

Annual Conveyance System Report 2017-2018

Clayton County Water Authority



*“Providing Quality
Water and Quality
Services to Our
Community”*



Table of Contents

1.0 INTRODUCTION.....	1
2.0 ASSET INVENTORY AND WORK MANAGEMENT TRACKING.....	1
Geographical Information Systems.....	1
Computerized Maintenance Management System	1
3.0 COLLECTION SYSTEM OPERATIONS	2
Organization and Management	2
D&C Staffing Summary.....	2
D&C Budget and Major Initiatives for FY 2016 – 2017	3
D&C Levels of Service.....	6
Inspections	6
Manhole Inspections.....	7
Right of Way Inspections	7
Exposed Pipe Inspections.....	8
Emergency Stream Inspection	8
Force Main Inspections	8
Smoke/Dye Testing	8
Easement Clearing	8
Closed Circuit Televising	9
Maintenance	9
Manhole Rehabilitation	10
Pipeline Maintenance	10
Air Release Valve Maintenance	10
Hydraulic Cleaning/Structured Cleaning Program	10
Smart Cover Monitoring System.....	11
Cured in Place Pipe Rehabilitation	11
Lift Station Maintenance.....	12
Emergency Response	13
4.0 ENVIRONMENTAL COMPLIANCE.....	14
Industrial Pre-Treatment	15
User Inventory, Monitoring, and Inspection.....	15
Grease Program	15



5.0 SSO OVERVIEW.....	17
SSO Documentation	17
SSO Response Plan	17
Emergency Sanitary Sewer Bypass and Repair	17
Sanitary Sewer Site Mitigation Canister	18
6.0 CAPTIAL IMPROVEMENT PLANNING AND IMPLEMENTATION	18
2015 Update of the Strategic Master Plan (SMP).....	18
SMP Implementation FYB17 (May 2017 – April 2018)	21
Organization.....	21
SSES Program	22
Basin Renewal	23
Large Outfall Renewal	24
Sewer Force Main Renewal.....	25
Flow Monitoring.....	25
Capacity Models.....	25
SMP Implementation Look Ahead to FYB18 (May 2017 – April 2018)	25
Water Reclamation Facilities: Current and Future Plans.....	26
W.B. Casey WRF	26
Northeast WRF	26
Shoal Creek WRF	26



1.0 INTRODUCTION

The Clayton County Water Authority (the Authority) Collection system consists of approximately 1032 miles of gravity main sewer, and 47 miles of force main serving approximately 76,000 customers within a service area of 98.142 square miles. The Conveyance section of the Distribution and Conveyance Department has the prime responsibility for the operation and maintenance of the collection system. In order to perform this function the Conveyance section is staffed with 38 full time positions. The Authority has been proactive in the inspection, maintenance, and management of the Collection System since the early 90's. This proactive way of thinking lead to the development of a CMOM (Capacity, Management, Operations and Maintenance) based approach to operating the collection system in 2001. Through the implementation of a CMOM based approach the Authority intends to prevent service interruptions and system failures, which can result in overflows and/or system backups while protecting the capital investment in the Collection System.

This document provides a summary of the programs and activities conducted by the Authority that are required to properly manage, inspect, maintain, and improve on the collection system and manage wastewater flows in Clayton County. It also provides information as required and referenced in the CMOM Consent Agreement No. EPD-WQ-6110 (as described in section 1 [a] through [g]) signed into effect on the 9th day of June, 2015. The document includes information on the following key components:

- Asset Inventory and Work Management Tracking
- Collection System Operations
- Environmental Compliance
- Sanitary Sewer Overflow (SSO) Overview
- Capital Improvement Planning and Implementation
 - Strategic Master Plan
 - Water Reclamation Facilities

2.0 ASSET INVENTORY AND WORK MANAGEMENT TRACKING

Geographical Information Systems

As part of the 2000 Master Plan, the Authority began developing a Geographical Information System (GIS) to manage its liner assets. Currently, the mapping and inventory data of the Collection System assets are maintained by the Authority's GIS (Geographic Information System) section with the Program Management and Engineering (PM&E) department. The Authority maintains the GIS data in an Enterprise Geodatabase, which allows for multi-user editing, and versioning. The central database serves the entire company, and users either connect to it through the wide area network or via copies of the data. Currently each of the Conveyance Crew Leaders and Foremen has a complete, fully queryable GIS system on their laptops.

Computerized Maintenance Management System

In 2004, the Authority implemented Cityworks, a Computerized Maintenance Management System (CMMS) to track, schedule and visually display collection system maintenance activities that are conducted on our assets that are stored in the GIS. Because it is integrated with the GIS, Cityworks is able to leverage the extensive GIS data warehouse. Users can create, view, and manage work orders and customer requests directly through a GIS interface, allowing them to associate calls, customer locations, crews, infrastructure, and work orders, viewing and querying them from within the map frame. Work orders created for the Conveyance Section are attached directly to the physical asset within the GIS, which allows the Authority to maintain a work history on our assets. In 2009 the GIS department began testing and training for a web based version of Cityworks. This version, along



with Wi-Fi access on laptops, allows crews to use the CMMS in the field. Cityworks is currently being used by all field crews within the Conveyance Section. Work orders are received and created in the field and the use of hard copy work orders has been eliminated.

3.0 COLLECTION SYSTEM OPERATIONS

While there are activities conducted throughout the Authority that all contribute to effective management of our wastewater, the majority of these activities are conducted by the Distribution and Conveyance (D&C) Department. This section will provide a summary of the D&C organization as well as the inspections and maintenance activities conducted by this group.

Organization and Management

The D&C Department is charged with the critical task of ensuring the efficiency of the individual distribution and collection systems. It has the responsibilities of installing the Authority's water lines and water meters and maintaining both water and sewer lines. Work must be performed in compliance with standards established by the federal and state regulatory agencies as they pertain to water distribution and sewerage collection.

Responsibilities are accomplished per the general direction of the General Manager and the Assistant General Manager over operations. The Distribution and Conveyance Manager is responsible for the day-to-day operations of the department.

To better manage operating expenses, the department is broken down into specific programs, types of services, or functional areas of responsibility. There are ten budget units and the following five budget units pertain to the collection system:

- 601 - Distribution and Conveyance Department Manager
- 619 - Utility and Landscaping Services
- 621 - Wastewater Conveyance Maintenance
- 627 - Conveyance System Inspections
- 630 - Utility Locators

D&C Staffing Summary

A total of 97 employees are assigned to the D&C Department and of those 39 are dedicated to maintenance and inspection of the collection system and another 15 contribute through utility locates or other landscaping and restoration activities that must be completed as repairs are made to the system. Exhibit 1 provides a summary of staff by budget unit for the previous two fiscal years and for the current fiscal year.



EXHIBIT 1

D&C Department Staffing Summary

Authorized Personnel	FY 2017-2018 Budgeted	FY 2018-2019 Budgeted	FY 2019-2020 Budgeted
Distribution and Conveyance Division			
601 - Distribution & Conveyance Manager	4.00	4.00	4.00
610 - Meter Installation	4.00	4.00	4.00
612 - Water Distribution Maintenance	27.00	26.00	25.00
616 - Meter Testing and Repair	6.00	5.00	5.00
617 - Leak Detection and Repair	2.00	2.00	2.00
618 - Backflow Testing and Repair	5.00	5.00	5.00
619 - Utility & Landscaping Services	9.00	7.00	7.00
621 - Wastewater Conveyance Maintenance	15.00	16.00	17.00
627 - Conveyance System Inspections	20.00	22.00	22.00
630 - Utility Locators	6.00	6.00	6.00
Total Full-Time Employees (FTEs)	98.00	97.00	97.00

D&C Budget and Major Initiatives for FY 2018 – 2019

Exhibits 2 and 3 provide a summary of the Budget and Major Initiatives planned for the D&C Department Fiscal Year Beginning 17 (FYB17).



EXHIBIT 2

D&C Department Budget

Department : Distribution and ConveyanceBusiness Unit : Department 600 -
ConsolidatedOverview of Department Responsibilities

The primary responsibility of the Distribution and Conveyance (D&C) Division is ensuring the overall integrity of the water distribution and wastewater collection systems. The Division installs and maintains water lines and water meters. It also maintains the wastewater collection system. The activities are performed in accordance with federal and state laws which govern water distribution and wastewater collection systems. Tasks are generally undertaken based on the priorities established by the General Manager.

