CITY OF ST. AUGUSTINE, FLORIDA

DRINKING WATER

FACILITIES PLAN

Florida Department of Environmental Protection

Drinking Water State Revolving Fund

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1.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

This facilities plan was prepared by Applied Technology & Management (ATM) in conjunction with Four Waters Engineering (4W) for the City of S. Augustine to meet the requirements of the State Revolving Fund (SRF) funding of drinking water systems**.** The planning area considered in preparing this report includes the municipal city limits and areas north and west of the City. The planning period extends through the year 2026. The needs of the planning area through the year 2026 were considered by this report.

The City's water treatment facilities are composed of the Lime Softening Water Treatment Plant (WTP) and the Low Pressure Reverse Osmosis (LPRO) WTP which together have a 6.5 MGD capacity, the Wellfield, and the North and South Tank Facilities. The LPRO WTP was constructed in 2008 and has 2.0 MGD capacity. The Lime Softening WTP was placed in service in the 1920's and although modifications were made to the plant in 1987 it has reached the end of its useful life. The Wellfield is composed of eight wells, seven are deep wells and one is surficial. Four of the deep wells pump water from the Upper Floridan Aquifer and were constructed in 2011 as required by the St. Johns River Water Management District (SJRWMD) when the City's most recent consumptive use permit for water withdrawals was issued. Though the existing systems are rated above average, the old Lime Softening WTP has reached its service life and, therefore, needs to be replaced.

The City's water distribution system is comprised of nearly 200 miles of distribution mains ranging in size from 2 to 20-inches and over 13,000 potable water customers. The City has expended significant funds and efforts over the last few years to improve the capacity, pressure of the water system, reliability and water quality aspect of the water distribution system by increasing pipe sizes and utilizing more suitable materials such as PVC to replace the deteriorating cast iron and galvanized steel. SRF funds will be directed towards continuing to replace aging cast iron and galvanized steel water mains in the distribution system.

Additional focus for the City's water distribution system is on the replacement of aging water meters. Approximately 56% of the system meters are greater than 10 years old and 23% are more than 20 years old. As water meters age they tend to deteriorate due to sand and particulates in the water which results in inaccurate and typically low recordings of water consumption. This makes it difficult for a utility to understand water consumption behaviors, institute water conservation measures, detect water losses and leaks, and appropriately charge customers for water usage. Capital Improvements to institute a water meter replacement program are underway and preparations to the system for implementation of an automated meter reading system are a high priority for the City and will utilize SRF funding. The use of automated meter reading will improve the efficiency of the meter reading division and the quality of water consumption data. The replacement program will utilize newer technology which will allow for improved customer service; reduced labor costs, reduced employee injuries and increased accuracy of meter reads.

The alternatives for solving the City of St. Augustine's water system problems requires an evaluation of the water distribution system and water treatment facilities. Three alternative solutions were evaluated for both the water distribution system and water treatment facilities. The alternatives include:

Water Distribution System

1. No Action
2. Replace existing water mains or meters in kind with no enhancement or modification
3. Replace existing water mains or meters with larger sizes, superior materials or better technology

Water Treatment Facilities

1. No Action
2. Upgrade existing Lime Softening WTP
3. 1.0 MGD expansion of the existing LPRO WTP

The projects were evaluated on the basis of the effectiveness of resolving the water system issues, cost effectiveness, and adverse environmental impacts. The No Action alternative was rejected for both water distribution system and water treatment facilities as it did not resolve either the water quality or capacity issues and would only lead to continued deterioration of the existing water mains and Lime Softening WTP.

The alternative for the water distribution system to replace existing water mains or meters with no enhancements or modifications was rejected on the basis of capacity and lack of technological improvements. It was also rejected for specific projects based on FDOT restrictions. Although the alternative will address finished water quality problems, it does not provide a solution to issues with capacity, pressure, fire flow or alleviate manual water meter reads which could potentially impact the citizens of the community.

The recommended project for the water distribution system, therefore, is the replacement of existing water mains or meters with larger sizes, superior materials or better technology. This will improve water quality, capacity, fire flow, pressure and convert aging manual read water meters. The improvements are comprised of six capital improvement projects which include the replacement of aging water main and water meter infrastructure. Environmental impacts from this alternative are expected to be minimal as the projects require replacement of infrastructure in the same location or within established and open right-of-ways.

The alternative for the water treatment facilities to upgrade the existing Lime Softening WTP was rejected on the basis of the lime softening treatment technology being incompatible with the current Upper Floridan Aquifer water source water and an inability of the Lime Softening WTP to feasibly

provide proper redundancy to reliably meet production, capacity demands and regulatory requirements.

The recommended project for the water treatment facilities, therefore, is a 1.0 MGD expansion of the existing LPRO WTP which will provide the most beneficial water quality and capacity improvements. Environmental impacts from this alternative are expected to be minimal as the expansion will occur at the existing water treatment facility location.

The recommendations resulting from this study are consistent with both the City of St. Augustine and St. Johns County's local comprehensive plans.

The project cost and timing are shown below in Table 1-1.

Table 1-1 City of St. Augustine Capital Project Costs and Timing

Proposed Capital Projects		
Project	**Estimated Costs**	**Year**
Water Distribution System		
San Marco Water Main Replacement project	$3,190,000	2017
Fullerwood Water Main Replacement project	$1,700,000	2017
Water Meter (AMR) Replacement project	$5,392,421	Multi Phased over 5 Years
North City Water Main Replacement project	$1,580,042	2019
King Street 16-Inch SubAqueous project	$600,000	2020
King Street Drainage (KSDI) - Water Line Relocations	$1,300,000	Pending FDOT
Total Water Distribution System Costs	**$13,762,463**	
Water Treatment Facilities		
Water Treatment Plant RO Phase 2 Expansion	$8,000,000	2018
Total Water Treatment Facilities Costs	**$8,000,000**	
Total Capital Projects Costs	**$21,762,463**	

The details of the capital and annual operation and maintenance costs for each project are provided in Appendix A.

2.0 INTRODUCTION

2.1 BACKGROUND

The City of St. Augustine is responsible for the planning and implementation of the drinking water service area infrastructure needs. It is considered the nation's oldest city being founded in 1565. The City of St. Augustine is located in St. Johns County, in northeast Florida about 40 miles south of Jacksonville, as shown in Figure 2-1. For the purpose of this Facilities Plan, the City of St. Augustine municipal limits and areas north and west of the City are considered the planning area.

The City treats ground water from the surficial and Floridan aquifers at the Lime Softening WTP and the LPRO WTP, which are dually located on City property adjacent to King Street in the center of the service area, before distribution to the customer base. The eight wells are located north of the WTPs along US1.

2.2 NEED

As previously stated, the City's water distribution system is comprised of nearly 200 miles of distribution mains ranging in size from 2 to 20-inches and over 13,000 potable water customers. Due to the size, age and materials of the existing water distribution system, the City experiences numerous water main breaks, "red water", low pressure, decreased fire flows and issues with capacity. Table 2-1 below displays the pipe material and corresponding length within the system. The City has expended significant funds and efforts over the last few years to improve the issues relating to capacity, water quality and reliability by increasing pipe sizes and utilizing more suitable materials such as PVC to replace deteriorating water mains. SRF funds will be directed towards continuing to replace aging cast iron and galvanized steel water mains in the distribution system. One of the priority capital projects will replace major transmission lines under San Marco Avenue, which is the backbone of the distribution system in the downtown historic area where the water mains are cast iron and close to 100 years old. Another of the priority projects will include replacing 2-inch and 6-inch cast iron and galvanized iron water main in the Fullerwood neighborhood to improve water quality and provide better fire protection for 150 residences.

Table 2-1 City of St. Augustine Water Distribution Pipe Material and Length

Water Distribution - Pipe Material and Length	
Pipe Material	**Length (Miles)**
PVC	147
Cast Iron	38
Galvanized Steel	9
Ductile Iron	1

In addition to the water main issues the City's water distribution system is comprised of manually read water meters that are 10 to 20 years old. Aging water meters can potentially have inaccurate and low

recordings of water consumption, which lead to water losses and increased revenues. The City has completed a Water Meter Replacement Study to evaluate the current method of water meter replacement, overall condition of water meters in the distribution system and to provide recommendations of improving and formalizing the current manual read water meter system. From the study, a project was developed to replace approximately 13,000 water meters that vary from 5/8-inch to 6-inch with new automated meter reading (AMR) technology within the City's water system. The replacement program will utilize newer technology which will allow for improved customer service; reduced labor costs, reduced employee injuries and increased accuracy of meter reads.

Lastly, the major process facilities of the Lime Softening WTP are showing signs of their age. The Lime Softening WTP was placed in service in the 1920's and although modifications were made to the plant in 1987 it has reached the end of its useful life. Furthermore, the Lime Softening WTP lacks proper redundancy to reliably meet production and capacity demands in accordance with regulatory requirements. Taking these factors into account, the City has developed a project where it intends to phase out the Lime Softening WTP and expand the existing 2.0 MGD LPRO WTP by adding a 1.0 MGD low pressure membrane skid and all the ancillary facilities for the expansion. The expansion of the LPRO consists of adding another 1.0 MGD of membrane capacity to bring the ultimate membrane capacity to 3.0 MGD that in conjunction with 3.5 MGD of treated raw water blend will provide a design capacity of 6.5 MGD to serve projected water demands.

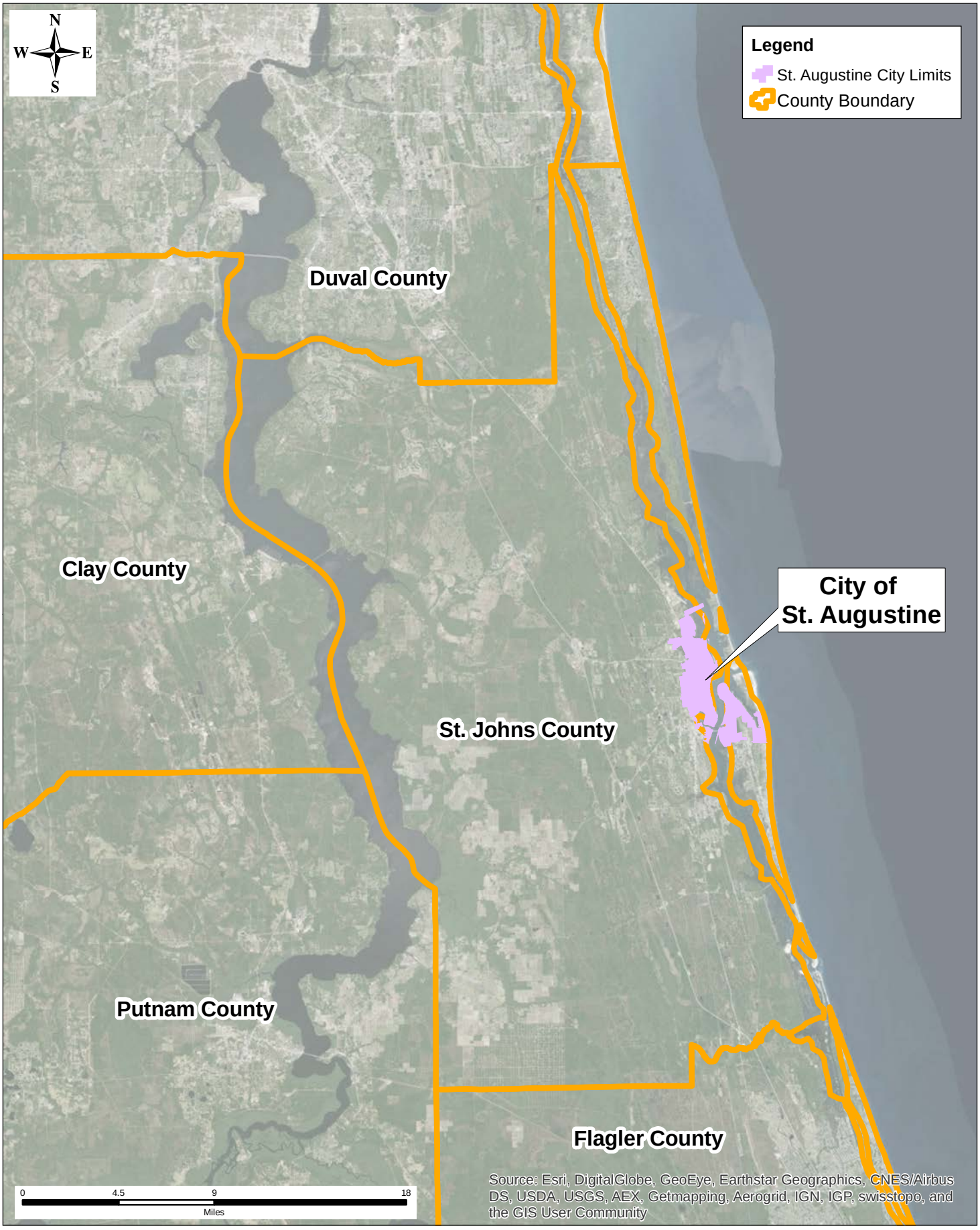

Figure 2-1
City of St. Augustine
Location Map

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2.3 SCOPE OF STUDY

The scope of the Facilities Plan is described below:

1. Inventory existing water facilities, service area characteristics, and environmental conditions.
2. Establish design needs for the planning period.
3. Identify and evaluate various water system alternatives to satisfy the planning year needs.
4. Recommend the most cost-effective, environmentally sound facilities to meet the planning needs.
5. Describe, in detail, the recommended projects and their cost.
6. Present a schedule of implementation of the recommended facilities.
7. Identify any adverse environmental impacts and propose mitigating measures.
8. Complete a SRF Business Plan.

3.0 ENVIRONMENTAL IMPACTS

3.1 DESCRIPTION OF PLANNING AREA

3.1.1 Planning/Service Project Area

For the purpose of this Facilities Plan, the City's water service area, which includes the municipal city limits and areas north and west of the City are considered the planning and service area. In northeastern Florida, the City is located in St. Johns County, which is bounded on the north by Duval County, on the south by Flagler County and west by Clay and Putnam County. As the nation's oldest city, the area is comprised of lowlands, bays and estuaries, beaches, several rivers, historical sites, a few wetland areas and access to the Atlantic Ocean via the St. Augustine Inlet of the Matanzas River. The City is the county seat of St. Johns County with a population of just over 13,500.

Figure 3-1 includes a map of the water service area and includes locations of all water service components. The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within existing disturbed right of ways. Other projects include a water treatment plant expansion, which will be confined to an existing site owned by the City. Impacts to the environment incurred by these projects is expected to be negligible.

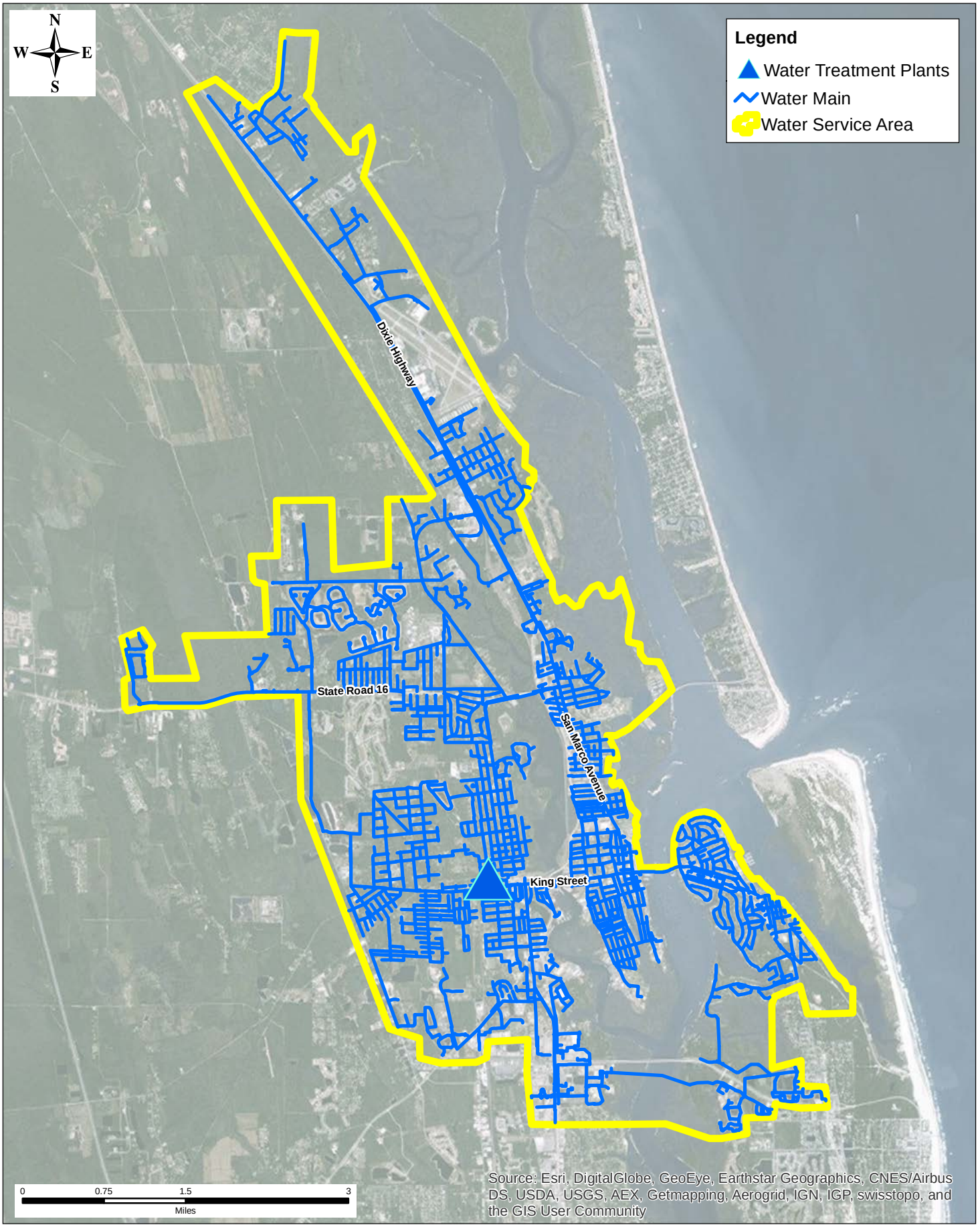

Figure 3-1
City of St. Augustine
Water Service Area

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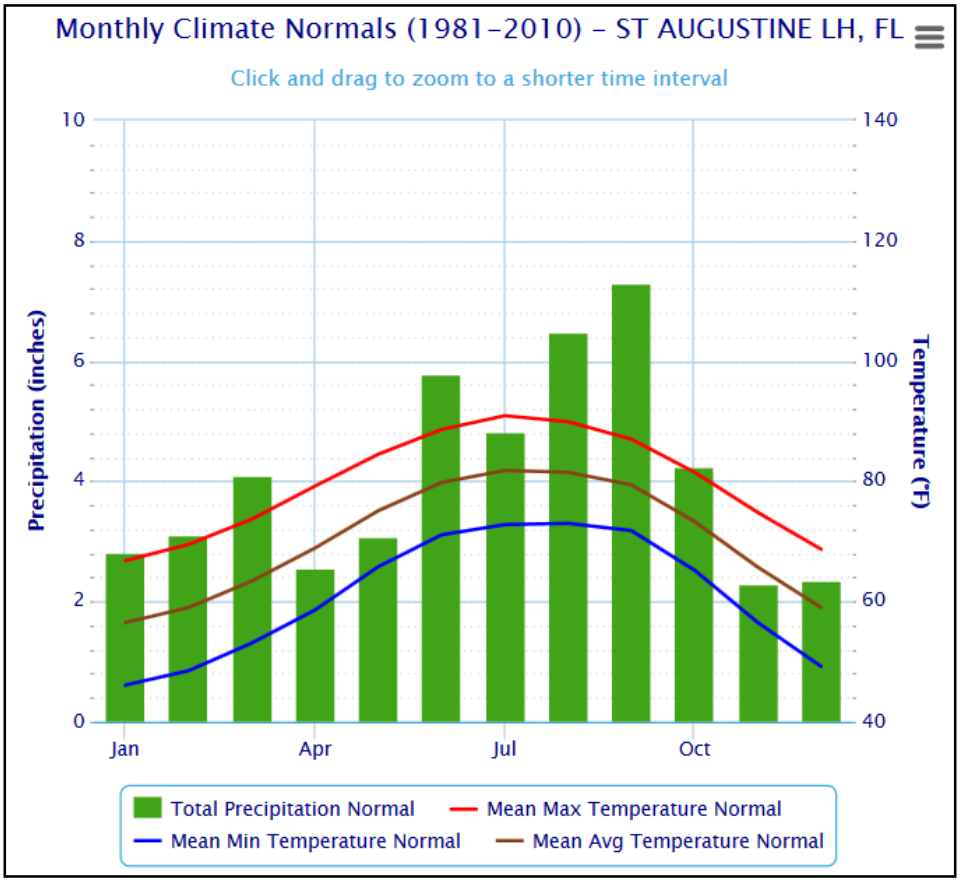
3.1.2 Climate

The planning area is located in the North climate division of Florida, where it is generally warm and humid, with long summers and mild winters. According to climatological data provide by the USDC National Oceanic and Atmospheric Administration (NOAA), the warm season lasts from June to September with average temperatures above 79 °F and the cold season lasts from December to February with average temperatures below 59 °F. The highest recorded temperature was 103 °F in July of 1986 and the lowest recorded temperature was 10 °F in January 1985.

The average annual rainfall is approximately 49 inches. Rainfall is commonly high between June and September with monthly averages between four and seven inches. Rainfall events of more than eight inches may occur during the Atlantic hurricane season, from the beginning of June to the end of November. Figure 3-2 shows the Monthly Climate Normals from 1981 to 2010 for St. Augustine as provided by the NOAA and the National Weather Service.

Figure 3-2 City of St. Augustine Monthly Climate Normals



3.1.3 Topography and Drainage

The topography of the City of St. Augustine is generally flat and developed and is characterized by lowlands, wetlands and several rivers. The planning area is located mostly within the Atlantic Coastal Ridge region and has average elevations ranging from 0 to 30 feet above mean sea level. The soils are moderately well drained to excessively drained, gently sloping sandy soils. Soils located in the lower elevations can be poorly drained, very poorly drained to somewhat poorly drained.

3.1.4 Geology, Soils and Physiographic

Sand, St. Augustine-Urban land complex, clay loam and Immokalee-Urban land complex deposits are characteristic of the geologic formation in the area. The soils in the planning area are considered nearly level and range from somewhat poorly drained, poorly drained, very poorly drained, well drained to excessively drained. Soils have been mapped by the USDA Soil Conservation Service and are depicted in Figure 3-3. Table 3-1 below shows the soil map key. St. Augustine-Urban land complex and clay are characteristic of the Anastasia Island and the Downtown planning areas, while Immokalee fine sand and Immokalee-Urban land complex are characteristic of the Mainland portion of the planning area.

According to the U.S. Geological Survey (USGS), the planning area is located in the Atlantic Coastal Ridge physiographic division, which extends along the eastern coast as a low ridge of sand over limestone with shallow sloughs or transverse glades.

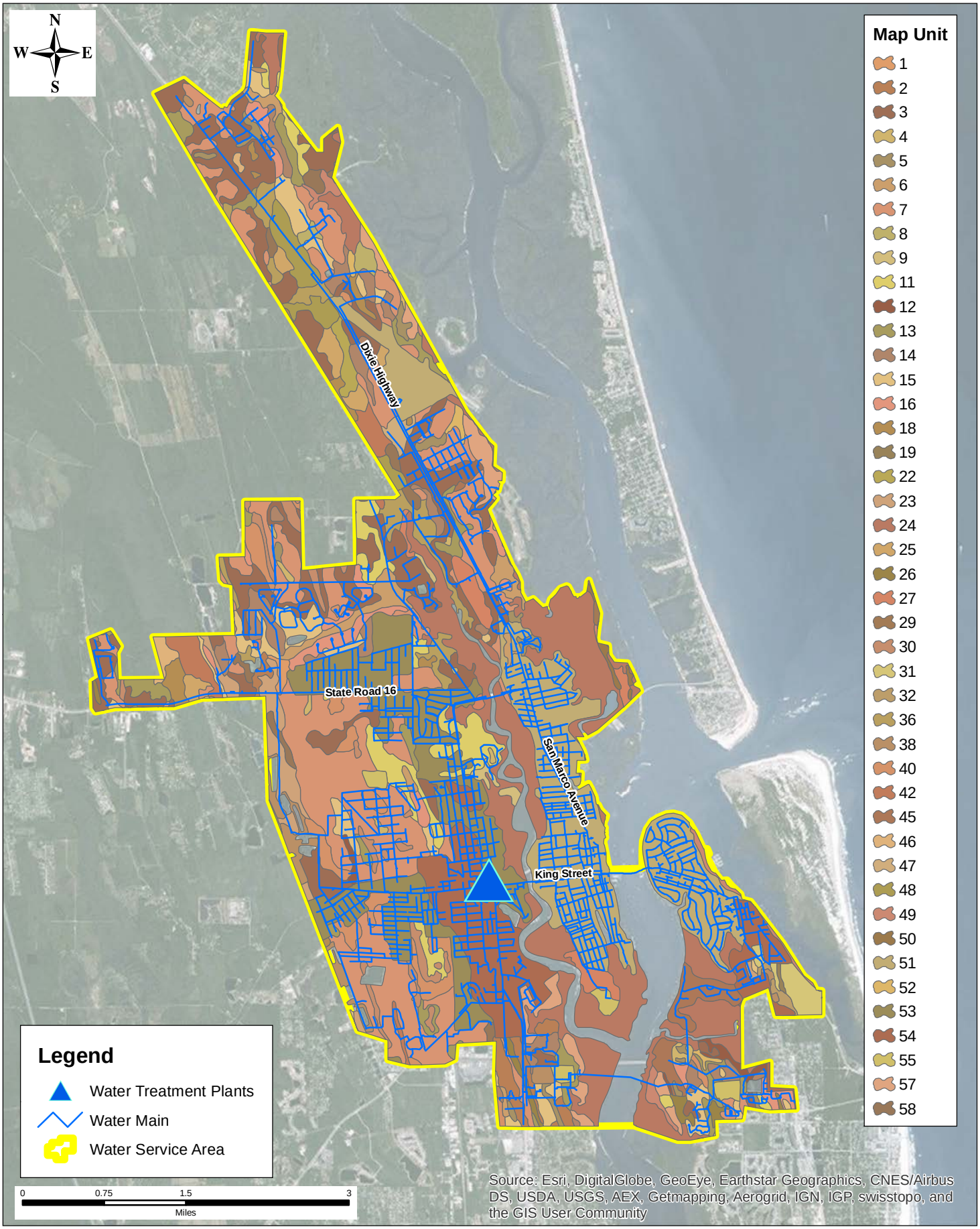


Figure 3-3
City of St. Augustine
Soil Map

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Table 3-1 City of St. Augustine Soil Types within Water Service Area

City of St. Augustine Soil Types within Water Service Area	
Map Unit Symbol	**Map Unit Name**
1	Adamsville fine sand
2	Astatula fine sand, 0 to 8 percent slopes
3	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes
4	Myakka fine sand, depressional
5	St. Johns fine sand, depressional
6	Tavares fine sand, 0 to 5 percent slopes
7	Immokalee fine sand
8	Zolfo fine sand
9	Pomona fine sand
11	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes
12	Ona fine sand
13	St. Johns fine sand
14	Cassia fine sand
15	Pomello fine sand, 0 to 5 percent slopes
16	Orsino fine sand, 0 to 5 percent slopes
18	Floridana fine sand, frequently flooded
19	Pompano fine sand
22	Manatee fine sandy loam, frequently flooded
23	Paola fine sand, 0 to 8 percent slopes
24	Pellicer silty clay loam, frequently flooded
25	Parkwood fine sandy loam, frequently flooded
26	Samsula muck
27	St. Augustine fine sand
29	Satellite fine sand
30	Wesconnett fine sand, frequently flooded
31	Fripp-Satellite complex
32	Palm Beach sand, 0 to 5 percent slopes
36	Riviera fine sand, frequently flooded
38	Pits
40	Pottsburg fine sand
42	Bluff sandy clay loam, frequently flooded
45	St. Augustine fine sand, clayey substratum
46	Holopaw fine sand
47	Holopaw fine sand, frequently flooded
48	Winder fine sand, frequently flooded
49	Moultrie fine sand, frequently flooded
50	Narcoossee fine sand, shelly substratum
51	St. Augustine-Urban land complex
52	Durbin muck, frequently flooded
53	Immokalee-Urban land complex
54	Astatula-Urban land complex
55	Arents, 0 to 2 percent slopes
57	Adamsville variant fine sand
58	EauGallie fine sand

3.1.5 Surface and Ground Water Hydrology, Quality and Uses

3.1.5.1 Surface and Ground Water Hydrology

Surface Water

The planning area has no Outstanding Florida Waters and is located within the Upper East Coast drainage basin. The entire Upper East Coast Basin covers approximately 692 square miles (excluding estuaries) and includes watersheds along the Atlantic Intercostal Waterway from Ponce de Leon Inlet in Volusia County, north through Flagler and St. Johns Counties, to southern Duval County.

