

# Water/Sewer Systems Concession Lease Agreement

## 2016 Annual Report



Presented by:  
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Office of Compliance  
Department of Public Works  
May 23, 2017

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### • INTRODUCTION

Following a very detailed and engaging bidding process, Lehigh County Authority (LCA) emerged as the successful bidder for the operation of the City of Allentown's water and sewer systems. The City and LCA signed the *Allentown Water and Sewer Utility System Concession and Lease Agreement* (Lease) on May 1, 2013. In addition to the terms and conditions, the Lease includes the Operating Standards (OS) manual, which contains definitions, metrics, and performance requirements to which LCA must comply. The focus of the OS is on water quality for drinking water and sewage effluent, customer service, and operation and maintenance of the facilities to ensure that all the systems are properly and continuously maintained throughout the term of the Lease.

LCA's actual tenancy of operation of the utility systems started on August 8, 2013. This report was compiled by the City of Allentown's Office of Compliance and covers the period from January 1, 2016 to December 31, 2016.

**PERSONNEL** - Eighty-three former City employees became part of LCA's Allentown Division (Allentown); twenty-three out of 26 supervisory employees (88%) also transferred to LCA. As evidenced by the high number of transfers, a very significant amount of direct experience and institutional knowledge was retained for the successful operation of the water and sewer systems.

The City's Office of Compliance (OoC) was established to oversee LCA's performance and compliance with the Lease and OS. In addition to conducting the COA/LCA Regular Compliance meetings, the OoC reviews all reports and is empowered to conduct reviews and inspections. The OoC can assess liquidated damages (penalties) if LCA does not comply with its obligations under the Lease or OS.

**REPORTING** - LCA is required to submit to the OoC copies of all regulatory reports in Exhibit A and those reports listed in Exhibit B which are required by the OS or Lease. Additionally, copies of all correspondences between LCA and regulatory agencies are to be submitted to the OoC. The OoC reviews all submissions to determine, verify, or confirm that the requirements of the Lease and OS are being followed. As holder of water and wastewater permits, the City must meet regulatory requirements included in the permits. The OoC consults with LCA and regulatory authorities regarding these conditions. The OoC also reviews all water/sewer applications relevant to construction, permit renewals, etc., and advises the Director of Public Works of its findings.

In addition to fulfilling all regulatory reporting obligations, LCA is required to file various monthly, quarterly, and annual reports to document compliance with the performance requirements in

the OS. Beginning in 2015, and through the duration of the Lease, the annual performance standards are calculated from January to December. This is a change from the first year performance requirements, which were reduced to 50% to allow the successful bidder the opportunity to acclimate, provide adequate staffing, train the staff, develop operating procedures, integrate with City operations, develop and maintain required computerized recording and reporting systems, etc. All water quality standards were in full effect from the first day of operation.

This annual report is formatted and presented to provide the reader with specific information on the performance standards and associated metrics, LCA's performance relative to compliance with the required standards, significant issues during the reporting period, and other information relative to the water and sewer systems operations under the terms of the Lease. Performance standards documented throughout the report include annual performance measures and any exceedance credits from prior years.

- **Wastewater Treatment**

The Wastewater Treatment Plant (WWTP), known as the Kline's Island Wastewater Treatment Plant is designed to treat 40 million gallons per day (MGD) of sewage and is operated under the National Pollutant Discharge Permit Elimination System (NPDES) Permit # PA0026000. The annual average daily volume of sewage treated at the WWTP in 2016 was 29.65 MGD, which was 2.5% less than the 30.44 MGD treated in 2015. This reduction is in part due to the drought conditions experienced by Lehigh County in 2016 and into 2017.

The WWTP is staffed 24 hours a day, seven days a week. Operational decisions and guidance is provided primarily by a manual of standard operating procedures (SOP). A Computerized Systems and Data Acquisition system (SCADA) was installed at the WWTP. The SCADA system allows operations personnel to monitor treatment processes, adjust pump rates, etc. from a centralized operations control room.

LCA utilizes a computerized maintenance management system. This system is the basis for scheduling, recording, and issuing work orders for predictive, preventative, and repair maintenance. All equipment is catalogued and assigned a discrete identification number. Information from the data plate, product literature, and the entire maintenance history including references to specific work orders is on file.

**FLOW METERS** - Meters throughout the WWTP are tested and calibrated annually. The communities and authorities (sewer signatories) which have sewage treated at Kline's Island Wastewater Treatment Plant test and calibrate their own meters. All calibrations and certifications are provided to the OoC.

## 2016 WATER/SEWER SYSTEMS CONCESSION ANNUAL REPORT

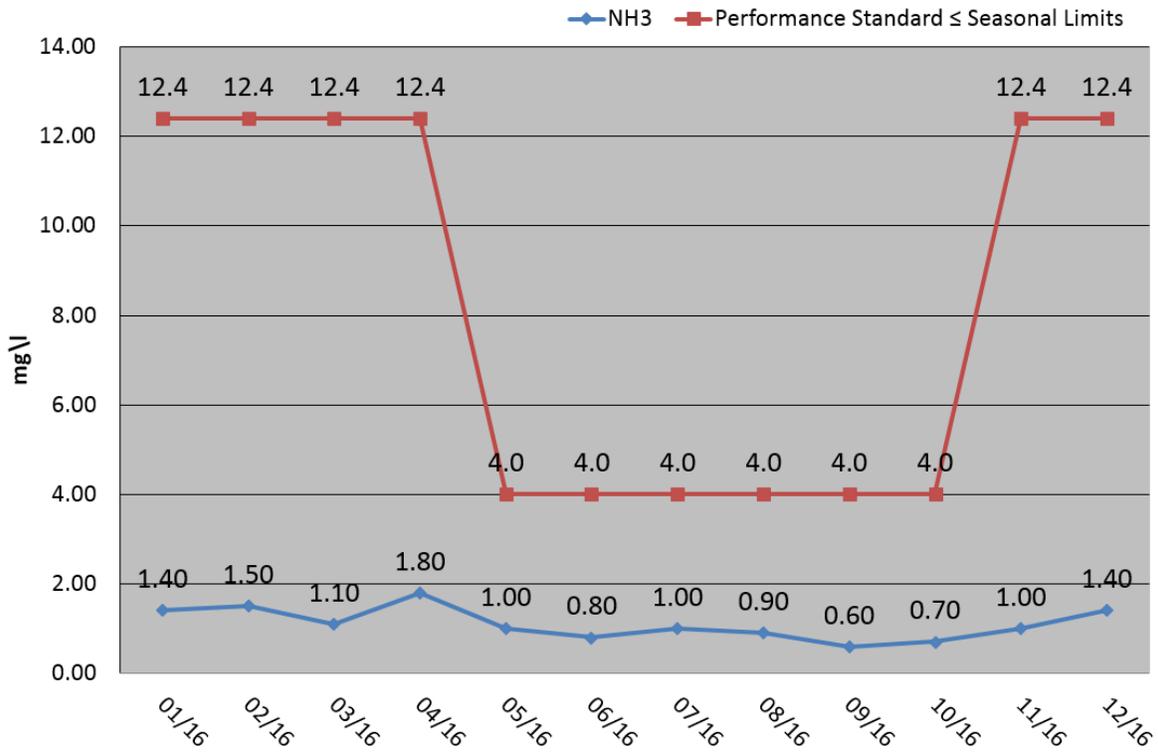
**EFFLUENT QUALITY** - The chemical and biological limits allowed by the NPDES permit and the lease are indicated in the chart and graphs below. No limits were exceeded.