Budget Detail By Individual Categories	FY 2017 - 18 Actual	FY 2018 - 19 Budgeted	FY 2019 - 20 Budgeted
Personal Services:			
Salaries and Wages	\$ 4,432,646	4,864,867	\$ 4,958,964
Overtime Pay	241,123	234,500	239,000
F.I.C.A.	345,495	390,099	377,364
Pension	613,238	688,279	689,294
Employee Benefits	777,038	1,258,207	1,084,864
Operating Expenditures:			
Operating Materials & Supplies	1,516,122	1,121,095	1,400,010
Vehicle Supplies	201,568	211,400	217,100
Administrative Supplies	11,640	15,525	15,275
Safety Supplies	34,897	33,400	32,200
Special Purchases	1,972	1,960	1,960
Utilities	111,690	101,979	101,514
Rentals	3,921	6,950	7,350
Maintenance and Repairs	258,756	302,349	352,849
Outside Services	1,975,063	2,178,150	2,265,796
Interest	-	-	-
Retiree Health Benefits	-	-	-
General Expenses	185,678	220,094	232,410
Accounting Charges	-	-	-
Debt Service:			
Capital Financing	-	-	-
Capital Outlay:			
Capital Expenditures	314,599	859,962	892,975
Other Financing Uses:			
Intrafund Transfers Out:	2,068,000	1,269,000	438,000
Total Appropriations	\$ 13,093,446	\$ 13,757,816	\$ 13,306,925

Department : Distribution and ConveyanceBusiness Unit : Department 600 -
Consolidated



EXHIBIT 3

D&C Department Major Initiatives

Business Unit	Budget Funding	Account Number	Amount Budgeted	Initiative	
Wastewater Conveyance Maintenance					
621	Operating	51104	\$ 210,000	Materials for Conveyance Maintenance	
		55106	200,000	Private Property Damage	
		56118	150,000	Patching & Paving	
		56124	500,000	Maintenance: Collections & Outfalls (Concrete, Dump Fees, Plumbing Repairs)	
	Capital	59988	16,000	Ridged Camera Reel & Transmitter	
Grand Total			\$ 1,076,000		
Conveyance System Inspections					
627	Operating	56104	\$ 50,000	Flow Monitoring	
		56124	300,000	Maintenance: Collections & Outfalls (Concrete, Dump Fees, Plumbing Repairs)	
	Capital	59933	25,000	SLRAT	
		59946	30,000	Smart Loggers (5)	
		59953	29,807	Truck: F-150 4x4	
		59988	35,000	Pole Camera (2)	
		59988	37,000	Transporter for Large Pipes	
		59988	24,000	Spare Camera	
	Grand Total			\$ 530,807	
	Utility Locators				
630	Operating	56104	\$ 26,000	IRTH Solutions Locating Software	
		56199	32,000	UPC Annual Membership	
	Capital	59953	29,807	Truck: F-150 4x4	
		59953	29,807	Truck: F-150 4x4	
		59953	29,807	Truck: F-150 4x4	
	Grand Total			\$ 147,421	



D&C Levels of Service

The Distribution and Conveyance Division is the Authority's largest division. This group has 16 Key Performance Indicator (KPI) metrics that are associated with six of the seven goals of the Authority: "Superior Product Quality"; "Exceed Customer Expectations;" "Provide Employee Development;" "Optimize Operations;" "Infrastructure Sustainability;" and "Stakeholder Support" goals and strategies 2, 4, 5, 6, 7, 8, 13, 21 and 23. The department's performance on these metrics are captured in Exhibit 4.

EXHIBIT 4 Levels of Service

Service Level Goal	Key Performance Indicator (KPI)	Division	Target	2017 - 2018	2016 - 2017	2015 - 2016
SUPERIOR PRODUCT QUALITY						
2 Potable water quality that meets customer expectations	# Discoloration Complaint Calls (CCWA issue): < 200/YR (reduce 10%/YR)	DC	< 200/Yr. - Reduce 10%/Yr.	236	272	1,034
	# Water Taste and Odor Complaint Calls (CCWA issue): < 25/YR (reduce 10%/YR)	DC	< 25/Yr. - Reduce 10%/Yr.	301	41	105
EXCEED CUSTOMER EXPECTATIONS						
4 Improve customer experience	% Site Visits Within 2 Hours of Customer Call: > 90%/MO	DC	> 90% / Month	94%	93%	94%
5 Minimize potable water service disruptions	# Low Pressure Complaints: < 20/YR	DC	< 20 / Year	15	14	20
	% Maintenance Related Water Service Disruptions < 4 Hours: > 80%/MO	DC	> 80% / Month	83%	84%	81%
6 Minimize customer sewer backups	Expense for Sewer Backup Claims: < \$200,000/YR	DC	< \$200,000 / Year	\$95,023	\$354,457	\$108,588
	# Sewer Backup Damage Claims: < 20/YR	DC	< 20 / Year	10	10	15
7 Complete all property restorations in 14 days	% Property Restorations Completed < 14 days: 100%/MO	DC	100% / Month	53%	55%	54%
PROVIDE EMPLOYEE DEVELOPMENT						
8 Provide effective employee training and development	% DC Employees with Required Certifications: 100%	DC	100% / Year	100%	96%	96%
OPTIMIZE OPERATIONS						
13 Reasonable Cost of Service	\$/Acct. of Wastewater Collection System Pipe Maintained: < \$373	DC	< \$373	\$80	\$82	\$87
	\$/Acct. of Water Distribution System Pipe Maintained: < \$408	DC	< \$408	\$82	\$91	\$95
	% of Budget: < 95%	DC	< 95%	89%	85%	NA
INFRASTRUCTURE SUSTAINABILITY						
21 Provide a sustainable water supply	# Water Main Breaks per 100 Miles of Pipe: < 11/YR	DC	< 11 / Year	5.2	7.5	0.13
	# Water Main Leaks per 100 Miles of Pipe: < 25/YR	DC	< 25 / Year	12.6	11.4	0.36
	Value of Water Services Claims Paid: < \$50,000/YR	DC	< \$50,000 / Year	\$1,157	\$9,407	\$55,374

Inspections

The inspection of the Collection System is crucial for condition assessment and the proactive search for existing and future problems. These problems can be structural defects, damaged structures, inflow and infiltration, line blockages, grease buildup, root intrusion, illegal cross connections, signs of previous surcharge, or vandalism that without the proper response from the maintenance section can lead to service interruptions and system failures, which can cause sanitary sewer backups or sanitary sewer overflows. The crews directly responsible for visual inspection of the collection system are the Collection System Inspection (CSI) crews and the Closed Circuit Televising (CCTV) crews. Inspections are also performed by various crews within the department.



In addition to the manhole inspections performed by the Conveyance crews, it was determined that D&C trouble shooters, who investigate customer complaints, could be a valuable tool inspecting manholes. Although the inspection is just a visual confirmation of correct functionality and not a detailed asset inspection, it is a valuable inspection as it can locate a possible problem within the system and prevent a possible SSO from occurring. The effort to locate blockages that have yet to cause an overflow is crucial in protecting the environment and staying proactive. These in-house inspection activities are in addition to the contracted inspections performed as part of the Authority's Sanitary Sewer Evaluation Survey (SSES) as described in the Capital Improvement Planning section of this document.

Manhole Inspections

The Conveyance System Inspection (CSI) crews are responsible for the inspecting the existing CCWA sanitary sewer manhole structures. Manhole structures are inspected to locate possible structural defects, damaged structures, inflow and infiltration, or signs of surcharging or vandalism that can lead to service interruptions and system failures, which can cause sanitary sewer backups or SSO's. The CSI crews perform as many inspections as practicable per fiscal year which allows the Authority to maintain an accurate inventory of the system as well as identify possible problems.

All manhole inspections are tracked using Cityworks. By assigning manhole inspections a work order type the work performed by the CSI crews is able to be properly tracked. In addition to the tracking of work performed through Cityworks the crews are also tasked with tracking their daily activities on a weekly log. The current format requires the crews to track the location of their activities as well as statistical information such as manhole inspection count, footage inspected and problems encountered. The information recorded on the weekly log is compiled into a Levels of Service spreadsheet for goal setting and production review by the Conveyance Supervisor.

In addition to the standard manhole inspection process the CSI crews also use additional methods to increase accuracy and verify geographical location of the manhole when needed. These methods include Pole Camera inspections and the GPS inspection process. Each of these inspection methods is tracked through work orders and the weekly log. The use of Pole Cameras allows the CSI crews to record visual data of the manhole inspection with the addition of the ability to zoom into the incoming and outgoing pipes for additional possibilities of locating a problem. The crews look for structural defects, inflow and infiltration, as well as verification of pipe material compared to recorded data in the GIS. Problems located during Pole Camera Inspections are input into Cityworks for work order generation.

The use of GPS units to inspect manholes allows for the location of the structure to be verified. The Authority's in-house survey team as well as the GIS Department worked together to develop methods, techniques, and data requirements for the project. The CSI crews use the GPS units, which are Topcon GMS -2 models, as an electronic data collector, using a preset pull-down menu to gather structural data of the manhole. The data collected is downloaded, and after a quality control inspection by PM&E, it is merged with the GIS. Any map discrepancies or new structures can be inspected with the GPS unit and corrected or added to the GIS Geodatabase.

Right of Way Inspections

CSI crews are responsible for the inspecting the existing CCWA sanitary sewer right-of-ways (ROW). The ROW is land that the Authority has an easement for ingress/egress to inspect, maintain, repair, or upgrade sanitary sewer infrastructure. Crews perform ROW inspection on the terrain located between manholes during manhole inspections. The purpose of inspecting the sanitary sewer ROW's is to locate possible structural defects, erosion of pipe coverage, failing rip rap areas, damaged structures, inflow and infiltration, illegal connections and cross



connections that can lead to service interruptions, and capacity overloads and system failures that can cause sanitary sewer backups or sanitary sewer overflows.