North of St. Augustine, the Tolomato River joins with the Guana River and flows to the Atlantic Ocean via the St. Augustine Inlet. South of St. Augustine, the Matanzas River is a lagoonal estuary with the water traveling to the Atlantic Ocean through the Matanzas Inlet. The part of the Matanzas River that runs through the City of St. Augustine is designated as Class II waters, which are generally coastal waters where shellfish harvesting occurs. The San Sebastian River runs parallel and connects with Matanzas River.

The Guana River is managed by the Florida Fish and Wildlife Conservation Commission and the Office of Coastal and Aquatic Managed Areas. The Pellicer Creek Aquatic Preserve is located approximately 16 miles south of St. Augustine and is designated as an Outstanding Florida Waters, however it is not located within the planning area of the projects. The Protected Waters in St. Johns County are provided below in Table 3-2.

Table 3-2 St. Johns County Protected Waters

Protected Waters within St. Johns County
Waters with State Parks, State Wildlife Parks and State Recreation Areas
Anastasia State (Recreation Area)
Faver Dykes State Park
Guana River State Park
Waters within Areas Acquired through Donation, Trade or Purchased Under Environmentally Endangered Lands Bonds Program
Ft. Mose
Guana River
Aquatic Preserves
Guana River Marsh
Pellicer Creek

The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within in the same location or established right-of-way as the existing

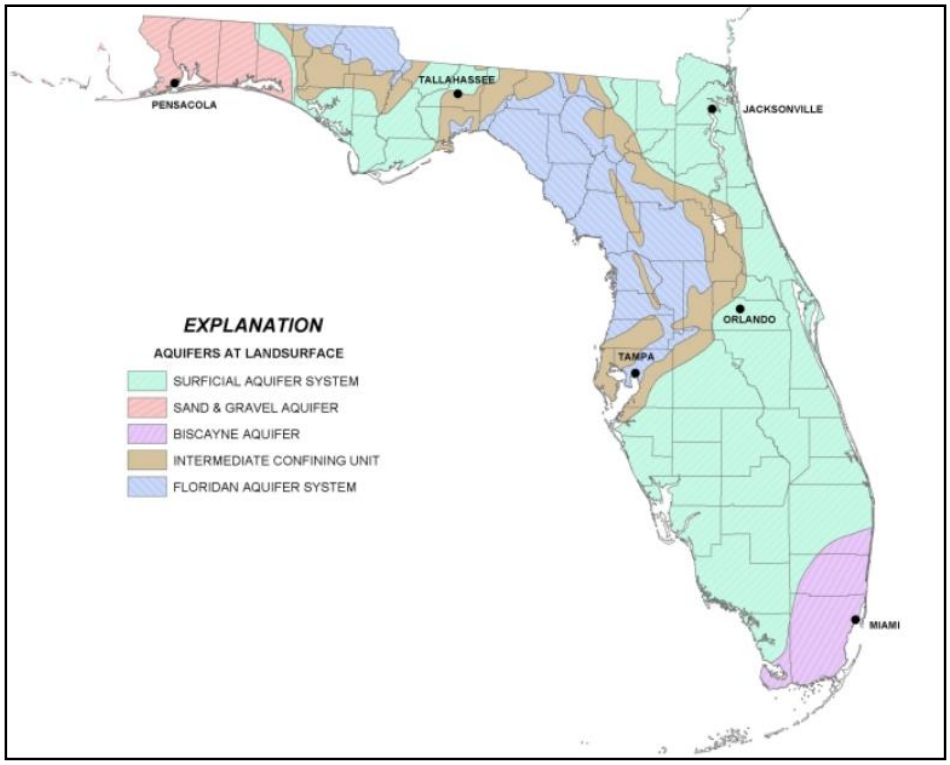
infrastructure and a water treatment plant expansion, which will be confined to an existing site owned by the City. Impacts to surface water are expected to negligible.

Ground Water

The City of St. Augustine Aquifer System consists of the Surficial Aquifer System and the Upper confining unit of the Floridan Aquifer System. The Surficial Aquifer System is generally under unconfined, or water-table, conditions and is made up of mostly unconsolidated sand, shelly sand and shell. The aquifer thickness is typically less than 50 feet but can range up to 400 feet in the Indian River and St. Lucie Counties.

As one of the most productive aquifers in the world, the Floridan Aquifer System underlies an area of approximately 100,000 square miles and stretches through Florida, southern Alabama, southeastern Georgia and southern South Carolina. Figure 3-3 depicts the Aquifer systems throughout the state of Florida.

Figure 3-4 State of Florida Aquifer Systems



The St. Johns River Water Management District states that there are two freshwater springs located in St. Johns County, which are the Crescent Beach Submarine Spring and the Shands Bridge Spring. Neither of the springs are located within the planning area. The Crescent Beach Submarine Spring is located in the Atlantic Ocean off the coast approximately two and a half miles east of Crescent Beach. The Shands Bridge Spring is located approximately three miles east of Green Cove Springs.

The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within in the same location or established right-of-ways as the existing infrastructure and a water treatment plant expansion, which will be confined to an existing site owned by the City. The proposed water treatment expansion will utilize the existing wells in accordance with the St. Johns River Water Management District Consumptive Use Permit. Impacts to ground water are expected to negligible.

3.1.5.2 Surface Water and Ground Water Quality

To provide a more detailed geographic basin for identifying and assessing water quality improvement activities, the Department of Environmental Protection (DEP) subdivided the Upper East Coast drainage basin into smaller areas called planning units. The City lies within the Matanzas River Planning Unit. According to the Northern Coastal Basin Surface Water Improvement and Management Plant, the Matanzas River Planning Unit has degraded water quality, with a high average total suspended solids, somewhat elevated turbidity and elevated fecal coliform bacteria levels, which are likely associated with both natural and man-made tributary loadings. In 1995, extensive shellfish harvesting areas were re-classified from "conditionally approved" to "conditionally restricted" to "prohibited" due to elevated coliform bacterial levels.

3.1.5.3 Water Uses

The groundwater in the planning area, from the surficial and Floridan aquifers is mainly used for domestic, commercial or municipal supplies. The Matanzas and Sebastian River is used for recreational purposes such as boating and fishing.

3.1.6 Sourcewater Protection

The Florida Department of Environmental Protection (FDEP) has initiated a program called SWAPP or Source Water Assessment and Protection Program. The program is meant to ensure that drinking water is safe both at the tap and the source. Source water can be threatened by potential contaminants such as stormwater runoff, hazardous chemicals, waste disposal sites and underground storage tanks. In order to achieve source water protection, FDEP delineates the drinking water source protection area, inventories known or potential sources of contamination, determines the susceptibility of the water supply to the contaminants and notifies the public about identified threats.

Based on the results of the evaluation there are no indicated potential sources of contamination for the planning area. The results of the FDEP evaluation are provided in Appendix B.

Other safeguards for sourcewater protection are called out in the City of St. Augustine 2030 Comprehensive Plan. The two sourcewater protection policies are described below:

- Policy 1.1.2

- Within 600 feet of any future potable water well field located inside the City limits, the City shall prohibit all activities and uses which could adversely impact the function of the surficial Aquifer recharge area and well head protection area. The City shall work with St. Johns County to prohibit activities or uses that could adversely impact surficial Aquifer recharge areas and well head protection areas for well fields located outside of the City limits

- Policy 1.1.4

  - The City shall comply with all applicable federal and state regulations related to well head protection areas.

3.1.7 Environmentally Sensitive Areas or Features

3.1.7.1 Wetlands

The U.S. Fish and Wildlife Service National Wetland Inventory map for the planning area is shown in figure 3-5. Small areas of freshwater pond, freshwater emergent and freshwater forested/shrub wetlands are located throughout the planning area. The areas of the planning area bounding the Matanzas River are Estuarine and Marine wetlands. Wetlands are throughout the utility service area, however not within the water main project disturbed right-of-way. Water meters could potentially be located within wetland areas, however, new water meters would be installed in the same location as the existing and are anticipated to have negligible impact.

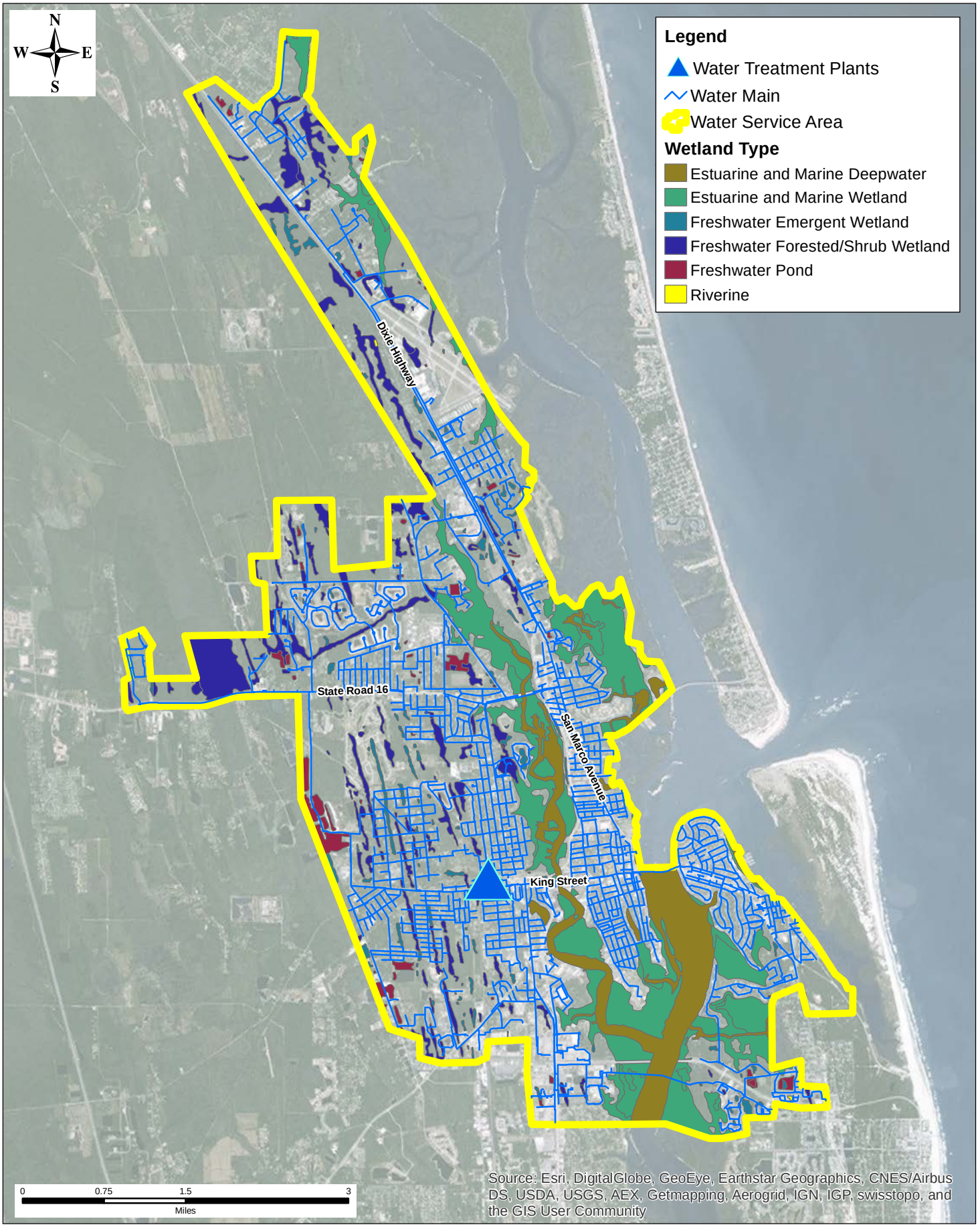


Figure 3-5
City of St. Augustine
Wetland Map

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3.1.7.2 Environmentally Sensitive Lands

According to the USDA Natural Resource Conservation Services, there is 0.2% of unique farmlands within the planning area. While there is a small area of unique farmland within the planning area, it is not anticipated to be impacted by any of the projects. There are existing water meters within the unique farmland area, however, new water meters would be installed in the same location as the existing and are anticipated to have negligible impact. There are no prime farmlands in the planning area.

3.1.7.3 Plant and Animal Communities

The natural vegetation of St. Johns County consists of palmetto and scrub live oak, laurel oak, live oak, magnolia and a few areas of longleaf pines. A good portion of the City is used for residential and commercial development with lots of tourism areas. There are no rare, endangered or threatened species of vegetation.

Animal life in the developed areas is limited. Raccoons, fox squirrel, rabbit, armadillo, opossum, skunk, bobcat, grey and red foxes, manatee, otters and a variety of songbirds, wading birds, shore birds and woodpeckers can be found in the planning area and its environments. Amphibian and reptiles include gopher tortoises, alligators, sea turtles and various species of snakes. Various birds are present in the area such as the SE American Kestrel, Little Blue Heron, Tricolored Heron, White Ibis and wood stork. The endangered or threatened species which may be found within the planning area are found in Table 3.3 below:

Table 3-3 St. Johns County Federally Listed Species

Federally Listed Species in St. Johns County			
Category	**Species Common Name**	**Species Scientific Name**	**Code**
Mammals	West Indian (Florida) Manatee	*Trichechus manatus latirostris*	E/CH
	Anastasia Island Beach Mouse	*Peromyscus polionotus phasma*	E
Birds	Piping Plover	*Charadrius melodus*	T
	Florida Scrub-jay	*Aphelocoma coeruluscens*	T
	Wood Stork	*Mycteria americana*	E
Fish	None		
Reptiles	Gopher Tortoise	Gopherus polyphemus	C
	Eastern Indigo Snake	*Dymarchon corais couperi*	T
	Green Sea Turtle	*Chelonia mydas*	E
	Hawksbill Sea Turtle	*Eremochelys imbricata*	E
	Leatherback Sea Turtle	*Dermochelys coriacea*	E
	Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E
	Loggerhead Sea Turtle	*Caretta caretta*	T
Amphibians	Striped Newt	Notophthalmus perstriatus	C
Mollusks	None		
Crustaceans	None		
Plants	None		

Code Key: E=Endangered, T=Threatened, CH=Critical Habitat Designated, C=Candidate

The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within existing established right-of-ways or in the same location as the existing infrastructure and a water treatment plant expansion, which will be confined to an existing site owned by the City. Impacts to endangered or threatened species are not anticipated, however if found appropriate mitigation measure will be followed.

3.1.7.4 Archeological and Historical Sites

The City of St. Augustine was founded in 1565, making it the longest continually occupied European settlement in the continental United States. There are several areas of outstanding historical or archeological significance that have been designated by the Florida Division of Historical Resources or the federal government.

Per the National Historic Landmarks Program of the National Park Service the following sites are listed in the Historic Landmarks and Historic Areas database:

- Historic Landmarks
    - Cathedral of St. Augustine
    - Fort Mose
    - Gonzalez-Alvarez House
    - Hotel Ponce De Leon
    - Llambias House
    - St. Augustine Town Plan Historic District

- Historic Areas
    - Castillo de San Marcos – National Monument
    - Fort Matanzas – National Monument

The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within existing established right-of-ways or in the same location as the existing infrastructure and a water treatment plant expansion, which will be confined to an existing site owned by the City. Impacts to archeological or historical sites is not anticipated. During the design of City infrastructure projects, the City Archeologist is engaged beginning with the conceptual design to determine the likelihood of impacts from the project to areas or sites of historical or archeological significance. Modifications to design are incorporated, as necessary, to address these potential impacts. Additionally, for any projects which may impact areas or sites of historical or archeological significance, the City Archeologist will be onsite during excavation operations. Preliminary archaeological considerations for a the Fullerwood and North City projects are addressed in the 2014 Annual Water Main Improvements Plan Report, which can be found in Appendix D. Below is the list of archaeological zones relating to each of the projects:

- Not with an Archaeological Zone:
    - North City Water Main Replacement Project

  - 1.0 MGD expansion at the existing LPRO WTP
  - King Street 16-inch Sub-Aqueous Project
- City of St. Augustine Historic Preservation (HP-3)
  - King Street Drainage (KSDI)-Water Line Relocation Project
- City of St. Augustine Archaeological Zone IIA
  - Fullerwood Water Main Replacement Project
  - San Marco Water Main Replacement Project

The City of St. Augustine has also identified Historic Preservation Zoning Districts and Archaeological Zones and Archaeological Preservation Ordinances, which can be found in Appendix E.

3.1.8 Flood Plain

Figure 3-7 designates the flood zones for the City per the FEMA Flood Insurance Map. The City is essentially split down the middle with the Eastern half of the planning area located in Zone AE and the Western half located in Zone X. Zone AE is defined by FIRM as an area inundated by 1-percent-annual-chance flooding, for which Base Flood Elevations have been determined. Zone X is defined by FIRM as areas determined to be outside of the 500-year floodplain determined to be outside the 1-percent-annual-chance flooding and 0.2-percent-annual-chance flooding areas.

A few small areas of Zone A can be found in Northwest portions of the planning area which is defined by FIRM as an area inundated by 1-percent-annual-chance flooding, for which no Base Flood Elevations have been determined.

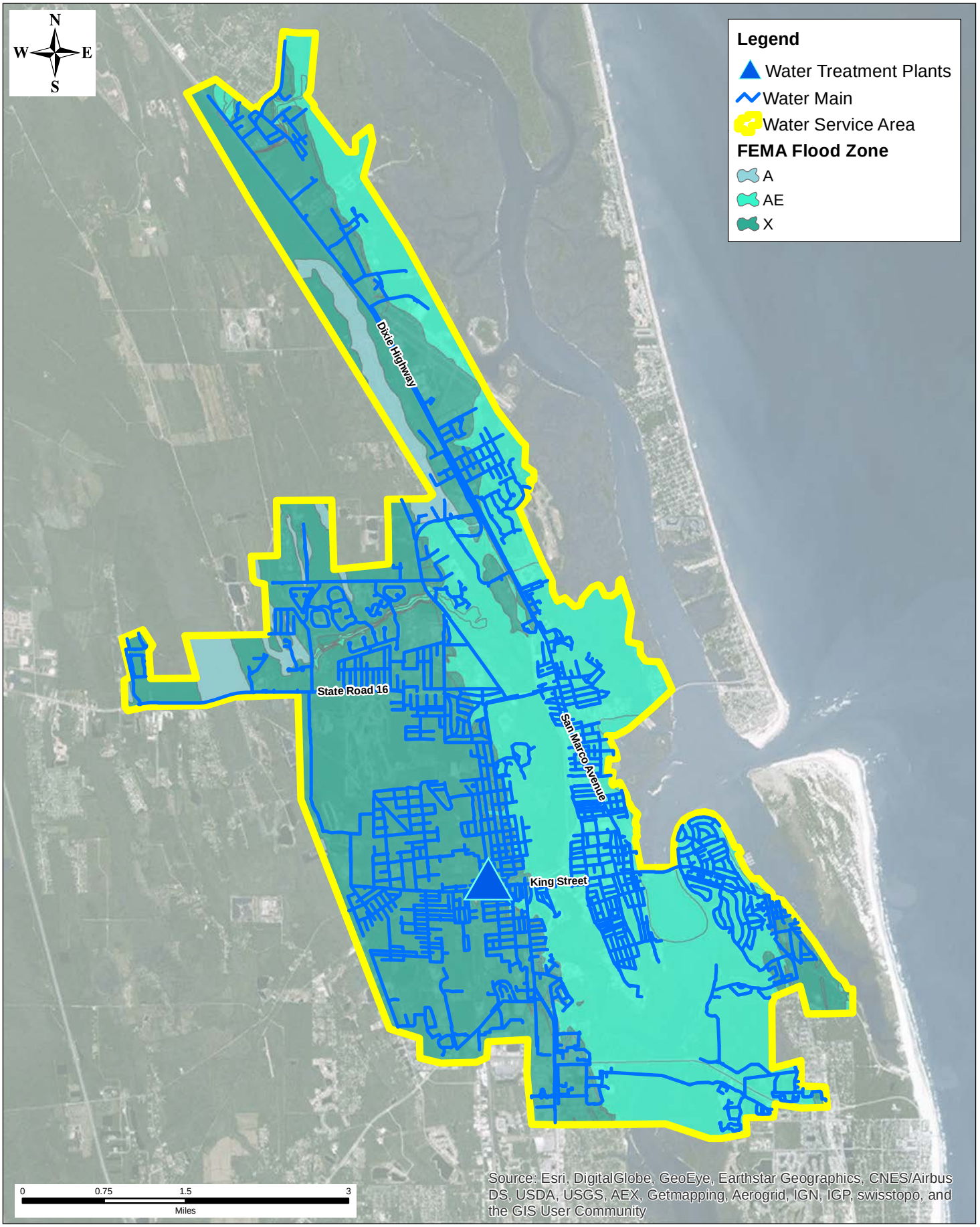

Figure 3-6
City of St. Augustine
FEMA Flood Zones

DISCLAIMER: This map is for reference and discussion purposes only. Data provided are derived from multiple sources with varying levels of accuracy. The information shown hereon is not intended for site specific use or design.

FOUR WATERS ENGINEERING

ATM APPLIED TECHNOLOGY & MANAGEMENT

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3.1.9 Air Quality

The Air Quality System (AQS ID # B109-1003) located in the northern Portion of St. Johns County is no longer in operation and according to FDEP there are no other monitoring stations within the County. However, the City has identified in their 2030 Comprehensive Plan that they will work with FDEP to maintain an air quality monitoring station at a location deemed appropriate by FDEP. If a station is ever installed and monitoring data were to show that the air quality standards were not being met, the City would take appropriate action through the direction of FDEP to resolve the air quality deficiency.

3.2 SOCIO-ECONOMIC CONDITIONS

3.2.1 Population

According to the 2010 U.S. Census, there were 12,975 people, 5,743 households and 2,679 families living in the City limits. The City has a total area of 10.7 square miles, of which, 8.4 square miles are upland and 2.4 miles are water. The City's population density is 1,385 people per square mile. The population outside the City limits is a little more difficult to quantify, however the City of St. Augustine Public Works Department has done extensive data gathering to keep track of the changes in water customer accounts. Based on historic data, it appears that about 35% - 40% of the customer accounts are outside the City limits.

The City of St. Augustine anticipates a moderate growth rate of 3-4% each year over the 10-year planning period. Table 3-4 shows the inside city and outside city customer account projections through 2026.

Table 3-4 Customer Account Projections

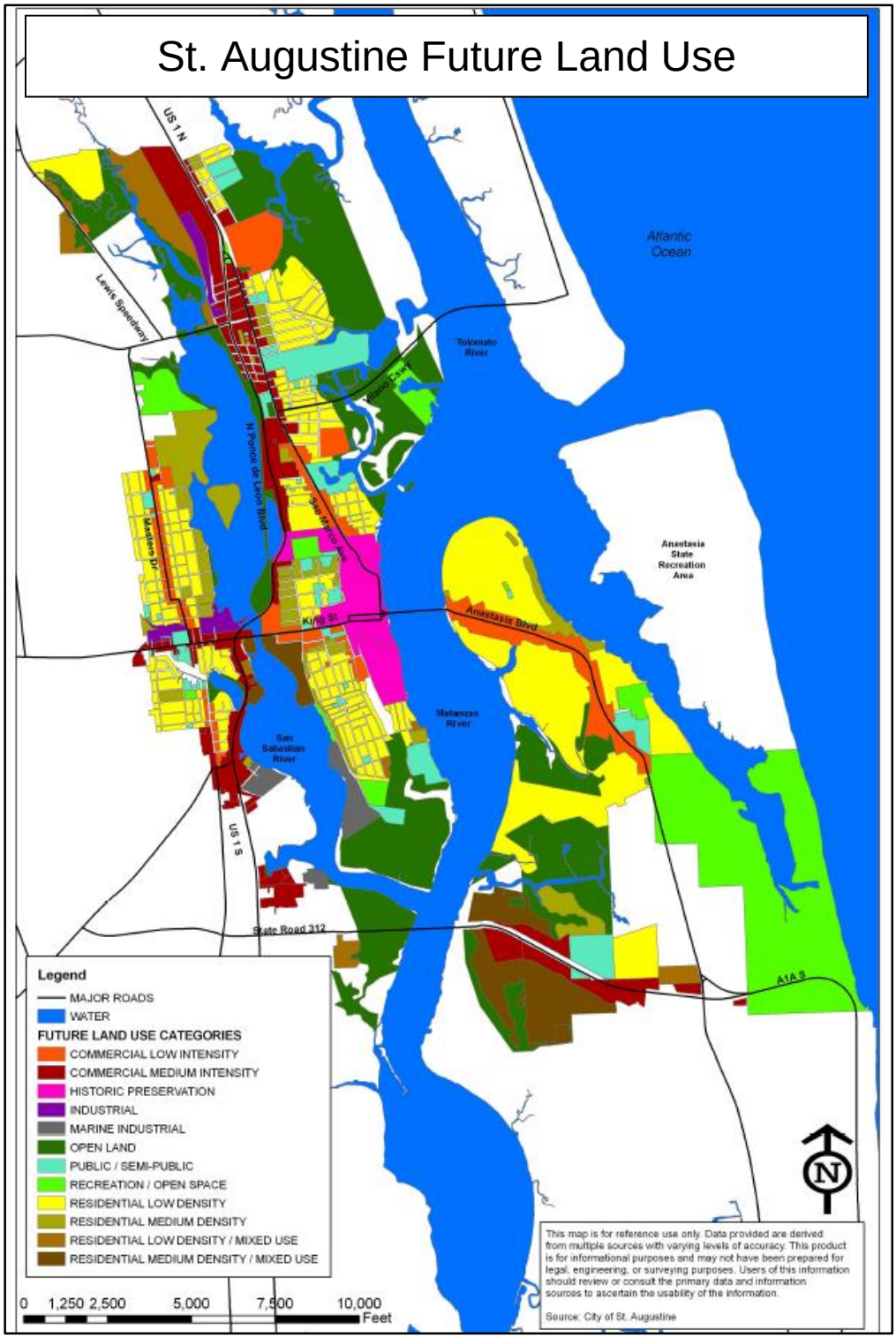
Projected Customer Accounts (In and Outside City)	
Year	Total
2016	12,983
2017	13,403
2018	13,835
2019	14,278
2020	14,734
2021	15,202
2022	15,681
2023	16,172
2024	16,676
2025	17,191
2026	17,718

3.2.2 Land Use and Development

Per the City of St. Augustine's 2030 Comprehensive Plan the goal of future land use is "to create an environment within the City and adjacent areas in which its residents have the opportunity to maximize the potential for economic benefit, the enjoyment of natural resources, while minimizing the threat to health, safety and welfare posed by hazards nuisances, incompatible land uses, and environmental degradation." Figure 3-7 is the City of St. Augustine's future land use map from the 2030 Comprehensive Plan.

The future land use map shows different land use categories, which include commercial, historic preservation, industrial, open land, public/semi-public areas, recreation/open space and varying types of residential zones.

Figure 3-7 City of St. Augustine Future Land Use Map



3.3 WATER SUPPLY, TREATMENT, AND TRANSMISSION/DISTRIBUTION SYSTEM

The City's Department of Public Works serves the entire City. No other private or public utility provides water or sewer services in the planning area. The City's Department of Public Works operates all drinking water and wastewater treatment facilities.

3.3.1 Description of the Existing Water System

Water Treatment

The City of St. Augustine presently owns and operates all water supply, treatment and storage, and distribution facilities within the service area. The City's water treatment facilities are composed of the Lime Softening Water Treatment Plant (WTP) and the Low Pressure Reverse Osmosis (LPRO) WTP which together have a 6.5 MGD capacity, the Wellfield, and the North and South Tank Facilities.

The LPRO WTP was constructed in 2008 and has 2.0 MGD capacity. The Lime Softening WTP was placed in service in the 1920's and although modifications were made to the plant in 1987 it has reached the end of its useful life. The Wellfield is composed of eight wells, seven are deep wells and one is surficial. Four of the deep wells pump water from the Upper Floridan Aquifer and were constructed in 2011 as required by the St. Johns River Water Management District (SJRWMD) when the City's most recent consumptive use permit for water withdrawals was issued. Though the existing systems are rated above average, the old Lime Softening WTP has reached its service life, and, therefore needs to be replaced. Other water storage, supply, and treatment systems are well positioned to serve well beyond the 10-year planning period with proper maintenance.

Water Distribution System

The City's water distribution system is comprised of nearly 200 miles of distribution mains ranging in size from 2 to 20-inches and over 13,000 potable water customers. The City has expended significant funds and efforts over the last few years to improve the reliability and water quality aspect of the water distribution system by increasing pipe sizes and utilizing more suitable materials such as PVC to replace the deteriorating cast iron and galvanized steel. These aged material types are prone to failure and can cause water quality issues such as "red water" from the cast iron piping leading to customer complaints.

The achievements of this program, include a 65% reduction in water quality customer complaints from 2011 to 2014.

In 2013 the City's Insurance Services Office (ISO) fire protection rating dropped from a Class 3 to a Class 2, a designation that places it in the top 1.3% of fire departments in the nation. While there are many contributing factors, the reliability, capacity, and pressure of the water system play a significant role in ISO ratings.

SRF funds will be directed towards continuing to replace aging cast iron and galvanized steel water mains in the distribution system. One of the Cities priority projects will replace major transmission lines under San Marco Avenue, which is the backbone of the distribution system in the downtown historic area. The water mains are close to 100 years old, experience numerous breaks and are heavily tuberculated. Another of the priority projects will include replacing 2-inch and 6-inch cast iron and galvanized iron water main in the Fullerwood neighborhood to improve water quality and provide better fire protection for 150 residences.

