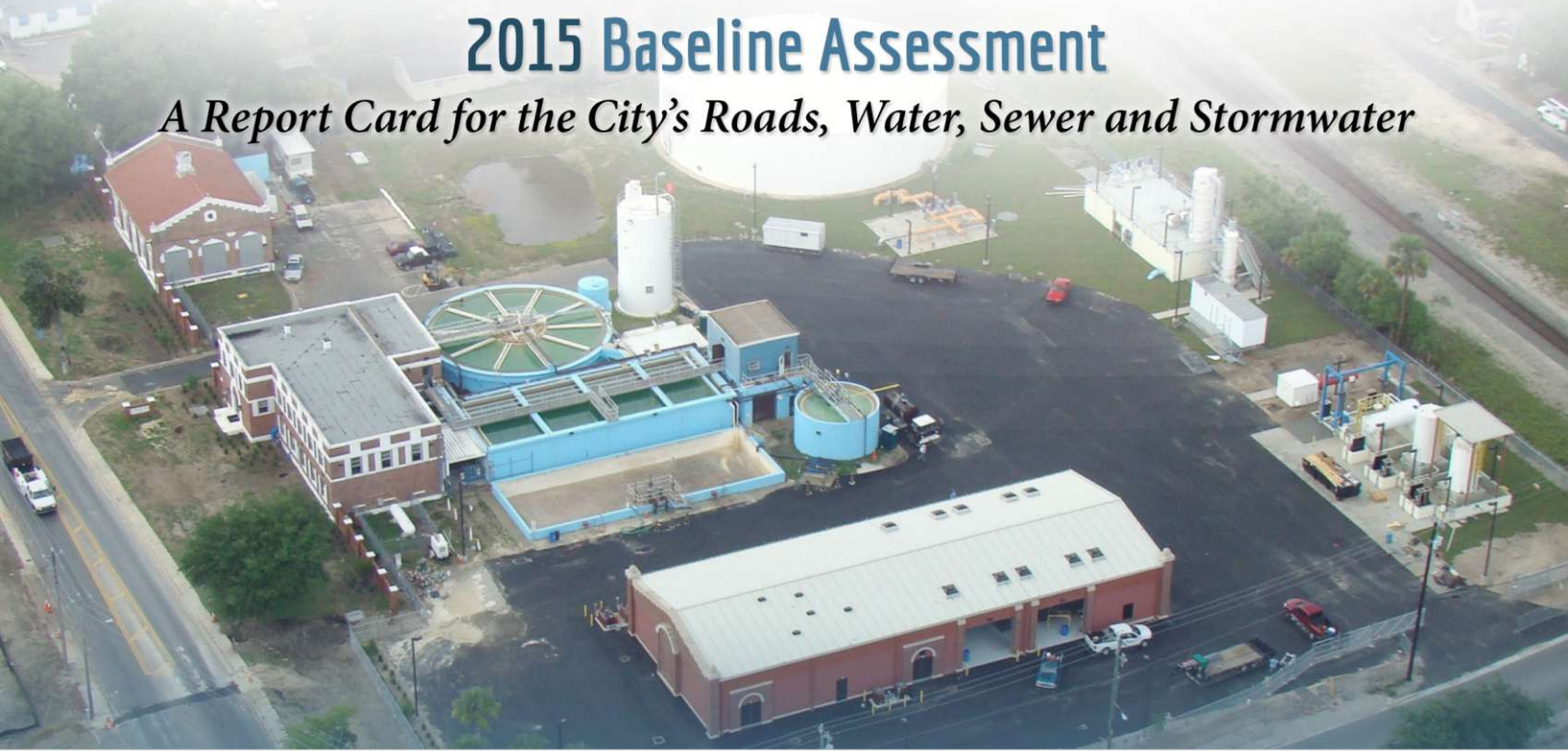




CITY OF
ST AUGUSTINE
EST. 1565

2015 Baseline Assessment

A Report Card for the City's Roads, Water, Sewer and Stormwater



C Grade
2015

Prepared by the:

**City of St. Augustine
Public Works Department**

With assistance from: *Applied Technology & Management, Inc.*



2015 Baseline Assessment

A Report Card for the City's Roads, Water, Sewer and Stormwater

INTRODUCTION

Public Work's Commitment

Public Works strives to manage the City's public infrastructure in such a way that meets public expectation for level of service while maintaining the critical goals of safety, efficiency and sustainability.

Purpose

Infrastructure is the backbone that supports a community. Monitoring and measuring performance of the system's health is an on-going daily mission of the Department. Yet, quantifying and publishing this information in a clear concise manner for public consumption has never before been produced for St. Augustine. This is the first published report card grading the City's infrastructure, what better time than during the City's 450th anniversary!

The grades are intended to be a measure of the present condition of our infrastructure as well as a future forecast within a three to five year period. We believe the discussion of the issues in this report will lead to a greater

understanding of the current and future needs of the City. Public Work's goal is to assist the City's commissioners and administrators



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in making decisions to address, consider and provide the necessary funding to effectively sustain the City's residents, businesses and visitors.

The staff hopes the information contained in this report will help the City leaders and public understand the many factors of sustaining and improving St. Augustine's Infrastructure. The aging infrastructure requires continual attention using sustainable maintenance and repair practices as well as capital improvements. Continued attention and financial support at equal or greater levels is critical to assure the health, safety and quality of life for future generations.