Exposed Pipe Inspections

The Exposed Pipe Inspection Program (EPIP) focuses on the inspection of all pipes that are without ground cover, adjacent to, crossing over, or parallel to a stream, waterway, or dry drainage area. The purpose of collecting inspection data on these structures is to guarantee that the pipes are in proper operating condition and to reduce the possibility of a washout, pipe rupture, or interruption of regular sanitary sewer flow which can lead to sanitary sewer overflow.

Emergency Stream Inspection

The Emergency Stream Inspection Program (ESIP) was developed in-house by the Conveyance section with input from the Water Resources Engineer, Fats, Oils, and Grease (FOG) program staff, and laboratory personnel. The purpose of the program is to provide an outline of the steps that will need to be followed in order to minimize the environmental impact on the watershed due to SSO's. This is done by performing a review of stream sampling data to determine potential areas where raw sewage may be escaping the collection system. Should the data review indicate a potential issue, field inspections are immediately initiated to locate possible defects in the collection system, and to respond to located defects with immediate remediation actions. The intent of the program is to outline the minimal required standards that must be followed to effectively inspect streams and the collection system based upon sampling data.

The ESIP coordinates the efforts of multiple departments with the single goal of providing a fast and appropriate response to the possibility of an SSO. This coordinated effort established a chain of communication and a documented approach to providing a timely response.

Force Main Inspections

The inspection of Force Main ROW's is conducted by the CSI crews. The ROW is visually inspected from the lift station to the gravity dump manhole and during the inspection crews look for any indication that a force main may be compromised or damaged. These visual inspections target possible sink holes, washouts, erosion, or signs of effluent discharge that could indicate a problem with the force main. The air release valves are inspected once a year by the tap and repair crews under the direction of the Maintenance and Repair foreman. Repairs are made as needed.

Smoke/Dye Testing

The Conveyance section CSI crews are responsible for conducting smoke and dye testing of the Authority's collection system. The purpose of performing smoke tests and dye tests is to locate possible structural defects, damaged structures, confirm customers tied into the system, inflow and infiltration, illegal connections, and cross connections. The crews use two oil based blowers to perform smoke testing and rotate locations throughout the service areas based on various factors including customer complaints, historical problem areas, CCTV data, visual inspection data, and inner department requests. Dye tests have historically been performed to locate customer connections or verify defects in coordination with CCTV work. Dye tests are performed on an "as needed" basis.

Easement Clearing

The Conveyance section has a full time crew dedicated to clearing of sanitary sewer ROW's. The purpose of clearing the ROW's is to allow more precise inspections of the ground above the sanitary sewer tangents, fast and safe access for inspection crews, reduction of intrusive vegetation, and allow vehicle access for emergency situations such as blockages or repairs. The crew consists of crew leader and two equipment operators that work



in direct coordination with the Preventive Maintenance Foreman. The crew uses specialized equipment including a Kubota Farm Tractor with a Bush-Hog attachment, and a TEREX Skid Steer with special forestry attachment. The crews also clear with chainsaws and bladed cutters. The clearing crew is instrumental in the development of access roads for special projects that require specialized equipment such as CCTV units and hydraulic jet trucks. The crews haul rock and gravel and develop permanent ingress/egress structures for the conveyance section. While performing clearing activities, the crews also perform visual inspections of the ROW's and manhole structures. The work performed by the clearing crew is tracked in Cityworks. Since the terrain and situations for each outfall cleared vary from job to job, a numeric goal for the clearing crew is not useful, however, the Preventive Maintenance Foreman reviews work orders and linear footage counts to assure the crew is maximizing production.

Closed Circuit Televising

The CCWA Conveyance section has two CCTV units. The units are used to visually inspect the existing inventory of sanitary sewer structures to locate and document structural deficiencies, illegal tap connections, root intrusion, inflow and infiltration, grease buildup, utility conflict, and damaged structures. These inspections help to prevent service interruptions and system failures, which can result in overflows, system backups, or reduction in pipe capacity. In addition, the CCTV units are used to document changes within the system inventory, locate lateral connections, and locate manholes that are buried. CCTV crews document inspections using the PACP (Pipeline Assessment and Certification Program) coding system. The Authority provided PACP training and certification for the CCTV staff as well as Conveyance staff members that use inspection data obtained from the CCTV units to schedule repairs.

The two CCTV units are specialized for the different types of terrain encountered when performing CCTV work. One unit is a standard box truck unit used to perform CCTV in roadways and areas adjacent to roadways while the other unit is mounted on an all-terrain vehicle to access hard to reach areas and locations that standard CCTV units could not navigate. Both CCTV units record all CCTV inspections using the granite XP software system and operate Cues CCTV equipment. CCTV inspections are linked directly to the GIS and CCTV data is reviewed in-house by the Tap and Repair Foreman for designation and scheduling of needed repairs. In addition to the two CCTV units the Tap and repair crews have mobile Sea Snake CCTV units which allow CCTV work to be performed on small aperture pipes such as cleanout caps and taps directly into manholes. The Sea Snake CCTV work performed on cleanouts is mainly used to determine locations of small blockages and make determinations of ownership between the CCWA and customer plumbing. The Tap and Repair crews are also equipped with a Rovver X Inspection Crawler. The Rovver X is a portable self-propelled CCTV unit that the crews use in conjunction with the Cured In Place Pipe (CIPP) point repair system. This allows the repair crews to perform their tasks without requiring the Authority's CCTV crews to be present.

Maintenance

In addition to the Inspection Crews the Conveyance section also has full time crews dedicated to the maintenance and repair of the collection system. These crews are specialized for their appropriate tasks but have the ability to work on all structures when needed. These crews perform daily maintenance and repair of the collection system in response to inspection data, customer complaints, and internal requests or after hour calls. These crews consist of Manhole Raising, Tap and Repair, and the Jet Truck units.



Manhole Rehabilitation

The Conveyance section has a full time crew dedicated to maintaining the manhole structures located within the collection system. This crew consists of four full time employees which include a crew leader, and operator, and two mechanics. Manhole structures are the access points for the CCWA sanitary sewer collection system. Manhole structures are placed at directional changes, and grade changes on sanitary sewer collection lines. Manhole structures that have been paved over, located within new construction, or have been covered with fill become inaccessible. These manholes are made accessible and safe through physical adjustment of cone sections, rings, and covers. The manhole crew is also responsible for the rehabilitation of existing CCWA manhole (MH) structures. The department performs various rehabilitative actions in response to detected problems including MH replacement (complete), MH replacement (partial), ring plastering and lockdown, ring and cover replacement, brick MH re-building, MH inflow and infiltration removal (grout, hydraulic cement), and MH bench construction and repair.

CCWA also utilizes private contractors for manhole rehabilitation jobs that require deep excavation, are located in very wet or swampy conditions, or require equipment that is not available to D&C staff. CCWA has an annual contract for these types of repairs and uses the contractor only when needed.

Pipeline Maintenance

The CCWA Wastewater Maintenance Tap and Repair crews are responsible for repairs made to the pipe structures located within the CCWA sanitary sewer collection system. There are two tap and repair crews each consisting of a crew leader, operator, and two mechanics. The crews remove root masses, replace defective pipe segments, repair illegal tap connections, repair damage to pipe structures, correct pipe washouts, and are responsible for tap installations on existing sanitary sewer pipe structures. The crews use standard open excavation repair techniques as well as a CIPP spot repair system. In order to use this system the Tap and Repair crews have been trained in the operation of a mobile self-propelled CCTV unit that the crews use during the installation of the CIPP spot repair. This system allows the crews to perform structural repairs without the need for excavation.

Large sanitary sewer line repairs and emergency repairs are contracted out to a private contractor. The contractor works under the supervision of CCWA staff. The private contractor is used when dealing with large diameter pipe, boring of roadways, extreme terrain challenges, or the workload of the CCWA repair staff is heavy. All repairs to the collection system are tracked in Cityworks. The goal of sewer line repairs is to eliminate sanitary sewer backups and overflows, and guarantee system capacity. The staff goal is to perform prompt and correct repairs to the CCWA sanitary sewer collection system and to install all tap requests promptly, correctly, safely and in a timely manner. Since corrective actions are initiated by inspection activities such as CCTV, manhole inspection, SSES results, smoke tests, etc., no numeric goals can be set for this activity. However, the Tap and Repair Foreman reviews production numbers for the Tap and Repair crews for possible improvements or increases in overall productivity.

Air Release Valve Maintenance

Air Release Valve (ARV) inspection and maintenance is scheduled and performed by the Conveyance Tap and Repair crews. ARV's are inspected annually and a spare parts inventory as well as switch out units are stored on site for repairs and replacement. Work performed on ARV's is tracked in Cityworks.