Additional focus for the City's water distribution system is on the replacement of aging water meters. Approximately 56% of the system meters are greater than 10 years old and 23% are more than 20 years old. As water meters age they tend to deteriorate due to sand and particulates in the water which results in inaccurate and typically low recordings of water consumption. This makes it difficult for a utility to understand water consumption behaviors, institute water conservation measures, detect water losses and leaks, and appropriately charge customers for water usage.

The City is implementing policies and procedures for a water meter replacement program and preparations to the system for implementation of an automated meter reading system are a high priority for the City. The City was awarded a water conservation grant from the St. Johns River Water Management District to initiate an automated meter reading pilot project and evaluate the impact on the City's ability to better assess customer water use, potential leaks, and to educate customers regarding water conservation and excessive water uses. As part of this pilot project, the City conducted a Request for Qualifications to prequalify meter vendors and meter installation contractors. Three groups were prequalified and subsequently responded to the City's Request for Proposals for a multi-year water meter replacement program. The City intends to contract with one group for the water meter replacement project so as to standardize on a meter manufacturer; without such standardization an automated meter reading program will not be feasible. The Request for Proposals and contract documents were prepared with the understanding that the City desires to utilize SRF funds for subsequent phases of the automated meter reading water meter replacement project beyond the SJRWMD funded pilot project.

The automated meter reading will improve the efficiency of the meter reading division and the quality of water consumption data. The replacement program will utilize newer technology which will allow for improved customer service; reduced labor costs, reduced employee injuries and increased accuracy of meter reads.

3.3.2 Present and Historical Water Usage

The City currently provides potable water to approximately 13,000 water customers. The City of St. Augustine Comprehensive Plan establishes the level of service of a minimum of 220 gallons per day per dwelling unit at a minimum pressure of 20 psi.

The City's historical number of customer accounts for the service area, both inside city limits and outside city limits is provided in Table 3-5. The table shows the average total water customers in this 10-year period is 10,987.

Table 3-5 Historical Customer Accounts

Projected Customer Accounts (In and Outside City)	
Year	Total
2006	9,440
2007	9,741
2008	10,554
2009	10,387
2010	10,714
2011	11,063
2012	11,423
2013	11,795
2014	12,179
2015	12,575
Average	10,987

The Annual Average Daily Flow and Maximum Monthly Average Daily Flow for both of the City's WTPs (Lime Softening and LPRO) are summarized in Table 3-6. The table shows that the over the 10-year period the Annual Average Daily Flow is 3.25 MGD and the Maximum Monthly Average Daily Flow is 3.72 MGD.

Table 3-6 WTP Historical Production Daily Flows

WTP Historical Production Daily Flows		
Year	Annual Average Daily Flow (MGD)	Maximum Montly Average Daily Flow (MGD)
2006	3.00	3.40
2007	3.56	4.09
2008	3.65	4.60
2009	3.39	4.12
2010	3.36	3.77
2011	3.24	3.69
2012	3.06	3.60
2013	3.01	3.23
2014	3.10	3.22
2015	3.17	3.44
Average	3.25	3.72

3.3.3 Water Conservation

In 2012, the City began a Water Use Benchmarking, Tracking and Conservation Project with grant funding assistance from the St. Johns River Water Management District. The project included the following tasks:

- Conversion of customer information into a format compatible with the City's Geographic Information System (GIS) dataset
- Analyzing historical water use to establish recommended benchmarks and conservation threshold ranges for acceptable water consumption by the various categories of land use and customer base
- Development of a set of electronic GIS Thematic Maps and Data Summary Reports as a water conservation tool for use by City staff to identify customers with water consumption beyond the recommended thresholds and benchmarks.
- Implementation of automated routines between the City's billing software, consumption benchmarks, and the City's Computerized Management Maintenance System (CMMS) to enhance the CMMS application program and programmatically trigger notification and work orders to City staff with the intent of promoting water conservation practices though asset maintenance and communication and interaction with customers.

As previously stated, with the assistance of SRF funding the City plans to implement a water meter replacement program by utilizing an automated meter reading system. The automated meter reading will improve the efficiency of the meter reading division and the quality of water consumption data. The new

meters and reading equipment will allow for more timely and accurate water usage data collection and notification of possible water leaks. Water consumption savings is realized through the replacement of outdated, inefficient meters, and improved water use monitoring and customer awareness.

3.3.4 Performance of Existing Water System

Even though the City experiences issues with water main breaks and "red water" issues, the City maintains the drinking water distribution system within the FDEP and Water Management District regulatory compliance.

The City also maintains the water treatment facilities within the FDEP and Water Management District regulatory compliance and no sampling or other types of violations have occurred in the last 48 months.

However, facing increasingly stringent water quality regulations, water main capacity issues, and a deteriorating and outdated Lime Softening WTP, major water distribution and treatment improvements are necessary for the City of St. Augustine.

3.3.5 Water Demand Projection

The City of St. Augustine Public Works Department prepares detailed population projections that are developed utilizing historic data, anticipated subdivision buildout, information concerning planned developments, zoning type, aerial imagery and overall likelihood of development.

The projected Annual Average Daily Flow and Maximum Monthly Average Daily Flow for the City's water treatment facilities are summarized in Table 3-7. The table shows that by the end of the 10-year planning period the Annual Average Daily Flow reaches 5.32 MGD and the Maximum Monthly Average Daily Flow reaches is 5.95 MGD.

Table 3-7 WTP Projected Production Daily Flows

WTP Projected Production Daily Flows		
Year	Annual Average Daily Flow (MGD)	Maximum Montly Average Daily Flow (MGD)
2016	3.89	4.36
2017	4.02	4.50
2018	4.15	4.65
2019	4.28	4.80
2020	4.42	4.95
2021	4.56	5.11
2022	4.70	5.27
2023	4.85	5.43
2024	5.00	5.60
2025	5.16	5.78
2026	5.32	5.95
Average	4.58	5.13

3.3.6 Service Population and Finished Water Projections

Table 3-8 shows the projected customer accounts in relation to the projected Annual Average Daily Flow and Maximum Monthly Average Daily Flow for the City's water treatment facilities. The table shows that the over the 10-year period the average projected population is 15,261, the Annual Average Daily Flow is 4.58 MGD and the Maximum Monthly Average Daily Flow is 5.13 MGD, which equates to a moderate growth rate of 3-4% each year over the 10-year planning period.

Table 3-8 Projected Customer Accounts and WTP Production Daily Flows

Projected Customer Accounts and WTP Production Daily Flows			
Year	Customer Accounts (In and Outside City)	Annual Average Daily Flow (MGD)	Maximum Montly Average Daily Flow (MGD)
2016	12,983	3.89	4.36
2017	13,403	4.02	4.50
2018	13,835	4.15	4.65
2019	14,278	4.28	4.80
2020	14,734	4.42	4.95
2021	15,202	4.56	5.11
2022	15,681	4.70	5.27
2023	16,172	4.85	5.43
2024	16,676	5.00	5.60
2025	17,191	5.16	5.78
2026	17,718	5.32	5.95
Average	15,261	4.58	5.13

3.4 MANAGERIAL CAPACITY

The City of St. Augustine has the sole responsibility and authority to build, operate, and maintain the water system. The City presently owns and operates all water supply, treatment and storage, and distribution facilities within the service area. No inter-local agreements are necessary for the City to provide drinking water services throughout the planning area, however the City does have emergency interconnects with the St. Johns County water system. The purpose of the interconnects is to allow for either public water system to supplement the other in times of emergency. The City's Public Works Department provides the drinking water services. The Director of Public Works is a licensed Professional Engineer in the State of Florida and heads the Public Works Department. The Public Works Department covers solid waste, streets, parks, water treatment, meter maintenance, transmission and distribution, wastewater treatment, engineering and pump station departments. The water treatment plants are operated two Class A, one Class B and four Class C operators who work shifts ranging from four to ten hours a day. The Public Works Department maintains a laboratory where routine water analysis is performed.

3.4.1 Operation and Maintenance Program

The City of St. Augustine's Department of Public Works staff maintains and operates the water system. Repairs and rehabilitation of the water mains due to broken pipes and joints are periodically made as necessary. The water treatment plants are operated two Class A, one Class B and four Class C operators who work shifts ranging from four to ten hours a day.

4.0 DEVELOPMENT OF ALTERNATIVES

4.1 GENERAL

The City of St. Augustine is taking proactive measures to maintain their water distribution and water treatment infrastructure, allowing them to continue meeting current regulatory standards and the aesthetic requirements of its customers. The alternatives for solving the City of St. Augustine's water system issues requires an evaluation of the water distribution system and water treatment facilities. This section of the report explores the viability of several alternatives to resolve these issues and meet both the immediate and long-term needs of the City. The capital and Operation & Maintenance (O&M) costs along with the present worth of all alternatives are given in Appendix C.

The alternatives for solving the water distribution system issues that will be explored are as follows:

1. No Action
2. Replace existing water mains or meters in kind with no enhancement or modification
3. Replace existing water mains or meters with large sizes, superior materials or better technology

The alternatives for solving the water treatment facility system issues that will be explored are as follows:

4. No Action
5. Upgrade existing Lime Softening WTP
6. 1.0 MGD expansion of the existing LPRO WTP

4.2 COST-EFFECTIVENESS

Present worth has been used to compare the various alternatives developed in this facilities plan. Present worth calculation for the viable alternatives incorporate the following considerations:

1. Planning period of 10 years.
2. A discount rate of 3.125% was used in this analysis.
3. Capital costs including any land acquisition, construction, and contingency.
4. Operation and maintenance costs.
5. Salvage values, if any, based on appropriate useful lives of various project components (land, permanent, conveyance and treatment related structures, including piping, tanks, buildings, and appurtenances) and equipment have been provided based on estimated salvage value at the end of the 10 year planning period.

6. Costs are obtained from recent bids and sales representatives/consultants in the area.

4.3 WATER DISTRIBUTION SYSTEMS

4.3.1 No Action

Under this alternative the existing practice will continue. Portions of the existing water distribution system are comprised of undersized, deteriorating cast iron and galvanized steel piping which are reaching the end of the design useful life. These aged material types are prone to failure and can cause water quality issues such as "red water" from the cast iron piping leading to customer complaints. If this alternative is selected, the City will continue to experience low pressure, decreased fire flow and issues with capacity. City water distribution O&M crews will similarly have to deal with increased repairs and a potential for water contamination and boil water notices. The system also utilizes manually read water meters, a majority of which are 10 to 20 years old that have increased potential for inaccurate and low recording of water consumption. This alternative will not require land acquisition or easements. This alternative will not address either the capacity or finished water quality issues the City is facing.

4.3.2 Replace Existing Water Mains or Meters in Kind with No Enhancement or Modifications

For this alternative the same size and material of water main and same type of water meter will be installed in the project areas. Portions of the existing water distribution system are comprised of undersized, deteriorating cast iron and galvanized steel piping which are reaching the end of the design useful life. These aged material types are prone to failure and can cause water quality issues such as "red water" from cast iron piping leading to customer complaints. Over time, the common materials of water main construction have changed and cast iron and galvanized steel are being replaced with more effective materials less prone to deterioration, such as polyvinyl chloride (PVC) and high density polyethylene (HDPE) pipe. Based on industry and City standards, modern materials should be installed that have longer life spans and provide better materials less likely to have structural failures.

The City's water system also utilizes manually read water meters the majority of which are 10 to 20 years old that have increased potential to have inaccurate and low recording of water consumption. By replacing the existing meters with the same manually read meters, the issue of inaccurate and potentially low recordings of water consumption will be resolved, however the water meter systems will still require meter reading staff to go out and physically record water consumption at every water meter. This practice is inefficient and leads to higher staffing costs, higher incidents and workers' compensation claims, a greater number of meter re-reads, and will require that the City continue to expand the meter reading department as new water system accounts and meters are added. The use of an automatic meter reading system will limit meter reading staff time in the field and will allow staff to be utilized for higher value purposes such as water main repairs; will reduce the risk for staff injury and the chances for human error when reading a meter; and will allow for real-time water consumption data for the billing department.

This alternative is not anticipated to require land acquisition or easements as the new water mains and new water meters will be replaced in the same location as the existing infrastructure or within established existing right-of-ways. This alternative will not address the capacity issues with the undersized water mains.

4.3.3 Replace Existing Water Mains or Meters with Larger Sizes, Superior Materials or Better Technology

For this alternative the City proposes to utilize SRF funding to complete six capital improvement projects, which are described below.

San Marco Water Main Replacement Project

This project will include the replacement of approximately 6,000 linear feet (LF) of 10-inch cast iron water main with 12-inch HDPE water main by pipe bursting methodologies along San Marco Avenue, a Florida Department of Transportation (FDOT) roadway, from Picolata Road (SR16) south to the intersection of Cincinnati Avenue. The City has experienced "red water" complaints from customers, water main failures due to the age of the existing cast iron material and the water main is undersized for fire flow conditions due to heavy tuberculation. This alternative will not require land acquisition or easements as the new water mains will be replaced in the same location as the existing water main and will be installed utilizing pipe bursting methodology to minimize disruption of pedestrian and vehicular traffic. The project will require approval and permitting from the FDOT. This alternative will address both capacity and finished water quality issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since it will be installed utilizing pipe bursting methodologies in the same location as the existing water main and all environmental permit requirements such as erosion and sediment control methods will be adhered to.

The project is currently scheduled for construction in FY 2017.

Fullerwood Water Main Replacement Project

This project will include the replacement of approximately 3,100 LF of 2-inch galvanized steel and 6,800 LF cast iron water main with approximately 5,400 LF of 6-inch PVC and 4,500 LF of 8-inch PVC water main within the Fullerwood neighborhood. This project will improve water quality for 150 residences and will improve fire protection within the neighbor. This alternative will not require land acquisition or easements as the new water mains will be installed within established right-of-way. The project will require approval and permitting from the FDOT. This alternative will address both capacity and finished water quality issues this portion of the City's water system is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the water mains will be installed within existing established right-of-ways and all environmental permit requirements such as erosion and sediment control methods will be adhered to.

The project is currently scheduled to start construction in FY 2017.

Water Meter (AMR) Replacement Project

As previously stated, the City recognizes the implications of aging water meters and plans to improve the efficiency of the meter reading division and quality of water consumption data. The City has completed a Water Meter Replacement Study to evaluate the current method of water meter replacement, overall condition of water meters in the distribution system and to provide recommendations of improving and formalizing the current manual read water meter system. The study concluded that approximately 56% of the system meters were greater than 10 years old and that 23% were more than 20 years old. From the study, a project was developed to replace approximately 13,000 water meters that vary in size from 5/8-inch to 6-inch with new automated meter reading (AMR) technology within the City's water system. The replacement program will utilize newer technology which will allow for improved customer service and water conservation education; reduced labor costs, reduced employee injuries and increased accuracy of meter reads. The alternative will not require land acquisition or easements as the new water meters will be replaced in the same location as the existing meters. This alternative will address both water capacity and conservation issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the meters will be replaced in the same location as the existing meters.

It is the intent of the City to phase the water meter replacements over a number of years, depending on cost and available funding.

North City Water Main Replacement Project

This project will include the replacement of approximately 9,500 LF of 2-, 6-, 8- and 10-inch cast iron water mains with approximately 9,500 LF of 8- and 10-inch PVC and HDPE water main to be installed by open cut and horizontal directional drill technologies in the northern area of the City, specifically along Hope Street, Cincinnati Avenue, Rohde Avenue, East Lane, Grove Avenue, Loring Street, 1st Street, US-1 (Ponce DeLeon Blvd), Fletcher Lane, and San Marco Avenue. The City has experienced "red water" complaints from customers, water main failures due to the age of the existing cast iron material and the water main is currently undersized for necessary fire flow conditions. The majority of the water main will be installed by open cut construction except for crossings of the FDOT US-1 roadway which will utilize trenchless methods including HDD and jack-and-bore. The project will require approval and permitting from the FDOT, but will not require land acquisition or easements. This alternative will address both capacity and finished water quality issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the water mains will be installed within existing established right-of-ways and all environmental permit requirements such as erosion and sediment control methods will be adhered to.

The project is scheduled to start construction in FY 2019.

King Street 16-inch Sub-Aqueous Project

This project will include the replacement of approximately 450 linear feet (LF) of 16-inch cast iron water main attached to a bridge that crosses the San Sebastian River with Horizontal Directional Drill (HDD) 16-inch HDPE water main installed under the San Sebastian River. The Florida Department of Transportation (FDOT) anticipates the need to replace the bridge in the future and intends to require the City to relocate the water main attached to the side of the bridge. It is not anticipated that this alternative will require land acquisition or easements as the new water main will be drilled under the San Sebastian River utilizing HDD methodology to minimize disruptions and impacts. The existing water main is cast iron, accordingly, this alternative will address finished water quality issues and will improve system capacity and fire flow capability. This alternative is not anticipated to cause any adverse impacts to the environment since the water main will be installed by HDD to minimize impacts to the river and the requirements of all environmental permits will be adhered to. The HDD contractor will be required to develop and follow a frac-out contingency plan to address and mitigate any drilling mud which may be released during construction.

Design and permitting of this project is scheduled for FY 2020.

King Street Drainage (KSDI)-Water Line Relocations Project

This project will include the replacement of approximately 3,100 LF of 16-inch cast iron and ductile iron water main with 16-inch PVC water main along King Street (FDOT US-1 Business route) from Malaga Street to Avenida Menendez. The FDOT will be making storm water drainage improvements along King Street that could potentially cause conflicts with existing 16-inch water main. The installation of the 16-inch PVC water main will be located to provide the required separation from the storm drainage improvement, which represent a potential sanitary hazard. The project will require approval and permitting from the FDOT, but will not require land acquisition or easements. Since the existing water main is cast iron and ductile iron this alternative will address finished water quality issues. This alternative is not anticipated to cause any adverse impacts to the environment since the water main will be installed within existing established right-of-ways and the contractor will be required to adhere to all environmental permit requirements such as erosion and sediment control methods.

Design of this project started in 2013, however due to right-of-way and land ownership issues with FDOT, the project is on hold.

4.4 WATER TREATMENT FACILITY

4.4.1 No Action

Under this alternative the existing practice will continue and the two existing WTPs will continue to operate. There are currently no deficiencies with either of the existing water treatment facilities' capability to meet the current water demands. However, as noted in previous sections, the Lime Softening WTP has been in

operation for over 80 years and while modifications have been made it has reached the end of its useful life. The Lime Softening facility will continue to deteriorate under this alternative as will the finished water quality and potential public health concerns. As equipment fails, the City will be unable to meet the water demand and production needs of the water system customers.

This alternative will not cause any adverse impacts to the environment nor will it require land acquisition or easements. This alternative will not address the water system issues and, in fact, will negatively impact both the system capacity and finished water quality.

4.4.2 Upgrade Existing Lime Softening WTP

Under this alternative, the 2.0 MGD LPRO WTP will not be expanded and the existing 4.5 MGD Lime Softening WTP will be rehabilitated. The City's Lime Softening WTP was originally placed in service in the 1920's and although modifications were made to the plant in 1987 it has reached the end of its useful life.

Within the last decade, the St. Johns River Water Management District (SJRWMD) has put pressure on communities to decrease demands on the Lower Surficial Aquifer. As the longtime source of drinking water for Northeast Florida, the Lower Surficial Aquifer was not anticipated to be able to support the growing demand for water without consequences. Responding to the SJRWMD initiative, in 2011, the City has transitioned from 10 Lower Surficial Aquifer and four Upper Floridan Aquifer wells to one Lower Surficial Aquifer and seven Upper Floridan Aquifer wells.

Customarily, the Upper Floridan Aquifer has been characterized by water quality parameters that are higher in chlorides, total dissolved solids, sulfates and hydrogen sulfide, which have prompted municipalities to change their treatment technologies. Older treatment processes, such as Lime Softening are not generally appropriate to treat the water quality of the Upper Floridan Aquifer. The Lime Softening WTP currently supplements the existing LPRO WTP as the primary source of water is from the Upper Floridan Aquifer.

In order for the City to properly treat the characteristics of their current water source and meet all water quality standards as demand increases, other water treatment technologies must be explored and this alternative to rehabilitate the lime softening processes has therefore, been rejected. If the Lime Softening WTP were upgraded and used to treat the City's primary source water from the Upper Floridan there would be a high potential for water quality issues.

Another reason this alternative was rejected, relates to issues with the Lime Softening WTP lacking the proper redundancy to achieve today's regulatory standards of reliability for meeting production and capacity demands. Currently, the Lime Softening WTP has only one clarifier, and when the clarifier is down for service or repairs, the raw water has to be diverted to a sedimentation basin which significantly affects finished water production by more than half. To meet production demands when unit operations are out of service, the higher flows produce higher solids carryover causing shortened filter runs and increased

backwash filter frequency thereby reducing production that meets finished water quality standards. Significant financial investments and land would be needed to provide adequate Lime Softening WTP redundancy.

The proposed improvements would be constructed on the existing WTP site which is already cleared. This alternative will not require land acquisition or easements.

4.4.3 1.0 MGD Expansion at the Existing LPRO WTP

Under this alternative, the City intends to phase out the existing Lime Softening WTP due to its age and condition and expand the existing 2.0 MGD LPRO WTP by adding a 1.0 MGD low pressure membrane skid and all the ancillary facilities for the expansion. With this expansion a certain percentage of pretreated raw water will be blended with the LPRO permeate to assist in finished water stabilization, minimize necessary chemicals additions, and minimize membrane treatment related capital and operating costs. The expansion of the LPRO will consists of adding another 1.0 MGD of membrane capacity to bring the ultimate membrane capacity to 3.0 MGD, that in conjunction with 3.5 MGD of treated raw water blend will provide a design capacity of 6.5 MGD to serve projected water demands. Design and permitting of the LPRO WTP expansion is scheduled for completion in FY 2017, and the construction is expected to be complete in 2019 pending funding for the new facility.

The membrane unit will be skid mounted and housed within the existing membrane unit building which will require expansion modifications. The proposed design includes raw water pumps, a sand strainer, 1.0 MGD membrane skid, cartridge filers, membrane feed pumps, membrane cleaning tank, degasifier, electrical and instrumentation.

The environmental impacts associated with this alternative are expected to be temporary and only due to construction. The proposed improvements will be constructed on the existing WTP site which is already cleared. This alternative will not require land acquisition or easements. This alternative will address the reliability, capacity and potential finished water quality issues the City is facing.

5.0 THE SELECTED PLAN

5.1 DESCRIPTION OF PROPOSED PROJECTS

Based on the analysis of the alternatives in Section 4.0 of this report, the proposed alternative for the water distribution system is the option to replace existing water mains or meters with larger sizes, superior materials or better technology. The proposed upgrades will consist of six capital improvement projects which include the replacement of aging and deteriorated water main and water meter infrastructure.

For water treatment facilities the selected alternative is the 1.0 MGD expansion of the existing LPRO WTP. The proposed project will include phasing out the existing Lime Softening WTP due to its age and condition and expanding the existing 2.0 MGD LPRO WTP by adding a 1.0 MGD low pressure membrane skid and all the ancillary facilities for the expansion.

The following sections provide additional detailed information on the proposed upgrades.

5.1.1 Water Distribution System

San Marco Water Main Replacement Project

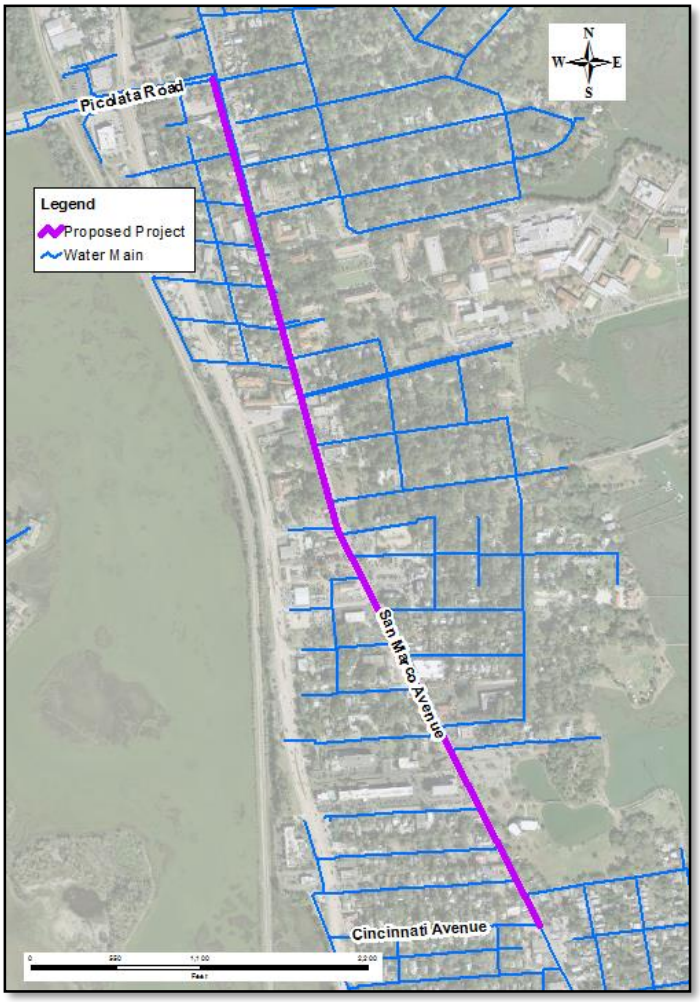
The City of St. Augustine owns and maintains a 10-inch cast iron water main located under the southbound asphalt area of San Marco Avenue (US 1 Business Route and SR A1A) which is a FDOT roadway. The City has experienced "red water" complaints from customers, water main failures due to the age of the existing cast iron material and the water main is currently undersized for fire flow conditions due to heavy tuberculation. Therefore, the 10-inch water main is in need of an upgrade to a new 12-inch water main along San Marco Avenue from Picolata Road (SR 16) south 6,000 LF to the intersection of Cincinnati Avenue.

Since the existing 10-inch cast iron pipe is located entirely in the south bound asphalt, mostly in parking zones, the City has decided to install the new water main by utilizing HDPE piping material and pipe bursting methodology to minimize disruption of pedestrian and vehicular traffic.

Although this project will not require land acquisition or easements as the new water mains will be replaced in the same location as the existing water main, FDOT approval and permit will be required. This project will address both capacity and finished water quality issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since it will be installed utilizing pipe bursting methodologies in the same location as the existing water main. The contractor will be required to adhere to all environmental permits.

The project is scheduled for construction in FY 2017. Figure 5-1 shows the project location map.

Figure 5-1 San Marco Water Main Replacement Project Map

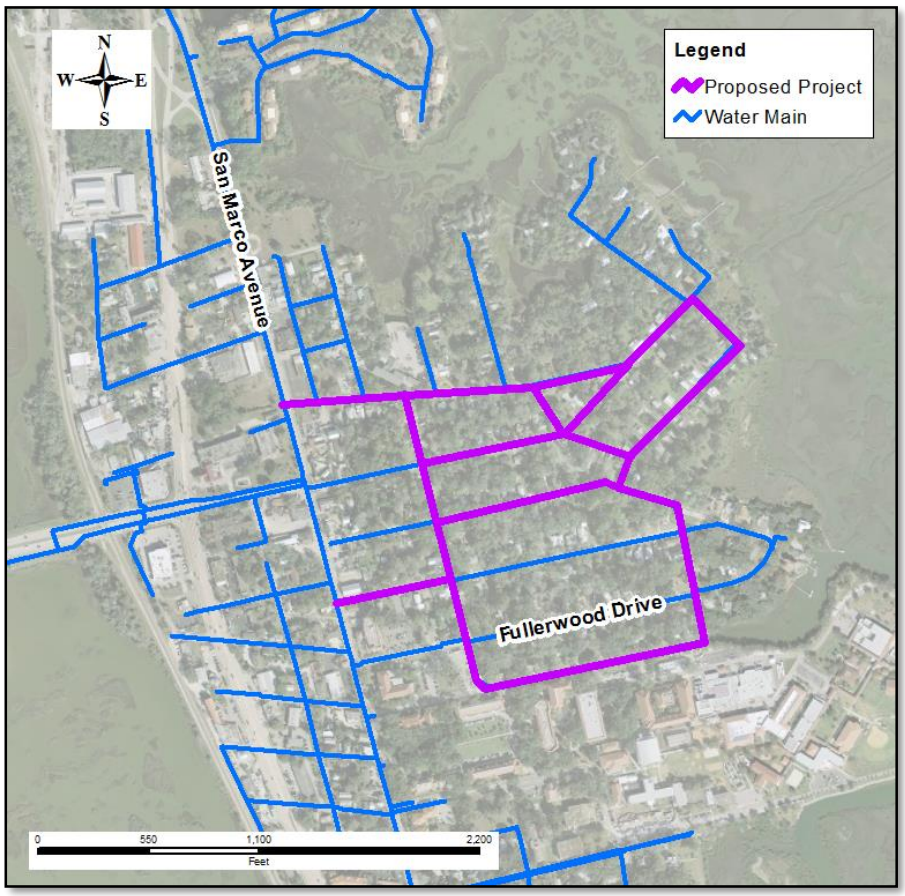


Fullerwood Water Main Replacement Project

This project will include the replacement of approximately 3,100 LF of 2-inch galvanized steel and 6,800 LF of 6-inch cast iron water main with approximately 5,400 LF of 6-inch PVC and 4,500 LF of 8-inch PVC water main within the Fullerwood neighborhood. This project will improve water quality for 150 residences and will improve fire protection within the neighborhood. A total of 14 fire hydrants will be installed for this project. This alternative will not require land acquisition or easements as the new water mains will be installed within established right-of-way. The project will require approval and permitting from the FDOT. This alternative will address both capacity and finished water quality issues this portion of the City's water system is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the water mains will be installed within existing established right-of-ways and all environmental permit requirements such as erosion and sediment control methods will be adhered to.