### EFFLUENT PARAMETERS

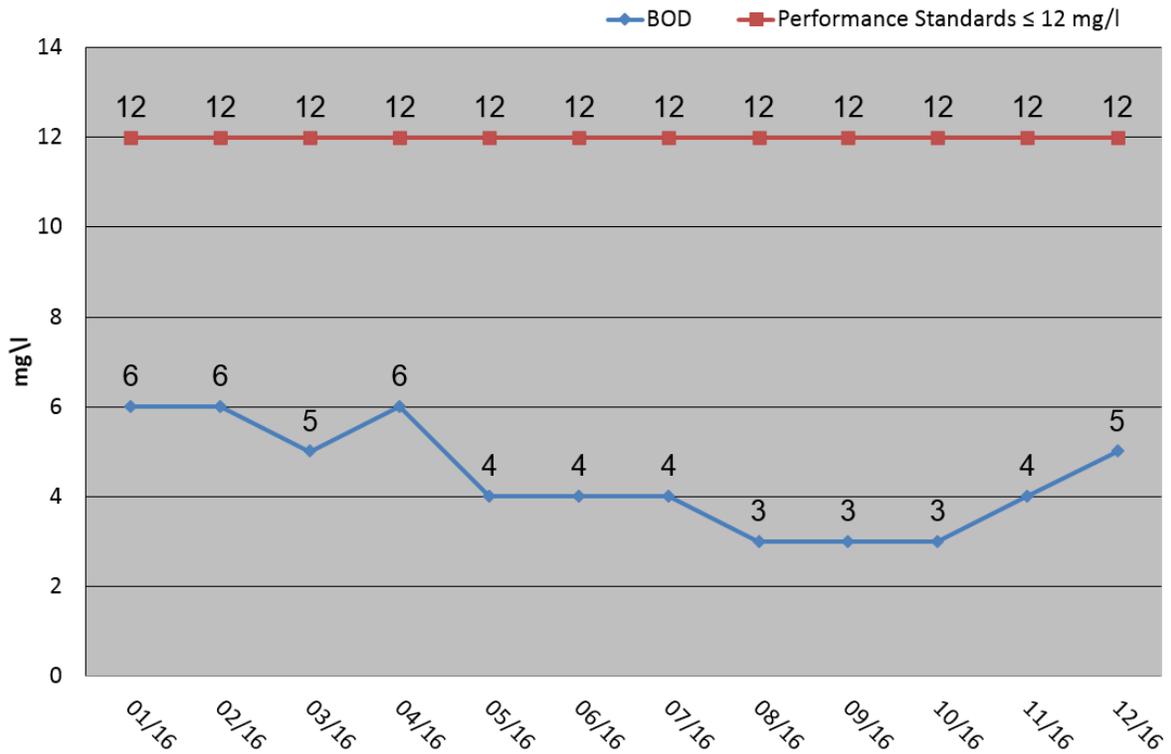
Parameter	LCA	Performance Standards	NPDES Discharge Permit Effluent Limitations		
		Monthly Average Effluent Concentration	Monthly Average Effluent Limit	Weekly Average Effluent Limit	Instantaneous (Daily) Maximum Effluent Limit
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	Met Requirement	≤ 12 mg/L	20 mg/L	30 mg/L	40 mg/L
CBOD <sub>5</sub> Percent Removal	Met Requirement	≥ 90 %	≥90 %	---	---
Total Suspended Solids (TSS)	Met Requirement	≤12 mg/L	30 mg/L	45 mg/L	60 mg/L
TSS Percent Removal	Met Requirement	≥90 %	≥90 %	---	---
Ammonia Nitrogen (NH <sub>3</sub> -N) May 1 to October 31	Met Requirement	≤4.0 mg/L	5 mg/L	---	10 mg/L
Ammonia Nitrogen November 1 to April 30	Met Requirement	≤12.4 mg/L	15 mg/L	---	30 mg/L
Fecal Coliform May 1 to September 31	Met Requirement	200/100 ml geometric mean	---	---	---
Fecal Coliform October 1 to April 30	Met Requirement	2,000/100 ml geometric mean	---	---	---
Residual Chlorine	Met Requirement	≤0.5 mg/L	---	---	---
Ph	Met Requirement	6.0 to 9.0 SU	---	---	---
Dissolved Oxygen	Met Requirement	5.0 mg/L minimum	---	---	---