EXECUTIVE SUMMARY

This document is a baseline assessment of the City's public infrastructure systems including Roads, Water Distribution, Water Treatment, Sewer Collection, Wastewater Treatment, and Stormwater, all critical to maintaining a safe and healthy community. The City monitors and measures the performance and condition of the systems continuously, however, this report represents the first time a clear, concise, and comprehensive state of the City's infrastructure assets has been presented to the public.

The goals of this Baseline Assessment are to establish an overall system condition and the funds necessary to correct system deficiencies. The Baseline Assessment is modeled after *The Report Card for America's Infrastructure* generated by the American Society of Civil Engineers (ASCE). This system evaluates infrastructure on eight categories which look across condition, financial, staffing, public safety, and resilience aspects of infrastructure management and results in a traditional letter grade score.

OVERALL

C

"Mediocre: Requires Attention"

Overall value: \$505M
Rehabilitation costs: \$140M

FUTURE FOCUS

Particular areas of focus include:

- Wastewater treatment plant & lift station refurbishments
- Water treatment plant expansion & replacement of old lime softening plant
- Reinvesting annual dollars for road resurfacing & reconstruction of S. Dixie Highway
- Continuing with the implementation of the stormwater master plan update recommendations
- Long-term cost-benefit analysis associated with rising sea level

Several achievements have been made recently including a 65% reduction in water customer complaints and improved water quality due to a substantial investment in water main replacement. Accordingly, the Public Works Department now recommends shifting focus toward other critical issues with roads, sewer, and stormwater systems including beginning to analyze the potential impacts of rising sea level.

The staff hopes the information contained in this report will help the City leaders and the general public understand the condition of St. Augustine's infrastructure and the many factors that impact long-term sustainability of these systems.

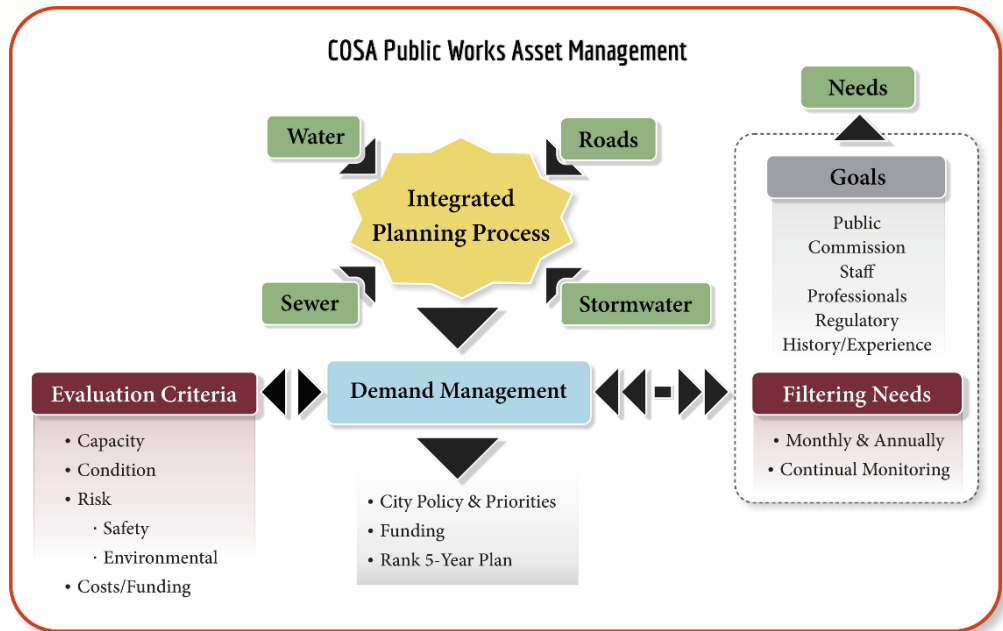


COSA PUBLIC WORKS ASSET MANAGEMENT PROGRAM

Public Works understands the importance of asset management especially within a historic community with numerous infrastructure needs. Asset management techniques attempt to manage the overall service levels with consideration of acceptable risk and available budgets. The Department utilizes an Integrated Planning Process (figure) to continually evaluate the various system needs while balancing those needs and associated risks with limited available resources

The Integrated Planning Process

“Needs” are identified in a variety of ways, originating from the staff, Commission, or public based upon replacement schedules, failures, complaints and concerns, capacity, or regulatory authorities. These needs may involve one or many types of assets that are analyzed in an ‘Integrated’ process of monthly coordination meetings within the Department. The “utility” meetings are routinely scheduled and involve engineer managers and field supervisors with first-hand knowledge of the systems. They collaborate to prevent and solve problems, identify the needs, and establish priorities and budgets to comprehensively “manage demands”.



Through this process of “demand management” staff review competing interests, find commonalities or disparities, review risks associated with deferral or regulatory interests, and compare those risks and needs against funding availability. Both short term and long term needs are filtered through this continual process of collaboration within the Department.

Budget requests which have gone through a similar process are submitted to administrative staff annually. The final decisions on project priority and resource allocation lie with policy makers and are made through the annual operating budget and the 5-year capital program. Oftentimes, the final budgets are determined through an iterative process of matching project with funding availability until the budget is balanced.

WHAT IS A BASELINE ASSESSMENT?

A Baseline Assessment is a snapshot evaluation of infrastructure systems which is necessary to properly understand the existing conditions and how capable the systems are of achieving a defined level of service. The goals of a Baseline Assessment are to establish a probability of failure, estimate the remaining life, assess current performance, and determine an overall system condition and the funds necessary to correct system deficiencies.