The project is scheduled to start construction in FY 2017. Figure 5-2 shows the project location map.

Figure 5-2 Fullerwood Water Main Relocation Project Map

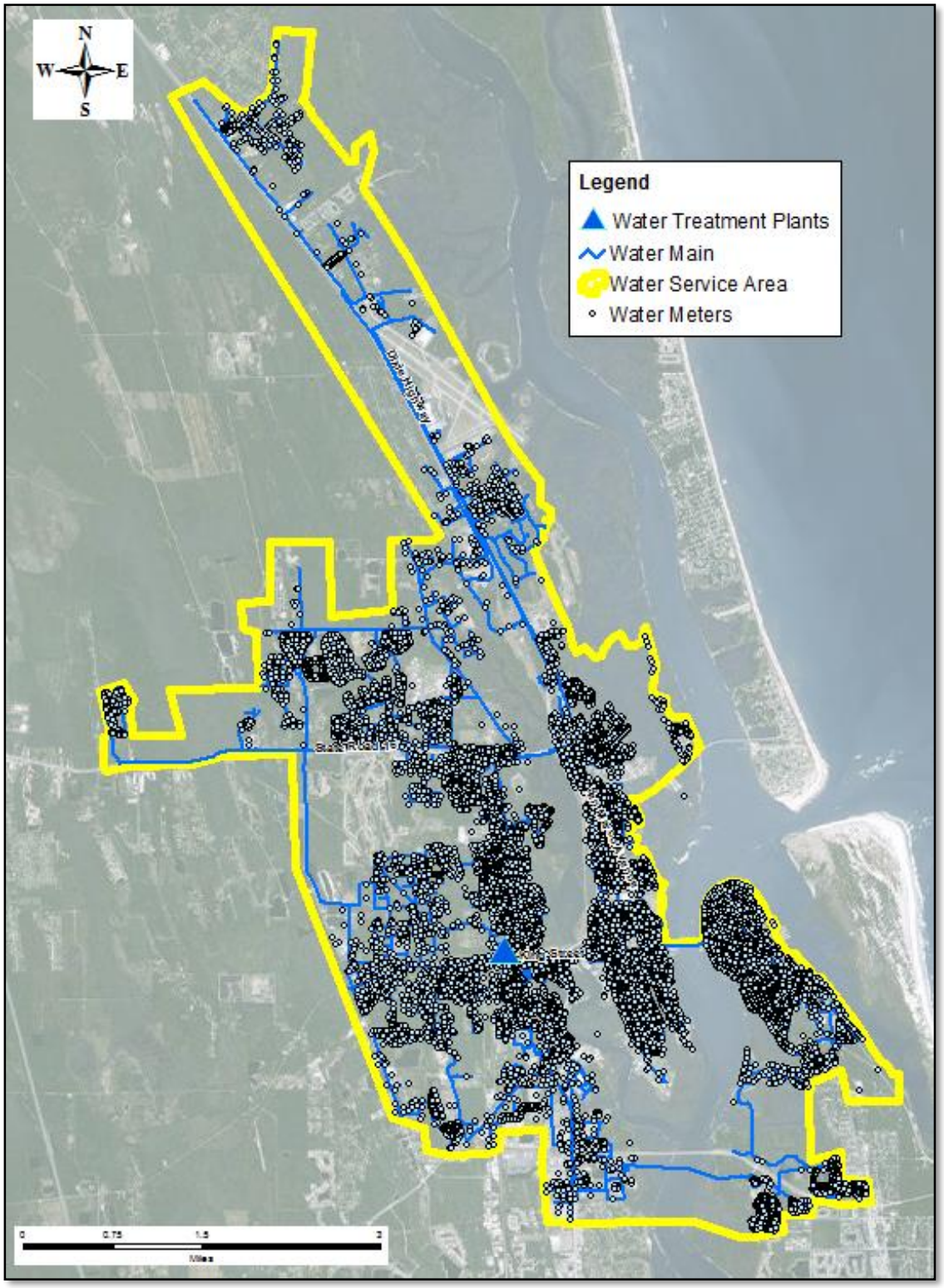


Water Meter (AMR) Replacement Project

This project will include the replacement of approximately 13,000 water meters that vary in size from 5/8-inch to 6-inch with new automated meter reading (AMR) technology within the City's water system. The replacement program will utilize newer technology which will allow for improved customer service; reduced labor costs, reduced employee injuries and increased accuracy of meter reads. The alternative will not require land acquisition or easements as the new water meters will be replaced in the same location as the existing meters. This alternative will address both water capacity and conservation issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the meters will be replaced in the same location as the existing meters.

It is the intent of the City to phase the water meter replacements over a number of years, depending on cost and available funding. Figure 5-3 shows the project location map.

Figure 5-3 Water Meter (AMR) Replacement Project Map

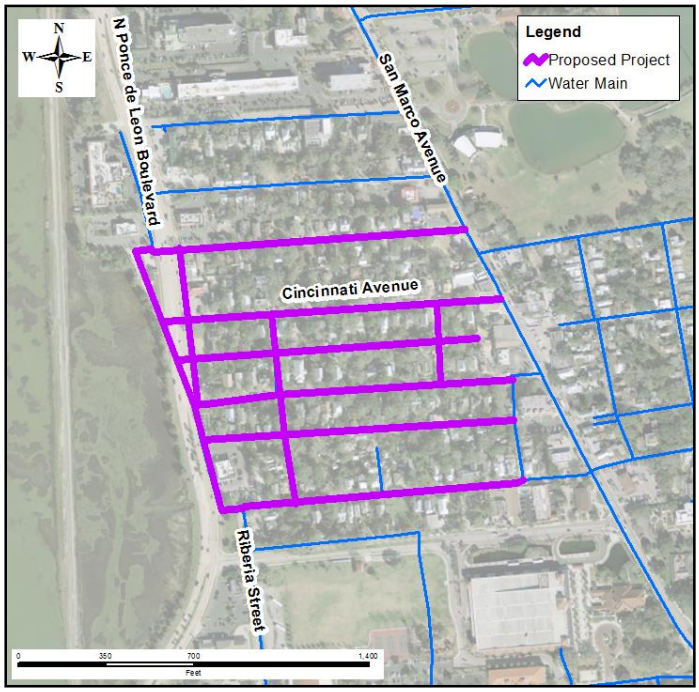


North City Water Main Replacement Project

The North City Water Main Improvements comprised an extensive water main upgrade for the northern area of the City of St. Augustine (CoSA) water system. The development of the water main loop and upgraded water mains allows for increased residential and commercial pressure and flows, fire flows per City code, increased access to fire protection, replacement of aged cast iron piping, elimination of "red water" concerns, and relocation of water mains and meters to public right-of-ways for improved accessibility for operation and maintenance. This project will include the replacement of approximately 9,500 LF of 2-, 6-, 8- and 10-inch cast iron water mains with approximately 9,500 LF of 8- and 10-inch PVC and HDPE water main to be installed by open cut and horizontal directional drill technologies in the northern area of the City, specifically along Hope Street, Cincinnati Avenue, Rohde Avenue, East Lane, Grove Avenue, Loring Street, 1st Street, US-1 (Ponce DeLeon Blvd), Fletcher Lane, and San Marco Avenue. The majority of the water main will be installed by open cut construction except for crossings of the FDOT US-1 roadway which will utilize trenchless methods including HDD and jack-and-bore. The project will require approval and permitting from the FDOT, but will not require land acquisition or easements. This alternative will address both capacity and finished water quality issues the City is facing. This alternative is not anticipated to cause any adverse impacts to the environment since the water mains will be installed within existing established right-of-ways and all environmental permit requirements such as erosion and sediment control methods will be adhered to.

The project is scheduled to start construction in FY 2019. Figure 5-4 shows the project location map.

Figure 5-4 North City Water Main Relocation Project Map

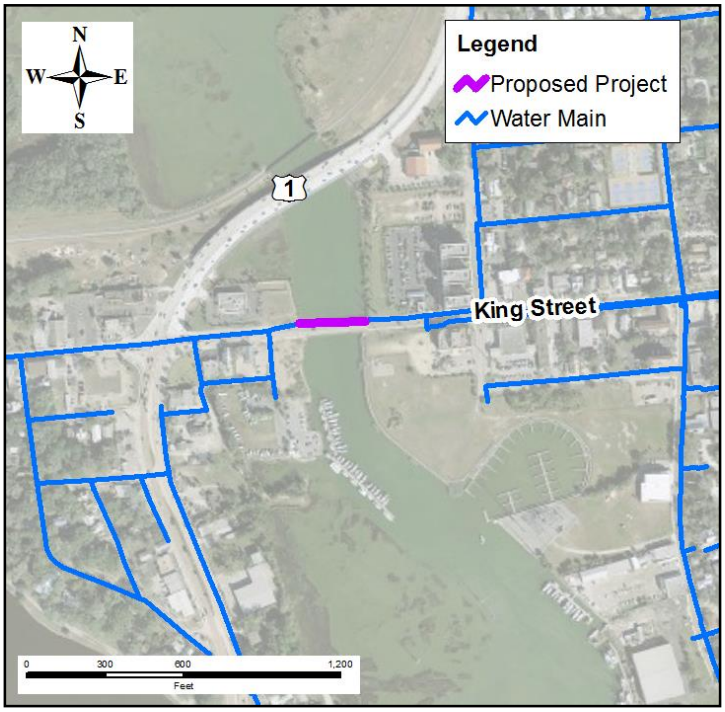


King Street 16-inch Sub-Aqueous Project

The City of St. Augustine owns and maintains a 16-inch cast iron water transmission main along the North side of King Street (SR-5A) which is a FDOT roadway. The transmission water main runs in the easterly direction from the water treatment plant facility site, crosses the US-1 (SR-5) highway and at the San Sebastian River Bridge the water main is installed above ground and supported on the side of the Bridge. The FDOT anticipates the need to replace the bridge in the future and intends to require the City to relocate the water main attached to the side of the bridge. The City intends to install approximately 450 LF of 16-inch HDPE pipe under the San Sebastian River to replace this section of the water main. The new main will be installed utilizing the HDD technology. It is not anticipated that this alternative will require land acquisition or easements as the new water main will be drilled under the San Sebastian River utilizing HDD methodology to minimize disruptions and impacts. Since the existing water main is cast iron this alternative will address finished water quality issues. This alternative is not anticipated to cause any adverse impacts to the environment since the water main will be installed by HDD to minimize impacts to the river and the requirements of all environmental permits will be adhered to. The HDD contractor will be required to develop and follow a frac-out contingency plan to address and mitigate any drilling mud which may be released during construction.

Design and permitting of this project is scheduled for FY 2020 and Figure 5-5 shows the project location map.

Figure 5-5 King Street 16-inch Sub-Aqueous Project Map

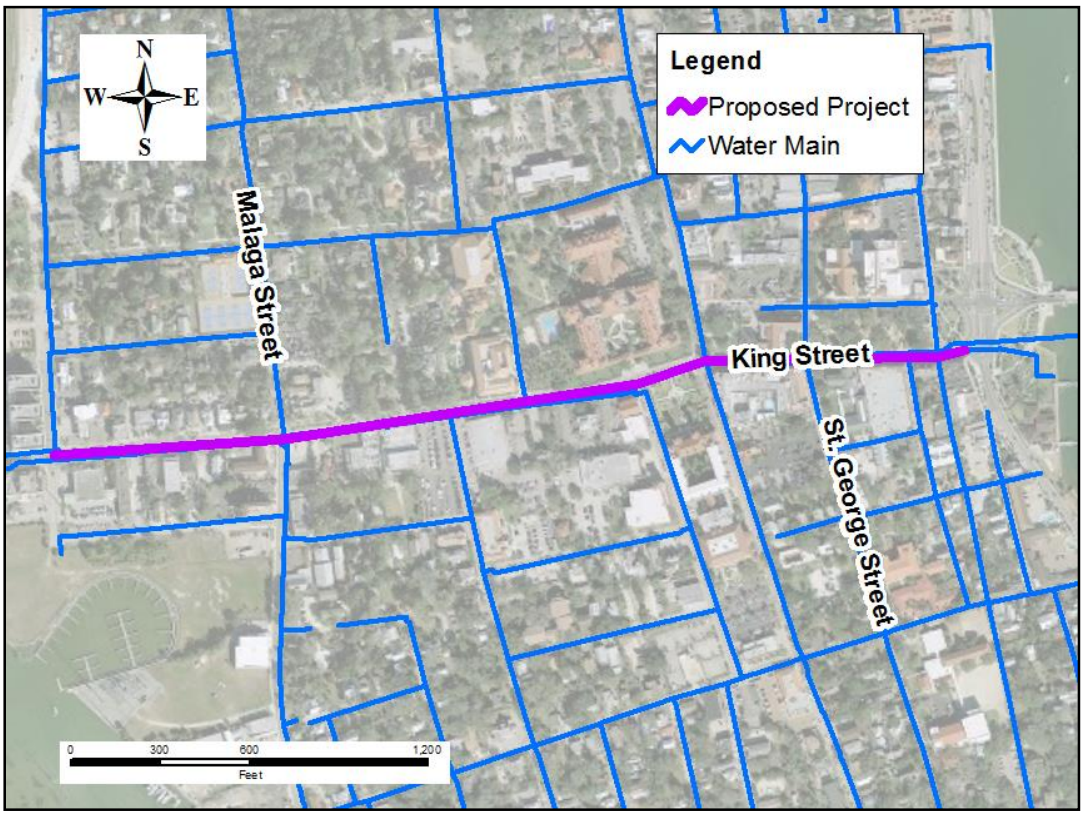


King Street Drainage (KSDI)-Water Line Relocations Project

The Florida Department of Transportation (FDOT) will be making drainage improvements along King Street (SR 5A) from Malaga Street to Avenida Menendez (SR A1A). Currently, the City of San Augustine owns and operates a 16-inch cast iron and ductile iron water main along the proposed FDOT drainage improvements. The installation of the new storm water collection system may cause conflicts with City's water main. Therefore, the City will replace 3,070 Linear Feet (LF) of existing 16-inch cast iron and ductile iron transmission main with a 16-inch PVC water main. The installation of the 16-inch PVC water main will be located to provide the required separation from the storm drainage improvement, which represent a potential sanitary hazard. The project will require approval and permitting from the FDOT, but will not require land acquisition or easements. Since the existing water main is cast iron and ductile iron this alternative will address finished water quality issues. This alternative is not anticipated to cause any adverse impacts to the environment since the water main will be installed within existing established right-of-ways and the contractor will be required to adhere to all environmental permit requirements such as erosion and sediment control methods.

Design of this project started in 2013, however due to right-of-way and land ownership issues with FDOT, the project is on hold. Figure 5-6 shows the project location map.

Figure 5-6 King Street Drainage (KSDI)-Water Line Relocation Project Map



5.1.2 Water Treatment Facilities

1.0 MGD Expansion of the Existing LPRO WTP

Under this alternative, the City intends to phase out the existing Lime Softening WTP due to its age and condition and expand the existing 2.0 MGD LPRO WTP by adding a 1.0 MGD low pressure membrane skid and all the ancillary facilities for the expansion. With this expansion, a certain percentage of pretreated raw water will be blended with the LPRO permeate to assist in finished water stabilization, minimize necessary chemicals additions, and minimize membrane treatment related capital and operating costs. The expansion of the LPRO will consists of adding another 1.0 MGD of membrane capacity to bring the ultimate membrane capacity to 3.0 MGD, that in conjunction with 3.5 MGD of treated raw water blend will provide a design capacity of 6.5 MGD to serve projected water demands. Design and permitting of the LPRO WTP expansion is scheduled for completion in FY 2017, and the construction is expected to be complete in 2019 pending funding for the new facility.

The membrane unit will be skid mounted and housed within the existing membrane unit building which will require expansion modifications. The proposed design includes raw water pumps, a sand strainer, 1.0 MGD membrane skid, cartridge filers, membrane feed pumps, membrane cleaning tank, degasifier, electrical and instrumentation.

The environmental impacts associated with this alternative are expected to be temporary and only due to construction. The proposed improvements will be constructed on the existing WTP site which is already cleared. This alternative will not require land acquisition or easements. This alternative will address the reliability, capacity and potential finished water quality issues the City is facing.

5.2 ENVIRONMENTAL IMPACTS OF PROPOSED FACILITIES

Water Distribution System

The short term impacts during construction include increased noise levels, increased airborne particulates and surface run-off during rainfall events at the site. Control measures will be implemented to minimize these temporary effects. The proposed projects described within this Facilities Plan include replacing existing infrastructure such as water mains and meters within existing established right-of-ways or in the same location as the existing infrastructure. There is no anticipated adverse impact to the threatened or endangered species in the region, wetlands, undisturbed natural areas, or the socio-economic character of the area. Impacts to archeological or historical sites is not anticipated. During the design of City infrastructure projects, the City Archeologist is engaged beginning with the conceptual design to determine the likelihood of impacts from the project to areas or sites of historical or archeological significance. Modifications to design are incorporated, as necessary, to address these potential impacts. Additionally, for any projects which may impact areas or sites of historical or archeological significance, the City Archeologist will be onsite during excavation operations. As noted, the proposed projects are temporary in nature and therefore any adverse environmental impacts will cease once the project is complete.

The overall impacts of these project are beneficial to the citizens of the City of St. Augustine and far outweigh any adverse environmental impacts. The proposed projects will result in improved water quality, pressure and fire flow.

Water Treatment Facility

The short term impacts during construction include increased noise levels, increased airborne particulates and surface run-off during rainfall events at the site. Control measures will be implemented to minimize these temporary effects. The entire proposed project will be constructed and located at the existing WTP. As this site is already cleared, it is unlikely that there will be any adverse environmental impacts from operation of the proposed upgrades. There is no anticipated adverse impact to the threatened or endangered species in the region, wetlands, undisturbed natural areas, or the socio-economic character of the area. There are no archeological, historical, or cultural sites within the area of construction. As noted, the proposed project is temporary in nature and therefore any adverse environmental impacts will cease once the project is complete.

The overall impacts of this project are beneficial to the citizens of the City of St. Augustine and far outweigh any adverse environmental impacts. The proposed project will result in improved water quality and capacity. The project will replace aged infrastructure which was anticipated to fail in the near future; and thus extended the capacity and life of the water system.

5.3 COST TO CONSTRUCT FACILITIES

Water Distribution System

The details of the anticipated construction and operation and maintenance (O&M) costs for the recommended water distribution projects are presented in Appendix A. The following tabulations present the total estimated project cost.

Table 5-1 San Marco Water Main Replacement Project Cost Estimate

San Marco Water Main Replacement Project Cost Estimate		
Item Number	Description	Cost
1	General Conditions	$198,000
2	Maintenance of Traffic	$35,000
3	As-Built Drawings	$20,000
4	Testing	$20,000
5	New Pipe, Fittings and Valves	$2,000,000
6	Fire Hydrants	$45,000
7	New Water Services	$41,000
8	Road Restoration	$207,000
Sub-Total		$2,566,000
0	Contingency	$334,000
Total Construction Cost		$2,900,000

Table 5-2 Fullerwood Water Main Replacement Project Cost Estimate

Fullerwood Water Main Replacement Project Cost Estimate		
Item Number	Description	Cost
1	Mobilization	$143,000
2	Maintenance of Traffic	$50,000
3	Soil Erosion and Sediment Control	$20,000
4	As-Built Drawings	$20,000
5	Testing	$25,000
6	New Pipe, Fittings and Valves	$730,000
7	Abandonment of Existing Pipe	$94,000
8	Fire Hydrants	$46,000
9	New Water Services	$292,000
10	Road Restoration	$280,000
Total Construction Cost		$1,700,000

Table 5-3 Water Meter (AMR) Replacement Project Cost Estimate

Water Meter (AMR) Replacement Project Cost Estimate		
Item Number	Description	Cost
Phase 1		
1	2,810 Meters Without Register or Encoder	$158,559
2	Register/Encoder	$526,688
3	Removal & Installation of New Water Meters	$163,210
4	Repairs of Boxes, Settings, Concrete during Installation	$343,965
Phase 1 Construction Cost		$1,192,422
Phase 2		
1	2,410 Water Meters (Size 5/8" through 2")	$1,050,000
Phase 2 Construction Cost		$1,050,000
Phase 3 - 5		
1	7,250 Water Meters (Size 5/8" through 10")	$3,150,000
Phase 3 -5 Construction Cost		$3,150,000

Table 5-4 North City Water Main Replacement Project Cost Estimate

North City Water Main Replacement Project Cost Estimate		
Item Number	Description	Cost
1	Maintenance of Traffic	$80,000
2	Soil Erosion and Sediment Control	$40,000
3	As-Built Drawings	$15,000
4	Testing	$10,000
5	New Pipe, Fittings and Valves	$905,127
6	Abandonment of Existing Pipe	$29,375
7	Fire Hydrants	$91,700
8	New Water Services	$265,200
Sub-Total		$1,436,402
0	Contingency	$143,640
Total Construction Cost		$1,580,042

Table 5-5 King Street 16-inch Sub-Aqueous Project Cost Estimate

King Street 16-inch Sub-Aqueous Project Cost Estimate		
Item Number	Description	Cost
1	General Conditions	$105,000
2	Mobilization	$10,000
3	Maintenance of Traffic	$10,000
4	Payment and Performance Bond	$15,000
5	HDPE Pipe, Pipe Fittings, Valves and HDD	$330,000
6	Site Restoration	$20,000
7	Remove Existing 16-inch Pipe	$30,000
8	Testing	$15,000
9	As-Built Drawings	$5,000
Sub-Total		$540,000
0	Contingency	$60,000
Total Construction Cost		$600,000

Table 5-6 King Street Drainage (KSDI)-Water Line Relocation Project Cost Estimate

King Street Drainage (KSDI)-Water Line Relocations Project Cost Estimate		
Item Number	Description	Cost
1	Maintenance of Traffic	$215,000
2	Soil Erosion and Sediment Control	$40,000
3	As-Built Drawings	$15,000
4	Testing	$10,000
5	New Pipe, Fittings and Valves	$648,935
6	Abandonment of Existing Pipe	$46,500
7	Fire Hydrants	$30,000
8	New Water Services	$125,000
Sub-Total		$1,130,435
0	Contingency	$169,565
Total Construction Cost		$1,300,000

Water Treatment Facility

The details of the anticipated construction and operation and maintenance (O&M) costs for the recommended water treatment facility project is presented in Appendix A. The following tabulation presents the total estimated project cost.

Table 5-7 1.0 MGD Expansion of the Existing LPRO WTP Project Cost Estimate

1.0 MGD Expansion at the Existing LPRO WTP Cost Estimate		
Item Number	Description	Cost
1	Raw Water Pumps, Valves and Piping	$300,000
2	Booster Water Pump, Valves and Piping	$25,000
3	Sand Strainer	$80,000
4	Cartridge Filters	$160,000
5	1.0 MGD Memebrane Skid	$700,000
6	Membrane Feed Pumps	$150,000
7	4,000-Gallon Membrane Cleaning Tank	$40,000
8	Degasifier Tower, Blower, Scrubber and Recirculation Pumps	$600,000
9	Expansion of existing membrane process building	$900,000
10	Electrical	$675,000
11	Instrumentation	$540,000
12	Site work, yard piping, storm water, etc.	$400,000
13	Demolition of Lime Softening WTP Units	$1,000,000
Sub-Total		$5,570,000
14	Mobilization, Insurance and Bonds	$1,510,000
Sub-Total		$7,080,000
0	Contingency	$920,000
Total Construction Cost		$8,000,000

5.4 CONSISTENCY WITH THE COMPREHENSIVE PLAN

The recommendations resulting from this study are consistent with both the City of St. Augustine and St. Johns County's local comprehensive plans.

6.0 IMPLEMENTATION AND COMPLIANCE

6.1 PUBLIC HEARING/DEDICATED REVENUE HEARING

A public hearing consistent with the requirements of "Drinking Water State Revolving Fund Program Guidelines," EPA 816-R-97-005, February 1997, will be conducted prior to formal adoption of the water Facilities Plan. The public hearing is proposed for April 11, 2016 and will be advertised in the local area newspaper in accordance with chapter 62-552, F.A.C. prior to the hearing. The purpose of the public hearing is to explain the projects to the public including the alternatives considered and the cost and impact to the user charges and to enable public participation in evaluating the project alternatives. The water Facilities Plan shall be made available to the public prior to the hearing. A complete record of the hearing shall be made by the City of St. Augustine and the record shall be made available to interested parties upon request.

The proof of the advertised notice of the hearing and the recorded minutes of the hearing shall be provided to the DEP in compliance with 62-552, F.A.C.

6.2 REGULATORY AGENCY REVIEW

To qualify for funding from the SRF, various governmental agencies must review the Facilities Plan and be satisfied with the way that the City of St. Augustine intends to solve the issues with the public water system. Copies of the Facilities Plan adopted by the City Commission will be sent to the following government agencies for review and comments.

1) Florida Department of Environmental Protection

2) Florida Department of Health

3) St. Johns River Water Management District

4) U.S. Environmental Protection Agency

5) Northeast Florida Regional Planning Council

6) Department of Community Affairs, State Clearinghouse

6.3 FINANCIAL PLANNING

The Department of Environmental Protection's State Revolving Fund is expected to be the financing source for the project

A Business Plan has been provided in Appendix F with supporting financial data provided in Appendix G. The purpose of the Business Plan is to provide information to the public and to the State Agency confirming

that if for some reason the SRF grant was not available that the project could still proceed and be completed with a loan. The Business Plan indicates what the financial impact would be to the users of the water system.

6.4 IMPLEMENTATION

The City of St. Augustine has the sole responsibility and authority to implement the recommended facilities. There are no inter-local agreements necessary for the City to provide drinking water services throughout the planning area, however the City does have emergency interconnects with the St. Johns County water system.

6.5 IMPLEMENTATION SCHEDULE

- April, 2016 — Hold public hearing on facilities plan and business plan.
- May, 2016 — Submit facilities plan to FDEP and other governmental agencies.
- July, 2016 — Publication of DEP's environmental information document in the Florida Administrative Weekly
- August, 2016 — End of 30-day comment period for the environmental information document and approval of planning documents.
- August, 2016 — Submit Plans and Specifications, Site Certification and Permits to FDEP
- September, 2016 — FDEP' Public Hearing - Projects ready to proceed will be placed on f list for funding.
- September, 2016 — SRF Loan Application submitted to FDEP.
- November, 2016 — Sign SRF Loan Agreement.
- January, 2017 — Start construction of the projects.
- June, 2019 — Complete construction of the projects.
- July, 2019 — Certify operational performance of the project and close out project.

6.6 COMPLIANCE

1. The treated water from the selected alternative will be in compliance with the DEP drinking water standards.

2. The disposal of all plant waste will be in accordance with the DEP permit application for the project and with all applicable Florida Administrative Code and Code of Federal Regulations standards.

3. The selected alternatives will meet the reliability requirements as per chapter 62-555, F.A.C.

4. The environmental aspects of the proposed facilities are satisfactory.

5. The recommended facilities are consistent with the City of St. Augustine's Comprehensive Plan and with St. Johns County's Comprehensive Plan.