Hydraulic Cleaning/Structured Cleaning Program (Program Update)

The Authority operates two Vactor Hydraulic Cleaning Units and one combination vac/cleaning unit. The combination vac/cleaning unit has the ability to clean debris out of manholes as well as pump liquids. This



combined vac/cleaning unit allows crews to perform a wider range of maintenance tasks and increases the response time when manholes require emergency bypass pump down. Each of the three hydraulic cleaning units is staffed with a crew leader and an equipment operator. The units perform routine cleaning, root cutting, debris removal, and clearing of blockages and stoppages from the sanitary sewer collection system. The crews also use a grease-fighting chemical to combat heavy grease. The grease fighting chemical is stored in an on-board reservoir located on each of the two Vactor Units.

The jet trucks are responsible for the operation of the hydraulic root saws that perform root removal and cutting of debris build up on the pipes. The crews perform root cutting based upon work orders or internal customer requests. The overall goal of the hydraulic cleaning effort is to keep all sanitary sewer lines open and flowing and routinely cleaned to prevent blockages or stoppages that can lead to service interruptions, capacity overloads, and system failures, which can cause sanitary sewer backups or SSO's.

CCWA has implemented a **Structured Cleaning Program** for the sanitary sewer collection system in an effort to not clean pipes too often (and waste resources) or too infrequently (resulting in a greater risk of back-ups and overflows). By reviewing historical collection system data, including overflows, CCTV data, and cleaning data, an initial schedule was created to indicate how often the high priority pipes in the system should be cleaned. This schedule will be continually optimized through the use of a decision support software which can quickly process newly collected data from each cleaning and CCTV event and make a recommendation as to whether the pipe needs to be scheduled for cleaning again at the same timeframe, cleaned more often, cleaned less often, added to the cleaning schedule, or removed from the cleaning schedule. This program will reduce the number of overflows and ensure that cleaning resources are used effectively and efficiently, by changing the focus from overall cleaning footage to focusing on cleaning pipes that need to be cleaned at the right time. CCWA created and filled a new full time position (D & C Planner/Scheduler) to coordinate the Structured Cleaning Program.

Cured in Place Pipe Rehabilitation

Since 2002, the CCWA has had an annual contract with a private contractor to perform cured-in-place pipe (CIPP) Rehabilitation. The CIPP work consists of a placing a resin impregnated flexible tube within existing CCWA pipe structures. After curing, the pipe is now structurally sound and will conduct sanitary sewer flow, resist chemical erosion, eliminate root intrusion, and increases the life expectancy of the sanitary sewer pipe. All work performed must meet or exceed the minimum requirements as set forth in the most recent version of ASTM F1216 (Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube), and ASTM F1743 (Rehabilitation of Pipelines and Conduits by Pulled-In-Place Installation of a Cured-In-Place Thermosetting Resin Pipe). The PM&E Department's Construction Services Section is responsible for the review and scheduling of all CIPP work including the inspection of the installation process. The Construction Services Section has a Civil Engineer, two Construction Services Supervisors and seven Construction Inspectors who oversee all outsourced pipeline construction for the Authority.

Smart Cover Monitoring System

CCWA has purchased and field deployed 14 SmartCover level monitoring devices at key locations throughout the collection system. These devices are an integrated, real-time remote water level monitoring system. The system has been designed and built to provide completely unmanned operations. The system requires no external power, performs on-site data collection, analysis, and storage, and provides a two-way communications link directly through a low earth orbit satellite system allowing deployment of Remote Field Units (RFUs) anywhere in the county. CCWA Conveyance staff are notified in real time if the sewer levels decrease or increase and can respond quickly to possible emergencies and prevent SSO's from occurring.



Lift Station Maintenance

Routine daily maintenance is performed on all of the CCWA lift stations. Daily maintenance checks include the electrical breakers, electronic pressure switch, control levels, pump and piping. Preventative maintenance is performed annually on the generators. The inspection and maintenance are performed through contracted services. The generators have different inspections to perform on a monthly, quarterly, and annual basis. The CCWA has invested heavily in a SCADA to monitor the operation of the lift stations within the system. The CCWA SCADA system is designed to monitor the lift station system and remotely access data that can be useful as a troubleshooting tool. The SCADA system also collects pertinent data both real time and historically. Through the proper operation, preventive maintenance, and predictive monitoring the Authority helps reduce possible overflows caused by lift station failures.

The lift station SCADA system allows online, interactive, menu driven, and configuring application software for operation and monitoring of the system through IFix Prophecy 5.8. From the IFix System Operations will be able to monitor, control, and gather data using Ifix, MDS 9810 radios, AB Controllogix units, and AB Micrologix 1500.

This includes the following signals and systems:

- Analog
- Digital
- Error Message
- Alarm Handling
- Win911 Reporting
- Log Changes
- Historical Trending
- Graphic Display
- Report generation (XL Reporter)

The SCADA system is controlled by 2 RAD 5 IBM servers. Each server is polling the system and gathering data. If one server should fail operation still can use the other to gather data and control the system. Inside the main PLC control cabinet is 2 Controllogix redundant PLC units; they monitor and maintain the radio system and polling cycles for the lift station. If one PLC drops out the other will take over seamlessly no data will not be lost.

The SCADA system is broken down into sever parts menu, data, alarm, trending, win911, XL reporter, and configuration. The system allows for easy menu driven moment from screen to screen. Operational staff can click on the lift station text and drop down a menu off all the stations in the system. Also by clicking on the green arrow button on the top left the operator can move from screen to screen. Operations can monitor real-time data from the graphic screens. Signals such as pump on/off, alarm event, level, and flows are presented on the screen. The data is updated every 5 seconds according to the polling cycle off the system. Pump status on/off are represented by the collar red and green. The level indication in the middle of the screen will move up and down giving a graphic view of the level in the wet well along with a digital number. Data points indicate pressure and flow form each pump as well as the flow leaving and interring the station. This representation allows operation for a quick scan of the station. Also on the graphic screen operation can start and stop any pump by clicking on the force run and stop buttons for each pump. A log is keep by the system when any changes are made to the graphic interface with time stamp and operation member name that made the change. The pumps run in auto but there are times when maintenance and checking of the pumps is done from the SCADA system. A log is kept by the system when any changes are made to the graphic interface with time stamp and operational member name that made the changes.



The SCADA system receives alarm events that are stored in the alarm Log and the system will display all new alarms. All alarms stay active till they are acknowledged by operations. A log is created inside the SCADA system that puts a time stamp when the system received the alarm and when it was acknowledged. The system also will specify which operational staff checked the alarm. These alarms include generator running, high water, generator fail, and other system alarms. All trending done by the SCADA system is historic trending. The data is stored inside the system to allow operation to travel back in time to view specify data events. The trending display allows for 8 signals to be displayed at one time. It also allows configuration for time spans. This trending is used to monitor level, pressure, generator and pump run times, and flow. This becomes a valuable tool when operation selects pump stats and level. Operations can see the cycles of the pumps and run times and determine if one pump is running to long or is missing cycles and can compare that to the level in the station. A long pump time or a quick cycle may suggest a pump failure.

The WIN 911 system allows operations to select alarms that the system to call operations on for after hours or for emergency alarms. The system is set up with voice software and the alarms are determined by operations. The system will call the on-call phone number to ask for verification from the operations staff. If the first call number is not answered it moves on to the next till a response is received. A time stamp is created inside the system that is logged telling the time of the call what operational member received the call and what action was taken. XI reporter is integrated in to Microsoft XL and it allows operations to print daily and monthly report summaries from the historical data. The SCADA system is configurable to fit the needs and wants of the operations staff. All graphics screens and trends can be created and modified using the system draw function.

Emergency Response

During regular operating hours the D&C Department has five full time Trouble Shooters that respond to all calls and determine if the situation requires additional staff or maintenance activities. One of the troubleshooter positions works second shift to answer field calls and prioritize needed maintenance activities. One of these troubleshooter positions is assigned to sewer-only calls and has a mobile pull behind jet unit to handle emergency situations immediately when arriving on site. In order to better serve the customers of Clayton County and provide immediate response to situations that occur outside of regular operating hours the D&C Department has a standby program that assures all emergency calls are responded to in a timely manner. A rotating schedule of standby staff is responsible to responding to customer complaints and resolving issues during afterhours. All the activities of the trouble shooters and after hour staff is tracked in the Authority's Cityworks CMMS program.

Exhibit 5 provides a summary of the results of the inspection and maintenance activities described in this section, for calendar year 2018.