Public Works has conducted a Baseline Assessment utilizing available infrastructure Geographic Information System (GIS) and inventory data, staff knowledge of existing conditions and future needs, and industry standards. The Baseline Assessment is modeled after *The Report Card for America's Infrastructure*¹ generated by the American Society of Civil Engineers (ASCE). The final grade issued utilizes the traditional letter-grade scale and is based on a variety of measurable performance standards, as listed below, to provide a comprehensive determination of the infrastructure condition and anticipated future performance.

Baseline Condition Assessment Methodology

Capacity	<ul style="list-style-type: none"> • Capability to meet current and future demands
Condition	<ul style="list-style-type: none"> • Existing or near future physical condition
Funding	<ul style="list-style-type: none"> • Comparison of current funding vs. estimated funding needs
Future Need	<ul style="list-style-type: none"> • Comparison of estimated rehabilitation costs vs. future funding prospects
Operation & Maintenance	<ul style="list-style-type: none"> • Owners ability to operate and maintain infrastructure properly and with regulations
Public Safety	<ul style="list-style-type: none"> • Implications to public safety and consequences of failure
Resilience	<ul style="list-style-type: none"> • Ability to prevent or protect against multihazard threats/incidents and recover critical services with minimal impact to public, economy and security
Innovation	<ul style="list-style-type: none"> • Implementation and strategic use of innovative techniques and delivery methods

ASCE Report Cards Grades

A *Exceptional: Fit for the Future*

B *Good: Adequate for Now*

C *Mediocre: Requires Attention*

D *Poor: At Risk*

F *Failing/Critical: Unfit for Purpose*

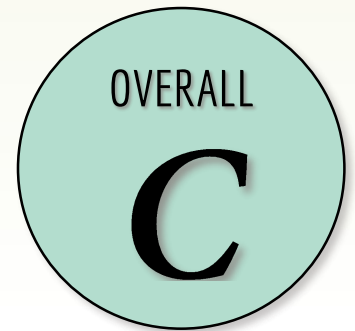
¹ American Society of Civil Engineers, 2013 *Report Card for America's Infrastructure* <http://www.infrastructurereportcard.org/a/#p/about-the-report-card/methodology>

STATE OF ST. AUGUSTINE'S PUBLIC WORKS ASSETS

Like most of the country and throughout Florida, St. Augustine's infrastructure is fair but needs constant and vigilant attention.

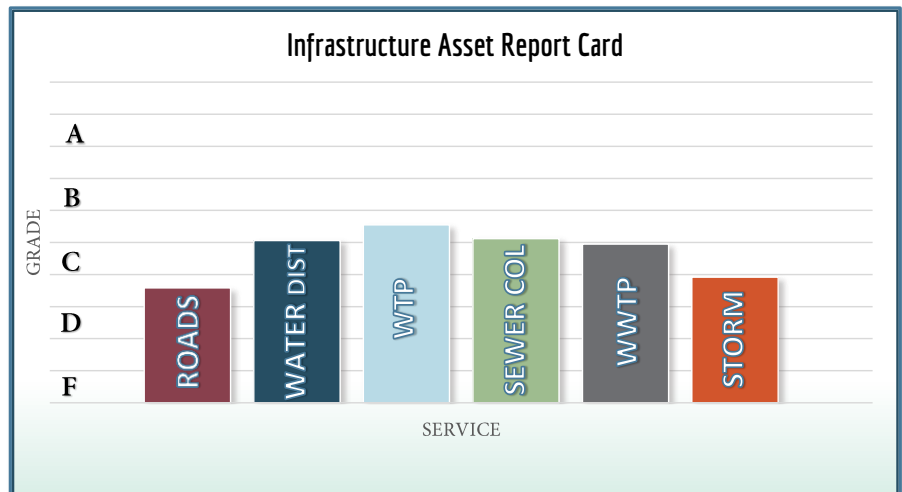


Substantial investment in water distribution mains has paid off with reduced complaints and improved water quality. Now is an appropriate time to shift the focus towards other needs like roads, sewer, and stormwater systems, in particular to begin to analyze how rising sea level will impact St. Augustine.



Well intentioned plans and priorities face competing demands for limited resources and the City continually manages its extensive needs through an iterative process balancing needs with budget.

Recommendations from the Department for capital improvements include shifting investments towards sewer; specifically wastewater treatment plant and lift station refurbishments, reinvesting annual dollars for road resurfacing and reconstruction of So. Dixie Highway, and preparing high-level impact analysis of rising sea level.



2015 Public Works Assets		
Service	Asset Replacement Value	Deficiencies
Roads	\$ 52,900,000	\$ 8,855,000
Water Distribution	\$ 182,600,000	\$ 59,855,000
Water Treatment	\$ 36,000,000	\$ 15,350,000
Sewer Collection	\$ 176,900,000	\$ 32,354,000
Wastewater Treatment	\$ 26,500,000	\$ 11,600,000
Stormwater	\$ 30,000,000	\$ 11,792,000
TOTAL	\$ 504,900,000	\$ 139,806,000

ROADS

The City of St. Augustine maintains approximately 72 miles of roadways including collectors, residential streets and alleyways and 32.6 miles of sidewalks. A city-wide inspection and assessment of streets was recently completed in 2014, the first assessment since 2003. MicroPAVER software was used to aid in the inspection and street ratings. This software was produced by the Army Corps of Engineers and is widely recognized as a standard in the industry for pavement condition assessment and asset management. This baseline assessment for street condition within the City can now be used for developing repair strategies, repair and funding scenario analysis, including monitoring performance for future years. It is recommended that a total analysis of the City's roadways be performed every three years. A third (1/3) of the streets/zones will be inspected annually so as to have continual coverage on a three year basis.

