommodate the future residential and commercial development in the service area.

Solid Waste

At present, the New River Landfill near Raiford has adequate remaining capacity to handle the region's solid waste through the 2025 planning period.

D.5 Existing and Projected Facility Needs

Rule 9J-5.011(1)(f)1, F.A.C.

Wastewater System and Facilities

Table D.5
Wastewater Treatment Plant Upgrades

Service Area	Required Improvements	Est. Cost
Main	Convert two existing SBR units to MBR units including installation of MBR mechanical equipment, electrical and site lighting	$7,360,000
	Convert remaining two existing SBR units to MBR units including installation of remaining MBR mechanical equipment, new digester, hypochlorite system, and generator	$6,530,000
SR 228	Upgrade existing Pier 6 lift station and force main	$870,000
	Upgrade existing gravity system between Super Wal-Mart lift station and Pier 6 lift station	$700,000
	Upgrade Super Wal-Mart lift station	$170,000
	Install a new submersible pump station and approximately 5,000 linear feet of 10-inch force main south along SR 228	$1,170,000
South of I-10	Construct a duplex type pump station at the Blair Nursery site with two pumps that will pump between 100 and 350 gpm. Construct 6,000 linear feet of 8-inch force main from the new Blair Nursery lift station to the Northeast Florida State Hospital life station.	$880,000
	Replace two existing 500 gpm pumps at the northeast Florida State Hospital with two 650 gpm pumps and upgrade associated piping and appurtenances. Construct a new triplex pump station at the Race Track transfer station and install two 985 gpm submersible pumps. Construct approximately 6,100 linear feet of 10-inch force main parallel to the existing 8-inch force main from the Race Track transfer station to the City's WWTP.	$1,250,000
	Replace the two smaller pumps at the Blair Nursery lift station with two pumps that will pump between 350 gpm and 750 gpm.	$40,000
	Add two dry pit pumps and motors at the Northeast Florida State Hospital that will pump 1,800 gpm and upgrade associated piping and appurtenances. Add a third identical 985 gpm pump at the Race Track transfer station.	$390,000

Source: Darabi and Associates, Inc., January 2007

Within the service area south of I-10 on SR 121, future residential and commercial development would increase daily wastewater flow by 624,000 gallons and 2,000 gallons, respectively. Within the service area on US 90 west of the City, future residential development would increase daily wastewater flow by 65,000 gallons. Within the SR 228 service area, future residential and commercial development would increase daily wastewater flow by 572,000 gallons and 50,000 gallons, respectively.

Water System and Facilities

A cursory assessment of the City's water treatment plants was conducted by Darabi and Associates, Inc. in January 2006 along with an available capacity review to provide a baseline for plant improvements in the future. The results of the assessment indicate at a minimum the following improvements to each plant are needed and that further evaluations of the plants are required to provide adequate capacity in the future.

Table D.6
Water Treatment Plant Upgrades

WTP	Required Improvements	Est. Cost
Main	Purchase an uninstalled 30-HP replacement pump	$100,000
	Install a new altitude valve on the line between the high service pumps and the elevated tank	
	Install a check valve on the main line from the plant to prevent backflow into the elevated tank due to high pressures in the system	
	Install an isolation valve on the 12-inch line located between the plant and the elevated tank to prevent water from bypassing the flow meter	
	Install a bypass from the main 10-inch finished water line to the 12-inch parallel water line	
Macclenny II	Expand the plant from a 0.25 MGD to a 1.0 MGD plant	$4,.260,000

Source: Darabi and Associates, Inc., January 2007

Within the SR 121 Service Area the average daily water demand for future residential development is 624,000 gallons; whereas, the average daily water demand for future commercial development is 2,000 gallons. Within the US 90 West Service Area the average daily water demand for future residential development is 65,000 gallons. Within the SR 228 Service Area the average daily water demand for future residential development is 572,000 gallons; whereas, the average daily water demand for future commercial development is 50,000 gallons