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## Ammonia Nitrogen

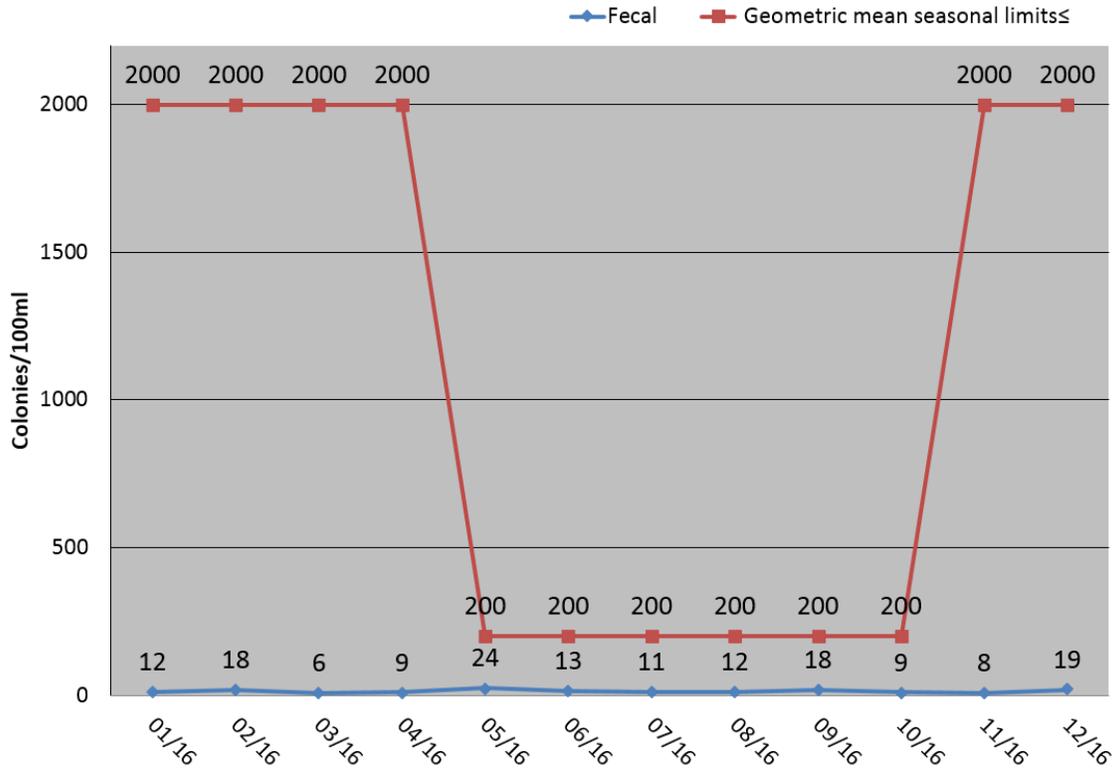


## Carbonaceous Biochemical Oxygen Demand

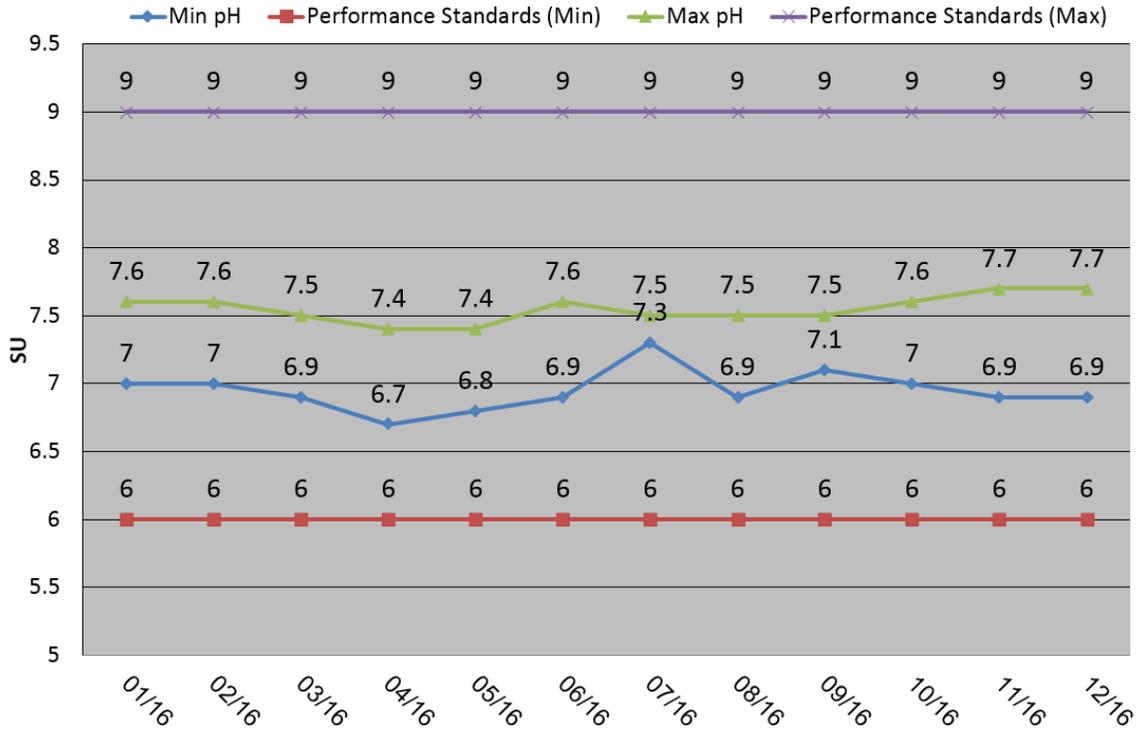


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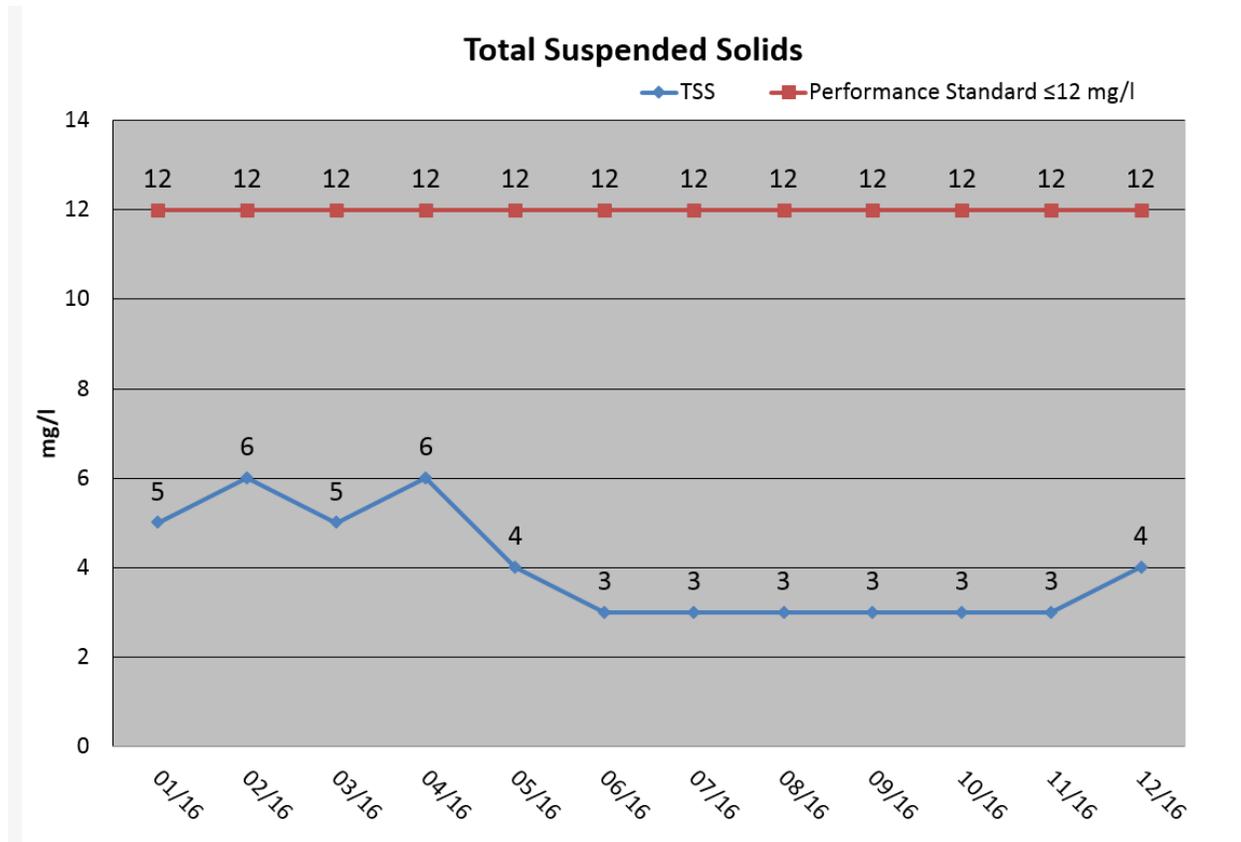
## Fecal Coliform



## pH Max and Min Limits



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**HAULED WASTE** - Septage and landfill leachate are hauled into the WWTP for treatment. The total volume of hauled wastes treated at the WWTP in 2016 was:

<b>HAULED WASTES</b>
<b>GALLONS</b>
Septic Haulers
<b>2,073,000</b>
Leachate
<b>6,357,160</b>
<b>Total Hauled Waste</b>
<b>8,430,160</b>

No wastewater from fracking operations was treated at the WWTP.

**HEADWORKS (OUTFALL 003) BYPASS** - One incident of a bypass occurred at the WWTP Headworks on 2/24/2016 due to mechanical problems and excessive flows from heavy precipitation and elevated ground water levels.

**ODORS** - No odor complaints were received in 2016.

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**BIOSOLIDS DISPOSAL** - In 2016, land application was utilized for the disposal of 2,748 Dry Metric Tons (DMT) of biosolids.

**PERMIT RENEWAL** - In June 2014, a NPDES (National Pollutant Discharge Elimination System) permit renewal application was filed with the Pennsylvania Department of Environmental Protection (PaDEP) listing the City and LCA as co-permittees. A draft permit was received from PaDEP; and on 7/24/2014, a joint response letter was submitted. In October 2016 PaDEP has responded and provided another draft permit for review. On 11/17/2016 a joint response letter was submitted. [PaDEP has not replied to that letter.]

**INSPECTIONS** – PaDEP conducted an inspection at the Wastewater Treatment Plant on 8/1/2016. The inspection included a compliance evaluation with the Wastewater Services Manager. A walk-through of the facilities was conducted which included explanations of the different treatment facilities of the WWTP. No violations or corrections were noted in the inspection report.

U.S. Army Corps of Engineers conducted an inspection of the Allentown Federal Flood Risk Management Project along the Lehigh River. The inspection received an overall “Unacceptable” rating. In response, LCA will be conducting maintenance activities in 2017.

**ACT 537 (The Pennsylvania Sewage Facilities Act)** - Several years ago, LCA identified the need for an additional four MGD of treatment capacity due to land development and increased operations of existing businesses. Since then, the other municipal and authority contributors to the WWTP, including the City, were contacted about their future needs. LCA has engaged consultants to investigate alternatives for securing the needed capacity. One of the four alternatives under consideration is the expansion of the WWTP. In December 2015, LCA met with PaDEP regarding their preliminary 537 Plan, which recommends expansion of Kline's Island. PaDEP advised LCA that it is too early to submit a 537 Plan for expansion as projected growth is too far into the future and there is no certainty it will occur or if the actual future capacity needs might be different. Additionally, PaDEP does not prematurely allocate assimilative capacity of the ecosystems on the Lehigh River as it might impact other dischargers.

The Chapter 94 report, which evaluates the existing and projected hydraulic and organic loads to treatment plants and sewer systems, determines whether such facilities should be upgraded. Together with projected future flows and economic development data, this information will determine the need for revisiting the Act 537 Plan.

**INDUSTRIAL PRETREATMENT PROGRAM** - Under the Lease, LCA is responsible to administer the Industrial Pretreatment Program (IPP) in accordance with federal regulations, guidance from EPA, and the City Sewer Ordinance. Thirty-five industries were permitted to discharge to the system-wide collection system in 2016. Thirty-seven industrial inspections were conducted by LCA in 2016 and 32 discharges were sampled by LCA. This sampling is in addition to the sampling

and testing that each of the permitted industries is required to perform as a condition of the industry’s discharge permit. Thirteen Notices of Violation (NOV) were issued in to industries in 2016. The City reviews industrial permits and permit violations with LCA. LCA is also required to prepare and submit an annual IPP report to EPA.