APPENDIX A

Cost Information of the Selected Alternative

Selected Alternative
San Marco Water Main Replacement Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
General Conditions	$	198,000
Maintenance of Traffic	$	35,000
As-Built Drawings	$	20,000
Testing	$	20,000
New Pipe, Fittings and Valves	$	2,000,000
Fire Hydrants	$	45,000
New Water Services	$	41,000
Road Restoration	$	207,000
Subtotal	***$***	***2,566,000***
Contingency		334,000
Total Construction Cost		**$2,900,000**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	960
Repairs	$	2,500
Total Annual O&M Cost	**$**	**3,460**

Selected Alternative
Fullerwood Water Main Replacement Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
Mobilization	$	143,000
Maintenance of Traffic	$	50,000
Soil Erosion and Sediment Control	$	20,000
As-Built Drawings	$	20,000
Testing	$	25,000
New Pipe, Fittings and Valves	$	730,000
Abandonment of Existing Pipe	$	94,000
Fire Hydrants	$	46,000
New Water Services	$	292,000
Road Restoration	$	280,000
Total Construction Cost		**$1,700,000**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

Selected Alternative
Water Meter (AMR) Replacement Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
2,810 Meters Without Register or Encoder	$	158,559
Register/Encoder	$	526,688
Removal & Installation of New Water Meters	$	163,210
Repairs of Boxes, Settings, Concrete during Installation	$	343,965
Total Construction Cost - Phase 1		**$1,192,422**

Item		Cost
2,410 Water Meters (Size 5/8" through 2")	$	1,050,000
Total Construction Cost - Phase 2		**$1,050,000**

Item		Cost
7,250 Water Meters (Size 5/8" through 10")	$	3,150,000
Total Construction Cost - Phase 3 - 5		**$3,150,000**

Engineer's Opinion of Annual O&M Costs

Item		Year 1 Cost
Personnel Expenses (Salaries, OT, Sick, FICA, Insurance, etc.)	$	387,672
Operating Expenses (Fleet, Equipment Repair, Fuel, Uniforms, Supplies, etc.)	$	115,590
Capital Outlay	$	13,934
Total Annual O&M Cost - Year 1	**$**	**517,196**
Total Annual O&M Cost - Year 2	**$**	**452,547**
Total Annual O&M Cost - Year 3	**$**	**395,978**
Total Annual O&M Cost - Year 4	**$**	**346,481**
Total Annual O&M Cost - Year 5	**$**	**303,171**
Total Annual O&M Cost - Year 6	**$**	**306,203**
Total Annual O&M Cost - Year 7	**$**	**309,265**
Total Annual O&M Cost - Year 8	**$**	**312,357**
Total Annual O&M Cost - Year 9	**$**	**315,481**
Total Annual O&M Cost - Year 10	**$**	**318,636**

Selected Alternative
North City Water Main Replacement Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
Maintenance of Traffic	$	80,000
Soil Erosion and Sediment Control	$	40,000
As-Built Drawings	$	15,000
Testing	$	10,000
New Pipe, Fittings and Valves	$	905,127
Abandonment of Existing Pipe	$	29,375
Fire Hydrants	$	91,700
New Water Services	$	265,200
Subtotal	***$***	***1,436,402***
Contingency		143,640
Total Construction Cost		**$1,580,042**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

Selected Alternative
King Street 16-inch Sub-Aqueous Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
General Conditions	$	105,000
Mobilization	$	10,000
Maintenance of Traffic	$	10,000
Payment and Performance Bond	$	15,000
HDPE Pipe, Pipe Fittings, Valves and HDD	$	330,000
Site Restoration	$	20,000
Remove Existing 16-inch Pipe	$	30,000
Testing	$	15,000
As-Built Drawings	$	5,000
Subtotal	***$***	***540,000***
Contingency		60,000
Total Construction Cost		**$600,000**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	960
Repairs	$	2,500
Total Annual O&M Cost	**$**	**3,460**

Selected Alternative
King Street Drainage (KSDI)-Water Line Relocations Project

Engineer's Opinion of Probable Construction Costs

Item			Cost
Maintenance of Traffic		$	215,000
Soil Erosion and Sediment Control		$	40,000
As-Built Drawings		$	15,000
Testing		$	10,000
New Pipe, Fittings and Valves		$	648,935
Abandonment of Existing Pipe		$	46,500
Fire Hydrants		$	30,000
New Water Services		$	125,000
	Subtotal	***$***	***1,130,435***
	Contingency		169,565
Total Construction Cost			**$1,300,000**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	480
Repairs	$	2,500
Total Annual O&M Cost	**$**	**2,980**

Selected Alternative
1.0 MGD Expansion at the Existing LPRO WTP Project

Engineer's Opinion of Probable Construction Costs

Item		Cost
Raw Water Pumps, Valves and Piping	$	300,000
Booster Water Pump, Valves and Piping	$	25,000
Sand Strainer	$	80,000
Cartridge Filters	$	160,000
1.0 MGD Membrane Skid	$	700,000
Membrane Feed Pumps	$	150,000
4,000-Gallon Membrane Cleaning Tank	$	40,000
Degasifier Tower, Blower, Scrubber and Recirculation Pumps	$	600,000
Expansion of existing membrane process building	$	900,000
Electrical	$	675,000
Instrumentation	$	540,000
Site work, yard piping, storm water, etc.	$	400,000
Demolition of Lime Softening WTP Units	$	1,000,000
Subtotal	***$***	***5,570,000***
Mobilization, Insurance and Bonds	***$***	***1,510,000***
Contingency		920,000
Total Construction Cost		**$8,000,000**

Engineer's Opinion of Annual O&M Costs

Item		Cost
Labor	$	422,555
Electric Power	$	607,500
Chemicals	$	406,300
Other	$	655,000
Total Annual O&M Cost	**$**	**2,091,355**

APPENDIX B

Potential Source of Contamination to Municipal Water Supply Wells

» SWAPP Homepage
» Search By County
» Search by PWS Name or Number
» How to Help?

Definitions

» Aquifers
» Public Water Systems
» Assessment
» Potential Contaminants
» Susceptibility
» Prevention

Contact Us

» Email
» Mailing Address
» Source Water Protection Workshop

EPA Source Water Protection website

Source Water Assessment & Protection Program

Results for: 2015

ST. AUGUSTINE WTP
254 WEST KING STREET
ST. AUGUSTINE, FL 32084

Public Water System ID: 2550210
County: ST. JOHNS
DEP Regulatory Office: DEP Northeast District
8800 Baymeadows Way West, Suite 100
Jacksonville, FL 32256
904-256-1700
Public Water System Type : COMMUNITY
Public Water System Source : GROUND
Primary Use: MUNICIPAL/CITY
Population Served: 39648
Size of Assessment Area:
GROUND: For this community system, a 5-year ground water travel time around each well was used to define the assessment area. The 5-year ground water travel time is defined by the area from which water will drain to a well pumping at the average daily permitted rate for a five year period of time.

Number of Wells: 8

Well ID	Owner ID	FLUWID	Status	Well Depth(ft)	Aquifer
43290	D-13	AAC2800	ACTIVE	375	Floridan Aquifer
43289	S-13	AAC2799	ACTIVE	85	Floridan Aquifer
43286	D-10	AAL1679	ACTIVE	325	Floridan Aquifer
43284	D-9	AAL1699	ACTIVE	325	Floridan Aquifer
43283	D-8	AAC2796	ACTIVE	375	Floridan Aquifer
53424	D-4	AAL1745	ACTIVE	450	Floridan Aquifer
53423	D-3	AAL1744	ACTIVE	450	Floridan Aquifer
53403	D-2	AAL1899	ACTIVE	450	Floridan Aquifer

Results:

GROUND WATER:
A search of the data sources indicated no potential sources of

contamination.

Last updated: September 22, 2015

3900 Commonwealth
Boulevard M.S. 49
Tallahassee, Florida 32399
850-245-2118 (phone) /
850-245-2128 (fax)

APPENDIX C

Detailed Cost Information and Present Worth Analysis for all Alternatives

Non Selected Alternative
San Marco Water Main Replacement Project - in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
General Conditions	$	164,480
Maintenance of Traffic	$	250,000
As-Built Drawings	$	20,000
Testing	$	20,000
New Pipe, Fittings and Valves	$	870,000
Fire Hydrants	$	45,000
New Water Services	$	41,000
Abandoment of exisitng Water Main	$	90,000
Erosion and Sediment Control	$	25,000
Restoration	$	175,000
Road Restoration	$	520,000
Subtotal	***$***	***2,220,480***
Contingency		333,072
Total Construction Cost		**$2,553,552**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	960
Repairs	$	2,500
Total Annual O&M Cost	**$**	**3,460**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$2,553,552 + $3,460 x 8.476 - $0 x 0.7351 = **$ 2,582,879**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 29,327.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Non Selected Alternative
Fullerwood Water Main Replacement Project - in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Mobilization	$	143,000
Maintenance of Traffic	$	50,000
Soil Erosion and Sediment Control	$	20,000
As-Built Drawings	$	20,000
Testing	$	25,000
New Pipe, Fittings and Valves	$	634,000
Abandonment of Existing Pipe	$	94,000
Fire Hydrants	$	30,667
New Water Services	$	292,000
Road Restoration	$	280,000
Total Construction Cost		**$1,588,667**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,588,667 + $4,420 x 8.476 - $0 x 0.7351 = **$ 1,626,131**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 37,464.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Non Selected Alternative
Water Meter Replacement Project - manual meter in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
2,810 Water Meters (Size 5/8" through 2")	$	158,559
Removal & Installation of New Water Meters	$	146,356
Repairs of Boxes, Settings, Concrete during Installation	$	343,965
Total Construction Cost - Phase 1		**$648,880**

Item		Cost
2,410 Water Meters (Size 5/8" through 2")	$	628,355
Total Construction Cost - Phase 2		**$628,355**

Item		Cost
7,250 Water Meters (Size 5/8" through 10")	$	1,802,000
Total Construction Cost - Phase 3 - 5		**$1,802,000**

Total Construction Cost - Phase 1 - 5		$3,079,235

B. Engineer's Opinion of Annual O&M Costs

Item		Year 1 Cost
Personnel Expenses (Salaries, OT, Sick, FICA, Insurance, etc.)	$	382,923
Operating Expenses (Fleet, Equipment Repair, Fuel, Uniforms, Supplies, etc.)	$	115,593
Capital Outlay	$	13,934
Total Annual O&M Cost - Year 1	**$**	**512,450**
Total Annual O&M Cost - Year 2	**$**	**532,948**
Total Annual O&M Cost - Year 3	**$**	**554,266**
Total Annual O&M Cost - Year 4	**$**	**576,437**
Total Annual O&M Cost - Year 5	**$**	**599,494**
Total Annual O&M Cost - Year 6	**$**	**649,685**
Total Annual O&M Cost - Year 7	**$**	**660,730**
Total Annual O&M Cost - Year 8	**$**	**671,962**
Total Annual O&M Cost - Year 9	**$**	**723,386**
Total Annual O&M Cost - Year 10	**$**	**735,683**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	183,750
Total Salvage Value	**$**	**183,750**

D. Present Worth

$3,079,235 + $5,214,522 - $183,750 x 0.73512 = **$ 8,158,678.47**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ 135,078.97***

Present Worth Factor for varying Annual O&M Costs

	n =	1 - 10 years
	i =	0.03125
Varying Total O&M Costs	=1/(1+i)^n	
$512,450.00	n = 1	0.96969697
$532,948.00	n = 2	0.940312213
$554,265.92	n = 3	0.911817904
$576,436.56	n = 4	0.884187058
$599,494.02	n = 5	0.857393511
$649,685.42	n = 6	0.831411889
$660,730.07	n = 7	0.80621759
$671,962.48	n = 8	0.781786754
$723,385.84	n = 9	0.758096246
$735,683.40	n = 10	0.735123632

Present Worth of Annual O&M Costs - Year 1	**=**	***$ 496,921.21***
Present Worth of Annual O&M Costs - Year 2	**=**	***$ 501,137.51***
Present Worth of Annual O&M Costs - Year 3	**=**	***$ 505,389.59***
Present Worth of Annual O&M Costs - Year 4	**=**	***$ 509,677.74***
Present Worth of Annual O&M Costs - Year 5	**=**	***$ 514,002.28***
Present Worth of Annual O&M Costs - Year 6	**=**	***$ 540,156.18***
Present Worth of Annual O&M Costs - Year 7	**=**	***$ 532,692.20***
Present Worth of Annual O&M Costs - Year 8	**=**	***$ 525,331.37***
Present Worth of Annual O&M Costs - Year 9	**=**	***$ 548,396.09***
Present Worth of Annual O&M Costs - Year 10	**=**	***$ 540,818.25***
Total Present Worth of Annual O&M Costs		***$ 5,214,522.44***

Note: 1. Listed USDA NRCS Discount Rate for 2016 *3.125%*

Non Selected Alternative
North City Water Main Replacement Project - in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Maintenance of Traffic	$	150,000
Soil Erosion and Sediment Control	$	40,000
As-Built Drawings	$	15,000
Testing	$	10,000
New Pipe, Fittings and Valves	$	746,275
Abandonment of Existing Pipe	$	29,375
Fire Hydrants	$	68,775
New Water Services	$	265,200
Subtotal	***$***	***1,324,625***
Contingency		198,694
Total Construction Cost		**$1,523,319**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,523,319 + $4,420 x 8.476 - $0 x 0.7351 = **$ 1,560,783**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 37,464.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Non Selected Alternative
King Street 16-inch Sub-Aqueous Project - in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Project	$	-
Subtotal	***$***	**-**
Contingency		0
Total Construction Cost	***$***	**-**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	-
Repairs	$	-
Total Annual O&M Cost	**$**	**-**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$0 + $0 x 8.476 - $0 x 0.7351 = **$** **-**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$*** **-**

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$*** **-**

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

*No viable Alternative 2 for this project. FDOT will be removing the bridge and it is the City's understanding that a water main will not be allowed to attach to the bridge. Sub-Aquesous installation is the only alternative.

Non Selected Alternative
King Street Drainage (KSDI)-Water Line Relocations Project - in kind

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Maintenance of Traffic	$	215,000
Soil Erosion and Sediment Control	$	40,000
As-Built Drawings	$	15,000
Testing	$	10,000
New Pipe, Fittings and Valves	$	713,000
Abandonment of Existing Pipe	$	46,500
Fire Hydrants	$	30,000
New Water Services	$	125,000
Subtotal	***$***	***1,194,500***
Contingency		179,175
Total Construction Cost		**$1,373,675**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	480
Repairs	$	2,500
Total Annual O&M Cost	**$**	**2,980**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,373,675 + $2,980 x 8.476 - $0 x 0.7351 = **$ 1,398,934**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 25,258.61***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Non Selected Alternative
Upgrade Existing Lime Softening WTP

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Raw Water Pumps, Valves and Piping	$	300,000
Sand Strainer	$	80,000
Existing Clarifiers Modification	$	350,000
Additional Clarification System	$	1,000,000
Filters	$	750,000
Chemical System	$	250,000
Renovate Existing Lime Building	$	500,000
Electrical	$	675,000
Instrumentation	$	540,000
Site work, yard piping, storm water, etc.	$	400,000
Pumps, Mixers and Mechanical	$	500,000
Demolition	$	200,000
Lime Storage Silo	$	400,000
Subtotal	***$***	***5,945,000***
Contingency		1,189,000
Total Construction Cost		**$7,134,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Labor	$	563,407
Electric Power	$	204,668
Chemicals	$	175,156
Other	$	399,034
Total Annual O&M Cost	**$**	**1,342,265**

C. Engineer's Opinion of Salvage Value

Item		Cost
Pumps, Mixers and Mechanical	$	160,000
Sand Strainer	$	32,000
Clarification System	$	450,000
Filters	$	225,000
Lime Building	$	200,000
Lime Storage Silo	$	160,000
Total Salvage Value	**$**	**1,227,000**

D. Present Worth

$7,134,000 + $1,342,265 x 8.476 - $1,227,000 x 0.7351 = **$ 17,609,103**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ 901,997***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 11,377,099.77***

Note: 1. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
San Marco Water Main Replacement Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
General Conditions	$	198,000
Maintenance of Traffic	$	35,000
As-Built Drawings	$	20,000
Testing	$	20,000
New Pipe, Fittings and Valves	$	2,000,000
Fire Hydrants	$	45,000
New Water Services	$	41,000
Road Restoration	$	207,000
Subtotal	***$***	***2,566,000***
Contingency		334,000
Total Construction Cost		**$2,900,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	960
Repairs	$	2,500
Total Annual O&M Cost	**$**	**3,460**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$2,900,000 + $3,460 x 8.476 - $0 x 0.7351 = **$ 2,929,327**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 29,327.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
Fullerwood Water Main Replacement Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Mobilization	$	143,000
Maintenance of Traffic	$	50,000
Soil Erosion and Sediment Control	$	20,000
As-Built Drawings	$	20,000
Testing	$	25,000
New Pipe, Fittings and Valves	$	730,000
Abandonment of Existing Pipe	$	94,000
Fire Hydrants	$	46,000
New Water Services	$	292,000
Road Restoration	$	280,000
Total Construction Cost		**$1,700,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,700,000 + $4,420 x 8.476 - $0 x 0.7351 = **$ 1,737,464**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 37,464.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
Water Meter (AMR) Replacement Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
2,810 Meters Without Register or Encoder	$	158,559
Register/Encoder	$	526,688
Removal & Installation of New Water Meters	$	163,210
Repairs of Boxes, Settings, Concrete during Installation	$	343,965
Total Construction Cost - Phase 1		**$1,192,422**

Item		Cost
2,410 Water Meters (Size 5/8" through 2")	$	1,050,000
Total Construction Cost - Phase 2		**$1,050,000**

Item		Cost
7,250 Water Meters (Size 5/8" through 10")	$	3,150,000
Total Construction Cost - Phase 3 - 5		**$3,150,000**

Total Construction Cost - Phase 1 - 5	$5,392,422

B. Engineer's Opinion of Annual O&M Costs

Item		Year 1 Cost
Personnel Expenses (Salaries, OT, Sick, FICA, Insurance, etc.)	$	387,672
Operating Expenses (Fleet, Equipment Repair, Fuel, Uniforms, Supplies, etc.)	$	115,590
Capital Outlay	$	13,934
Total Annual O&M Cost - Year 1	**$**	**517,196**
Total Annual O&M Cost - Year 2	**$**	**452,547**
Total Annual O&M Cost - Year 3	**$**	**395,978**
Total Annual O&M Cost - Year 4	**$**	**346,481**
Total Annual O&M Cost - Year 5	**$**	**303,171**
Total Annual O&M Cost - Year 6	**$**	**306,203**
Total Annual O&M Cost - Year 7	**$**	**309,265**
Total Annual O&M Cost - Year 8	**$**	**312,357**
Total Annual O&M Cost - Year 9	**$**	**315,481**
Total Annual O&M Cost - Year 10	**$**	**318,636**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	1,898,750
Total Salvage Value	**$**	**1,898,750**

D. Present Worth

$5,392,422 + $3,075,922 - $1,898,750 x 0.73512 = **$ 7,072,527.93**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ 1,395,816.00***

Present Worth Factor for varying Annual O&M Costs

	n =	1 - 10 years
	i =	0.03125
Varying Total O&M Costs	=1/(1+i)^n	
$517,196	n = 1	0.969696970
$452,547	n = 2	0.940312213
$395,978	n = 3	0.911817904
$346,481	n = 4	0.884187058
$303,171	n = 5	0.857393511
$306,203	n = 6	0.831411889
$309,265	n = 7	0.806217590
$312,357	n = 8	0.781786754
$315,481	n = 9	0.758096246
$318,636	n = 10	0.735123632

Present Worth of Annual O&M Costs - Year 1	**=**	***$ 501,523.39***
Present Worth of Annual O&M Costs - Year 2	**=**	***$ 425,535.00***
Present Worth of Annual O&M Costs - Year 3	**=**	***$ 361,060.00***
Present Worth of Annual O&M Costs - Year 4	**=**	***$ 306,353.94***
Present Worth of Annual O&M Costs - Year 5	**=**	***$ 259,936.68***
Present Worth of Annual O&M Costs - Year 6	**=**	***$ 254,580.41***
Present Worth of Annual O&M Costs - Year 7	**=**	***$ 249,334.51***
Present Worth of Annual O&M Costs - Year 8	**=**	***$ 244,196.70***
Present Worth of Annual O&M Costs - Year 9	**=**	***$ 239,164.77***
Present Worth of Annual O&M Costs - Year 10	**=**	***$ 234,236.53***
Total Present Worth of Annual O&M Costs		***$ 3,075,921.93***

Note: 1. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
North City Water Main Replacement Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Maintenance of Traffic	$	80,000
Soil Erosion and Sediment Control	$	40,000
As-Built Drawings	$	15,000
Testing	$	10,000
New Pipe, Fittings and Valves	$	905,127
Abandonment of Existing Pipe	$	29,375
Fire Hydrants	$	91,700
New Water Services	$	265,200
Subtotal	***$***	***1,436,402***
Contingency		143,640
Total Construction Cost		**$1,580,042**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	1,920
Repairs	$	2,500
Total Annual O&M Cost	**$**	**4,420**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,580,042 + $4,420 x 8.476 - $0 x 0.7351 = **$ 1,617,506**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 37,464.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
King Street 16-inch Sub-Aqueous Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
General Conditions	$	105,000
Mobilization	$	10,000
Maintenance of Traffic	$	10,000
Payment and Performance Bond	$	15,000
HDPE Pipe, Pipe Fittings, Valves and HDD	$	330,000
Site Restoration	$	20,000
Remove Existing 16-inch Pipe	$	30,000
Testing	$	15,000
As-Built Drawings	$	5,000
Subtotal	***$***	***540,000***
Contingency		60,000
Total Construction Cost		**$600,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	960
Repairs	$	2,500
Total Annual O&M Cost	**$**	**3,460**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$600,000 + $3,460 x 8.476 - $0 x 0.7351 = **$ 629,327**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 29,327.11***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
King Street Drainage (KSDI)-Water Line Relocations Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Maintenance of Traffic	$	215,000
Soil Erosion and Sediment Control	$	40,000
As-Built Drawings	$	15,000
Testing	$	10,000
New Pipe, Fittings and Valves	$	648,935
Abandonment of Existing Pipe	$	46,500
Fire Hydrants	$	30,000
New Water Services	$	125,000
Subtotal	***$***	***1,130,435***
Contingency		169,565
Total Construction Cost		**$1,300,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Crew Maintenance (Flushing, Valve Exercising, Fleet, Fuel and Staff)	$	480
Repairs	$	2,500
Total Annual O&M Cost	**$**	**2,980**

C. Engineer's Opinion of Salvage Value

Item		Cost
Salvage Value	$	-
Total Salvage Value	**$**	**-**

D. Present Worth

$1,300,000 + $2,980 x 8.476 - $0 x 0.7351 = **$ 1,325,259**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ -***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 25,258.61***

Note: 1. Water mains will have no salvageable value after being in the ground for 10 years
2. Listed USDA NRCS Discount Rate for 2016 3.125%

Selected Alternative
1.0 MGD Expansion at the Existing LPRO WTP Project

A. Engineer's Opinion of Probable Construction Costs

Item		Cost
Raw Water Pumps, Valves and Piping	$	300,000
Booster Water Pump, Valves and Piping	$	25,000
Sand Strainer	$	80,000
Cartridge Filters	$	160,000
1.0 MGD Membrane Skid	$	700,000
Membrane Feed Pumps	$	150,000
4,000-Gallon Membrane Cleaning Tank	$	40,000
Degasifier Tower, Blower, Scrubber and Recirculation Pumps	$	600,000
Expansion of existing membrane process building	$	900,000
Electrical	$	675,000
Instrumentation	$	540,000
Site work, yard piping, storm water, etc.	$	400,000
Demolition of Lime Softening WTP Units	$	1,000,000
Subtotal	***$***	***5,570,000***
Mobilization, Insurance and Bonds	***$***	***1,510,000***
Contingency		920,000
Total Construction Cost		**$8,000,000**

B. Engineer's Opinion of Annual O&M Costs

Item		Cost
Labor	$	422,555
Electric Power	$	607,500
Chemicals	$	406,300
Other	$	655,000
Total Annual O&M Cost	**$**	**2,091,355**

C. Engineer's Opinion of Salvage Value

Item		Cost
Membrane		
Pumps (Raw Water, Booster, Membrane Feed)	$	95,000
Sand Strainer	$	40,000
Cartridge Filters	$	80,000
1.0 MGD Membrane Skid	$	210,000
Cleaning System	$	20,000
Degasification System	$	120,000
Membrane process building	$	675,000
Total Salvage Value	**$**	**1,240,000**

D. Present Worth

$8,000,000 + $2,091,355 x 8.476 - $1,240,000 x 0.7351 = **$ 24,814,865**

Present Worth Factor for Salvage Value

	n =	10 years
	i =	0.03125
PWF for Salvage Value	=1/(1+i)^n	0.735123632
Present Worth of Salvage Value	**=**	***$ 911,553.30***

Present Worth Factor for Annual O&M Costs

	n =	10 years
	i =	0.03125
	=(1-(1+i)^(-n))/i	8.476043766
Present Worth of Annual O&M Costs	**=**	***$ 17,726,417.95***

Note: 1. Listed USDA NRCS Discount Rate for 2016 3.125%

APPENDIX D

2014 Annual Water Main Report

Annual Water Main Improvements Plan Report

January 9

2014

Annual report on evaluating and recommending the replacement of existing water mains and/or proposed construction of new water mains within the City's utility service area.

City of St. Augustine
P.O. Box 210 | St. Augustine, FL | 32085 | (904) 825-1040

Prepared By
Reuben C. Franklin Jr., P.E., CFM | Engineer II

Approved By
William G. Mendez, P.E. | Engineering Manager & Martha S. Graham, P.E. | Public Works Director

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Plan Summary

The City of St. Augustine's Public Works Department has been working to identify water main improvements that shall be designed and constructed using bond monies acquired in 2011 and 2012. The push for increased water main improvements in 2012/2013 was generated by recurring "red water" complaints throughout the City. At first, a solution to the "red water" problem was focused at the City's Water Treatment Plant finished water product, however, over a period of time it became apparent that the "red water" solution requires a multiple step approach with an emphasis on the replacement of the City's potable water infrastructure that is mainly composed of cast iron (CI) and galvanized steel (GS) pipes. The City has implemented the following three step approach to solve the City's "red water" problem:

1. Water main replacement;
2. Unidirectional flushing; and
3. Corrosion control of the finished water product.

The water main replacement step is a long term plan that increases the annual water main improvements constructed in a year by the City. The following table describes the long term water main replacement catch up analysis:

Water Main Inventory & Replacement (Catch-Up) Analysis (Table 01)

Materials	Inventory (miles)	Material Breakdown of Inventory (%)	Proposed Replacement	Preliminary Cost Estimate	Updated Inventory (miles) 12/16/2013	Updated Material Breakdown of Inventory (%) 12/16/2013
PVC	134	67%	-	-	136.2	68.4%
Cast Iron (CI)	55	28%	-	-	53.26	26.8%
CI < 6"	*10*	*18%*	100%	$5,170,176	*9.41*	*17.7%*
CI = 6"	*28*	*51%*	50%	$7,096,320	*27.32*	*51.3%*
Galvanized Steel (GS)	9	4%	100%	$4,352,072	8.55	4.3%
Ductile Iron (DI)	1	1%	-	-	1	0.5%
			Total	**$16,618,568**	**199.01**	
	1% Annual:	$1.6 million				
	5-Year Catch-Up:	$3.3 million/yr				
	10-Year Catch-Up:	$1.6 million/yr				

This report focuses on the first step and phase in the City's approach to solve the "red water" problem. Since funding is limited not all of the CI and GS pipes in the City can be replaced at once and therefore the Public Works Department needed to set criteria in order to select pipes for replacement. The following set of criteria was used to review and identify pipes for replacement:

1. Pipe material is cast iron (CI) or galvanized steel (GS).
2. "Red water" complaints were recorded in the vicinity of the pipe.
3. Is there a clean water source for the pipe?
4. Is there inadequate fire flow (< 500gpm @ 20 psi)?
5. Is the pipe routinely maintained due to leaks or breaks?

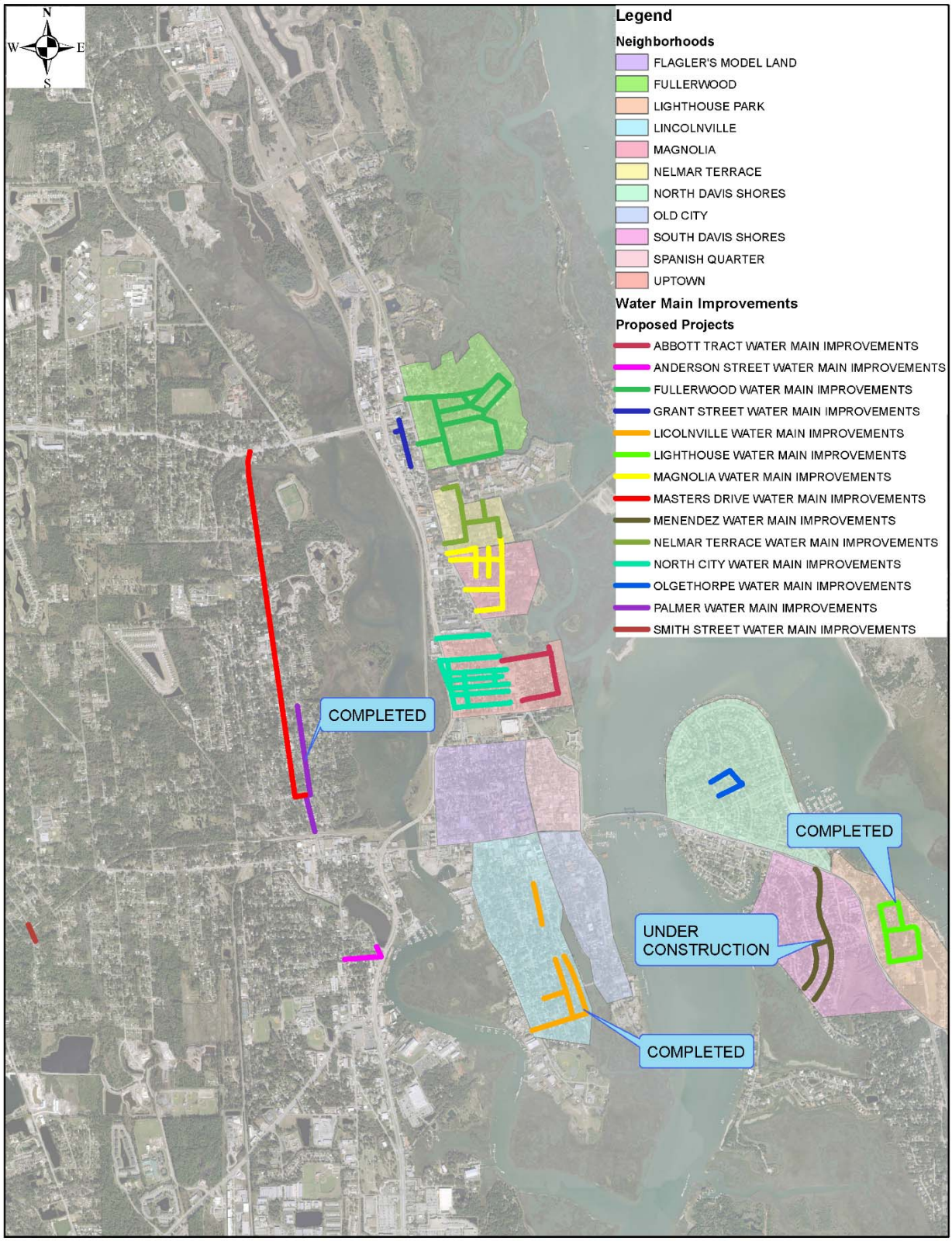
The water main improvement projects contained in this report were developed using the above listed criteria. Once these improvements are constructed there should be a dramatic improvement to the City's aesthetic water quality, fire flow and maintenance. Additionally, once these improvements are implemented the City shall be in a favorable position to continue tracking and isolating the remaining areas with "red water" complaints.