ROADS
D+

Asset Replacement
Value:
\$52,900,000

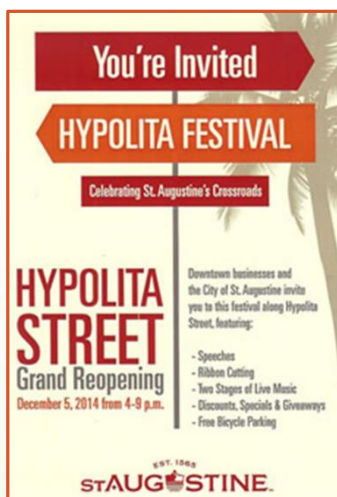
Estimated Asset
Rehabilitation Cost:
\$8,855,000

Surface Material	Road Miles	% of Total	Average PCI
Asphalt	66.4	91%	69
Brick	1.9	3%	
Concrete	0.4	1%	
Unpaved	4.1	5%	
Total	72.8		

The City's roadways are comprised of a variety of paving materials including asphalt, brick, and concrete. Only 5% of the City's roadways are unpaved. **Asphalt comprises 91% of the City's roadways and these roadways have an average PCI rating of 69 – Fair.**

Overall the city-maintained roadways have a Fair or "C" grade rating based solely on condition. The Report Card methodology, however, looks across other categories to develop a comprehensive evaluation. The

City's local roads and alleys received particularly low scores for Funding, Future Needed Funding, O&M, and Resilience which resulted in the overall D+ score for the City's roads.



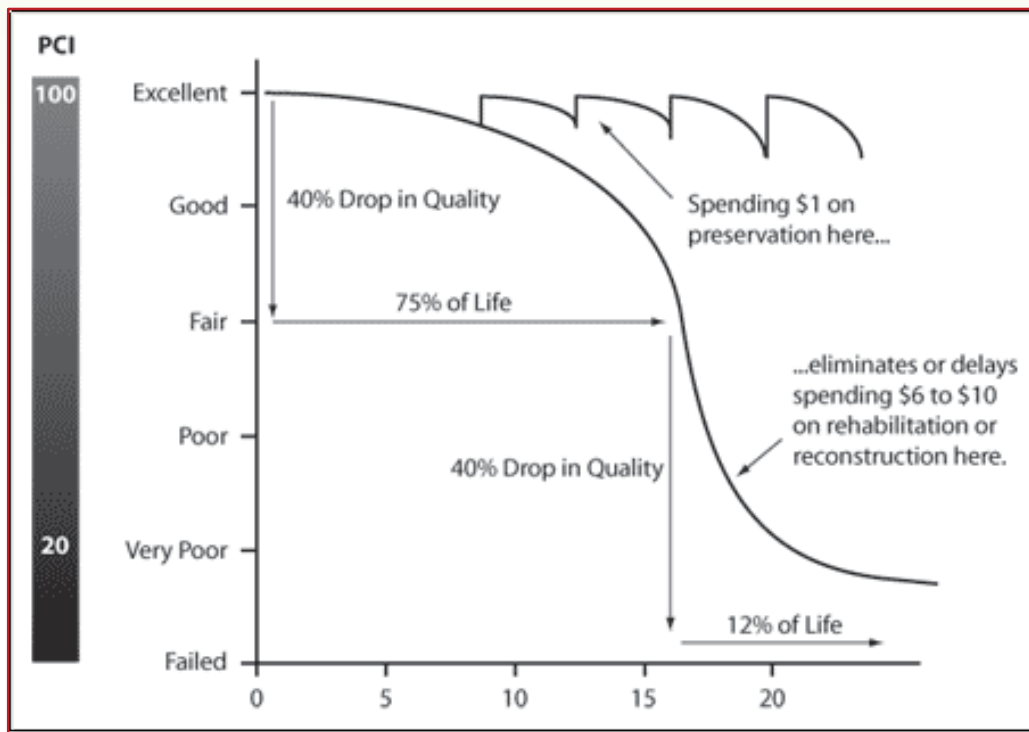
The lowest scores were for the current and future funding categories. Based on the roadway assessment and MicroPAVER evaluation, any roads with a PCI rating lower than 56 (Fair) are in critical need of rehabilitation. As indicated in the figure from the U.S Department of Transportation Federal Highway Administration¹, **as pavement deteriorates beyond the PCI Fair condition, rehabilitation and restoration costs increase up to tenfold.**

9 MILES OF ROADS

PCI < 56

**Estimated Restoration
Cost \$4.4M**

Pavement Deterioration Curves vs. Rehabilitation Costs



In order to maintain an acceptable PCI rating, it is recommended that annual funds of 1% of the City's total roadway asset value be allocated to roadway preservation activities.