Table D.7
Water System Upgrades

Service Area	Required Improvements	Est. Cost
SR 121 (South of I-10)	At SR 121 install approximately 16,000 linear feet of 12-inch main south to proposed development located at the Blair Nursery property (approved planned unit development in unincorporated Baker County).	$1,660,000
	Connect the Macclenny II WTP to the City's water system on SR 121 by installing a parallel 8-inch main to the existing 6-inch main from the intersection of Pine Avenue to Cedar Avenue along Estate Street. At Cedar Avenue install approximately 2,000 linear feet of 12-inch main to SR 121. Connect the existing 8-inch main along SR 121 to the new 12-inch line to loop the system.	$290,000
	Connect the existing Northeast Florida State Hospital elevated tank to the new 12-inch main on SR 121.	$510,000
US 90 West	Install approximately 5,700 linear feet of parallel 12-inch main from Ocean Acres Drive to the entrance of Baker County High School along US 90 and connect the parallel 12-inch main to two existing 10-inch mains in the vicinity of Ocean Acres Drive and US 90.	$810,000
SR 228	Install approximately 1,625 linear feet of 12-inch water main from the Wal-Mart water main extension on SR 228 south under Interstate 10	$400,000
	Connect the Macclenny II WTP to the City's system on SR 228 by installing approximately 6,500 linear feet of 16-inch main from the plant north of Interstate 10, parallel I-10 to SR 228 and connect to the 12-inch main	$1,110,000
	Install approximately 1,500 linear feet of 16-inch water main south along SR 228 and terminate. The main will extend from the interconnection point of the 12-inch water main and the 16-inch water main routed from the Macclenny II WTP.	$650,000

Source: Darabi and Associates, Inc., January 2007

Stormwater Management

Future drainage needs in the City will be to ensure all future development and redevelopment meets the DEP standards set forth in Chapter 62-25, F.A.C. as well as applicable rules of Chapter 40C, F.A.C. of the SJRWMD.

D.6 Problems and Opportunities for Facility Replacement, Expansion and Siting

Rule 9J-5.011(1)(f)3, F.A.C.

In January 2010, King Engineering and Associates, Inc. completed Phase 1 of the City of Macclenny Stormwater Master Plan. It is the governing document for stormwater-related improvements.

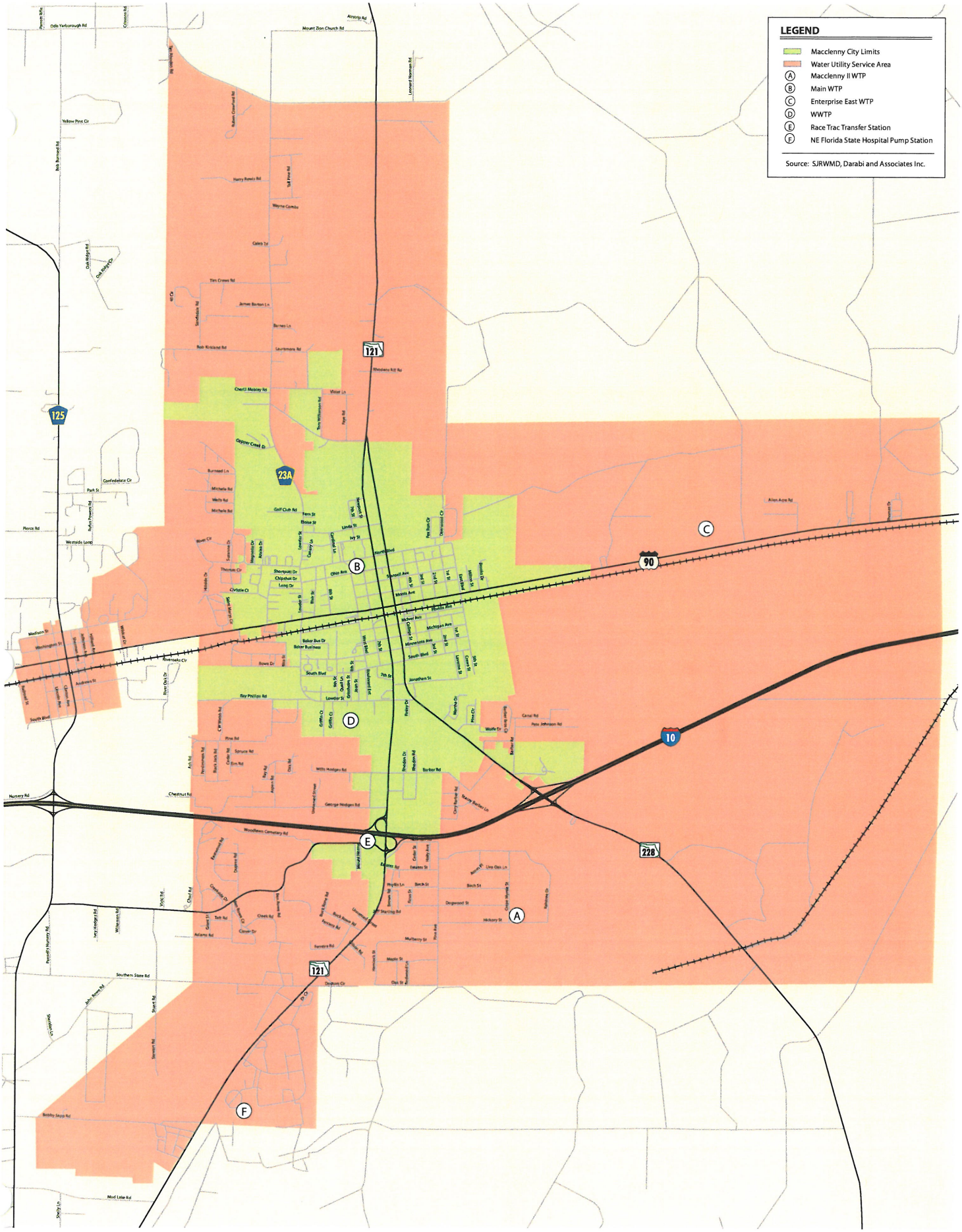
The City's Public Works Department believes that there will eventually be a need to expand the service capacity of the facility, but not until after the planning period ends in 2025. The only stipulation may be if the City begins to provide potable water to the nearby Town of Glen St. Mary. In that event, the existing facility will not be able to meet the increased demand and the needs of the projected City population.