The allocated bond budget for this first phase of the water main improvements is $1,841,600.00 for 2011 and $4,530,000.00 for 2012, totaling $6,371,600.00. This means that in order to complete the long term water main improvements an investment of approximately $10, 246,968.00 is required in the upcoming 5 to 10 years.

In addition to bond funded water main improvements, the City's operating utility fund has budgeted for Anderson Street, Olgethorpe and Smith Street improvements scheduled to be designed and constructed in-house during 2014.

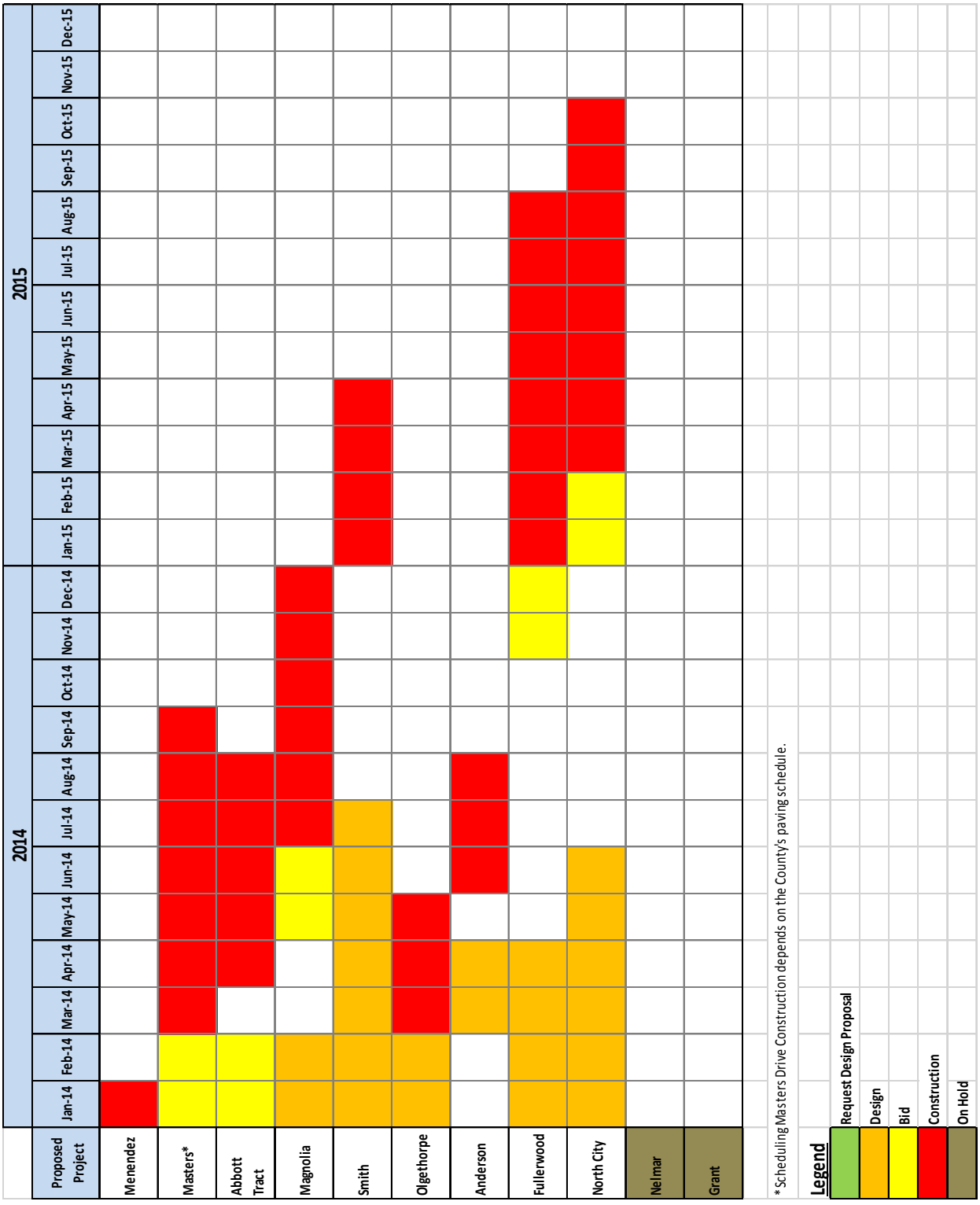
In 2013, Lincolnville, Lighthouse and Palmer Street water main improvements were completed. The following figure provides an overall project location map for the proposed, under construction and completed water main improvements:

Overall Project Location Map (Figure 01)



The following table provides an overall implementation schedule for the proposed water main improvements:

Implementation Schedule (Table 02)



Proposed Water Main Improvement Projects

Abbott Tract Water Main Improvements

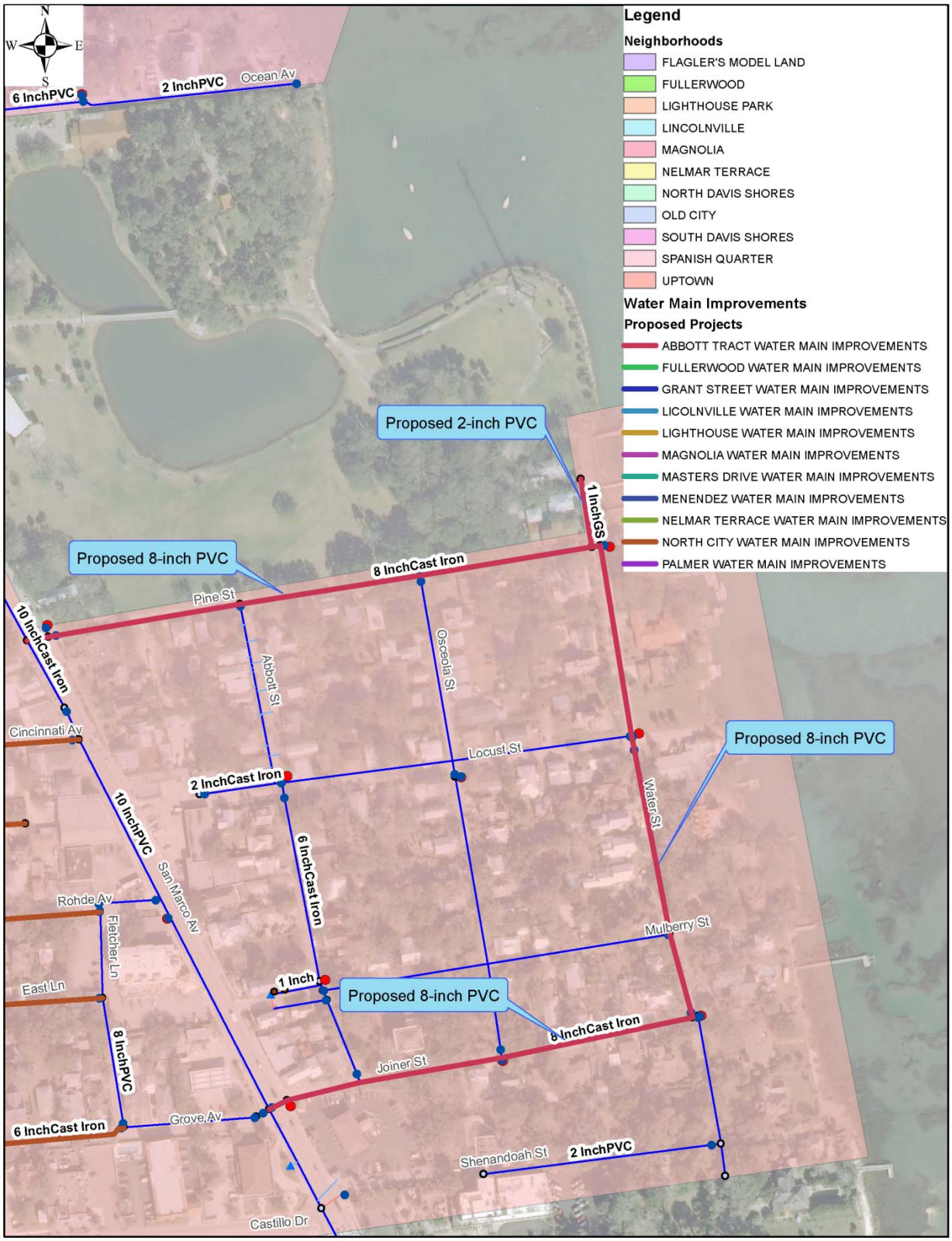
Scope of Work

Replace approximately 900 linear feet (LF) of existing 6-inch CI pipe on Water Street, 1,100 LF of existing 8-inch CI pipe on Pine Street and 900 LF of existing 8-inch CI pipe on Joiner Street with a total of 2,900 LF of 8-inch PVC pipe. Replace approximately 130 LF of existing 1-inch GS pipe with 2-inch PVC pipe. A FDOT utility permit will be required for the two water main connections on San Marco Avenue.

In addition to the proposed water main improvements, an inflow and infiltration (I&I) for the sanitary sewer system and stormwater assessment shall be conducted for Abbott Tract. All work identified in the assessments should be incorporated into the construction plan set for the water main improvements.

The I&I assessment has been completed and the project is currently finishing design. Replacement of sewer laterals has been added to the scope of work.

Project Location Map (Figure 02)



Anderson Street Water Main Improvements

Scope of Work

Replace approximately 402 linear feet (LF) of existing 6-inch CI pipe on Anderson Street beginning at South Dixie Highway and heading east, replace approximately 654 linear feet (LF) of 2-inch CI pipe along Anderson Street and on north Rio Vista Drive connecting to Spencer Street.

This project will be designed and constructed by the City.

Project Location Map (Figure 03)

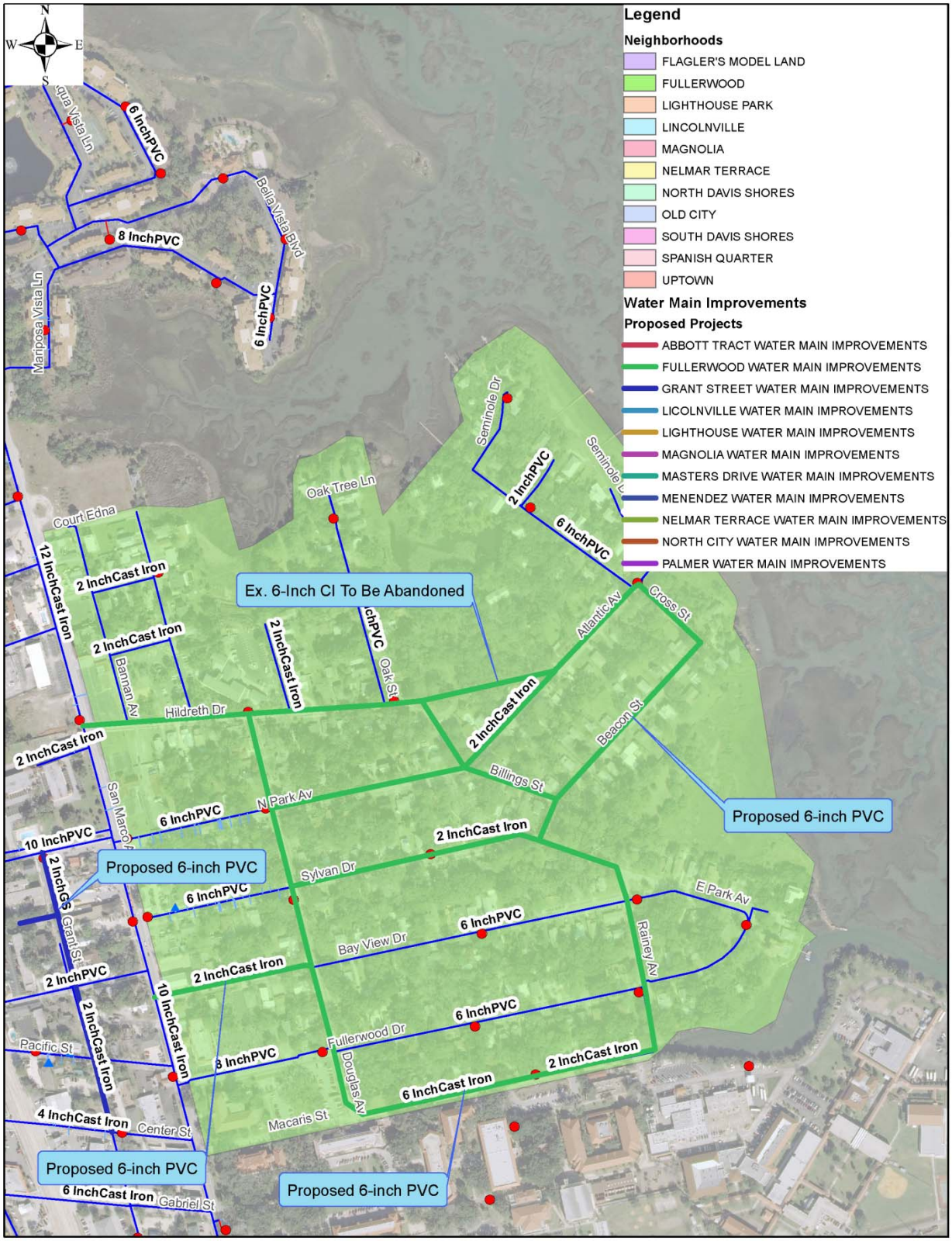
Fullerwood Water Main Improvements

Scope of Work

In the Fullerwood neighborhood replace approximately 2,800 linear feet (LF) of existing 2-inch CI pipe and 6,500 LF of existing 6-inch CI pipe with a total of 9,300 LF of 6-inch PVC pipe. Install 700 LF of 6-inch PVC pipe along North Park Avenue between Douglas Avenue and Barbour Place. Abandon in place approximately 500 LF of 6-inch CI pipe between Hildreth Drive and Atlantic Avenue. A FDOT utility permit will be required for the two water main connections on San Marco Avenue.

Project is currently under design.

Project Location Map (Figure 04)



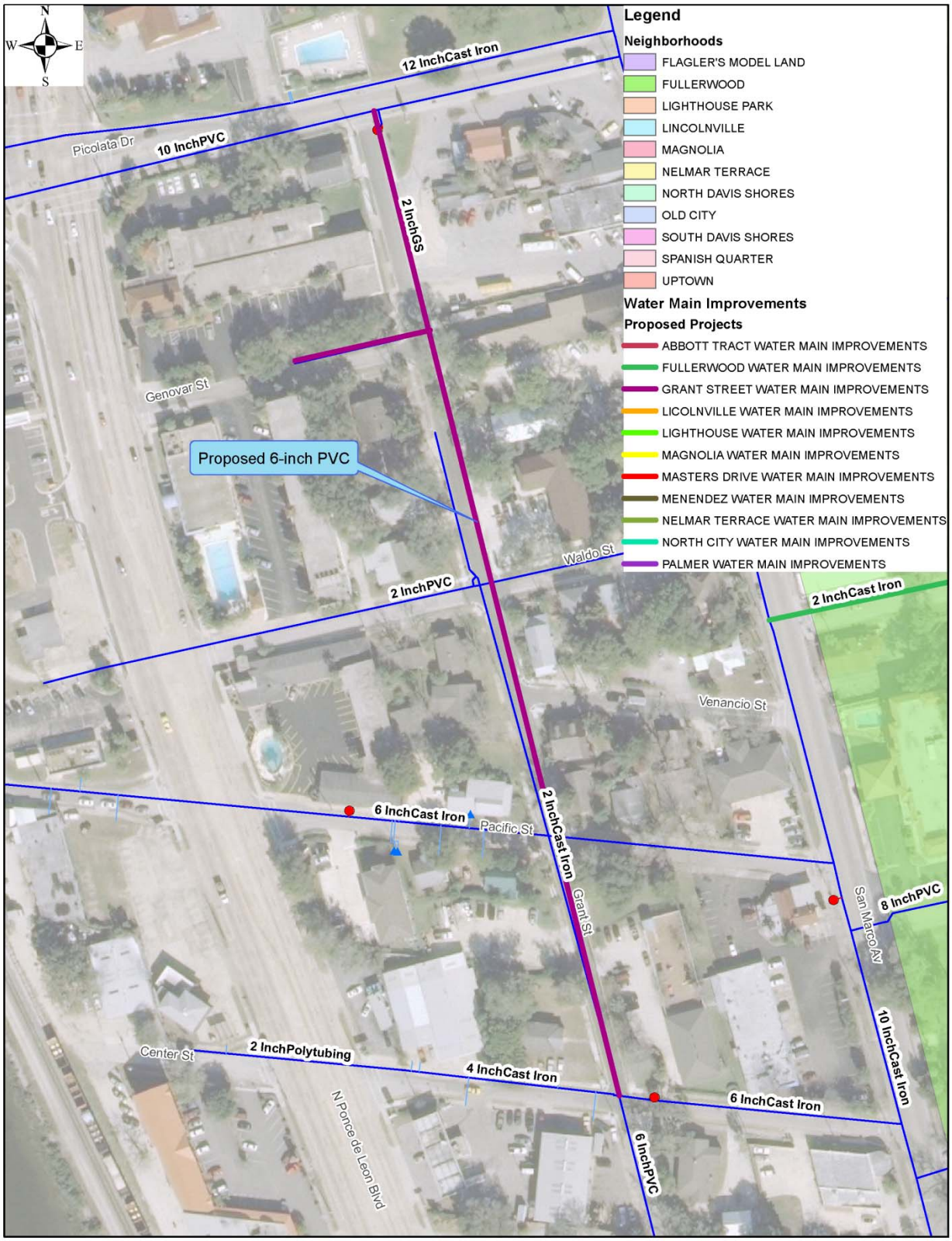
Grant Street Water Main Improvements

Scope of Work

Replace approximately 1,200 LF of 2-inch CI pipe with 6-inch PVC pipe between Picolata Drive and Center Street.

Project is on hold.

Project Location Map (Figure 05)



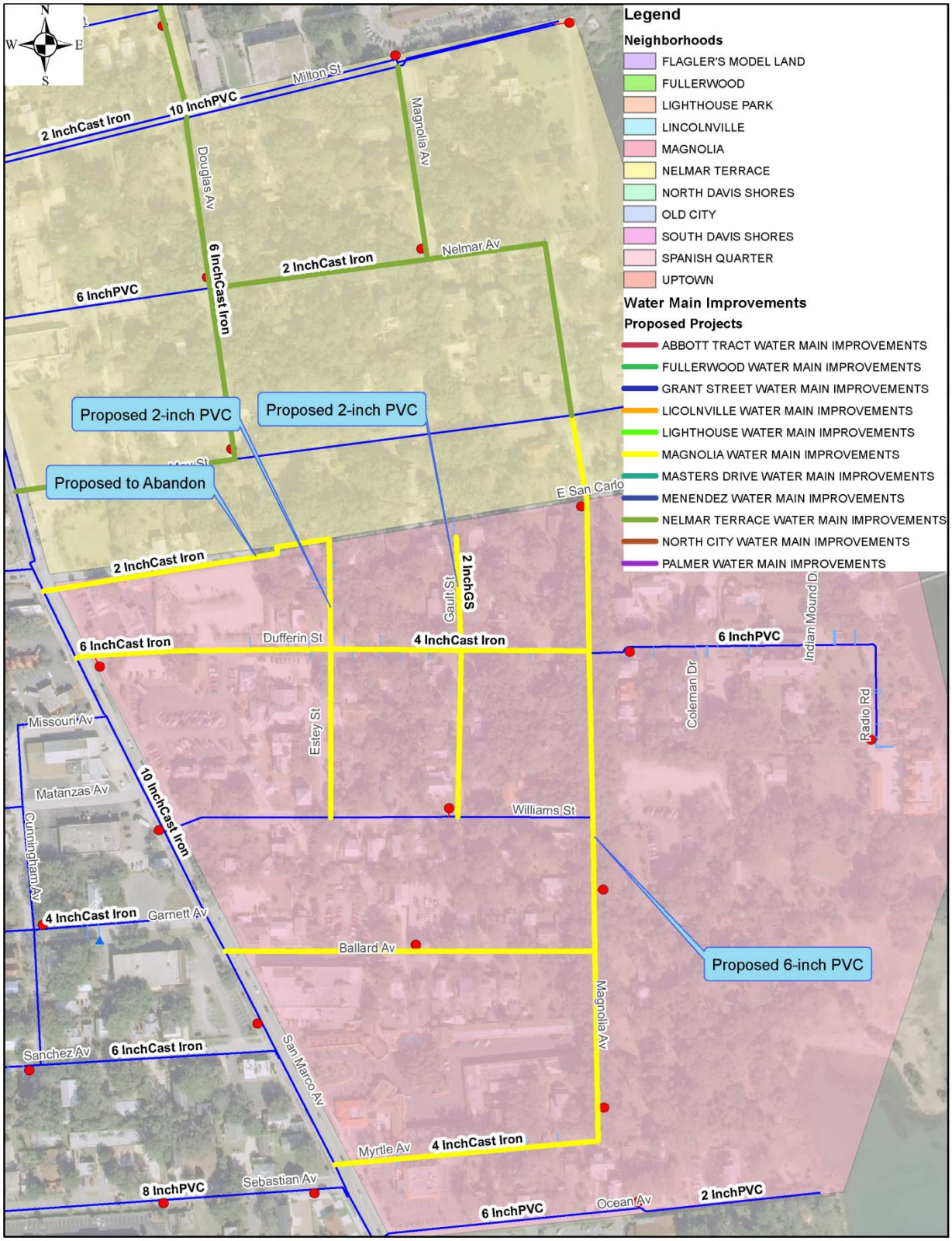
Magnolia Water Main Improvements

Scope of Work

Replace 4,844 LF of existing 2-inch and 6-inch CI with 6-inch PVC pipe along Dufferin Street between San Marco Avenue and Magnolia Avenue, Estey Street between Dufferin Street and Williams Street, Gault Street between Dufferin Street and Williams Street, Magnolia Avenue between May Street and Myrtle Avenue, Ballard Avenue between San Marco Avenue and Magnolia Avenue and Myrtle Avenue between San Marco Avenue and Magnolia Avenue. Replace 2-inch GS with 2-inch PVC pipe on Gault Street north of Dufferin Street and 2-inch CI with 2-inch PVC on Estey Street north of Dufferin Street. Abandon the 2-inch CI pipe along East San Carlos between San Marco Avenue and Estey Street. A FDOT utility permit will be required for proposed water main connections along San Marco Avenue.

Project is currently under design.

Project Location Map (Figure 06)



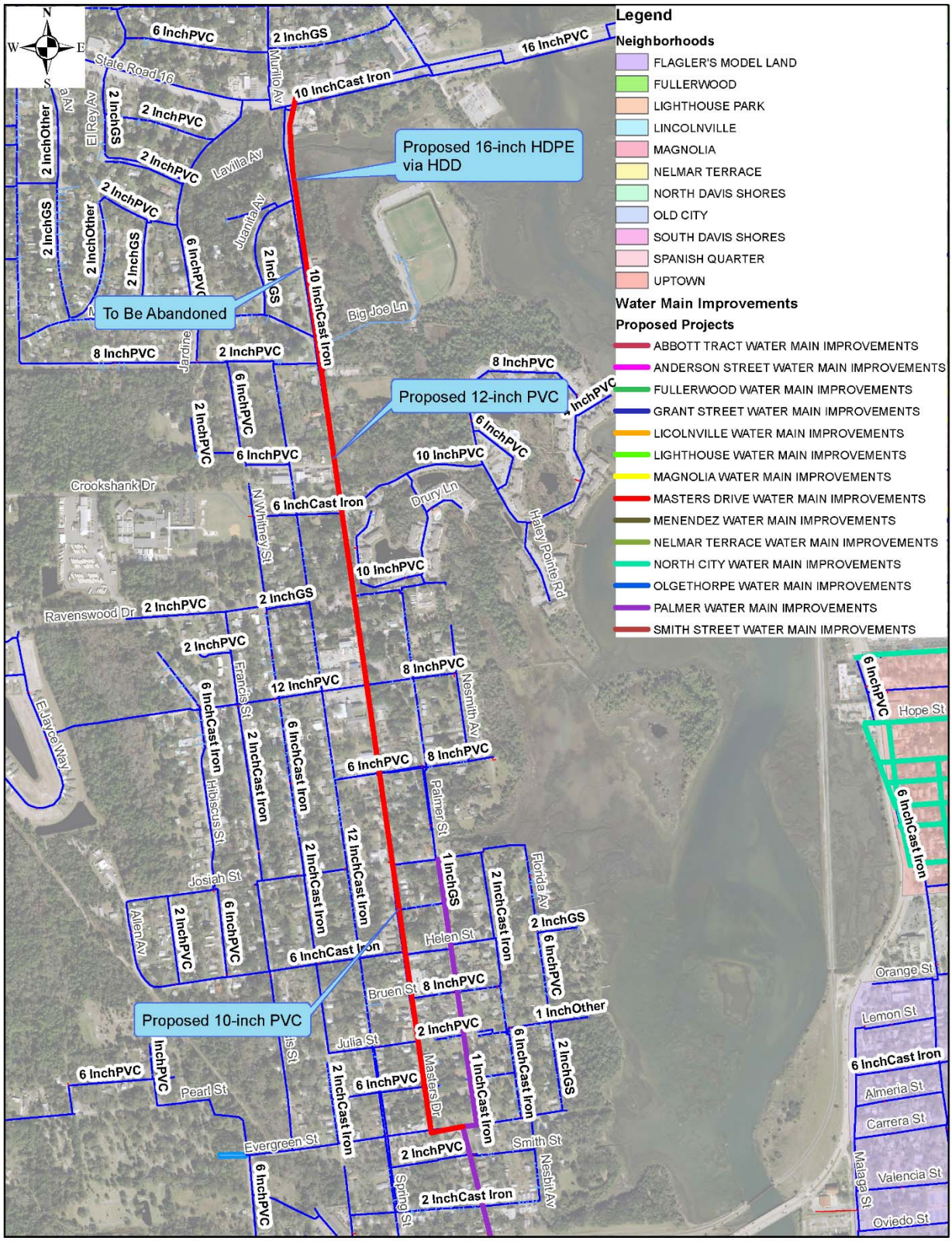
Masters Drive Water Main Improvements

Scope of Work

Install 3,170 LF of 12-inch PVC pipe along Masters Drive from S.R. 16 to Ravenswood Drive. Install 460 LF of 16-inch HDPE pipe by directional drill under a stream near the intersection of Masters Drive and S.R. 16. Abandon in place the existing 10 and 12-inch CI pipe along Masters Drive.

Project scope of work was increased to include water main and sewer lateral replacement from Ravenswood Drive to Palmer Street. The additional work includes installation of 4,200 LF 10-inch PVC pipe.