\$530,000

**(1% of Roadway Assets) Annual
Recommended Roadway
Preventative Expenditure**



The projected rehabilitation and CIP funding needs for the next 3 to 5 years are presented below:

Roads Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
Charlotte Street Reconstruction between King Street & Bridge Street	\$ 1,079,290	\$ -	\$ -
South Dixie Highway (SDBC); Box Culvert, Milling & Resurfacing Leonardi to Anderson St.	\$ 470,000	\$ -	\$ -
South Dixie Highway (SDHI); Storm Improvements between W. King & SR 207	\$ -	\$ 1,400,000	\$ -
King Street; Undergrounding Electric	\$ -	\$ -	\$ 679,000
Sevilla Street Reconstruction between Carrerra Street & King Street	\$ -	\$ -	\$ 921,900
Road Rehabilitation - Resurfacing Various	\$ 295,000 *	\$ 120,000 *	\$ 205,000 *
TOTAL	\$ 1,844,290	\$ 1,520,000	\$ 1,805,900

Interim Range Roads Capital Improvement Projects (4-5 Year Outlook)

Capital Improvement Project Name	Fiscal Year	
	2019	2020
King Street; New Lighting Construction (Water, Sewer, & Storm on Separate CIPs)	\$ 809,514	\$ -
Downtown District Phase 2 (Cuna/Spanish)	\$ 2,300,000	\$ -
St. George Street Reconstruction between Artillery Lane & St. Francis Street	\$ -	\$ 724,531
South Dixie Highway (SDHI); Storm Improvements between W. King & SR 207	\$ 3,458,000	\$ -
Road Rehabilitation - Resurfacing Various	\$ 175,000 *	\$ - *
TOTAL	\$ 6,742,514	\$ 724,531

*\$530,000 recommended annual expenditure.

WATER DISTRIBUTION SYSTEM

The City's water distribution system is comprised of over 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. The achievements of this program, including a 65% reduction in water quality customer complaints, are evidenced in the following graphs.

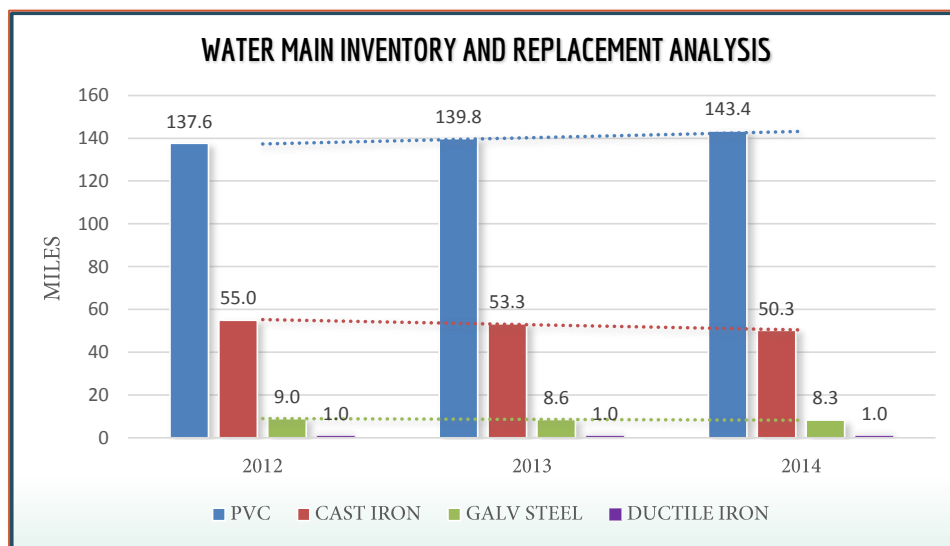
WATER DISTRIBUTION SYSTEM C

Asset Replacement
Value:

\$182,600,000

Estimated Asset
Rehabilitation Cost:

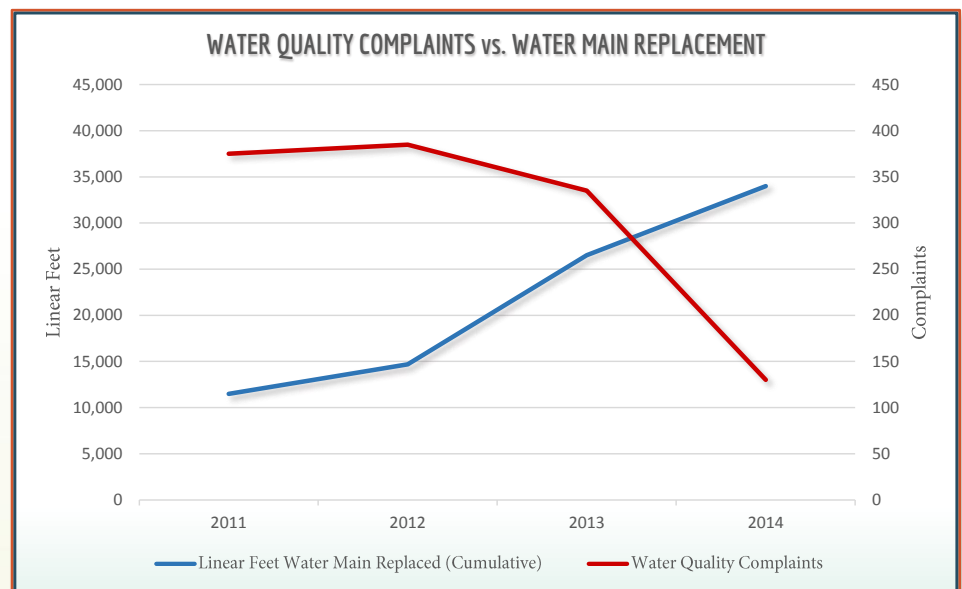
\$59,855,000



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.

The lowest grades for the water system were focused on the condition, funding, O&M, and innovation categories and are primarily related to the water meters and the remaining Cast Iron and Galvanized Steel piping in the system.

Approximately 56% of the system meters are greater than 10 years old and 23% are more than 20 years old.