EXHIBIT 5

Conveyance Section Production Data, Calendar Year 2018

Wastewater Conveyance	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Number of MH Overflows	10	9	7	3	8	4	1	5	1	3	9	10
Overflows to State Waters - Number of Spills	1	1	3	1	1	3	1	1	3	1	1	3
Total Volume to State Waters	33500	10780	29442	12300	15,870	8500	4600	6000	0	3100	13100	13850
Repairs by CCWA	25	28	39	27	27	34	25	11	26	30	13	21
Repairs by Contractor	1	1	0	0	0	1	0	0	0	0	0	2
Footage Cleaned	29650	21941	29442	28887	7,369	41,379	50,821	42,986	30,860	26,830	21,257	23,233



EXHIBIT 5

Conveyance Section Production Data, Calendar Year 2018

Wastewater Conveyance	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Footage Cleaned/CCTV by Contractor	0	0	36152	0	105629	0	20401	28436	45143	0	15628	54562
Footage Root Cut	0	230	3638	610	0	0	0	0	0	694	0	437
Footage Root Control applied by Contractor	0	0	0	0	29,071	0	0	0	0	0	0	0
Footage Inspected - Visual	51083	76470	91356	108820	93,495	64,259	120,078	71,599	91,606	112,411	33,569	104,944
MH's Inspected	2414	2237	2789	2545	2455	3024	3771	2954	2525	3010	1454	1,111
Footage Inspected - CCTV	9465	9419	9778	13652	13,075	10,481	18,437	4,479	5,838	19,558	10,987	8,372
MH's Rehabilitated	40	46	84	59	29	9	34	30	122	164	171	27
Footage Smoke tested	287	0	990	1142	4,800	3,054	3,393	4,285	0	3,172	2,401	680
Footage CIPP	164	0	0	1975	0	0	0	0	0	4,246	0	0
Service Requests - Total	101	123	102	94	99	56	64	70	51	82	89	64
Service Requests - CCWA Problem	22	105	23	19	24	12	8	17	4	10	34	22
Service Requests - Customer Problem	79	18	79	70	75	44	56	53	47	66	55	44
Average Response Time	0.57	0.44	1.71	0.65	1	0.87	0.75	0.66	1.26	0.72	1.15	1.86
Odor Complaints - Total	4	5	7	11	7	5	11	11	6	4	1	1

4.0 ENVIRONMENTAL COMPLIANCE

The Water Reclamation Department manages three programs related to environmental compliance that are intended to maximize system capacity; Sewer Use, Industrial Pretreatment, and Grease Management.

The Sewer Use Ordinance sets forth uniform requirements for users of the Publicly Owned Treatment Works for Clayton County and enables Clayton County Water Authority to comply with all applicable State and Federal laws, including the Clean Water Act (33 United States Code § 1251 et seq.) and the General Pretreatment Regulations (40 Code of Federal Regulations Part 403). The federally mandated objectives of this ordinance are:

1. To prevent the introduction of pollutants into the Publicly Owned Treatment Works that will interfere with its operation;
2. To prevent the introduction of pollutants into the Publicly Owned Treatment Works that will pass through the Publicly Owned Treatment Works, inadequately treated, into receiving waters, or otherwise be incompatible with the Publicly Owned Treatment Works;
3. To protect both Publicly Owned Treatment Works personnel who may be affected by wastewater and sludge in the course of their employment and the general public;
4. To promote reuse and recycling of industrial wastewater and sludge from the Publicly Owned Treatment Works;
5. To provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the Publicly Owned Treatment Works; and



6. To enable Clayton County Water Authority to comply with its National Pollutant Discharge Elimination System permit conditions, sludge use and disposal requirements, and any other Federal or State laws to which the Publicly Owned Treatment Works is subject.

Industrial Pre-Treatment

The Industrial Pre-Treatment Program focuses on Significant Industrial Users (SIUs). A SIU is defined as a user subject to categorical pretreatment standards or discharges greater than an average of 25,000 gpd of process wastewater. CCWA may also designate a user as SIU on the basis that it has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement. All SIUs are issued a CCWA discharge permit.

The Discharge Permit must contain:

- A statement that indicates wastewater discharge permit duration, which in no event shall exceed five (5) years;
- A statement that the wastewater discharge permit is nontransferable without prior notification to CCWA in accordance with Sec. 98-9 (E) of this ordinance, and provisions for furnishing the new owner or operator with a copy of the existing wastewater discharge permit;
- Effluent limits based on applicable pretreatment standards;
- Self-monitoring, sampling, reporting, notification, and record-keeping requirements. These requirements shall include an identification of pollutants to be monitored, sampling location, sampling frequency, and sample type based on Federal, State, and local law; and
- A statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule. Such schedule may not extend the time for compliance beyond that required by applicable Federal, State, or local law.
- Other conditions as deemed appropriate by the Manager to ensure compliance with this ordinance, and State and Federal laws, rules, and regulations.

Permits are also issued to Groundwater Remediation Sites, Liquid Waste Haulers, and Single Event Dischargers. During fiscal year (FY) 2018, CCWA permitted 16 SIUs, 0 Liquid Waste Haulers, 1 Groundwater Remediation Sites, and 1 Single Event discharge.

User Inventory, Monitoring, and Inspection

Environmental Compliance staff performs at least annual inspections and monitoring is conducted routinely as needed and at quarterly intervals on SIUs. Surveillance sampling and analysis and self-monitored data or unexplained changes in water quality may require changes to the monitoring and inspection cycle. The Authority may at any time conduct compliance monitoring/inspection in order to identify and document violations to the permit/sewer use ordinance.

Grease Program

The Grease Program falls under the jurisdiction of the Water Reclamation Department. The environmental Compliance & Lab Coordinator is responsible for overseeing the program. For complete statistical data and program documentation see the CCWA Grease Management Program submitted to the EPD as part of compliance order EPD-WQ-5355. The following section is an overview of the program. The purpose of this program is to minimize the introduction of fats, oils, greases, and sand into the CCWA wastewater collection system. The main components of the program are the proper sizing, installation, and maintenance of grease interceptors. All proposed or newly remodeled food service facilities inside the CCWA Wastewater Service area shall be required



to install an approved properly operated and maintained grease interceptor. All interceptor units shall be installed outdoors of the Food Service Facility building unless the user can demonstrate to CCWA that an outdoor interceptor would not be feasible. All interceptor units shall of the type and capacity approved by the County and CCWA.

All existing food service facilities inside the CCWA Wastewater Service area are expected to conduct their operations in such a manner that grease is captured on the user's premises and then properly disposed.

Existing Food Service Facilities will be handled under CCWA's Grease Management Program in the following manner:

- CCWA will periodically inspect each Food Service Facility on an as-needed basis to assure that each facility is complying with the intent of the Grease Control Program. The as needed inspection shall be determined by the CCWA.
- Each Food Service Facility in the vicinity of the problem area will be inspected. The facilities' grease control practices and the adequacy of their grease control interceptor/equipment will be assessed. Maintenance records will also be reviewed.
- Following the inspections, CCWA will send written notice to the inspected food service facilities, containing a summary of the policy requirements, and the results of the inspection. The inspections will typically result in one of the following actions:
- Facilities equipped with an appropriate and adequately sized grease interceptor who are meeting the intent of the Grease Management Program through effective grease control practices will be commended for their compliance.
- After notice and an opportunity to be heard, facilities not in compliance shall be required to develop and submit to CCWA a proposed plan designed to achieve compliance through improved housekeeping and/or increased maintenance and pumping on the existing grease interceptor/equipment
- Facilities that are not successful in achieving compliance with the intent of the Grease Management Program through improved housekeeping and increased maintenance and pumping on the existing grease interceptor/equipment will be required to install the necessary interceptor/equipment to bring the facility into compliance.

Design criteria consist of construction materials, access, load-bearing capacity, inlet/outlet piping, and proper sizing. Outdoor grease interceptors shall not have a capacity of less than 1,500 gallons nor exceed a capacity of 3,000 gallons. If the calculated capacity exceeds 3,000 gallons, then multiple units in series shall be installed. Grease interceptor designs represent minimum standards for normal usage. Installations with heavier usage require more stringent measures for which the user is responsible and shall pay the costs to provide additional measures if required by CCWA. CCWA reserves the right to evaluate interceptor sizing on an individual basis for facilities with special conditions, such as highly variable flows, high levels of grease discharge, or other unusual situations.

All grease interceptors shall be maintained by the user at the user's expense. Maintenance shall include the complete removal of all contents, including floating materials, wastewater, and bottom sludges and solids. Decanting or discharging of removed waste back into the interceptor from which the waste was removed or any other grease interceptor, for the purpose of reducing the volume to be disposed, is strictly prohibited. Outdoor



grease interceptors must be pumped out completely a minimum of once every three months. Under-sink or in-line grease interceptors must be pumped/cleaned out completely a minimum of once every month.

Authorized personnel of CCWA, bearing proper credentials and identification, shall have the right to enter upon all properties subject to this program, at any time and without prior notification, for the purpose of inspection, observation, measurement, sampling, testing or record review, as part of this program. All interceptors are inspected at least twice each year. All users must keep a record of any cleaning or maintenance of their grease interceptor. Records including manifests must be kept on-site at the food service facility for a period of three years. The Water Reclamation Department manages three programs related to environmental compliance that are intended to maximize system capacity, Sewer Use, Industrial Pretreatment, and Grease Management.

5.0 SSO OVERVIEW

The D&C Department is responsible for the documentation and response effort in the continued effort to reduce SSO's. The CMOM based approach to managing the collection system was implemented in 2002. This included the development of the documentation process and defining the roles of the various crews within the section that are responsible for SSO documentation, response, and follow up procedures. The Environmental Compliance Specialist and the Conveyance Preventive Maintenance Foreman are tasked with keeping the program moving forward and overseeing activities of the section regarding SSO's.