- **Sewage Collection System**

Allentown’s sewage collection system consists of approximately 285 miles of pipe, about 80% of which is eight to ten inches in diameter. There are approximately 7,100 manholes. Similar to the drinking water system, most of the collection system was installed years ago:

<u>Time Frame</u>	<u>Percent Installed</u>
<b>1910-1930</b>	<b>21%</b>
<b>1930-1950</b>	<b>34%</b>
<b>1950-1970</b>	<b>36%</b>
<b>1910-1970</b>	<b>91%</b>

Maintenance of the collection system focuses on two primary concerns, to prevent surcharging and sanitary system overflows (SSO) by preventing blockages and minimizing extraneous flows. Inflow and infiltration (I&I), due to significant precipitation, snowmelt, and elevated ground water levels, are sources of the extraneous flows. No pumping stations exist to move City sewage to the WWTP. Sewage conveyance relies on gravity. Velocities within most of the gravity collection system are slow for a significant amount of the time and result in the settling of materials. This settling causes blockages. The problem is compounded by customers improperly disposing of materials, principally fats, oils, and grease (FOG), which congeal and promote blockages. Tree roots are also responsible for blockages. SSOs, which are caused by blockages typically occur within smaller diameter pipes. In order to address maintenance of the collection system for the issues noted, in compliance with the Lease, LCA developed a Collection System Inspection and Maintenance Plan (CSIMP) to provide a systematic approach for inspecting, televising, cleaning, and flushing the collection system. The CSIMP includes daily, weekly, and monthly preventative maintenance to flush and jet areas where blockages are known or anticipated to occur. Additional collection system areas are added to the preventative maintenance program based on inspections and televising the lines.

**FOG** - LCA is continuing the dedicated FOG abatement program.

**SSO** – Two SSOs were caused by blockages and cleared by LCA personnel. Six SSOs occurred between February 24-26 caused by excessive flows from heavy precipitation and elevated ground water levels. LCA provided notification and reporting to PaDEP.

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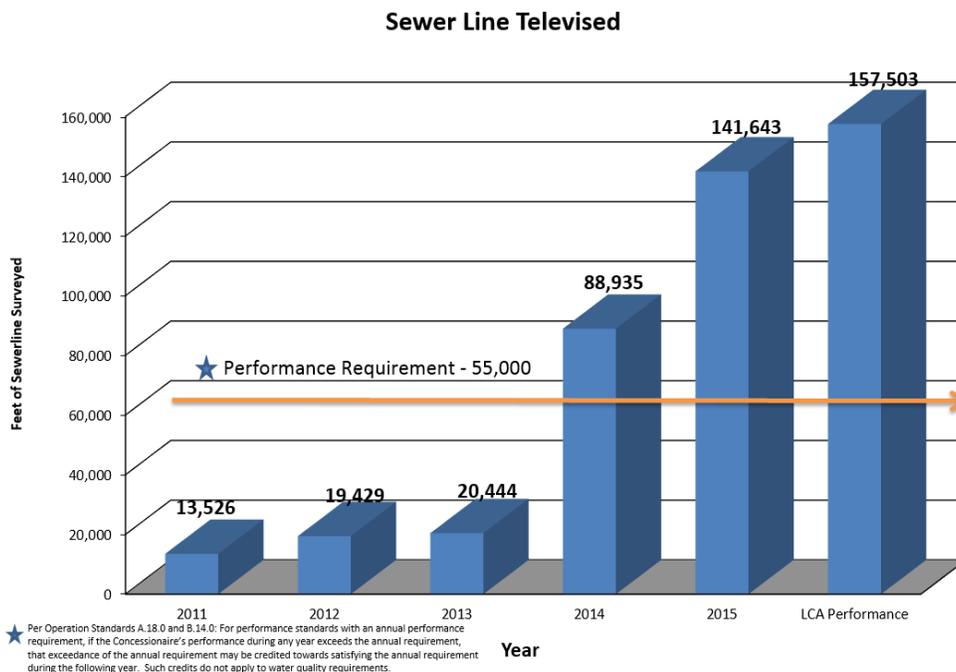
**ROOT INTRUSION** - Root intrusion is addressed by the application of a specially formulated chemical. The OS require that 40,000 to 50,000 linear feet of areas where root intrusion was identified to be treated annually. Treatment will typically last a few years and then a re-application is necessary.

Root Control Application	
Requirement	Linear Feet
OS annual	40,000 to 50,000
LCA Performance	62,136

**TELEVISIONING COLLECTION SYSTEM** - Analytical assessments of the internal condition of collection system pipes are done by skilled personnel operating specialized vehicles with CCTV (closed circuit television).

The operators televise the lines after they have been flushed to look at structural conditions, signs of leakage, sags in the lines, FOG accumulations, accumulations of materials, etc. The televised footage is preserved in the Geographical Information System (GIS) system for closer review and for future reference. The televising process is a key component of the CSIMP and is the source for determining the need for remedial repairs and additional preventive maintenance. The OS requires that LCA televise at 55,000 linear feet of the collection system annually.

Sewer Lines Televised	
Requirement	Linear Feet
OS annual	55,000
LCA Performance	157,503



Similar to the pipes in the collection system, the manholes are old and are often the source of leaks. Over time, the sidewalls become porous and/or the upper sections are no longer able to withstand the hydraulic forces during surcharging. LCA inspects and rates the condition of each manhole specifically looking for candidates for the Sanitary Sewer Manhole Lining or Manhole Collar and Frame capital projects, as part of the response to the Administrative Orders. The purpose of these capital projects is to prevent infiltration by reinforcing the manhole's internal wall and bolting down covers and/or adding concrete collars to the upper portions of the manhole to reinforce the structure. As of now, all manholes have either solid lids or have had inserts installed to prevent stormwater from entering the collection system.

Also included in the collection system program are the inspection of new lines and participation in the City's Streets Program. Major resurfacing projects under the City's Streets Program require the collection system pipes be televised and cleaned. Any damaged or leaking sections of the lines need to be repaired or replaced. Manhole rim elevations must be aligned with the new street elevation.

- **Drinking Water Treatment and Production**

The City's permits allow the discharge of 39 million gallons of drinking water a day with a maximum of 30 million gallons a day being treated at the Water Filtration Plant (WFP). Allentown's drinking water sources are: Schantz Spring (SS), Crystal Spring (CS), the Little Lehigh Creek (LLC), and the Lehigh River (LR). In 2016, approximately 48% of the finished water originated from the two springs. The completion of the SS Chlorine Booster Station project in 2016 provides proper contact time and continuous disinfection during power outage.

Raw water from the LLC and the LR require treatment at the WFP before entering the distribution system. The LR is considered a backup supply source in the event of a drought or a problem with the LLC's water quality as the tributaries to these supplies originate from different geographic areas. The LR supply is engaged periodically to ensure it is available if needed. The LR provided 0.9% of the drinking water in 2016.

The volume of drinking water discharged from the WFP in 2016 averaged 20.35 MGD, which was an increase of 0.28 MGD or approximately 1% above the 2016 average of 20.07 MGD. One million gallons of the increased discharge was delivered to LCA's Suburban system in accordance with the 2009 Water Supply Agreement between the City of Allentown and LCA.

Removing contaminants during water treatment employs two basic processes. Chemical addition, mixing, and settling removes the majority of contaminants from the raw water which results in the generation of sludge. The sludge is removed from the settling basins and

transported to the WWTP where it is dewatered and subsequently disposed. Approximately 95 tons, on a dry weight basis, were generated in 2016.

The second process is filtration of the clarified effluent from the settling process through filter beds utilizing anthracite and sand as the primary filtering agents. This method removes smaller particulate matter not previously removed. The quality of the effluent from filtration is based on turbidity, which measures the clarity of the water or analogously the absence of materials that would impede the passage of light during analytical testing procedures. Coagulant testing of Polyaluminum Chloride was completed in 2016. [In 2017 Polyaluminum Chloride will become the primary coagulant used.] The filters are routinely backwashed and the waste is discharged to the WWTP for treatment. The filtered water is chlorinated, fluoridated, and then discharged to the distribution system.