Project Location Map (Figure 07)



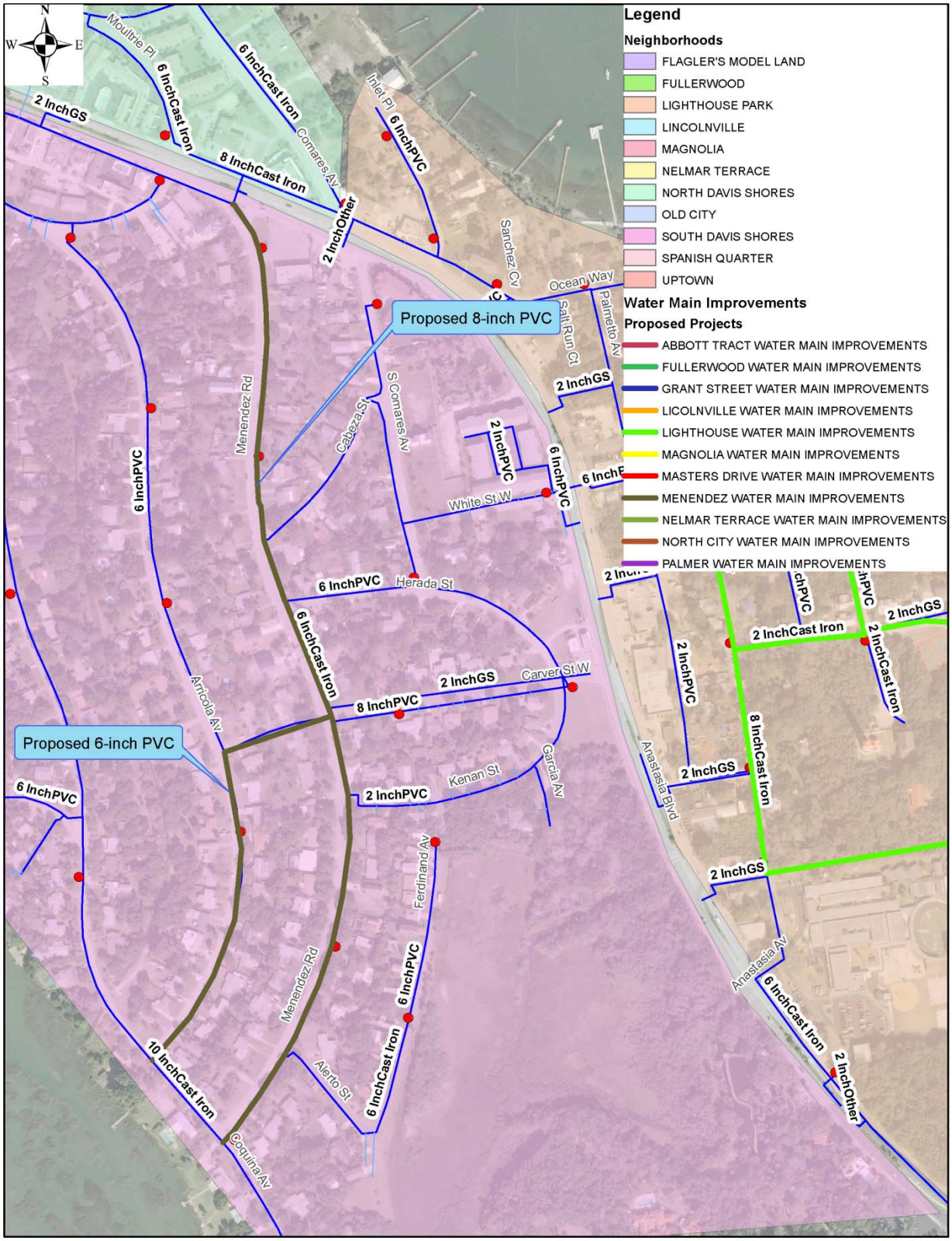
Menendez Water Main Improvements

Scope of Work

Replace 3,035 LF of existing 6-inch CI with 8-inch PVC pipe along Menendez Road between Anastasia Boulevard and Coquina Avenue. Replace 1,025 LF of existing 6-inch CI with 6-inch PVC along Arricola Avenue from Carver Street to Coquina Avenue. Replace 350 LF of existing 6-inch CI with 6-inch PVC pipe along Carver Street between Arricola Avenue and Menendez Road.

Project is under construction.

Project Location Map (Figure 08)



Nelmar Water Main Improvements

Scope of Work

Install 511 LF of 6-inch PVC pipe connecting to the existing 10-inch PVC pipe on Genoply Street and running to the intersection of Douglas Avenue and Alfred Street. Abandon the existing 3/4 inch service line on Genoply Street. Replace existing 3,049 LF of 6-inch CI with 6-inch PVC pipe along Douglas Avenue between Alfred Street and May Street, Magnolia Avenue between Milton Street and Nelmar Avenue, Nelmar Avenue between Douglas Avenue and Magnolia Avenue, Magnolia Avenue between Nelmar Avenue and May Street and May Street between San Marco Avenue and Douglas Avenue. A FDOT utility permit will be required for replacing the water main along May Street.

Project is on hold.

Project Location Map (Figure 9)

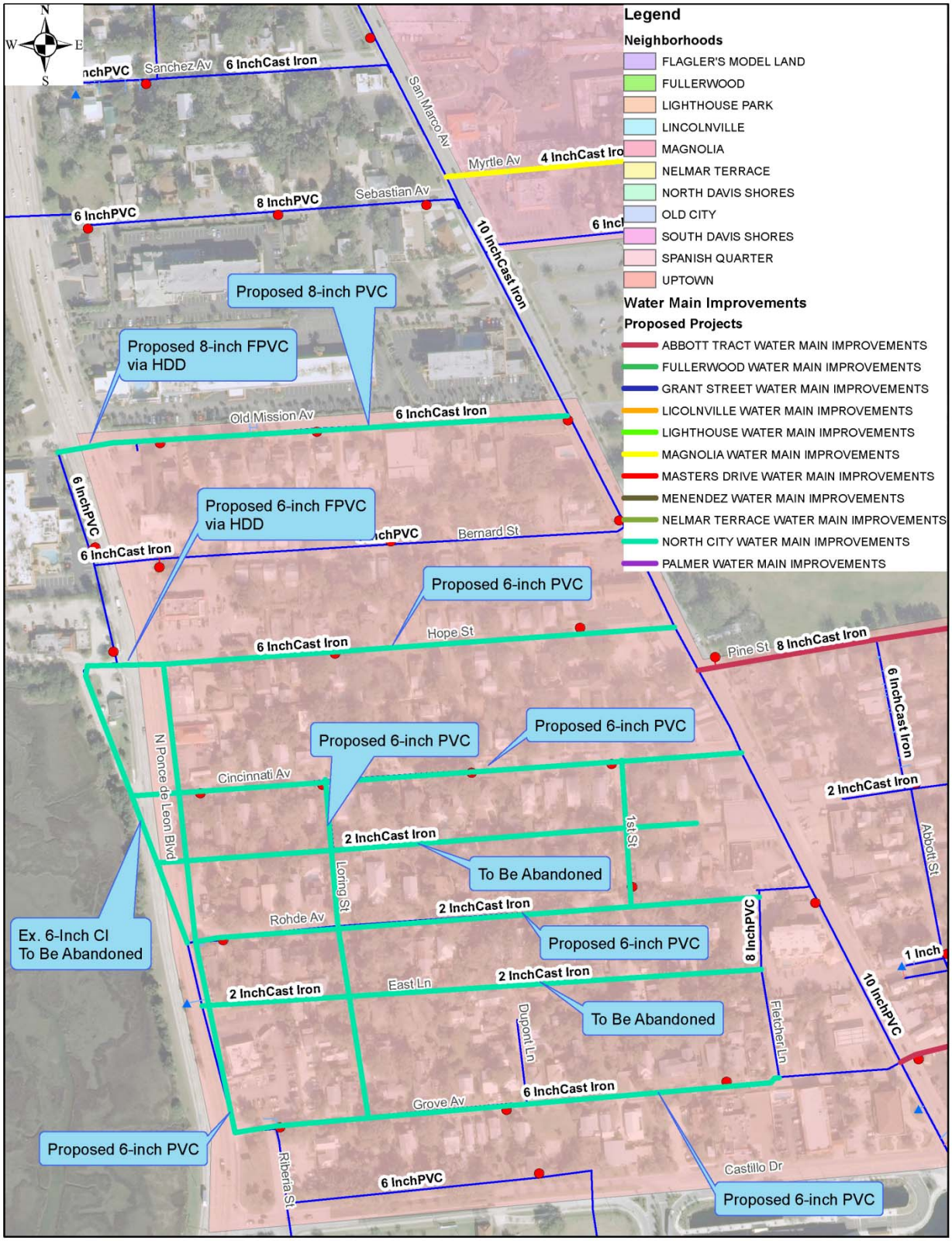
North City Water Main Improvements

Scope of Work

Replace 1,142 LF of existing 6-inch CI with 8-inch PVC pipe from San Marco Avenue to the west side of U.S. 1. Replace 1,260 LF of existing 6-inch CI with 6-inch PVC pipe along Cincinnati Avenue between San Marco Avenue and U.S. 1. Replace existing 2 and 6-inch CI with 6-inch PVC pipe along Loring Street between Cincinnati Avenue and Grove Avenue. Replace 330 LF of existing 6-inch CI with 6-inch PVC pipe along 1st Street between Cincinnati Avenue and Rohde Avenue. Replace 1,265 LF of existing 2-inch CI with 6-inch PVC pipe along Rohde between Fletcher Lane and U.S. 1. Replace 1,230 LF of existing 6-inch CI with 6-inch PVC pipe along Grove Avenue between Fletcher Lane and U.S. 1. Replace 430 LF of existing 6-inch CI with 6-inch PVC pipe along U.S. 1 between Grove Avenue and Rohde Avenue. Install 620 LF of 6-inch PVC pipe along U.S. 1 between Rohde Avenue and Hope Street. Abandon existing 2-inch CI pipes along East Lane alley and alley between Cincinnati Avenue and Rohde. Special attention is to be paid to transferring the residential and commercial water services from the alleys to Cincinnati Avenue and Rohde Avenue. The existing 6-inch CI pipe crossing U.S. 1 diagonally is to be abandoned. A FDOT utility permit is required for the work proposed at San Marco Avenue and U.S. 1.

Project is under design.

Project Location Map (Figure 10)



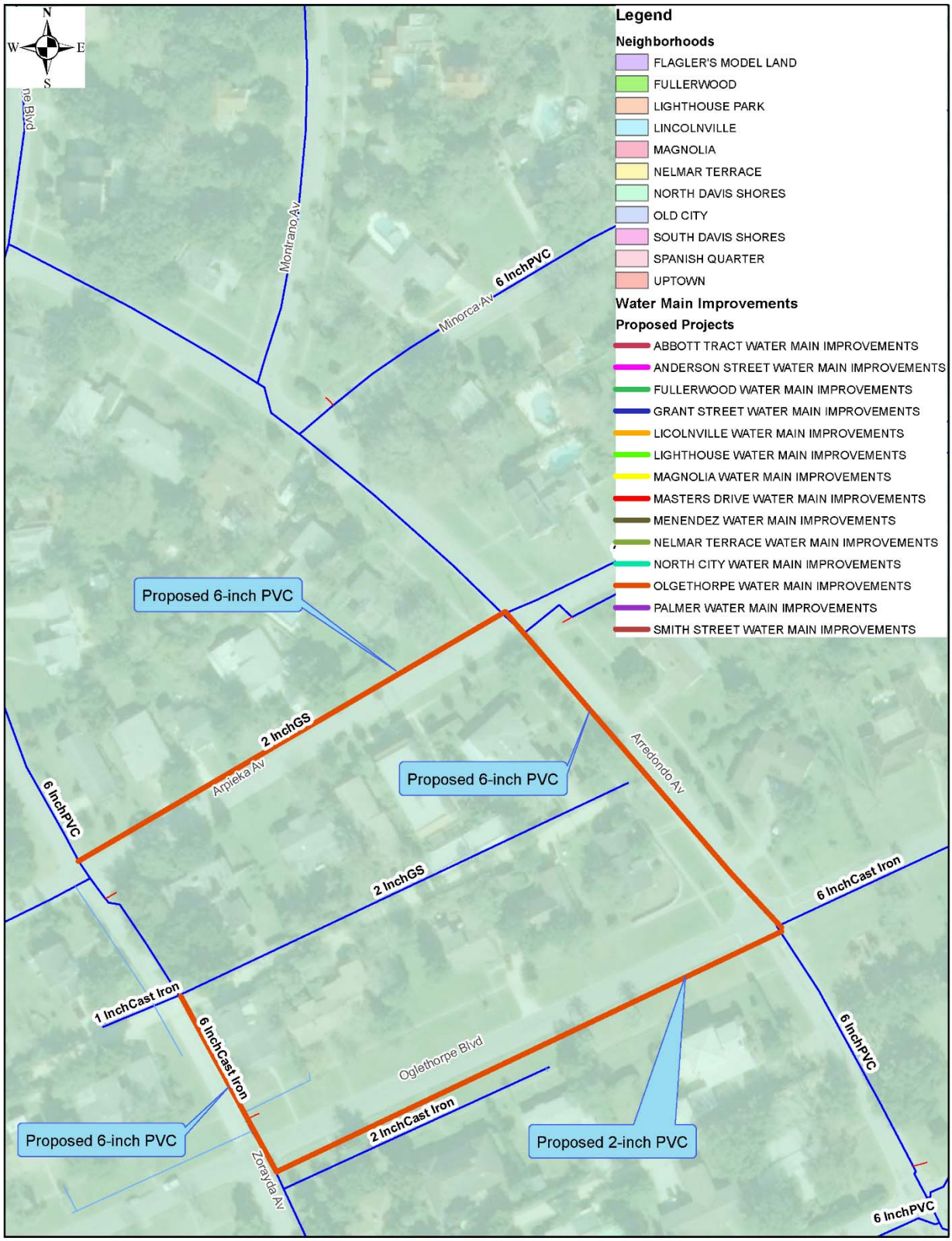
Olgethorpe Water Main Improvements

Scope of Work

Install approximately 210 LF of 6-inch PVC pipe along Zorayda Avenue, 375 LF of 6-inch PVC pipe along Arrendondo Avenue from Arpieka to Olgethorpe, 475 LF of 6-inch PVC pipe along Arpieka Avenue from Arrendondo to Zorayda and 540 LF of 2-inch PVC pipe along Olgethorpe Boulevard from Zorayda to Arrendondo. This project will be designed and constructed by the City.

Project is under design.

Project Location Map (Figure 11)



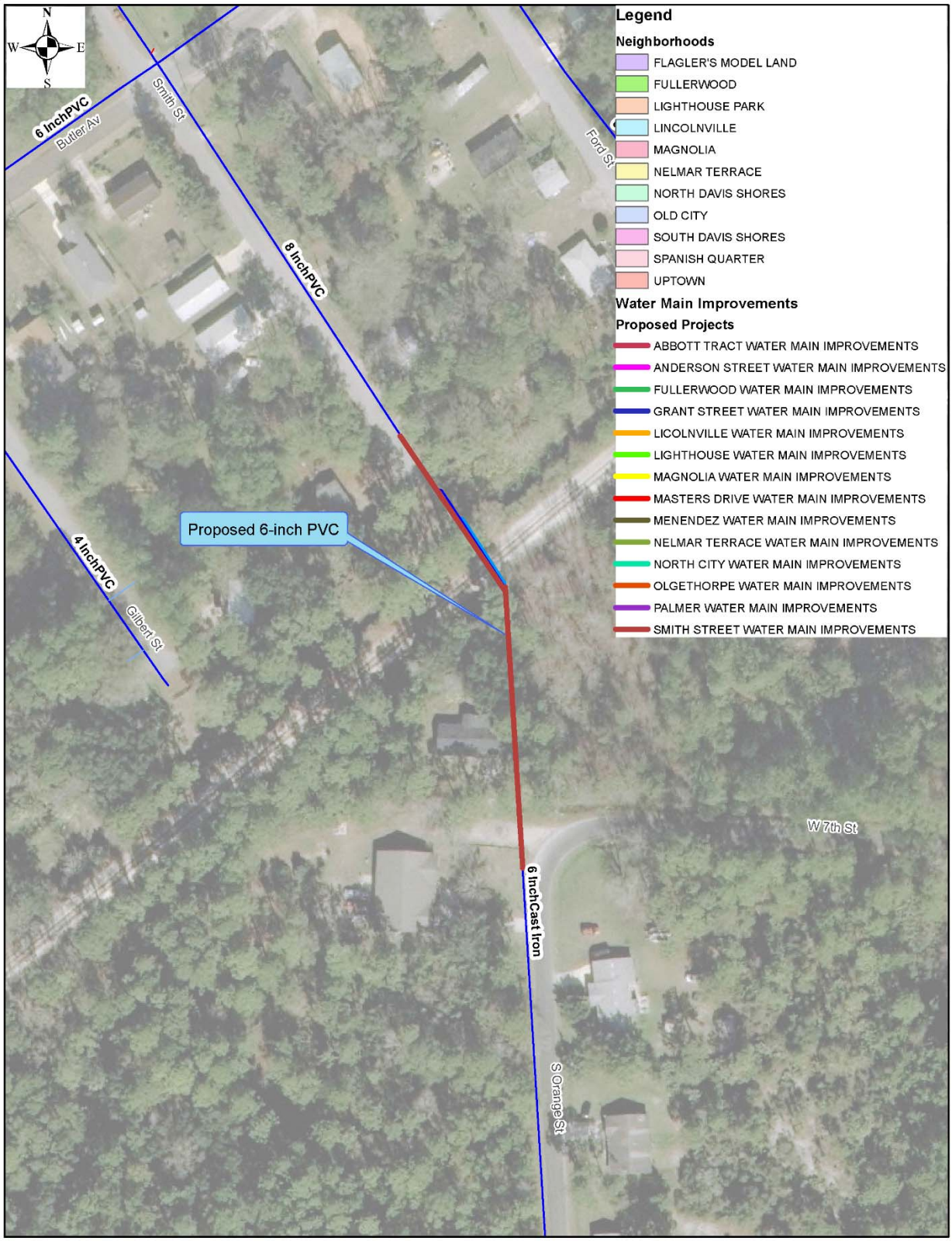
Smith Street Water Main Improvements

Scope of Work

Design, permit and construct the replacement of approximately 350 LF of existing 6-inch water main along the south end of Smith Street, across F.E.C. railroad tracks and along the north end of South Orange Street from the railroad tracks to 7th Street. Design and construction will be performed by the City.

Project is under design.

Project Location Map (Figure 12)



Preliminary Archaeological Considerations

Carl Halbirt, City Archaeologist provided the following preliminary considerations regarding archaeology in reference to the proposed projects:

Most of the project areas are within archaeological zones or are in areas that may contain significant deposits, but aren't within an actual zone. The following provides you with a brief narrative of each project area, whether it occurs within an archaeological zone, and what deposits may be encountered. Determining archaeological resources that may be affected during construction is based on historical documents and archaeological investigations that have occurred in the immediate project area.

Probably the least likely project areas to contain archaeological deposits are the Palmer and Masters Drive water main improvements. Both are situated on the west side of the San Sebastian River and both are probably slightly inland from where the historical marsh boundary would have occurred based on overlaying the 1860 Dorr Map on top of the 1900s U.S.G.S Quad Map. Even so, the possibility cannot be ruled out that prehistoric sites (ca. 4,000 to 500 years ago) may occur. The St. Johns Country cultural resources map has identified estuary zones as having a high probability for archaeological deposits. Moreover, there is evidence of an early historical mission site somewhere along the west bank of the San Sebastian River somewhere near the north end of the Palmer project or at the south end of the Maters Drive project. According to the Hernando Mestas Map of 1593, this mission site was known as San Sebastian de Yaocos, and contained seven structures. These structures had crosses at the top of the roof indicating a Christianized community.

The other two project locations which also are unlikely to contain archaeological deposits are Menendez and Lighthouse project areas. Of the two, the Menendez project area is the least likely as it is within marshland reclaimed in the early 20th century with the development of Davis Shores. The Lighthouse project is within Archaeological IIIB and most of the archaeological remains date to the construction of the current lighthouse and subsequent development of the neighborhood. Nice trash deposits have been found near the lighthouse. Some prehistoric deposits also have been found in this zone near White Street. Most city archaeological projects that have occurred in this zone have turned up little (if any) archaeological remains.

One other project area, which is not within archaeological zones, but has the potential for containing a significant archaeological resource is the North City area. Some of the streets within this zone may bisect the historic 18th century Horneque Line: a defensive line that extended from Hospital Creek to the San Sebastian River. This line consisted of an earthen

berm and an accompanying moat. Soil sediments associated with the moat would still be present. Streets that may bisect this line are Cincinnati Ave. and Rhode Ave.

Excluding the Lincolnville project, the remaining projects areas are within Archaeological Zone IIA: a zone that covers the western shoreline of the intercoastal waterway, or North River. This zone is known to contain a diverse assortment of archaeological sites dating from the prehistoric era to the recent past. Archaeological remains present in the Abbott Tract consist of 18th-century deposits associated with the mission community of Nombre de Dios and mid- to late 19th century deposits associated with the development of the Abbott Tract—St. Augustine's first suburban neighborhood. Archaeological remains present in the Magnolia project area date consist of Native American sites dating from 4,000 to 500 years ago, the 16th to 17th century mission site of Nombre de Dios (the original location), and late colonial farm sites. The Nelmar Terrace area is essentially a continuation of the Magnolia area containing late prehistoric to colonial era deposits (circa A.D. 1000 to A.D. 1800). Locations along the eastern side of the Fullerwood project area are known to contain late prehistoric Native American deposits. Between 25 to 50 percent of the archaeological projects conducted at residential units within these respective areas contained archaeological artifacts and/or features indicating the likelihood that archaeological deposits will be unearthed when ground-penetration construction occurs.

The Lincolnville project area, which is complete, is in Archaeological Zone IIC, which is known to contain deposits associated with the 18th century mission community of Pocolataca and 19th century urban farmsteads and/or plantations. Monitoring has occurred along Oneida Street and Washington Street, with archaeological features being documented in the construction trench profiles and artifacts collected from the spoil piles associated with mechanical digging. The Lincolnville project area clearly illustrates the importance of working in tandem with construction contractors in both those areas that occur within archaeological zones to insure that St. Augustine's non-renewable archaeological heritage is documented, as specified in the City's Archaeological Preservation Ordinance. Project areas that occur outside archaeological zones—while not protected under the ordinance—should be monitored if it is suspected that significant archaeological resources may be exposed and disturbed (e.g., the North City area).

It is recommended that archaeological monitoring be a component of those improvement projects that occur within archaeological zones, as well as those zones suspected to contain archaeological deposits. Those project areas requiring monitoring for all or most of the construction activities are: Abbott Tract, Magnolia, Nelmar, and Fullerwood. It is recommended that spot monitoring be implemented for Palmer, Masters, and Lighthouse project areas. Only the Menendez project area is outside this recommendation. Because 5 of the 9 project areas will require extensive presence of the City Archaeologist and/or assistant, it

is strongly suggested that a schedule be worked out such that there is no conflict with other projects the City's archaeology program is engaged in for 2014 and 2015.

Plan Recommendations

Coordinate with the City's archaeology program and continue to move forward with the proposed water main improvements using bond and operating utility funds. Planning for the second phase of water main improvements is anticipated to begin late-2014.

APPENDIX **E**

Archaeological and Historic Preservation Information

Chapter 6 - ARCHAEOLOGICAL PRESERVATION [22]

Sec. 6-1. - Title.

This chapter shall be known and cited as the City of St. Augustine Archaeological Preservation Ordinance.

(Code 1964, § 5½-1)

Sec. 6-2. - Findings.

It is the finding of the city commission that St. Augustine, as the oldest permanent European settlement within the United States of America, contains many areas that are historically and archaeologically important to the citizens of this city and the United States, from all periods of its history, including pre-Columbian Indian villages, the original Spanish settlements on the mainland and the Anastasia Island portion of the city, British settlements, fortifications and other settlements and developments from the Second Spanish period, the American Territorial period and the preCivil War period. Further, in the preservation and understanding of the historical importance of St. Augustine, there is generally a direct relationship of archaeology to the economic well-being of the city and the present and future needs, public health, safety, morals and general welfare of its citizens and its visitors. Further, there is an educational value and benefit to the city that would result from a viable program of archaeological activities and the preservation of related resources.

(Code 1964, § 5½-2)

Sec. 6-3. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Archaeological site means a property or location which has yielded or may yield information on the city's history or prehistory. Archaeological sites may be found within archaeological zones, historic sites, historic districts, private properties, city properties and other areas of the city. Archaeological sites are evidenced by the presence of artifacts and features below the ground surface indicating the past use of a location by people.

Archaeological zone means a geographical area which has or may reasonably be expected to yield information on local history or prehistory based upon broad prehistoric or historic settlement patterns and existing archaeological knowledge.

Artifact means objects which are a product of human modification or objects which have been transported to a site by people. In this city, artifacts over fifty (50) years old are protected by this chapter.

City archaeologist means the individual with general responsibility for assessing the archaeological resources of the city and directing, conducting or coordinating the monitoring, testing or salvage archaeology excavations of these resources. The individual may either be a city employee, employed by the city manager, or may be an individual or corporation employed by the city on a contract basis.

Cultural or historic resource means any prehistoric or historic district, site, building, object or other real or personal property of historical, architectural or archaeological value. The properties may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure troves, artifacts or other objects with intrinsic historical or archaeological value, or any part thereof relating to the history, government and culture of the city, the state or the United States of America.

Delay period means the total number of calendar days (expressed in terms of weeks), such that the delay period is comprised of consecutive calendar days prior to commencement of a disturbance, plus the total number of calendar days subsequent to the commencement of a disturbance, during which testing or salvage archaeology efforts may be performed by the city archaeologist at an archaeology site, such that commencement or continuation of the disturbance and related construction work cannot otherwise proceed on the disturbance.

Disturbance means the cumulative digging, excavating, site preparation work or other such construction activities, regardless of the number of individual excavation or construction areas, related to an archaeological site.

Disturbance, major, means a disturbance that:

(1) Occurs at a non-single-family residential property.
(2) Occurs at locations more than three (3) inches below the adjacent surrounding ground surface.
(3) Encompasses a combined area of two hundred fifty (250) square feet or more.

Disturbance, minor, means a disturbance that:

(1) Occurs at a non-single-family residential property.
(2) Occurs at locations more than three (3) inches below the adjacent surrounding ground surface.
(3) Encompasses a combined area of less than two hundred fifty (250) square feet but equal to or greater than one hundred (100) square feet.

In addition, the term "minor disturbance" shall be defined to mean a disturbance that occurs at a single-family residential property and occurs at locations three (3) inches or more below the surrounding ground surface and encompasses combined areas of one hundred (100) square feet or more.

Disturbance, unrelated, means a disturbance that:

(1) Occurs at locations from the ground surface to a maximum of three (3) inches below the adjacent surrounding ground surface.

(2) Encompasses a combined area of less than one hundred (100) square feet.

(3) Is not defined under "major disturbance" or "minor disturbance."

Land includes the word "marsh," "water" or "swamp."

Map means the archaeological base map of the city.

Monitoring means the observation after commencement of a disturbance to determine if archaeological resources exist in an area or, when such resources are known to exist, the observation, recording and incidental recovery of site features and materials to preserve a record of the affected portion of the site. Monitoring is applicable in locations where sites or features may occur but are generally not expected to be of such importance, size or complexity as to require lengthy work or project delays for salvage archaeology.

Project cost means either the estimated costs of construction, improvements or other related expenses, that are submitted by the applicant and used as the basis for calculation of prescribed building permit fees, or the estimated costs of construction, improvements or other related expenses, that are submitted by the applicant relative to a utility or right-of-way permit project, provided that the city, during its review of the archaeology application and the estimated costs, finds the proposed costs to be reasonably accurate.

Salvage archaeology means the archaeological excavation of a proposed disturbance (or a portion thereof) prior to its destruction by construction, or any other form of site disturbance. Salvage archaeology shall be concentrated only within the confines of the disturbance areas, in order to save site data which otherwise would be lost due to the disturbance. The extent of the salvage archaeology will be dependent on the proposed area of construction or disturbance, the estimated significance of the site and archaeological resources, the costs of the archaeology efforts and the availability of fees as hereinafter provided, the availability of general fund revenue budgeted for archaeology programs, time constraints, the degree of evidence of archaeological resources, and the recommendations of the city archaeologist relative to the need for the archaeology efforts.

Testing means the limited subsurface excavation or remote sensing of a proposed disturbance (or a portion thereof) to determine the potential, type or extent of the archaeological site. Testing may include augering and establishing archaeological excavation units and will include the screening of excavated material for artifact recovery.

Used or *occupied* includes the words "intended, designed or arranged to be used or occupied."

(Code 1964, § 5½-3)

Cross reference— *Definitions and rules of construction generally, § 1-2.*

Sec. 6-4. - Archaeological zones.

In order to regulate and restrict subsurface disturbances as provided in this chapter, and to determine the extent and scope of work for archaeological investigations and excavations that may be required at a given archaeological site, the incorporated area of the city is hereby divided into zones as shown on the archaeological base map entitled "Archaeological Base Map For St. Augustine, Florida," and such map is hereby declared to be a part of this chapter. The zones, as delineated on the base map, are described as follows, with titles and abbreviations as indicated:

(1) Archaeological Zone Number I relates to areas containing the most significant archaeological sites in the city and includes the following subzones: Archaeological Zone I-A consists of an area containing historic resources from the 17th to the 20th centuries, including the Cubo Line west to Ponce de Leon Boulevard, and limited prehistoric resources. Archaeological Zone I-B consists of an area containing historic resources from the 16th through the 20th centuries, specifically including the earliest areas of the downtown portion of the city. Archaeological Zone I-C consists of an area containing historic resources from the 17th to the 20th centuries; Archaeological Zone I-D consists of an area containing the original settlement of St. Augustine in 1565 and important Indian mission settlements and prehistoric sites. Archaeological Zone I-E consists of an area containing the site of Ft. Mose.

(2) Archaeological Zone Number II relates to areas containing important known archaeological sites and includes the following subzones: Archaeological Zone II-A consists of an area containing portions of Hospital Creek, numerous prehistoric and historic Indian sites, farmsteads, plantations and possible military sites. Archaeological Zone II-B consists of an area containing the Lincolnville Dump area on the edge of Maria Sanchez Lake; Archaeological Zone II-C consists of an area containing the Pocotalaca Indian Mission; Archaeological Zone II-D consists of an area containing the Palica Indian Mission; Archaeological Zone II-E consists of an area containing the Tolomato Mission; Archaeological Zone II-F consists of an area containing the Tolomato Cemetery; Archaeological Zone II-G consists of an area containing the Ft. Mose Line and other fortifications and the Fairbanks Plantation site; and Archaeological Zone II-H consists of an area containing Old Quarry Road.