As 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 rehabilitation costs for the water distribution system include capital improvements to institute a water meter replacement program and potentially begin preparing the system for implementation of innovative technologies such as automated meter reading which will improve the efficiency of the meter reading division and the quality of water consumption data.

The projected rehabilitation and CIP funding needs for the next 3 to 5 years are presented below:

Water Distribution Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
San Marco Watermain Replacement	\$ 290,000	\$ 2,900,000	\$ -
Neighborhood Water Main Replacements	\$ 100,000	\$ 100,000	\$ 100,000
Fullerwood Water Main Improvements	\$ 965,893	\$ 965,892	\$ -
Meter Replacement Program	\$ 1,207,000	\$ 1,175,000	\$ 1,175,000
May Street Water Main Replacement	\$ 325,000	\$ -	\$ -
TOTAL	\$ 2,887,893	\$ 5,140,892	\$ 1,275,000

Interim Range Water Distribution Capital Improvement Projects (4-5 Year Outlook)

Capital Improvement Project Name	Fiscal Year	
	2019	2020
King Street Drainage (KSDI) - Water Line Relocations	\$ 650,000	\$ -
Meter Replacement Program	\$ 1,175,000	\$ -
North City Water Main Imp. (NCWM)	\$ 1,293,621	\$ -
King St 16-Inch SubAqueous Water Main	\$ -	\$ 600,000
Neighborhood Water Main Replacements	\$ 100,000	\$ -
TOTAL	\$ 3,218,621	\$ 600,000

WATER TREATMENT SYSTEM

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 1920s; although modifications were made to the plant in 1987 it has essentially reached the end of its useful life. The Wellfield is composed of eight (8) wells, seven (7) are deep wells and one (1) is surficial (shallow). Four (4) of the deep (Upper Floridan) wells were constructed five years ago 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 existing systems are rated above average, the old Lime Softening WTP has reached its service life, therefore plans to replace the old plant are anticipated to begin in 2019. Other water storage, supply, and treatment systems are well positioned to serve well beyond 20-years with proper maintenance.

WTP
C+

Asset Replacement
Value:
\$36,000,000

Estimated Asset
Rehabilitation Cost:
\$15,350,000



The Lime Softening WTP is scheduled for demolition after an expansion of the LPRO system is completed. The LPRO expansion will increase permeate capacity to 4.0 MGD. The expansion of the LPRO WTP is anticipated for design and construction in fiscal years 2019 and 2020, respectively. Based on current discussions with the St. Johns River Water Management District (SJRWMD) a 35% grant toward construction is probable.

The projected rehabilitation and CIP funding needs for the next 3 to 5 years are presented below

Water Treatment Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
South Tank Pump & Control Rehabilitation	\$ 415,000	\$ -	\$ -
Deep Wells Acidification	\$ 40,000	\$ 40,000	\$ 40,000
Demolition/Disposal Old Well Houses	\$ -	\$ 200,000	\$ -
Wellfield Emergency Generator	\$ -	\$ 150,000	\$ -
RO Membrane Replacement	\$ -	\$ -	\$ 300,000
TOTAL	\$ 455,000	\$ 390,000	\$ 340,000

Interim Range Water Treatment Capital Improvement Projects (4-5 Year Outlook)

*\$35% cost share grant from SJRWMD Alternative Water Supply Program anticipated.

Capital Improvement Project Name	Fiscal Year	
	2019	2020
Deep Wells Acidification	\$ 40,000	\$ 40,000
WTP Plant RO Phase 2 Expansion	\$ 1,210,000	\$ 12,100,000 *
TOTAL	\$ 1,250,000	\$ 12,140,000



SEWER COLLECTION SYSTEM

The City's sewer collection system is composed of the gravity conveyance system, lift stations and forcemains.

Of the gravity sewer piping, approximately 57% is composed of clay, ductile iron, cast iron, and concrete

Sewer Conveyance System	
Component	Quantity
Gravity	79.3 Miles
Forced	60.7 Miles
Manholes	2100 Ea
Lift Stations	75 Ea

which were widely used and acceptable materials at the time of construction. As the system ages these piping products are susceptible to deterioration from hydrogen sulfide gas, cracking from tree roots and traffic/stress loading, and for clay pipe the joint material is susceptible to disintegration. This deterioration allows for excessive infiltration of groundwater which furthers the decay and

diminishes the structural integrity of the pipe. Infiltration takes up capacity of the sewer collection system, reduces available capacity of the WWTP, and drives up costs associated with pumping and treatment. The City has

implemented a program of slip lining the non-PVC piping materials to reduce infiltration and improve the piping structure; to date almost 20% of the non-PVC piping has been slip lined. *Restoring pipe by slip lining is estimated to be*

approximately 1/5 the cost in comparison with open trench replacement. Every dollar spent reducing infiltration equates to deferred capital expenditure for WWTP expansion.

Component	Replacement Value		Rehabilitation Need	
Forcemains	\$	61,159,790	35%	\$ 16,889,469
Lift Stations	\$	16,420,000	9%	\$ 1,368,842
Gravity	\$	89,877,622	51%	\$ 8,723,036
Manholes	\$	9,445,500	5%	\$ 5,373,000
Total	\$	176,902,912		\$ 32,354,347

With the slip lining program established, the Department is now focused on rehabilitation of the lift stations and forcemains. Approximately 20% of the forcemains are constructed of cast/ductile iron and face similar deterioration issues if the main is unlined or the lining has become damaged. Concerns regarding the forcemain stability are compounded by the fact that the mains are under pressure and any rupture can result in discharge of raw sewage to the environment.