**SCADA** - The Water Filtration Plant's facilities and equipment are maintained using a computerized maintenance management system (see Wastewater Treatment). The operation of the WFP is similarly guided by a manual of SOPs. However, when the WFP was upgraded in 1998, a Computerized Systems and Data Acquisition system (SCADA) was incorporated into the design. The SCADA system allows operations personnel to monitor treatment processes, control chemical feed rates, adjust various flow rates, and pump rates, etc. from a centralized operations control room. The SCADA system also records information throughout the treatment facility. Although operations are principally controlled from the operations center, the WFP is staffed 24 hours a day, 7 days a week and the operators make routine checks and inspections of the facilities and the processes. Operator training includes running all operations manually. LCA plans to upgrade the existing Dynac SCADA software to latest version known as "Dynac ES." This project will also include replacing existing PC hardware and thus, complete the upgrade of SCADA systems at both WWTP and WFP giving a common operator interface and system.

**INSPECTIONS** - PaDEP did not conduct any inspections of the Water Filtration Plant in 2016.

**PARTNERSHIP for SAFE WATER** - During the public hearing on the Lease Concession, concern was expressed that drinking water quality might suffer under the control of the selected bidder. The OS were written to provide "Allentown Standards" which essentially mirror the performance standards required by the American Water Works Association's Partnership for Safe Water. The Partnership promotes the optimization of operations to produce drinking water quality to much higher standards than required under state or federal laws.

**TURBIDITY** - The more stringent turbidity standards require LCA to conduct a significant amount of sampling, religiously oversee operations (particularly filtration), and complete required

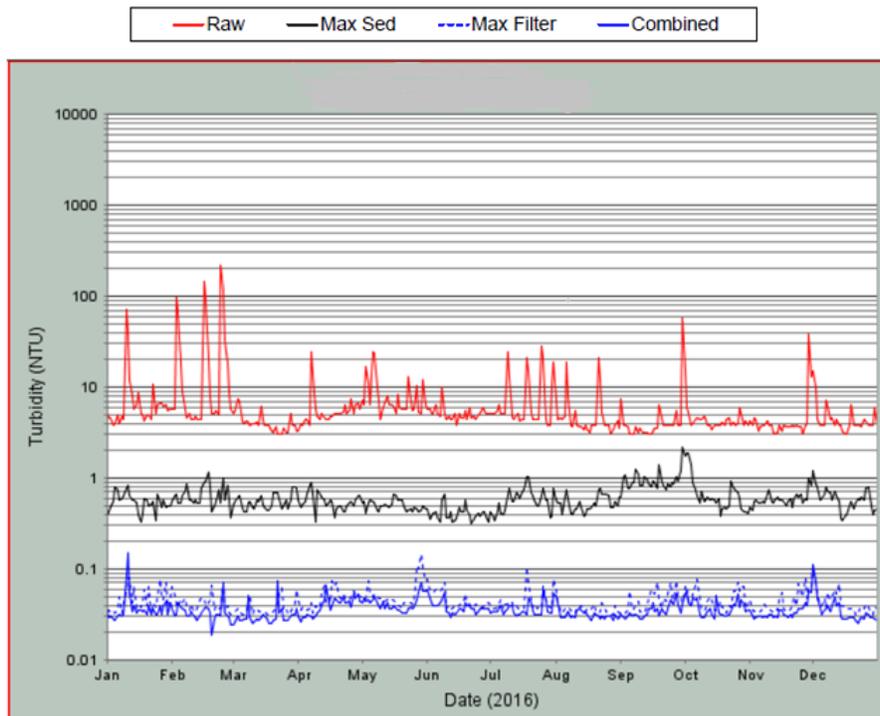
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reporting obligations. LCA has complied with all the requirements of the OS (see Awards and Acknowledgements). See table and graphs below.

ANNUAL DATA	Avg (NTU)	Min (NTU)	Max (NTU)	RSQ	95% (NTU)	Opt. Goal % Values	Reg % Values
Raw Turbidity	8.14	3.01	214.94	n/a	20.89	n/a	n/a
Max. Settled Turbidity	0.6	0.32	2.16	0.03	0.98	95.4	n/a
Max. Filtered Turbidity	0.045	0.031	0.143	0.02	0.071	98.6	n/a
Combined Filtered Turbidity	0.036	0.019	0.151	0.43	0.053	99.5	100

RSQ = Correlation Coefficient for two selected data sets.  
 95% = 95th Percentile value for data set.  
 Opt. Goal = % of values in data set that are less than or equal to the selected optimization turbidity goal.  
 Reg. = % of values in data set that are less than or equal to the regulated turbidity requirement.

**Turbidity Profile**



**CONTAMINANT TESTING** - Nearly 100 chemicals, called Primary Contaminants, must be tested for on an annual basis per Pennsylvania Code Title 25. Environmental Protection, Chapter 109 Safe Drinking Water. No maximum contaminant levels were exceeded in 2016. Information about water quality is supplied to all customers in the annual *Consumer Confidence Report*.

**WATER AESTHETICS** - As required in the OS, LCA must also address and record all customer complaints regarding the aesthetic qualities of the water such as odor, discoloration, or taste. A total of 25 complaints about aesthetics was received in 2016. Most complaints can be resolved

over the phone by suggesting that the customer let the water run, check other taps, etc. Periodically it is necessary to visit the customer's property to verify through testing and inspection the cause of the water quality issue. In 2016, no investigations were conducted.

**PRIMARY FLOW METERS** - All primary flow meters at the WFP are tested and calibrated annually. Bulk water users (South Whitehall Township, Salisbury Township, Hanover Township, Whitehall Water Authority, and LCA) test and calibrate their meters annually. All calibration and meter certification information is provided to the OoC.

- **Drinking Water Distribution System**

Allentown's water distribution system is very extensive and contains numerous components. Maintenance, renovation, and updating of the distribution system is critical to the supply of drinking water from both a day-to-day perspective and relative to maintaining the system's integrity into the future.

The water distribution system includes:

- Approximately 325 miles of pipe.
- Approximately 8,060 valves ranging in size from 4 to 36 inches.
- Approximately 33,400 service connections.
- Four booster pump stations which provide adequate pressure to service connections in higher elevations.
- Three finished water storage reservoirs with a combined storage capacity of 50 million gallons. These reservoirs store water to meet customer demands, provide the water system's operating pressure, and ensure an adequate supply for fire protection.

Requirements for the booster stations and reservoirs include maintenance of system components, annual external inspections, periodic internal inspections, and hydrostatic testing of the reservoirs. Rehabilitation of the Halstead tank included installation of mixing system and interior coating was performed in 2016.

**SAMPLING** - A distribution system sampling plan is maintained by LCA. Samples are collected routinely and tested by a certified laboratory to verify that the water is safe and meets regulatory requirements. Sampling results which do not comply with regulations and necessitate re-testing must be reported to the OoC.