(3) Archaeological Zone Number III relates to areas having a high potential for historic/prehistoric archaeological sites and contains the following subzones: Archaeological Zone III-A consists of an area containing the Lincolnville portion of the city; Archaeological Zone III-B consists of an area containing portions of Anastasia Island; Archaeological Zone III-C consists of an area containing Oyster Creek; and Archaeological Zone III-D consists of an area containing portions of the eastern edge of the San Sebastian River, west of the FEC Railroad, north of SR 16.

(Code 1964, § 5½-4)

Editor's note—

It should be noted that Ord. No. 98-24, adopted Sept. 14, 1998, amended the Archaeological Base Map for St. Augustine, Florida.

Sec. 6-5. - Interpretation of zone boundaries.

Where uncertainty exists as to the boundaries of zones as shown on the archaeological base map for the city, the following rules shall apply:

(1) Boundaries indicated as approximating centerlines of streets, highways or alleys shall be construed to follow such centerlines.

(2)

Boundaries indicated as approximately following platted lot lines shall be construed to follow such lot lines.

(3) Boundaries indicated as approximately following city limits shall be construed to follow such city limits.

(4) Boundaries indicated as following railway lines shall be construed to be midway between the main tracks.

(5) Boundaries indicated as following shorelines shall be construed to follow such shorelines. In the event of a change in shorelines, the boundaries shall be construed to move with the change except where such moving would change the archaeological status of a lot or parcel; in such case the boundary shall be interpreted in such a manner as to avoid changing the archaeological status of such lot or parcel.

(6) Boundaries indicated as parallel to or extensions of beaches indicated in subsections (1) through (5) above shall be so construed. The distance not specifically indicated on the archaeological base map shall be determined by the scale of the map.

(7) Where physical or cultural features existing on the ground are not in agreement with those shown on the archaeological base map, or in other circumstances not covered by subsections (1) through (6) above, the city archaeologist shall make recommendations concerning the interpretation of the zoning boundaries for the city's approval.

(Code 1964, § 5½-5)

Sec. 6-6. - Zone regulations.

(a) Within Archaeological Zones I, II or III, any proposed major or minor disturbance which requires a building permit, a city utility permit or a city right-of-way permit shall be subject to a review of the proposed disturbance, before such disturbance takes place, by the city based on an application form (archaeological review application) to be prescribed by the city manager. No building, right-of-way or utility permit will be issued by the city until the archaeology application has been submitted and the applicable archaeology fees have been paid. The archaeological review shall result in the determination of proposed archaeology efforts on the site and the application shall then be made a part of the city's prescribed permitting process. Only those disturbances that require a city building, utility or right-of-way permit will be governed by this chapter and, in addition, unrelated disturbances will not be applicable to this chapter. Furthermore, this chapter will apply only to the areas within the boundaries and confines of the proposed disturbances and any archaeology efforts shall be conducted so as not to cause any unnecessary damage to adjacent areas of the property. Any archaeology work proposed by the city concerning disturbances not relevant to this chapter may be conducted only based on written permission from the property owner to the city.

(b) Disturbances applicable to this chapter shall be in compliance with the following regulations:

(1) Within Archaeological Zone I, any major disturbance shall be subject to intensive salvage archaeology prior to the commencement of the disturbance, building construction, or utility excavation, by the city archaeologist. After the disturbance has commenced, it shall be subject to monitoring during construction to provide data and to determine the presence of further or additional resources and, then, either testing or salvage archaeology may be conducted, as recommended by the city archaeologist and approved by the city.

(2) Within Archaeological Zone II, any major disturbance shall be subject to testing prior to the commencement of the disturbance. If it is determined that there will be a

significant archaeological impact from the proposed disturbance, or if the testing reveals that significant archaeological resources may exist, then salvage archaeology may also be conducted prior to commencement of the disturbance, as recommended by the city archaeologist and approved by the city. In addition, after the disturbance has commenced, it shall be subject to monitoring during construction to provide field data and to determine the presence of further or additional resources and, then, testing may again be conducted, as recommended by the city archaeologist and approved by the city.

(3) Within Archaeological Zone III, any major disturbance shall be subject to testing prior to the commencement of the disturbance. If it is determined that there will be a significant archaeological impact from the proposed disturbance, or if the testing reveals that significant archaeological resources exist, then salvage archaeology may also be conducted prior to commencement of the disturbance, as recommended by the city archaeologist and approved by the city. In addition, after the disturbance has commenced, it shall be subject only to monitoring during construction to provide additional field data.

(4) Within Archaeological Zone I, any minor disturbance shall be subject to testing prior to the commencement of the disturbance. If it is determined that there will be a significant archaeological impact from the proposed disturbance, or if the testing reveals that significant archaeological resources exist, then salvage archaeology may also be conducted prior to commencement of the disturbance, as recommended by the city archaeologist and approved by the city. In addition, after the disturbance has commenced, it shall be subject only to monitoring during construction to provide additional field data.

(5) Within Archaeological Zones II and III, minor disturbances shall be subject only to testing prior to commencement of the disturbance and only to monitoring after commencement of the disturbance by the city archaeologist.

(6) Within Archaeological Zones I, II and III, any changes in construction plans or documents (based on those formally approved by the city during the city's application review process) that identify additional or modified disturbance areas may necessitate or allow additional considerations, fees and actions by the city, in accordance with provisions of this chapter.

(7) Within Archaeological Zone I, the city will impose a delay period for any proposed disturbance (or portion thereof) for a minimum of four (4) weeks for a major disturbance and a maximum of four (4) weeks for a minor disturbance, in order to conduct the appropriate archaeology efforts. If more time is required relative to a major disturbance, the city archaeologist may request from the city manager up to four (4) additional two-week periods, to be reviewed and granted individually. The applicant shall be provided copies of these requests when they are submitted to the city manager and the additional delay period reviews shall include the applicant, at the applicant's request. After a total of twelve (12) weeks of delays for a major disturbance, the city archaeologist may request that the city manager grant additional two-week periods, provided that written permission for the delays is granted by the property owner.

(8) Within Archaeological Zone II, the city will impose a delay period for any proposed disturbance (or portion thereof) for a minimum of four (4) weeks for a major disturbance and a maximum of three (3) weeks for a minor disturbance, in order to conduct the appropriate archaeology efforts. If more time is required relative to a major disturbance, the city archaeologist may request from the city manager two (2)

additional two-week periods, to be reviewed and granted individually. The applicant shall be provided copies of these requests when they are submitted to the city manager and the additional delay period reviews shall include the applicant, at the applicant's request. After a total of eight (8) weeks of delays for a major disturbance, the city archaeologist may request that the city manager grant additional two-week periods, provided that written permission for the delays is granted by the property owner.

(9) Within Archaeological Zone III, the city will impose a delay period for any proposed disturbance (or portion thereof) for a minimum of two (2) weeks for a major disturbance and a maximum of two (2) weeks for a minor disturbance, in order to conduct the appropriate archaeology efforts. If more time is required relative to a major disturbance, the city archaeologist may request from the city manager two (2) additional one-week periods, to be reviewed and granted individually. The applicant shall be provided copies of these requests when they are submitted to the city manager, and the additional delay period reviews shall include the applicant, at the applicant's request. After a total of four (4) weeks of delays for a major disturbance, the city archaeologist may request that the city manager grant additional one-week periods, provided that written permission for the delays is granted by the property owner.

(Code 1964, § 5½-6)

Sec. 6-7. - Excavations on public property.

No individual shall be allowed to use a probe, metal detector or any other device to search or excavate for artifacts on public property, nor can any individual remove artifacts from public property without the written permission of the city. The city manager or the city archaeologist shall grant such written permission and shall exercise sole and complete discretion in the exercise of such authority. Furthermore, no disturbances or construction activities shall be authorized within properties belonging to the city, including public streets and rights-of-way, without a city right-of-way permit and without such archaeology efforts as may be addressed by this chapter. Any proposed archaeological work and delays relative to a disturbance or construction work shall be in accordance with provisions of this chapter relative to major and minor disturbances in Archaeological Zones I, II and III.

(Code 1964, § 5½-7; Ord. No. 2012-04, § 1, 3-26-12)

Sec. 6-8. - Fees.

(a) For the purposes of funding the city's archaeology program there shall be added to the fees collected for each applicable building, utility and right-of-way permit issued within Archaeological Zone I a nonrefundable minimum archaeology fee of one and one-half (1½) percent of the estimated project cost for which the permit is issued. In addition, there shall be added to the fees assessed for each applicable building, utility and right-of-way permit issued within Archaeological Zone II a nonrefundable minimum archaeology fee of one and one-fourth (1¼) percent of the estimated project cost for which the permit is issued. In addition, there shall be added to the fees assessed for each applicable building, utility and right-of-way permit issued within Archaeological Zone III a nonrefundable minimum archaeology fee of one (1) percent of the estimated project costs for which the permit is issued. Following calculation of the percentage-based archaeology fees for Zones I, II and III, as herein defined, and if such fees are less than fifty dollars ($50.00), then the minimum fee shall be

adjusted to the fifty-dollar amount. If the percentage-based archaeological fees exceed twenty-five thousand dollars ($25,000.00), the applicant shall be required to pay twenty-five thousand dollars ($25,000.00) at the time of application for the permit. In the event that the actual city costs expended in the archaeological efforts, as described in subsection (b) hereof, exceed twenty-five thousand dollars ($25,000.00), the city shall submit a statement for such services to the applicant which shall include wages of city employees for time spent on site, reasonable fees for use of city equipment, and costs of outside labor and services at the actual rate billed to the city, and the additional amount expended by the city and billed shall be paid to the city prior to final issuance of a building permit for the subject property.

(b) In the event that archaeology efforts, including research, testing, salvage archaeology, monitoring, analysis, curation, conservation, cataloging, recording, storage, reports and other related archaeology services are proposed to be performed by the city archaeologist, either prior to, during or after the conduct of any construction or disturbance, and the total estimated costs related thereto are in excess of the minimum archaeology fees prescribed herein, the city archaeologist shall request approval of the estimated additional costs for the archaeology efforts and, based on approval of the city manager, the city shall require the applicant to deposit with the city additional fees equal to the additional costs. Any of the additional fees not actually expended in the conduct of such research, testing, salvage archaeology, monitoring, analysis, curation, conservation, cataloging, recording, storage and reports, shall be returned to the applicant by the city at the time of final disposition of the work by the city archaeologist.

(c) As an alternative to paying the above described archaeology fees, a qualified applicant (qualified applicant is any applicant that is a 501(c)(3) nonprofit corporation authorized to do business in the State of Florida and is an entity engaged in the preservation of historical and archaeological resources of the St. Augustine area and has shown a demonstrated ability to conserve and display various aspects of historical resources of the St. Augustine area in a venue tantamount to a museum setting and said venue is accessible to the general public for a fee and said venue is licensed to do business in the City of St. Augustine), for a building permit may pay fifty (50) percent of the archaeology fee as determined in accordance with this article for administration by the city archaeologist, if the applicant desires to privately contract with a member of the Registry of Professional Archaeologists to perform archaeology efforts, including research, testing, salvage archaeology, monitoring, analysis, curation, conservation, cataloging, recording, storage, reports and other related archaeology services in accordance with the following criteria:

(1) A scope of services is submitted to and approved by the city archaeologist prior to performing any archaeological efforts to ensure compliance with the comprehensive plan and the City Code;

(2) The scope of services contains a work schedule that details the archaeological efforts and the time frame for excavation to ensure close monitoring by the city archaeologist and a condition that all reports and other documents are property of the city; and

(3) The applicant ensures compliance with the scope of services via enforceable contract with the selected archaeologist, and stipulates to allowing the city archaeologist to issue a stop work order when noncompliance is observed.

(Code 1964, § 5½-8; Ord. No. 96-48, § 1, 9-9-96; Ord. No. 00-08, § 1, 3-13-00; Ord. No. 04-22, § 1, 11-8-04)

Sec. 6-9. - Ownership of artifacts.

(a) All artifacts uncovered, recovered or discovered during the course of any testing, salvage archaeology or monitoring, as provided herein, on private property shall belong to the owner

of the property upon which such artifacts are found. Likewise, artifacts uncovered, recovered or discovered during testing, salvage archaeology or monitoring on property belonging to the city shall belong to the city. However, the city shall retain possession of artifacts from private property for a period of up to two (2) years to allow for their proper analysis, cataloging, recording, and conservation, with written permission of the owner. Furthermore, the city shall attempt to obtain written permission from property owners to secure permanent ownership of the artifacts; otherwise, all retained artifacts are then to be returned to the property owner as soon as such analysis, cataloging, recording, and conservation is completed. Individuals and property owners are strongly urged to donate archaeological artifacts to the city for long-term storage, care, protection and preservation.

(b) The removal of human skeletal remains recovered in archaeological context in all instances shall be coordinated with the local medical examiner, city, the city archaeologist and the state archaeologist. Such remains shall be dealt with in accordance with provisions of F.S. ch. 872 and they are not subject to private ownership. Such material shall be sensitively treated and, following their analysis by a physical anthropologist, shall be curated at a designated repository or appropriately reburied. If at all possible, human burials should not be removed and they should be left undisturbed in their original position.

(Code 1964, § 5½-9)

Sec. 6-10. - Curation of artifacts.

Artifacts from monitoring, salvage archaeology and testing efforts will be washed, catalogued, analyzed, recorded and conserved by the city archaeologist in compliance with the U.S. Department of Interior curation standards, with written permission of the owner. If the artifacts are permanently donated to the city they will be properly preserved and stored. The city will be responsible for determining the approved and acceptable repository for artifacts from the archaeological program in the city and the city will strive to maintain consistency in curation procedures and storage of materials in a minimal number of locations.

(Code 1964, § 5½-10)

Sec. 6-11. - City archaeologist.

(a) The city manager shall appoint a city archaeologist who shall meet the city's requirements and the standards for membership by the Society of Professional Archaeologists and shall have a demonstrated background in historic and prehistoric archaeology.

(b) The city archaeologist shall work at the direction of the city manager and shall:

(1) Review all applicable building, utility and right-of-way permit applications in Archaeological Zones I, II and III.

(2) Submit project cost proposals, recommendations and requests, as required, to the city manager, or his designee.

(3) Conduct such testing, salvage archaeology or monitoring as shall be addressed by this chapter.

(4) Prepare or oversee preparation and submittal of a final report on all projects, which report shall be consistent with the scope of each project and shall meet the general guidelines established for archaeological reports by the department of state, division of historical resources.

(5) Record completed archaeology projects with the Florida Master Site file.

(c) In addition, the city archaeologist may, as directed by the city manager:

(1) Conduct archaeological site surveys within the city.

(2) Develop strategies for preservation of the archaeological resources of the city.

(3) Work with property owners during the planning stage of projects applicable to this chapter in order to minimize the potential impact on archaeological sites.

(4) Advise the city manager concerning archaeological issues.

(5) Undertake or be involved in other specific city archaeology projects.

(6) Carry out public archaeology programs for the education and benefit of the citizens and visitors to the city.

(Code 1964, § 5½-11)

Sec. 6-12. - Grievance procedure.

An appeal of any portion of this chapter may first be brought before the city manager and then before the city commission.

(Code 1964, § 5½-12)

Sec. 6-13. - Commencement of delay period and archaeological work.

(a) The delay period for any proposed project requiring compliance with this chapter shall be considered to begin:

(1) Forty-eight (48) hours after the payment of archaeology fees and the issuance of the building, utility or right-of-way permit; or

(2) After the resolution of any appeal;

whichever is greater.

(b) Within a reasonable time after commencement of the delay period, and prior to a disturbance, the city must formally notify the applicant in writing if salvage archaeology or testing efforts will be conducted by the city and, if so, that, in accordance with provisions of the delay period, the disturbance may not proceed until the archaeological work is completed or the delay period has expired, whichever occurs first.

(c) The city may, however, reserve a maximum of twenty-five (25) percent of any applicable delay period to undertake further or additional salvage archaeology or testing efforts after the commencement of a disturbance, in accordance with the zone regulations and other provisions of this chapter, provided that less than seventy-five (75) percent of the delay period has expired or was actually expended prior to commencement of the disturbance. In such instances, the city may formally notify the applicant in writing at any time that the salvage archaeology or testing work will be conducted and that, in accordance with provisions of the delay period, the disturbance may not proceed or it must cease until the work is complete or the delay has expired, whichever occurs first.

(d) Proposed salvage archaeology and testing efforts may be commenced prior to the issuance of the applicable city permit, based on a written request or written approval from the applicant, provided that the archaeology fees have been paid and the project construction plans are in sufficient detail to accurately define the boundaries of the disturbance areas. If any design or location changes to the project disturbance areas occur after the archaeology efforts have begun, additional fees and salvage archaeology or testing efforts may be required and assessed accordingly. The commencement of archaeology efforts prior to the issuance of the applicable city permit will not alter the delay period or its beginning time as provided in this chapter.

(Code 1964, § 5½-13)

Sec. 6-14. - Penalty for violation.

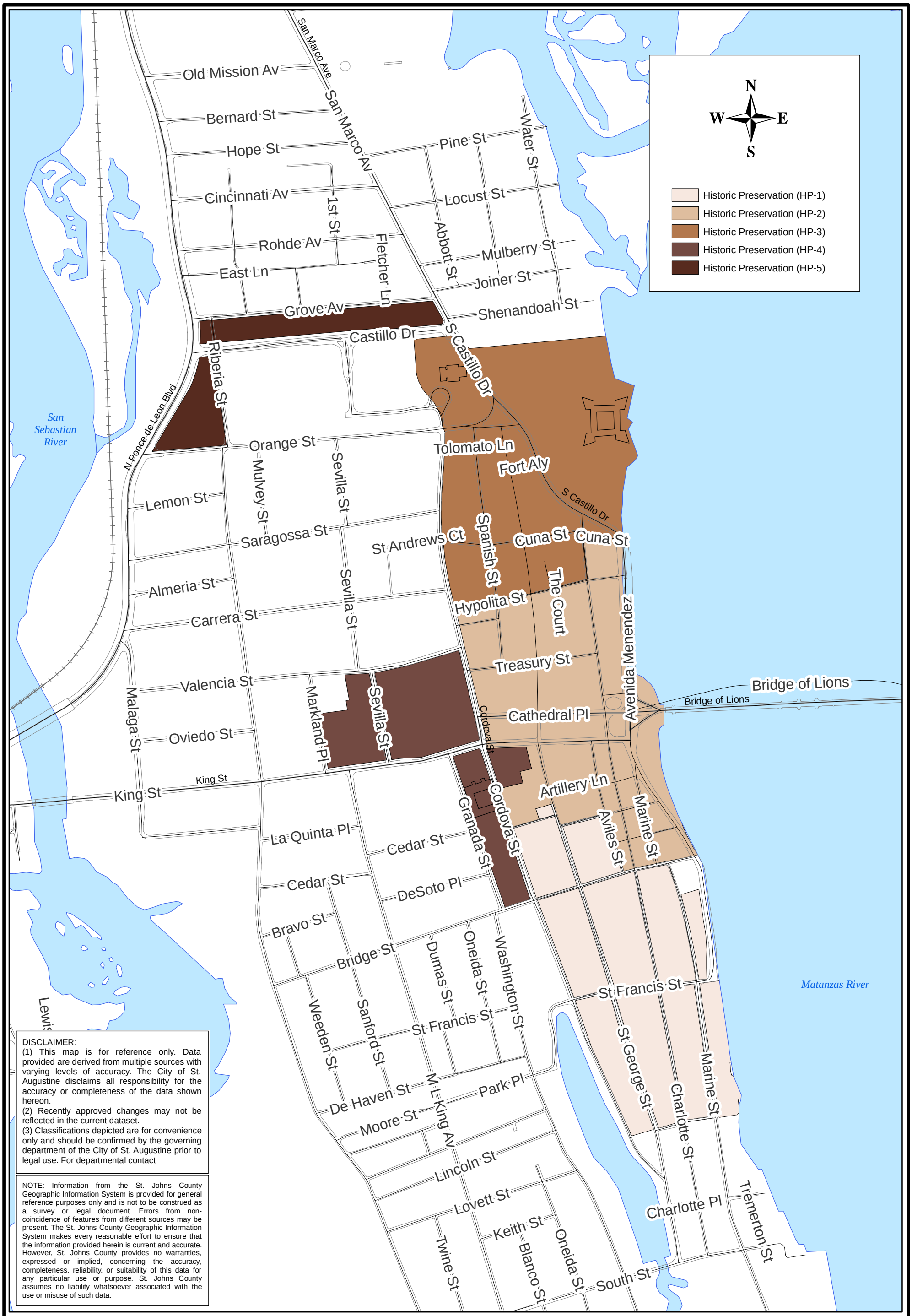
Any violation of this chapter shall be punished as provided in section 1-8 of this Code.

(Code 1964, § 5½-14)

FOOTNOTE(S):

(22) ***Cross reference—*** *Buildings and building regulations, Ch. 8; environmental protection, Ch. 11; planning and development, Ch. 21; subdivisions, Ch. 23; zoning, Ch. 28.* *(Back)*

(22) ***State Law reference—*** *Municipal Home Rule Powers Act, F.S. ch. 166.* *(Back)*



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(1) This map is for reference only. Data provided are derived from multiple sources with varying levels of accuracy. The City of St. Augustine disclaims all responsibility for the accuracy or completeness of the data shown hereon.
(2) Recently approved changes may not be reflected in the current dataset.
(3) Classifications depicted are for convenience only and should be confirmed by the governing department of the City of St. Augustine prior to legal use. For departmental contact

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City of St. Augustine
PLANNING AND BUILDING DEPARTMENT
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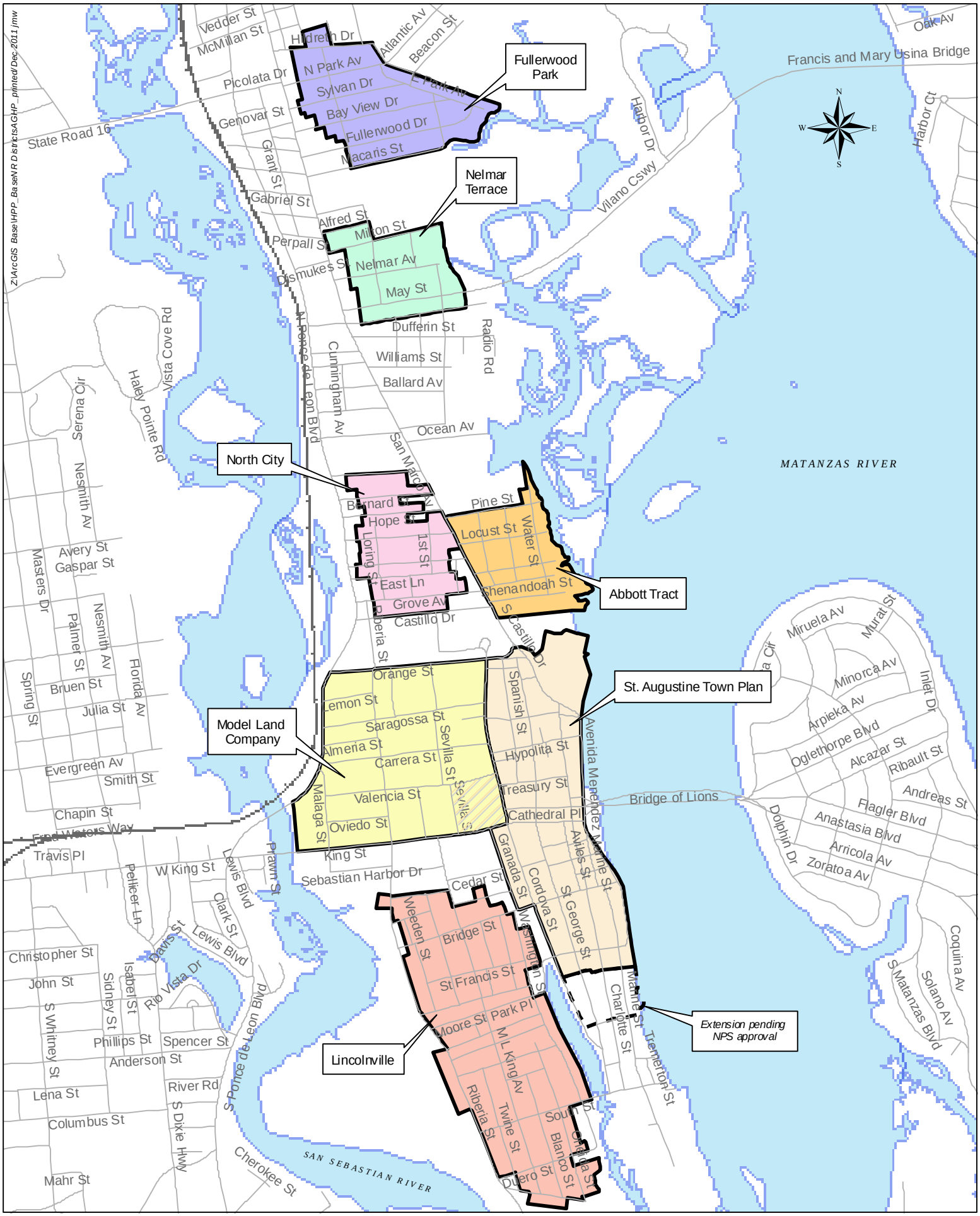
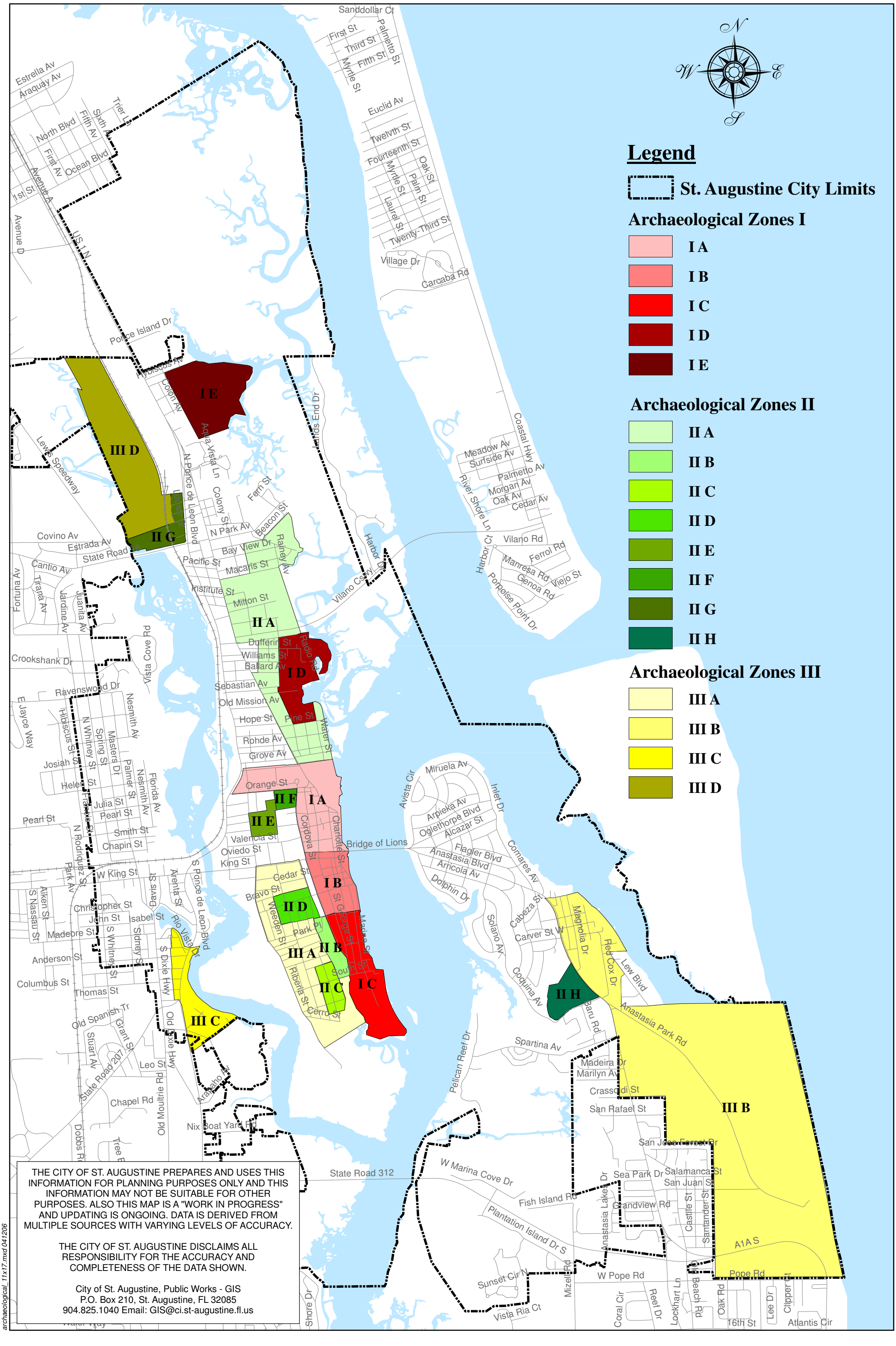
HISTORIC PRESERVATION ZONES

SHEET
1 of 1



St. Augustine National Register Historic Districts

CITY OF ST. AUGUSTINE ARCHAEOLOGICAL ZONES



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APPENDIX F

Drinking Water State Revolving Fund Business Plan

APPENDIX G

Financial Data in Support of Business Plan