SSO Documentation

All SSO's to the ground, State Waters, or Major spills (<10,000 gallons) are documented. Field documents are used to take preliminary data in the field as site assessments are performed by responding crews. This data from the field is used to populate electronic Cityworks Work Orders and Inspections that attach the SSO data directly to the physical assets in the Authority's GIS. Once the data has been transferred to Cityworks the final spill report can be generated for notification purposes and review. All related work activities and follow up inspections can be attached to the asset where the event happened. Custom reports have been developed that allow searches on SSO events and review of SSO data. SSO's are also tracked within the Departmental Levels of Service (LOS) Report that is used for managerial review of Department production numbers.

SSO Response Plan

The Authority developed the Emergency Spill Response Plan (ESRP) to insure a prompt and appropriate response to any spill, release, or diversion of wastewater from the CCWA sanitary sewer collection system. The ESRP is designed to set basic strategic guidelines for Authority personnel and/or authorized representatives to mobilize persons, materials, tools and equipment in order to prevent, correct, or repair any condition that has the potential to cause or contribute to a sanitary sewer overflow. The ESRP was originally drafted in 2001. The document is reviewed yearly or as needed by the Environmental Compliance Specialist to assure it is current.

Emergency Sanitary Sewer Bypass and Repair

The Emergency Sanitary Sewer Bypass and Repair Program (ESBAR) establishes the plan of action, a trained response team, and the materials needed to safely, and quickly respond to damaged sanitary sewer structures, and reduce environmental impact of sanitary sewer overflows (SSO). The ESBAR unit consists of a trailer stocked with the needed materials to safely perform a bypass pump-around of any sanitary sewer structures that may be damaged or blocked.



Sanitary Sewer Site Mitigation Canister

The Conveyance section budgeted for, and purchased a container in 2011 that will be used to de-water sanitary sewer removed from the collection system during a repair, general cleaning, or an emergency situation. A ramp was built on site to allow large tanker vehicles to access the canister. The canister is directly attached to a sanitary sewer manhole located on the Authority's property allowing liquid dewatered from the canister to re-enter the collection system while insuring solids do not re-enter the system and can be disposed of properly.

6.0 CAPITAL IMPROVEMENT PLANNING AND IMPLEMENTATION

The PM&E Department provides support services to CCWAs operational departments, which includes the Distribution and Conveyance (D&C) Department. PM&E manages the various software programs used for asset management (GIS, Cityworks, Granite XP). They also provide plan review, engineering, construction planning and inspection, survey, and are responsible for development and implementation of the Authority's long term capital plans. The following provides an overview of the capital improvement planning activities as it relates to the conveyance system as well as treatment at the Authority's Water Reclamation Facilities.

2015 Update of the Strategic Master Plan (SMP)

Since 1960, the Authority has developed 10-year master plans to identify regulatory challenges, growth drivers, and identify the infrastructure needed to respond to these conditions. The SMP is a framework with tools for planning, managing and evaluating Authority-wide performance. It also provides a design template to guide services, projects, and operations, for CCWA's departments and budget units.

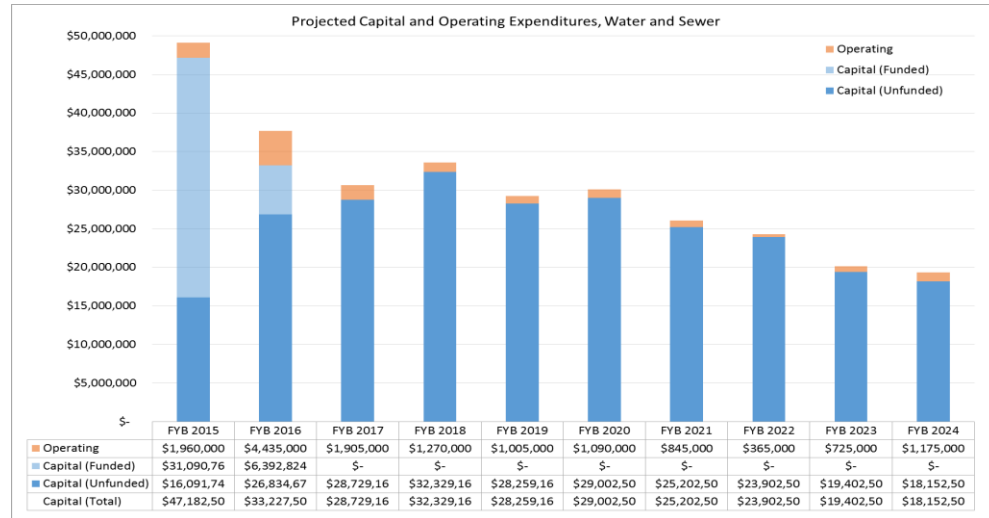
In response to a decrease in growth following the rapid growth of the 1990's, the development of another 10-year capital plan was not enough. In 2010, CCWA developed its first Strategic Master Plan (SMP). The change in our operating environment required that the Authority be more efficient and disciplined in not only in its operations, but also in how it prioritized its operating activities and its capital projects or programs. CCWA also completes 5-year updates of our master plans, and the 2015 Update of the SMP serves as an update to the 2010 SMP and is the comprehensive guide in continuing to achieve CCWA's vision of Quality Water, Quality Service. The approach taken to develop the plan prioritizes the operating and capital projects according to CCWA's strategic priorities. Additionally, the projects are scheduled based on the priority, predecessor or successor projects, and other schedule requirements and a 10-year cash flow schedule was developed. Projects scheduled for FY 2018 - 2019 were incorporated into the budgeting process, and moving forward, this document will continue to support the strategic planning and budgeting process. Additionally, CCWA is currently developing the 2020 SMP which will be complete in April 2020 and identify projects over a ten-year period.



The 2015 SMP identified 95 water, sewer, and stormwater projects that represent \$367.1 million dollars over 10 years. Exhibit 6 shows the projected expenditures over the 10-year planning period for the water and sewer fund. Of those projects, \$162 million is

EXHIBIT 6

2015 Update of the SMP, Projected Capital and Operating Expenditures, Water and Sewer



estimated to be needed for pipeline asset management needs. Considering the amount and age of CCWA's system, there is significant work to complete. CCWA maintains almost 1,500 miles of water distribution lines, 1,100 miles of sewer conveyance pipe, and 500 miles of stormwater pipe. As shown in Exhibit 7, our pipes, laid end to end, would span from Miami to Seattle.

EXHIBIT 7

Pipeline Asset Summary



Many factors contribute to the lifespan of a pipeline that among other things could include age, material, corrosion, and construction quality. As shown in Exhibit 8, looking at age alone, 300 of the 1100 miles of sewer pipe in our system would need to be replaced or rehabilitated. As we learn more about our system through continued preventive inspections and other projects discussed in this section, CCWA will be able to develop a better understanding of the long-term renewal and replacement needs.

Exhibit 9 lists the 20 conveyance system related programs and initiatives that were included in the 10-year master plan. The estimated duration is listed and shows that 8 of the projects are planned to continue throughout the 10-year period. For

example, Project 614, Basin Level Sanitary Sewer Rehabilitation is anticipated to be an ongoing activity over the entire SMP period. The need for each of the projects is addressed and validated annually as part of each years' budgeting process.

The following section shifts the focus from CCWA's long term planning to specific conveyance related activities completed during CCWA's Fiscal Year Beginning 2015 (FYB15).