The City has established a boundary for which they are willing to extend centralized utilities throughout the 2025 planning period (see Illustration D.2 on the following page).

D.7 Suitability for Areas Served by Septic Tanks

Rule 9J-5.011(1)(f)4, F.A.C.

The City owns and operates the sanitary sewer facility that serves the entire City. There are no septic tanks within the city limits since hook-up to the municipal sewer system is feasible, as well as mandatory by local ordinance. This regulation is significant as the type of soils within the City is generally not conducive for the use of septic tanks. These soils are nearly level to sloping, somewhat poorly and moderately drained sandy soils with a loamy subsoil. A large portion of the soils in Macclenny is classified as poorly drained.



NORTH

0 1,200 2,400 Feet

April 13, 2010

City of Macclenny

Illustration D.2 Urban Services Map

Prosser Hallock
PLANNERS & ENGINEERS
13901 Sutton Park Drive South, Suite 200 Jacksonville, Florida 32224-0729
p - 904.739.3655 f - 904.730.3413 info@prosserhallock.com

Project No. 104101.02

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D.8 Performance of Existing Facilities

Rule 9J-5.011(1)(f)2, F.A.C.

Sanitary Sewer

The City's wastewater system remains in good working order thanks to monthly servicing and annual improvements to the system.

Solid Waste

According to the landfill engineer, the New River Solid Waste Facility has adequate capacity to accommodate solid waste from the City for the next twenty years.