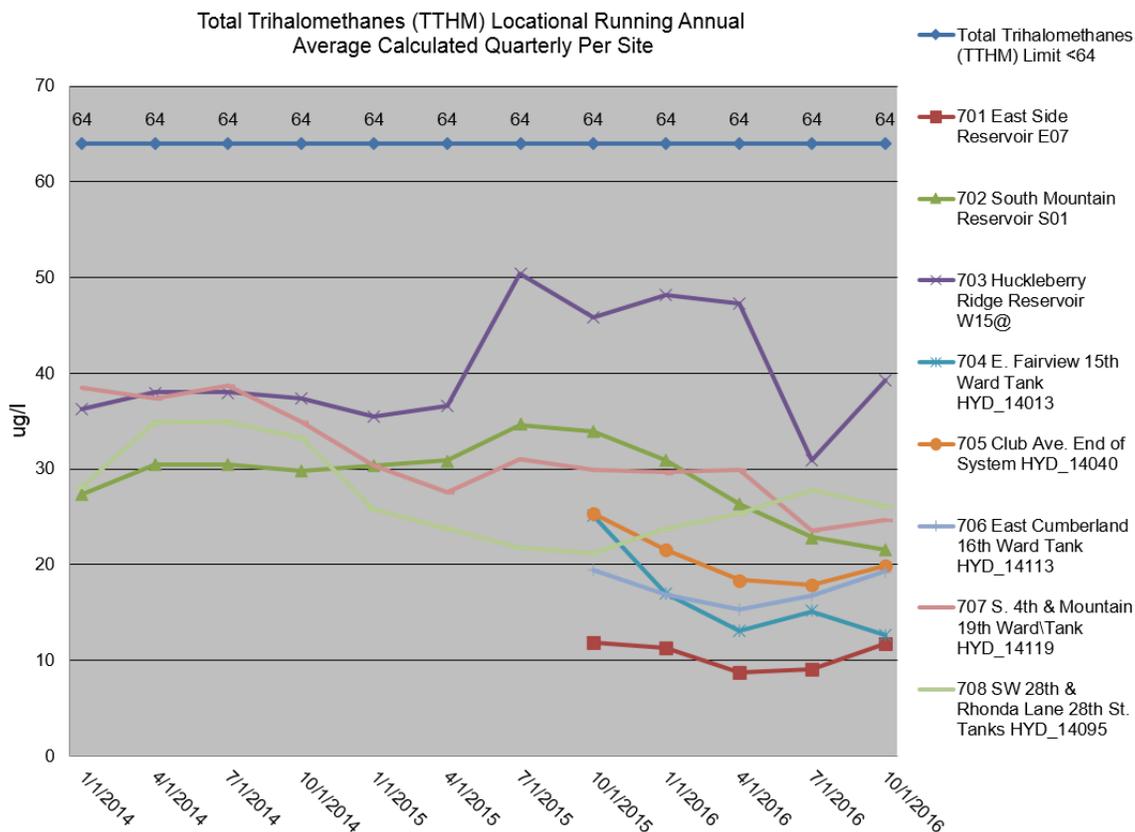
In 2016, no boil water advisories were issued.

**FLUSHING THE SYSTEM** - As with any water utility, LCA is required to insure that both chlorine residuals for continued disinfection and minimum operating pressures are maintained

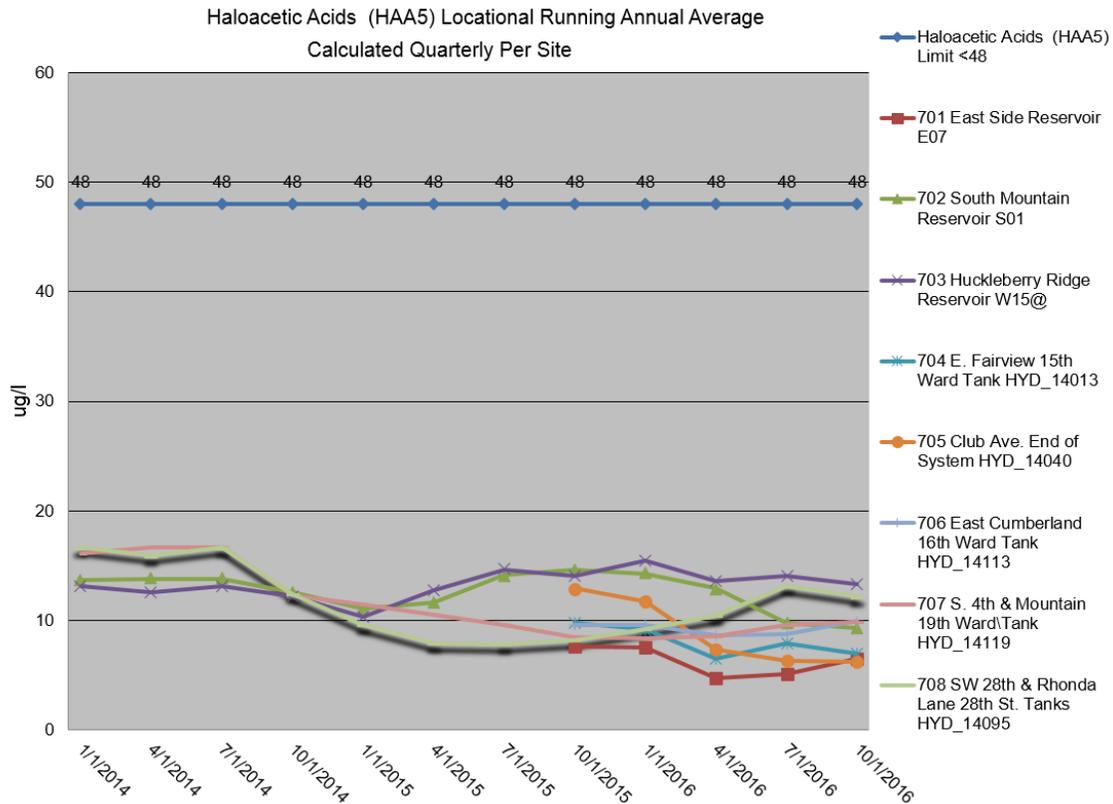
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throughout the distribution system. To achieve this objective, LCA has developed a program of flushing distribution system pipes. Flushing typically leads to the disturbance of sediment in the lines, causing cloudy or brownish water, which can appear at the customer’s tap for a short period. LCA provides the “flushing schedule” on its website and in billing mailers. Although it is difficult to determine exactly where discolored water might migrate, efforts are made to advise residents in the immediate area. In 2016 LCA’s program included flushing approximately 53% of the hydrants and use Automatic Flushing Stations.

**DISINFECTANT BYPRODUCTS** - OS Part A 4.1 Performance Requirements stipulate that the maximum four-quarter running average calculated at each required distribution system sample location is 64 parts per billion (ppb) for Total Trihalomethanes (TTHM) and 48 ppb for Haloacetic Acids (HAA5). TTHM and HAA5 contaminants are disinfection by-products. The Locational Running Annual Average 2016 at all sites remained below PaDEP and Lease limits. See graphs below.



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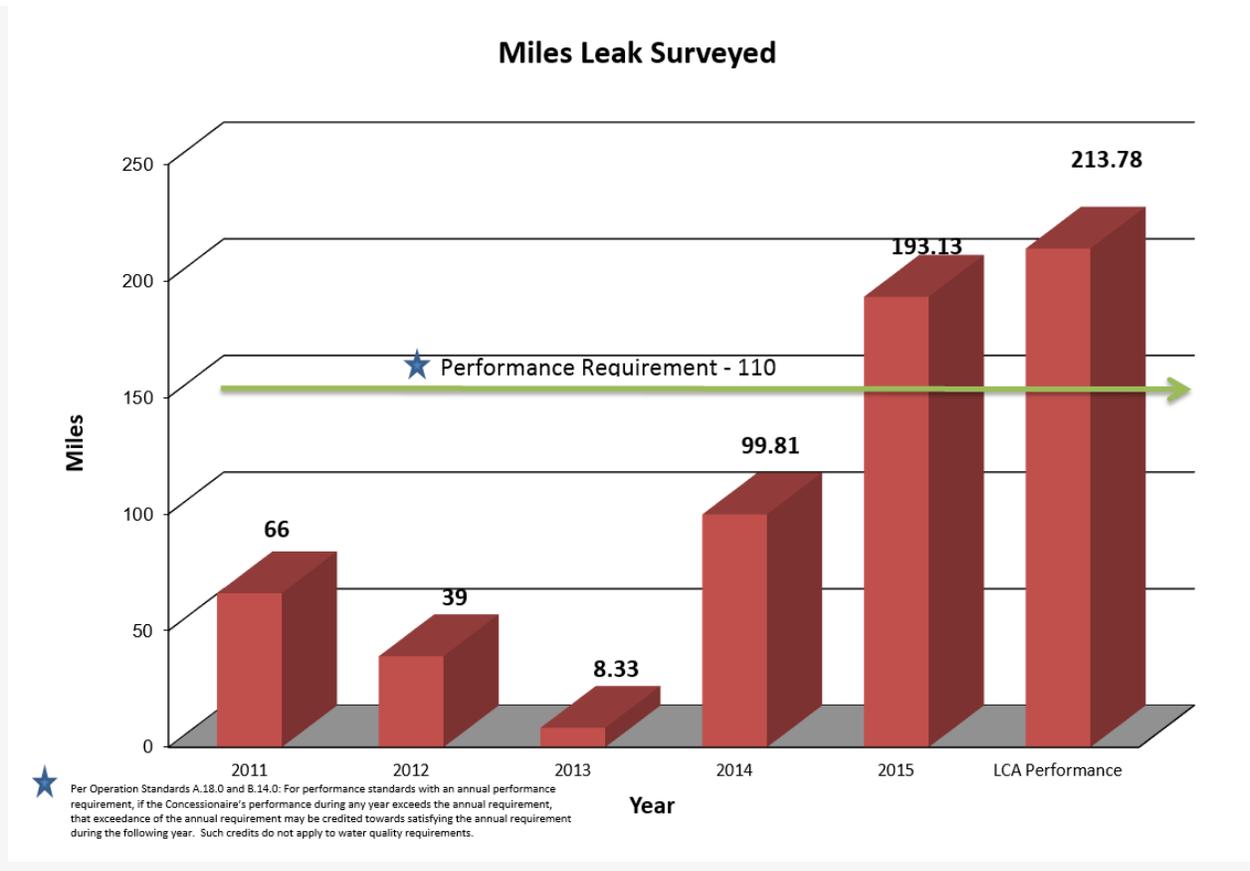