EXHIBIT 8 Sewer Pipeline Age

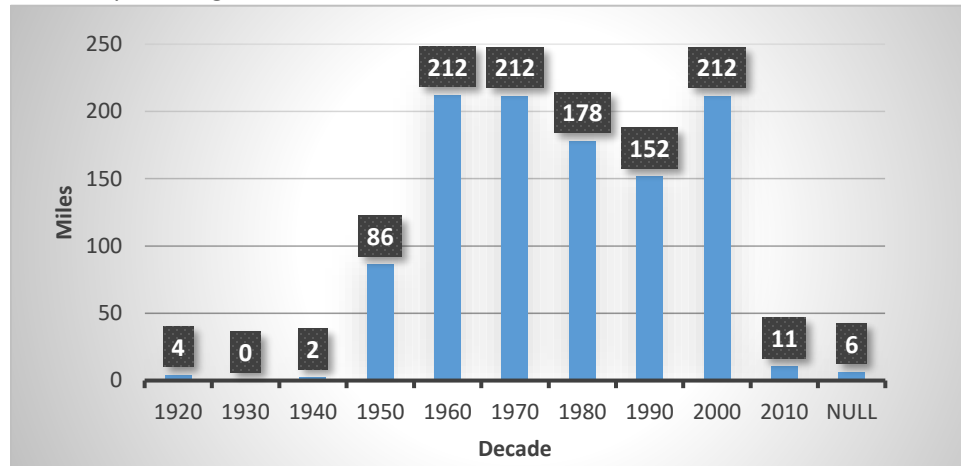


EXHIBIT 9 SMP Final Project List

Project ID/Project Name	Planning Level Estimated Cost	Total Benefit Score	Estimated Duration
110 / Asset Management Program Assessment	\$250,000	47.40	1 year
117 / Business Process Evaluation and Improvements	\$200,000	57.20	1 year
121 / Enhance Compliance Reporting	\$250,000	37.00	1 year
604 / Expand Sewer Service to Key Unsewered (Septic Tank) Areas	\$5,000,000	20.50	3 years
611 / Infiltration/Inflow Program, Flow Monitoring/RDII Analysis (Shoal Creek Basin)	\$350,000	37.80	1 year
612 / Develop Sewer Model (Shoal Creek Basin)	\$150,000	37.80	1 year
613 / Infiltration/Inflow Program, SSES Studies (for all three basins)	\$15,000,000	65.40	10 years
614 / Basin Level Sanitary Sewer Rehabilitation (for all three basins)	\$20,000,000	75.60	10 years
615 / Flint River, Phase 1A - Large Interceptor Rehabilitation	\$6,000,000	73.40	1 year
616 / Large Interceptor Condition Assessment	\$1,100,000	49.80	10 years
617 / Large Interceptor Rehabilitation (Flint River Phases 1B, 2, 3, R.L. Jackson, Jesters Creek,	\$60,000,000	73.40	10 years
618 / Post Infiltration/Inflow Rehabilitation Flow Monitoring, Analysis, and System Capacity Update (for all three basins)	\$500,000	54.80	10 years
619 / Identification, Evaluation and Selection of Recommended Odor and Corrosion Control Technologies	\$250,000	38.80	1 year
620 / Design & Implement Selected Odor and Corrosion Control Technologies	\$5,000,000	38.80	3 years
630 / Conveyance Modifications to take DeKalb County Flows	\$13,200,000	21.40	3 years
636 / College Park Contract WW Flows	\$7,900,000	23.50	2 years
638 / Pressure Sewer Condition Assessment	\$2,000,000	37.80	10 years
639 / Pressure Sewer Rehabilitation	\$12,000,000	78.60	10 years
902 / Lift Station Assessment	\$250,000	37.80	1 year
903 / Lift Station Rehabilitation	\$11,000,000	78.60	10 years
Total	\$160,400,000		



SMP Implementation FYB18 (May 2018 – April 2019)

This section shifts the focus from CCWA's long term planning to specific conveyance related activities completed during CCWA's Fiscal Year Beginning 2018 (FYB18). A brief description of staff who implement the projects is provided as well as a summary of the work that was completed for each program.

Organization

Management of pipeline contractors who complete the capital pipeline improvement projects generally falls to the Construction Services group within PM&E. In FYB15, Staff was doubled for a total of 10 full time equivalents in the Construction Services group and has since added 2 additional staff for a total of 12 full time equivalents. The D&C Department and other sections within PME such as Engineering and GIS provide significant support for the projects ultimately implemented by Construction Services.

Once specific pipeline projects are identified by PM&E, D&C, or others, Construction Services inspectors are responsible for planning and implementing the construction required to correct the issues.

The following is a list of some of the responsibilities of this staff:

- Review data available such as CCTV, as-builts, GIS, etc.
- Prepare project scope and cost estimate
- Prioritize projects and schedule work
- Coordinate with Engineering and GIS with design, easement, permit needs
- Write contracts for projects to be bid
- Procure and order materials
- Inspect work performed daily; full time for large projects
- Review and process contractor invoices

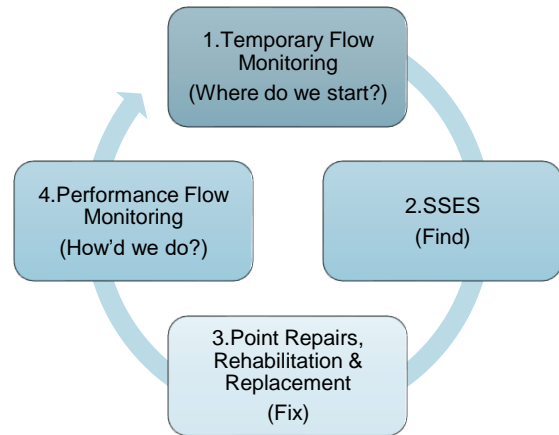
Conveyance system related engineering studies and other initiatives are supported in large part by our On-Demand Engineering Services contractors.



SSES Program

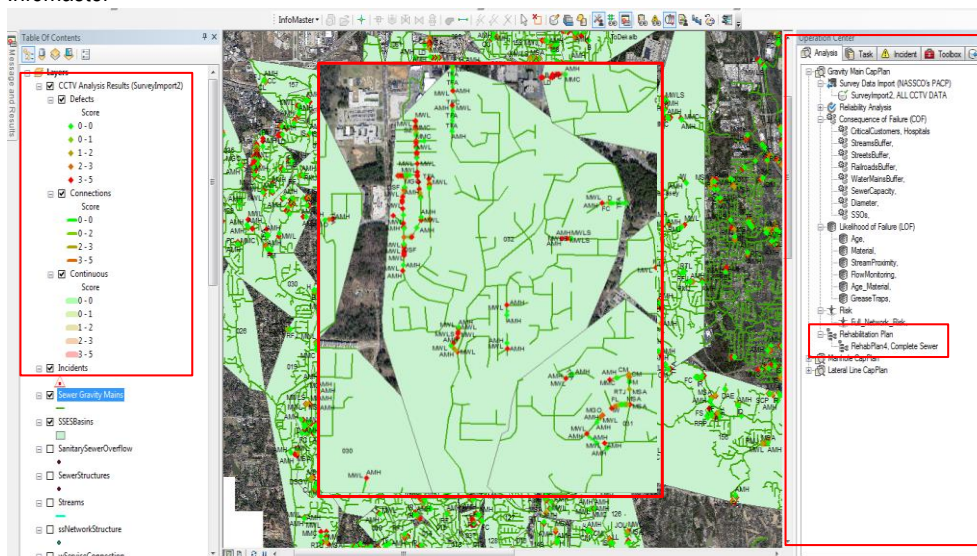
Several years ago, CCWA began developing a program focused on removing Inflow and Infiltration (I/I) and renewing its sewer system. As shown in Figure 10, CCWA's process began by conducting temporary flow monitoring across each WRF basin. The I/I study analyzed results and assigned priority to each of the flow monitored basins based on the level of I/I. The basins with the biggest I/I problems were then prioritized for SSES work. SSES activities such as CCTV, smoke testing, manhole inspections were conducted in these high priority basins to identify defects and help to determine the "fixes" required to improve the pipe condition. This could include a variety of things such as individual point repairs, rehabilitation (cured-in-place-pipe), or replacement through open-cut methods. Once the fixes were completed, performance flow monitoring in the basin was performed to determine the effectiveness of our fixes. This process is then repeated throughout our system.

EXHIBIT 10
Inspection and Renewal Process



Due to the large amount of SSES data CCWA is collecting, a methodology was developed to mass process the data in an automated way using Infomaster Sewer. This was chosen because it seamlessly integrates with our current software including ESRI (GIS), Cityworks (CMMS), and Granite XP (CCTV). Data is collected in a specific database format from the contractor and run through quality assurance/quality control (QA/QC) processes. Once CCWA determines the data is acceptable, it is imported into Infomaster, and the data is run through a decision matrix that makes a recommendation for each pipe segment that could include the following: point repair, pipe replacement, pipe rehabilitation, no action. Typically, point repairs are coordinated with the D&C Department and larger projects (such as replacement or rehabilitation along full pipe segments) are executed by the PM&E Department for completion by CCWA's pipeline annual services contractors. Exhibit 11 shows a screen capture of the Infomaster tool.

EXHIBIT 11
Infomaster





CCWA is currently working in the all sewer basins, however the majority of work completed to date is in the largest basin, where flows are treated at the W.B. Casey WRRF. In this basin, SSES activities have been completed in all of the 52 basins that were identified as a priority based on I/I and an additional 9 basins where staff determined the basin to be a priority. To date, \$3.9 million has been spent on Flow Monitoring and SSES activities in the W.B. Casey basin. Follow on renewal and rehabilitation (R&R) activities have been completed with a total spending of roughly \$4.2 million, bringing the total spent on activities in the basin to \$8.8 million. CCWA has incorporated data from the capacity models into the process for determining where this work is to be completed. Flow monitoring, SSES, and repair activities have been initiated in the Northeast, Shoal, and Dekalb basins. Roughly \$1.5 million has been spent on these activities. Sewer models are currently in development for these basins and once complete, all sewer areas within the county will be modeled. Future SSES and repair work will continue and will be based on the flow monitoring results, capacity models, overflows, risk, etc.

Basin Renewal

Basin renewal projects address pipes 15-inches and smaller and the majority of these projects are a direct result

of data collected the SSES program. Eight projects were opened in FYB18 which will result in nearly 15,000 feet of pipe being replaced or rehabilitated. Exhibit 12 provides construction photos of a CIPP and Open Cut project. These projects are estimated to cost \$2.1 million.