Stormwater Management

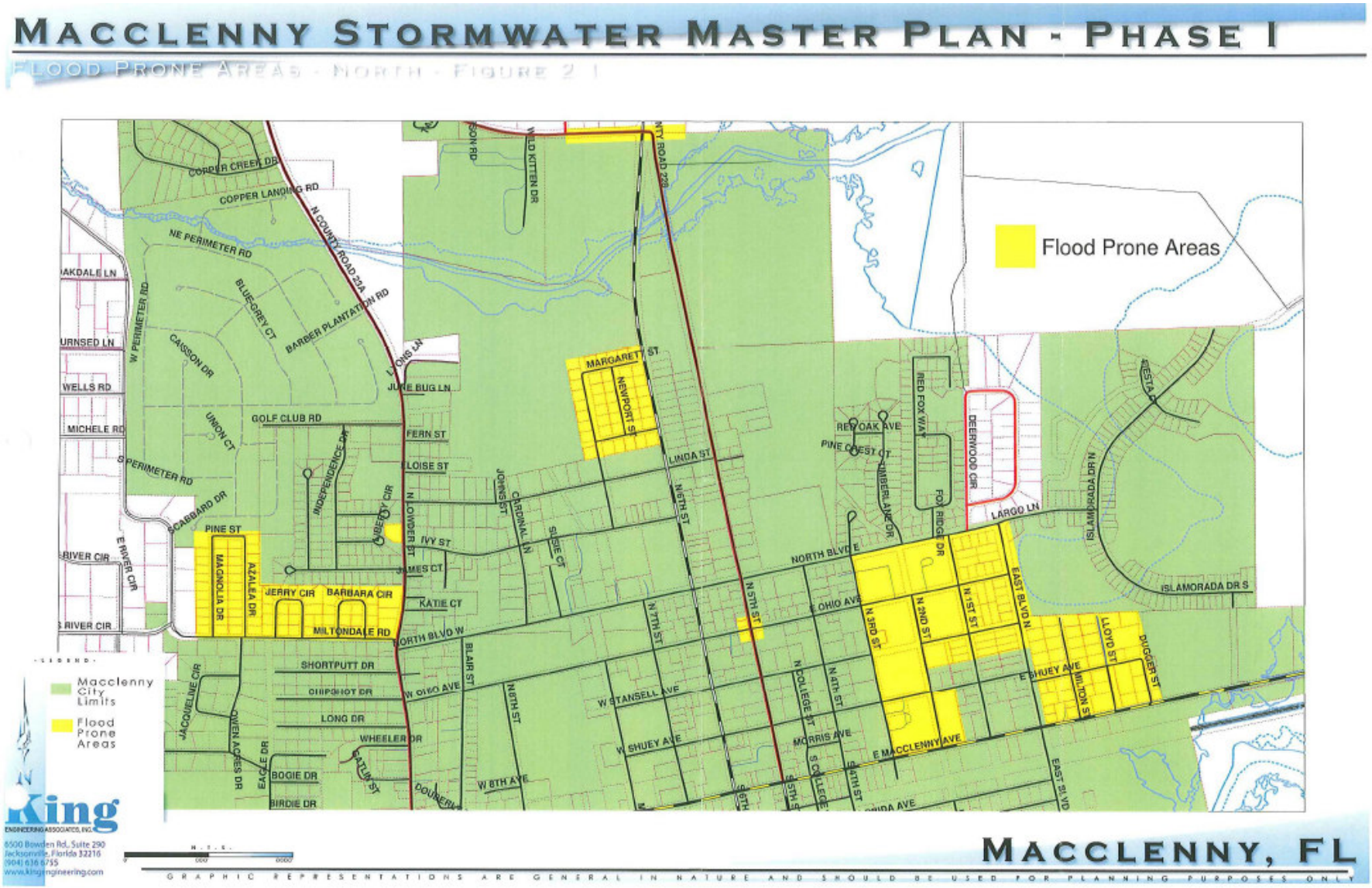
The City has several areas described as "flood prone," areas that see ponding of stormwater on a fairly regular basis in response to heavy rainfall (see Illustration D.3 on the following page).

Potable Water

The level of service for potable water is adequate for Macclenny's needs. Based on the best information available, the water treatment plant is in good working condition, according to the City's consulting engineer. The water facilities are expected to last throughout the planning period as long as regular maintenance of the facilities continues.

The primary source of water for Macclenny is the Floridan Aquifer. There are no prime recharge areas for the Floridan Aquifer in or near Macclenny, rather, the St. Johns River Water Management District (SJRWMD) classifies the City as being in a low recharge area. Recharge to the surficial aquifer is unknown. According to the SJRWMD, well-drained soils make for good recharge conditions to the surficial aquifer, however, the soils in Macclenny are poorly to moderately well drained soils.

Illustration D.3
Flood Prone Areas



D.9 Natural Groundwater Aquifer Recharge Areas

Rule 9J-5.011(1)(g), F.A.C.

The City draws it potable water from the Floridan Aquifer. There are, however, no prime groundwater recharge areas for the aquifer in or near Macclenny. Baker County itself is located in an area of very low recharge. A very low recharge area averages less than two inches per year. In these areas, the Floridan Aquifer is overlain by relatively impermeable confining beds that are generally more than 25 inches thick and unbreached.

Areas of high recharge average ten to twenty inches per year and development can significantly impact the amount of recharge to the aquifer. Since the City is in a very low recharge area and growth is only expected to reach 8,000 by 2025, future development within the City is not likely to affect recharge to the aquifer. To date, the City has not adopted specific programs to protect natural groundwater recharge areas. However, the City's potential for having aquifer recharge areas for either Floridan or surficial aquifer is so minimal since those soils that maybe conducive for recharge can not be identified in accordance with known identification procedures.

Protection zones were established around the City's wellheads, 200 feet around the wellheads, as recommended by the SJRWMD and DCA. Within this zone, the City established guidelines as to the type of land uses that are or are not compatible with the wellheads. Unacceptable uses generally include hazardous materials, gasoline stations, dry cleaners or other similar types of commercial/industrial uses that may have the potential for contaminating the water.