Deteriorated Ductile Iron Forcemain - Gwinnett County, GA

SEWER
C

Asset Replacement
Value:
\$176,900,000

Estimated Asset
Rehabilitation Cost:
\$32,354,000

The Department has conducted assessments on all of the lift stations and determined reliability concerns and associated rehabilitation costs to bring these lift stations up to acceptable standard.

The general condition of the lift stations are a grade "C-" indicating additional attention and resources are needed in the near term. The projected rehabilitation and CIP funding needs for the next 3 to 5 years are presented below:

Sewer Collection Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
I&I Elimination Program (R0179)	\$ 500,000	\$ 500,000	\$ 500,000
Pump Station Rehabilitation	\$ 165,000	\$ 170,500	\$ 175,000
Pump Stations-Equip Replacement	\$ 80,000	\$ -	\$ -
West Augustine Sewer	\$ 12,500	\$ 250,000	\$ 250,000
West King St. Sewer Improvements	\$ 237,500	\$ -	\$ -
TOTAL	\$ 995,000	\$ 920,500	\$ 925,000

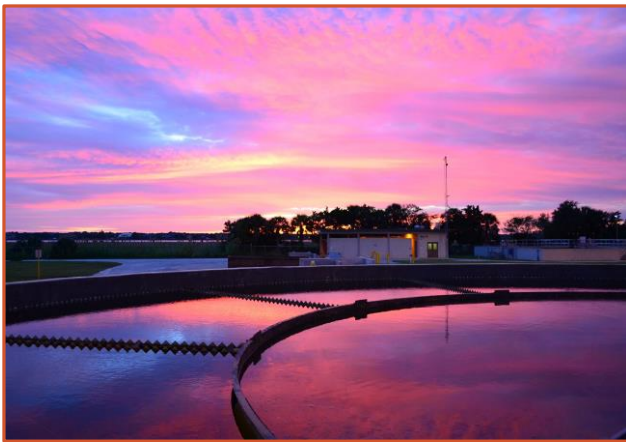
Interim Range Sewer Collection Capital Improvement Projects (4-5 Year Outlook)

Capital Improvement Project Name	Fiscal Year	
	2019	2020
King Street Drainage (KSDI) - Sewer Line Relocations	\$ 650,000	\$ -
I&I Elimination Program (R0179)	\$ 500,000	\$ 500,000
Pump Station Rehabilitation	\$ 175,000	\$ 175,000
Pump Stations-Equip Replacement	\$ 80,000	\$ -
West Augustine Sewer	\$ 250,000	\$ 250,000
TOTAL	\$ 1,655,000	\$ 925,000



WASTEWATER TREATMENT SYSTEM

The City's WWTP has a permitted capacity of 4.95 MGD and utilizes a complete mix activated sludge treatment process with a headworks system for removal of grit and debris, biological treatment units (BTUs) which provide aeration, clarifiers, disinfection chambers and post aeration. Effluent is disinfected utilizing paracetic acid, an innovative process which eliminates the creation of environmentally damaging chlorinated disinfection byproducts and reduced chemical costs.



WWTP
C

Asset Replacement
Value:
\$26,500,000

Estimated Asset
Rehabilitation Cost:
\$11,600,000

Residuals are treated, dewatered and land applied.

Effluent from the WWTP is discharged to the Matanzas River. The WWTP's discharge permit was recently renewed authorizing discharge through 2019.

Currently the WWTP is reaching capacity which is being closely monitored. The efforts to slip line the gravity sewer and reduce infiltration into the system do have a direct impact on WWTP capacity and can allow for delay of expansion. The diversion of the WTP RO concentrate to the San Sebastian River in 2015 will effectively increase plant capacity by 0.3 MGD.

Although the WWTP currently has sufficient capacity overall, an addition of 1 MGD of treatment capacity by 2019 is being planned. There are some components of the treatment system which lack suitable hydraulic flow capacity and efficiency, are structurally damaged, or which have reached the end of their useful life. These include the following systems:

Capacity and Efficiency

- Headworks Structure - 2018/2019
- WWTP Piping

Structural Integrity and Capacity

- Biological Treatment Units - 2019

End of Useful Life Expectancy

- Clarifiers (Currently underway)
- Return Sludge and Waste Sludge Systems
- Aerobic Digesters

The CIP for Fiscal Year 2015 includes funding to construct a significant project to refurbish the clarifier and return activated sludge systems which deficiencies are noted above.

The projected rehabilitation and CIP funding needs for the next 3 years are presented below. There are no substantial Capital Improvement Projects recommended for the interim range, however, the Department continues to evaluate the need for upgrades and expansion to the WWTP to achieve advanced treatment and/or additional capacity as dictated by the regulating agencies.

Wastewater Treatment Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
Headworks Replacement & BTU Expansion	\$ -	\$ 500,000	\$ 5,000,000
TOTAL	\$ -	\$ 500,000	\$ 5,000,000



STORMWATER

The City's stormwater conveyance system spans 13 watersheds consisting of pipes, inlets, manholes, water quality treatment structures and swales within the road system and drainage channels. Since 1995, extensive improvements have been made in areas that suffered from frequent flooding and the Department has maximized

**STORM
D+**

Asset Replacement
Value:
\$30,000,000

Estimated Asset
Rehabilitation Cost:
\$11,792,000

Stormwater Conveyance System	
Component	Quantity
Channels	3 Miles
Pipes/Culverts	
≤ 12"	9 miles
15" - 66"	10 Miles
Outfalls	103 Ea
Inlets	950 Ea
Manholes	
Brick	211 Ea
Precast	87 Ea
Treatment Structures	14 Ea

construction funds by installing new stormwater conveyance systems as part of roadway projects.