EXHIBIT 12

Basin Renewal Construction Photos





Large Outfall Renewal

Large Outfall Renewal projects address pipes larger than 15-inches and account for 76 miles of our system. Inspections helped CCWA to determine the first outfall replacement project would be the Flint River Outfall. The entire Flint River Outfall stretches from the W.B. Casey WRF Raw Water Pump Station up to Georgia Highway 85. Exhibit 13 shows the outfall replacement projects in the W.B. Casey WRF basin that have been active since FYB15. As shown in Exhibit 14, three projects (1-3) along the Flint River Outfall have been completed. These projects have invested roughly \$17.9 million replacing and upsizing 4.2 miles of reinforced concrete pipe (RCP) with Fiberglass Reinforced Polymer Mortar Pipe (FRP). Additionally, three phases of the Jesters Creek Outfall were completed for roughly \$2.2 million and replaced 1 mile of sewer. A total of 5.2 miles of sewer projects since FYB15 have been completed for a total of \$20.2 million. Eight additional projects are either under construction, design, or planned for the upcoming fiscal year which will address nearly 12 miles of large sewer and invest nearly \$47 million. A total of \$6.2 million was spent on Large Outfall Renewal projects during FYB18.

EXHIBIT 13
Outfall Replacement Projects

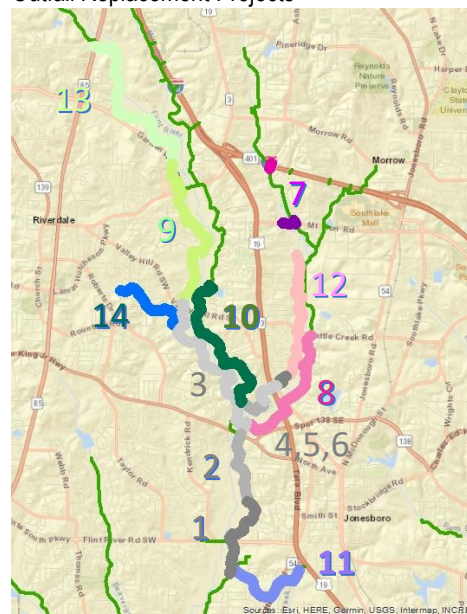


EXHIBIT 14
Outfall Replacement Projects

Project	Funding / Status	Length	Cost (\$)
MAJOR REPLACEMENT PROJECTS (2015-Current)			
1) FRO Phase 1a	Complete	0.8	\$4,740,000
2) FRO Phase 1b	Complete	1.1	\$5,690,000
3) FRO Phase 2	Complete	2.3	\$7,450,000
4) Jesters Creek Outfall Phase 1	Complete	0.3	\$570,000
5) Jesters Creek Outfall Phase 2	Complete	0.2	\$480,000
6) Jesters Creek Outfall Phase 3	Complete	0.5	\$1,200,000
Subtotal:		5.2	\$20,130,000
PROJECTS UNDERWAY / PLANNED FOR FYB19			
7) Jesters Creek Outfall East Misc	Construction	0.5	\$1,720,000
8) Jesters East Phase 1	Construction	1.3	\$8,500,000
9) FRO Phase 3	Design	2.3	\$10,300,000
10) FRO East Phase 1	Design	2.1	\$4,900,000
11) Rum Creek Outfall	Design	1.2	\$3,100,000
12) Jesters Creek Outfall Phase 4	Design	1.7	\$4,800,000
13) FRO Phase 4	Planning	2.2	\$11,200,000
14) Riverdale Outfall Phase 1	Planning	1.1	\$2,300,000
Subtotal:		11.9	\$46,820,000
Total:		17.1	\$66,950,000



Sewer Force Main Renewal

Systematic inspection and renewal of force mains was identified as a need in the 2015 SMP. Since FYB15, \$1.8 million has been spent on four different Force Main replacement projects. One replacement project (Rum Creek Force Main) was completed over FYB17 and FYB18 and cost \$1.1 million. A new force main will be constructed beginning in FYB19 to convey flows from the Walnut Creek Lift Station to the gravity system that feeds into the Shoal Creek Water Reclamation Facility. Depending on the final alignment, the length of the project is roughly 3 miles.

Flow Monitoring

Temporary Flow Monitoring was initiated in FYB15 and FYB16 for the Shoal Creek, DeKalb County, and Northeast basins and concluded in mid-2017. This will be used to determine the level of I/I issues and will form the basis for development of capacity models.

Capacity Models

Projects were initiated in FYB15 to develop conveyance system models for pipes 10-inches and larger in the W.B. Casey WRF basin. The models provide capacity information for dry and wet weather flows and when complete, will be used in conjunction with I/I, SSO, and other data to prioritize and plan for capital projects in the future. Capacity assurance modeling for the W.B. Casey WRF basin was then completed in early 2017. Models for the remainder of the county (Shoal Creek, Northeast, and DeKalb) are planned for completion in FYB19.

SMP Implementation Look Ahead to FYB19 (May 2019 – April 2020)

While the previous section described the work initiated and completed in FYB18, this section will list the programs and initiatives planned for during FYB19. Exhibit 15 lists the projects planned for in FYB19, based on needs identified in the SMP as well as other projects. A list of the project, budget, and brief description are provided.

EXHIBIT 15
FYB19 Programs/Initiatives

Programs/Initiatives	FYB19 Budget	Description
Sewer Pipeline Rehab Programs		
SSes	\$1,000,000	Systematic inspection of sewer basins based on priority. Criteria considered include inflow/infiltration severity, capacity, etc.
Basin Renewal	\$2,500,000	Replacement or renewal of gravity sewers, based primarily on the SSes program, and 15 inches or less.
Large Outfall Renewal	\$46,800,000*	Replacement or renewal of large gravity sewers greater than 15 inches. Exhibit 13 and 14 list the specific projects that will be initiated. The majority of the projects will be supported by the one of two GEFA loans (one existing loan and one additional loan)
Conveyance System Initiatives/Studies		
Sewer Force Main Assessment	\$250,000	Development of a plan for systematic force main assessment that will identify methodology and frequency of inspections that can be used to feed into the force main replacement program.



Water Reclamation Facilities: Current and Future Plans

W.B. Casey WRRF

The most recent plant upgrade was completed in July 2004 bringing the permitted design treatment capacity to 24 MGD. On average the facility operates at around 60% of its permitted capacity. The facility incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit compliance. Facilities include preliminary, primary, biological and secondary treatment facilities. The facility also applies various chemicals for controlling plant processes and effluent disinfection. The final treatment process is constructed wetland treatment.

The W.B. Casey WRRF has faced issues with high flows at the facility related to excessive rainfall events. These events not only caused operational issues within the plant but caused on occasion an overflow of treated plant effluent at the Casey Plant's effluent box. The plant staff exercise all options to try and prevent this situation from happening each and every time. CCWA initiated a flow and load study for the W.B. Casey WRRF in 2010 and determined a path forward to mitigate the issues within the plant and at the effluent box related to high flow situations. Once such project was recently completed which included a new preliminary treatment process and a fourth secondary clarifier. This project allowed CCWA to have enhanced screening and grit removal, bypass the primary clarification process, improve pellet quality, and a new 4th secondary clarifier to capacity to handle increasing flows and more stringent effluent requirements.

Immediately following this project, a construction project to build a phosphorus polishing facility and discharge pipeline to the Flint River began and will be complete in early 2020. When complete, this project provides a total of 24 mgd discharge capacity and gives CCWA the ability to begin using our "B2" permit limits which allows for up to 6.6 mgd of discharge to the Flint River.

Northeast WRF

The most recent plant upgrade was completed in 2008 bringing the permitted design treatment capacity to 10 MGD. On average the facility operates at around 37% of its permitted capacity. The facility incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit compliance. Facilities include preliminary, primary, biological and secondary treatment facilities. The facility also uses UV for effluent disinfection.

Currently the facility is operating under its NPDES "B1" permit limits of 6 MGD. CCWA is planning to start a design for a phosphorus polishing facility in the near future in order to go to the "B2" NPDES permit limits of 10 MGD. Current tertiary treatment process can't consistently meet the more stringent phosphorus permit limit.

Benefits:

- Currently, the plant operates under its original reduced capacity permit of 6 MGD
- Additional flows into the plant will trigger a need to ask EPD to increase our permit limit to 10 MGD
- Existing phosphorus removal processes at the plant can't consistently meet the 0.18 mg/L effluent limit once the permit limit increase to 10 MGD
- Evaluation needed to determine most cost effective treatment option

Shoal Creek WRF

The most recent plant upgrade was completed in 2002 bringing the permitted design treatment capacity to 4.4 MGD. On average the facility operates at around 36% of its permitted capacity. The facility also incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit



compliance. Facilities include preliminary, biological and secondary treatment facilities. The facility also uses UV for effluent disinfection. The final treatment process is constructed wetland treatment. Currently there are no immediate plans to upgrade or expand the Shoal Creek WRF.