The requirements and LCA's efforts in meeting OS annual performance standards are as follows:

**LEAK DETECTION AND WATER LOSSES** - LCA must perform leak detection on at least 110 miles of distribution pipe annually; therefore, the entire distribution system is checked for leaks every three years. Finding and repairing leaks is cost effective, reduces unaccounted for water losses, and can prevent possible property damage. Any identified leaks are to be further investigated to determine the nature and severity of the leak. No time frame for repairs is established in the OS to avoid the City sharing liability associated with repairs if an identified leak is not addressed in a timely manner before property damage occurs. LCA is aware of this liability concern. In 2016, LCA identified and repaired 30 leaks.

### Leak Detection

Requirement	Miles
<b>OS annual</b>	<b>110</b>
<b>LCA Performance</b>	<b>214</b>



An estimated 106,135,000 gallons of water were saved in 2016. This estimate is calculated by determining the volume of each leak repaired multiplied by the number of days remaining in the year.

**ANNUAL WATER AUDIT** - In addition to the Leak Detection Program, LCA is required to complete and submit an annual water audit to the Delaware River Basin Commission to document and demonstrate its efforts in controlling water loss. The purpose of this report is to track and evaluate water loss trends.

**VALVE EXERCISING PROGRAM** - Water main valves in the distribution system typically remain in the open position for years. Eventually, a valve may need to be closed to facilitate addressing breaks, repairs, and pipe replacements. The ability to close valves to isolate pipe sections and redirect the flow of water becomes critical. Too often in many utilities, the inability to close valves, particularly in cold weather when most breaks occur, can lead to significant problems.

LCA is required to exercise all valves between 4 and 12 inches at least once every five years. These are the valves within the distribution system which directly serve customers. Any valve, which is found to need repair or replacement, must be addressed within one year of the initial identification.

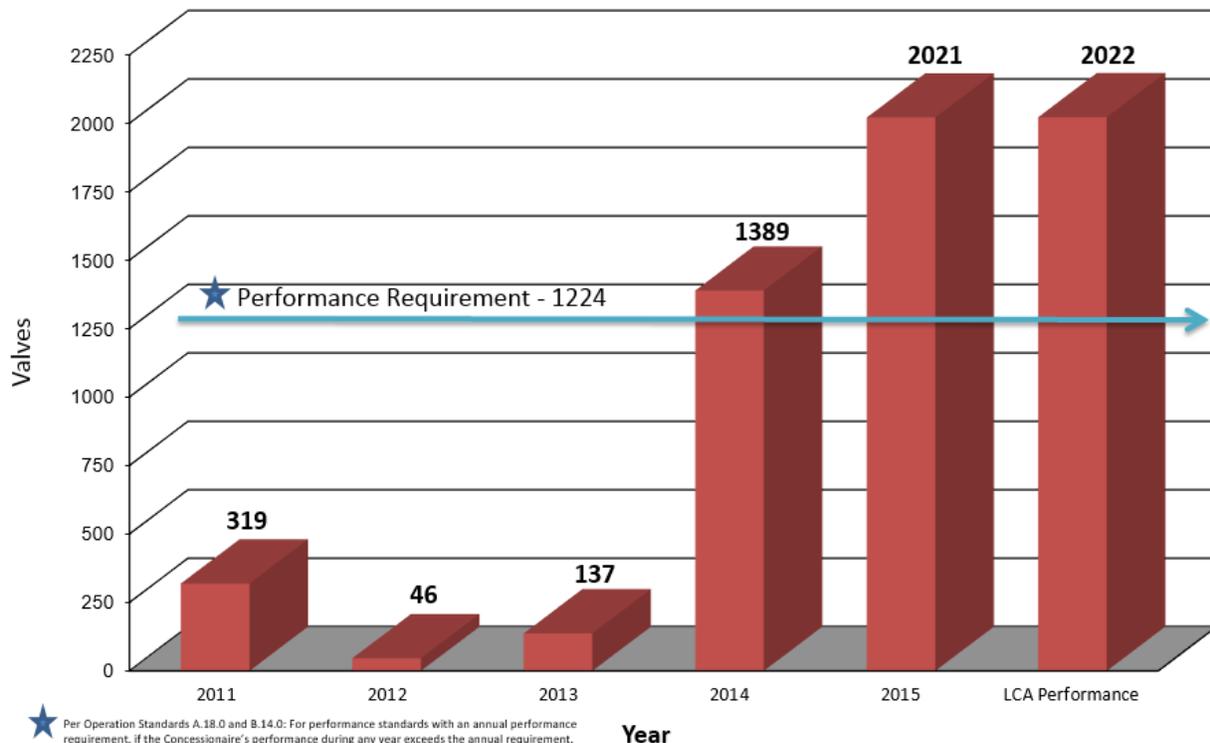
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As a result of this program:

- 52 valves were repaired
- 28 valves were replaced

Valves Exercised	
Requirement	# of Valves
OS annual	1,224
LCA Performance	2022

### Valves Exercised



★ Per Operation Standards A.18.0 and B.14.0: For performance standards with an annual performance requirement, if the Concessionaire's performance during any year exceeds the annual requirement, that exceedance of the annual requirement may be credited towards satisfying the annual requirement during the following year. Such credits do not apply to water quality requirements.

**HYDRANT MAINTENANCE AND TESTING** - Approximately 1,800 fire hydrants are present throughout the City. It is critical that fire hydrants be serviceable at all times. LCA is required to inspect, test, and monitor pressure and flow on 900 hydrants annually. This requirement will result in every hydrant being checked at least every two years. Hydrants which require repair or replacement must be completed within six months of the problem(s) being identified. Hydrants reported by the Fire Department as not functioning properly are handled similarly. Painting of hydrants subsequent to inspection to ensure visibility is an additional requirement.