D.10 Existing Regulations and Programs Governing Land Use and Development of Natural Drainage Features and Groundwater Aquifer Recharge Areas

Rule 9J-5.011(1)(h), F.A.C.

Wastewater

Section 208 of the Federal Water Pollution Act (PL 92-500, 1972) is the directing federal law with respect to water pollution abatement. In implementing the Act, EPA identified pollutants carried in stormwater runoff as major sources of water contamination. To achieve the pollution abatement goals of the Act, EPA provided assistance to state and local governments to develop Areawide Water Quality Management Plans, or "208 Plans" as they are commonly known. The 208 Plan studies a broad range of potential water pollution sources, including stormwater and focused on identifying pollutant sources and abatement needs as well as development of regulatory programs regulation for stormwater management concerning the quantity of stormwater runoff.

The Florida Department of Environmental Protection (DEP) has adopted a Stormwater Rule (Ch. 62-25, F.A.C.) to fulfill part of the state's responsibilities under Section 208 of the Federal Water Pollution Control Act. The Rule's basic objective is to achieve 80 to 95 percent removal of stormwater pollutants before discharge to receiving waters. This Rule requires treatment of the first inch of runoff for sites less than 100 acres in size and the first one-half inch of runoff for sites 100 acres or greater in size.

Treatment is generally accomplished through retention or through detention with filtration. Retention requires the diversion of the required volume of runoff to an impoundment area with no subsequent direct discharge to surface waters. Pollutant removal by settling and by percolation of the stormwater through the soil is almost total. Detention facilities are typically within the line of flow of the drainage system. Stormwater from a site passes through the detention facility and is filtered prior to discharge to remove pollutants.

Implementation of the stormwater rule is achieved through a permitting process. DEP has delegated permitting responsibility to the St. Johns River Water Management District (SJRWMD). Exemptions to the permit requirements are provided for: (1) facilities serving individual sites for single-family, duplex, triplex or quadruplex units; (2) facilities serving dwelling unit sites that are less than ten acres in total land area, have less than two acres of impervious area, and that comply with local stormwater management regulations or discharge to a permitted regional facility; and (3) facilities for agricultural or silvacultural lands that have approved management plans.

SJRWMD promotes the conservation, development and proper utilization of surface and groundwater. Further, SJRWMD requires a dredge fill permit for activity in all waters of the state except a waterbody owned by one person that will not discharge onto other property or waters, or those waters within an artificially constructed stormwater system. The District requires permits for water well construction, management and storage of surface water, stormwater discharge, consumptive use, works of the District and wells for artificial recharge. In addition, SJRWMD has authority to declare and implement water shortage warnings, water shortages and water use restrictions. It also has the authority to acquire land for flood control, water shortage, water management and preservation of wetlands, streams and lakes.

SJRWMD's Management and Storage of Surface Waters permitting program is regulated by Chapter 40C-1, F.A.C., Chapter 40C-4, F.A.C., Chapter 40C-40, F.A.C. and Chapter 40C-41, F.A.C. Individual permits are required for any development project that: (1) are capable of impounding a volume of water of forty or more acre-feet; (2) serves a project with a total land area equal to or exceeding forty acres; or (3) provides for the placement of twelve or more acres of impervious surface that constitutes 40 or more percent of the total area.

The Rule also applies to work in certain hydrologically sensitive areas. General permits may be obtained for small-scale projects. Both general and individual stormwater permits are issued with specific criteria for each. Additional treatment is required for facilities that directly discharge to Class I, Class II or Outstanding Florida Waters.

The difference between the Management and Storage of Surface Waters (MSSW) rule and the stormwater rules is basically quantity versus quality. A MSSW permit is for the protection of water quality from stormwater runoff as well as the effect on wetlands. It requires the peak runoff after development to be less than or equal to the peak runoff prior to development. A stormwater permit focuses on water quality impacts from runoff.

The City requires all new developments to obtain all necessary permits from DEP and SJRWMD prior to issuing building permits. The City also participates in the National Flood Insurance Program.

Potable Water

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 (PL 93-523). This law directed the EPA to establish minimum drinking water standards. The EPA standards are divided into primary (those required for public health) and secondary (recommended for aesthetic quality) categories.

In accordance with federal requirements, the Florida Legislature has adopted the Florida Safe Drinking Water Act, Sections 403.850 – 403.864, F.S. DEP has promulgated rules classifying and regulating public water systems under Chapter 62-22, F.A.C. The primary and secondary standards of the Federal Safe Drinking Water Act are mandatory in Florida.