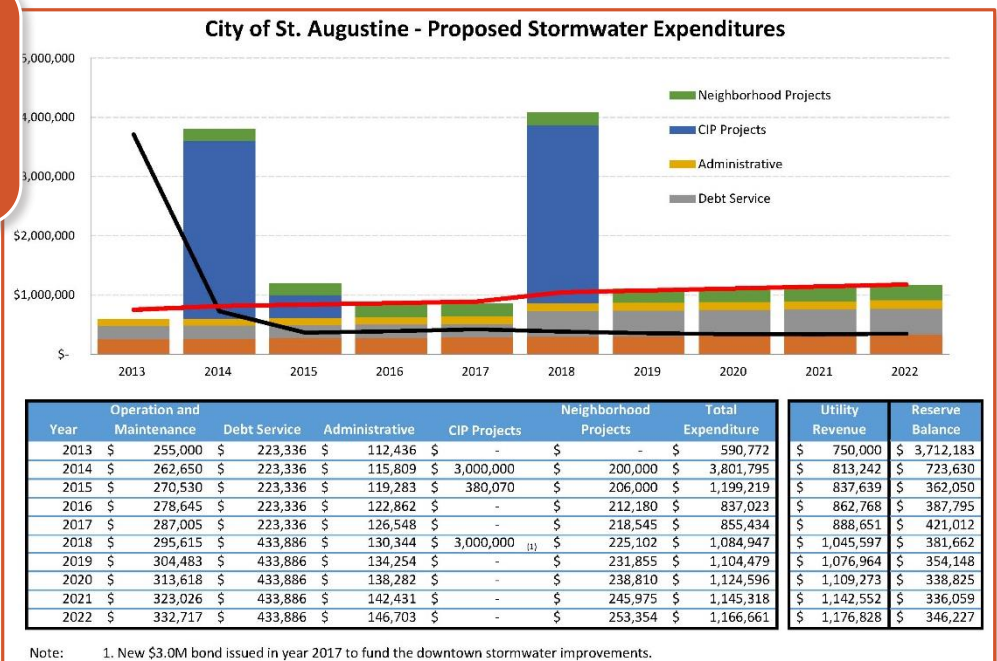
In 2013 a Stormwater Master Plan Update along with a Stormwater Utility Rate Study was completed which evaluated stormwater infrastructure and flooding concerns within a portion of the City. The Master Plan identified three stormwater improvement projects within the Oyster Creek and Maria Sanchez watersheds which are underway in the planning process:

- Oyster Creek: Sidney Street, \$590,000
- Oyster Creek: South Dixie Highway, 2,891,000
- Maria Sanchez Lake, 3,073,000

By conducting the Rate Study in conjunction with the Master Plan, the funding needs and impact of these projects were incorporated into the analysis.

47%
**OF PIPE SYSTEM
LESS THAN 15"**

The Baseline Assessment of the stormwater infrastructure addressed only the condition of the existing systems and the rehabilitation cost of bringing pipe sizes up to a minimum acceptable standard of 15-inches.



This assessment does not address the rehabilitation and restoration costs of improving the Level of Service of the existing systems or adding stormwater infrastructure to currently unserved areas. Such an analysis is beyond the scope of this report and will require additional master planning efforts.

Of note for concern and beginning discussions are the potential impacts of sea level rise. According to NOAA, global sea level is expected to rise a minimum of 8 inches and no more than 6.6 feet by 2100. Anticipated impacts of sea level rise on the St. Augustine coastline are depicted at right based on the NOAA Sea Level Rise Visualizer tool depicting Castillo de San Marcos.

Moving forward it is critical that the City continue with the master planning efforts and begin developing an understanding of the potential impacts and infrastructure needs due to sea level rise. The projected rehabilitation and CIP stormwater funding needs, based on the current understanding of conditions, for the next 3 years are presented below. There are no substantial Capital Improvement Projects recommended for the interim range, other than a continuation of the Neighborhood Drainage Improvements and a connection for the King Street Drainage project.



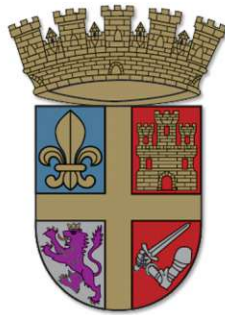
2' Sea Level Rise at Castillo de San Marcos

Source: NOAA <http://coast.noaa.gov/slr/>

Stormwater Capital Improvement Projects 3-Year Outlook

Capital Improvement Project Name	Fiscal Year		
	2016	2017	2018
Coquina Ditch Drainage Improvements	\$ 130,000	\$ -	\$ -
Lincolnville CDBG Drainage Improvements	\$ 1,080,000	\$ -	\$ -
Prawn Street Drainage Improvements	\$ 60,000	\$ -	\$ -
Neighborhood Drainage Improvements	\$ 200,000	\$ 200,000	\$ 200,000
Downtown Drainage Improvements	\$ -	\$ 500,000	\$ 2,573,000
TOTAL	\$ 1,470,000	\$ 700,000	\$ 2,773,000





CITY OF
ST AUGUSTINE[™]
— EST. 1565 —