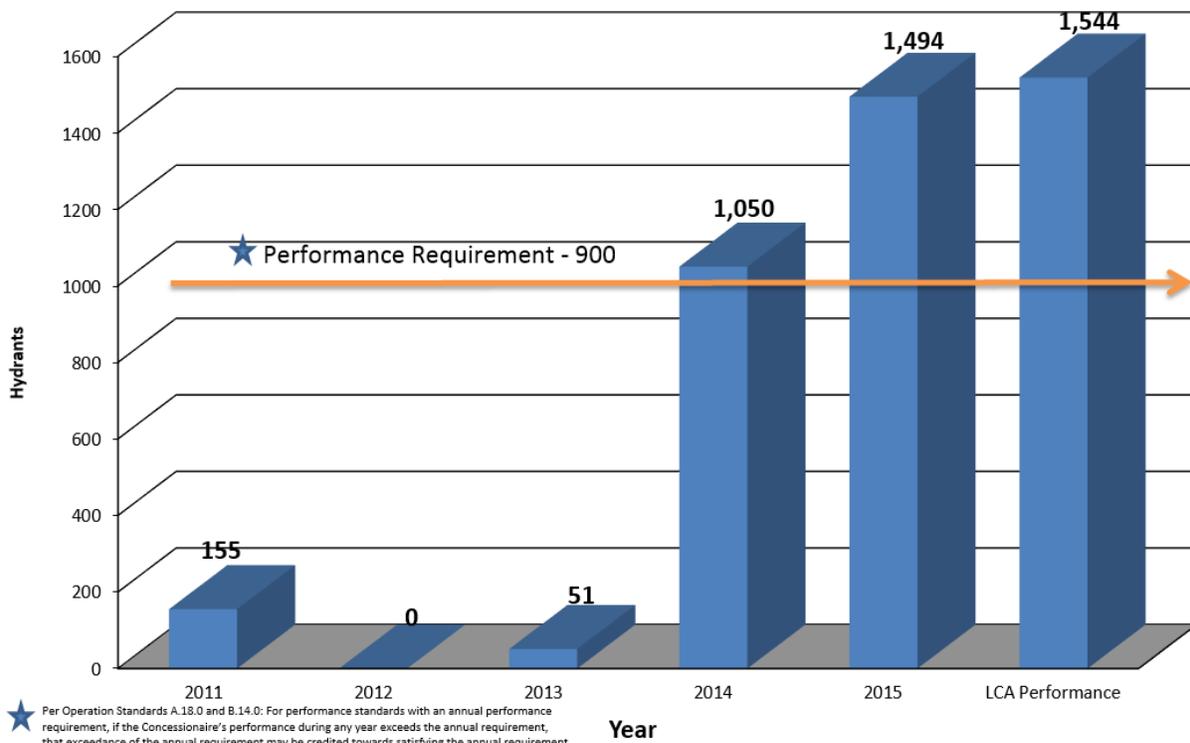
As a result of this program:

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- 109 hydrants were repaired
- 19 hydrants were replaced
- 1,544 hydrants were inspected; no hydrants were identified as needing painting.

Hydrants Inspection & Testing	
Requirement	# of Hydrants
OS annual	900
LCA Performance	1544

### Hydrants Inspected & Tested



**PIPE ASSESSMENT PROGRAM** - Approximately 325 miles of water distribution pipes were inventoried during the bidding process. That inventory indicated that 49% were installed between 1870 and 1944. Between 1944 and 1963, the City utilized spun cast iron pipe, which accounts for another 19% of the system pipes. Unfortunately, this type of pipe has been shown to be the most prone to breakage. Replacement of the spun cast iron pipe has been a City priority for several years. There were 21 main breaks in 2016, 12 breaks involved spun cast pipe.

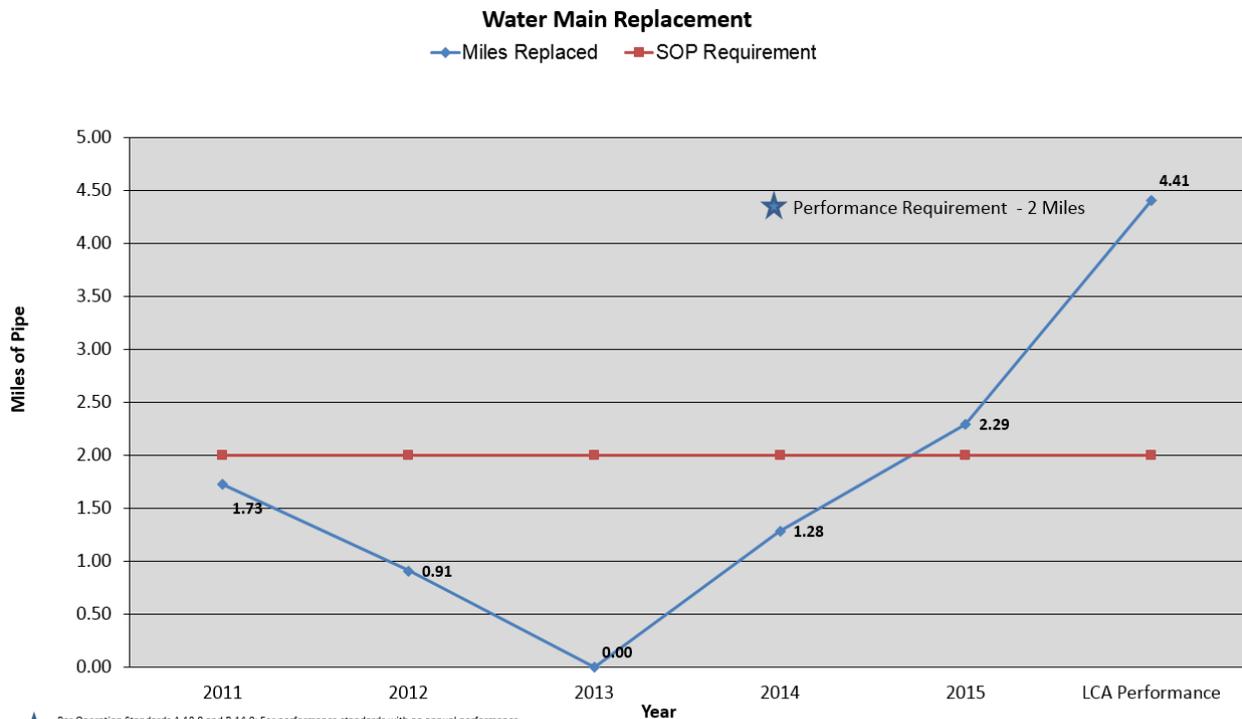
LCA was required to develop an assessment program that looked at variables such as age of pipe, type of pipe and breakage history to determine which pipe segments should be replaced most

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immediately. Spun cast iron pipes and pipes over 100 years old were to be prioritized along with consideration for dovetailing main replacement into the City’s Streets Program. When a street is to be resurfaced, the pipe underground will be replaced to minimize the potential for a water line break in a newly resurfaced street.

**WATER MAIN REPLACEMENT** - The OS requires two miles of pipeline to be replaced annually. Service lines are also replaced and information on all the new lines are to be entered into the Geographic Information System (GIS) so that information on the City’s infrastructure is kept current.

<b>Water Main Replacement Program</b>	
Requirement	Miles of Pipe
<b>OS annual</b>	<b>2.0</b>
<b>LCA Performance</b>	<b>4.41</b>



★ Per Operation Standards A.18.0 and B.14.0: For performance standards with an annual performance requirement, if the Concessionaire’s performance during any year exceeds the annual requirement, that exceedance of the annual requirement may be credited towards satisfying the annual requirement during the following year. Such credits do not apply to water quality requirements.

**CUSTOMER METERING** - All customer metering devices must follow American Water Works Association guidelines. In 2012, before the Lease, the City began a major residential meter replacement program to replace the existing meter with an Automatic Meter Reader (AMR). These meters are more accurate and have greater data collection capabilities, which allow for information on water use patterns to be determined. Meter reading is accomplished by driving by a customer’s property with a specially equipped vehicle, eliminating the need for entry onto

property. Approximately 28,000 customers have been converted to AMRs under the Itron contract. LCA personnel are currently installing the approximately 250 remaining meter replacements not previously replaced under the contract.

- **Customer Service**

Customer service was a primary concern during public meetings on the Lease. Consequently, significant effort was undertaken in order to make the transition from the City's Water Resources (WR) operation to LCA as seamless and as transparent as possible. LCA kept all existing phone numbers the same as those used by WR. LCA and the City developed a service agreement wherein the City Communications Center functioned in exactly the same capacity as it had with WR, receiving calls and notifying designated response personnel for emergencies during off hours and on weekends. The radios used by WR plant and field personnel were included in the agreement, which also provided an interconnection with Police and Fire for emergencies. The majority of the rolling stock used by WR was transferred to LCA. As noted in the Introduction, the majority of WR personnel transferred to LCA. Service technicians are available to respond to emergencies 24 hours a day 7 days a week. Essentially, other than different logos on the vehicles and different uniforms, Allentown customers saw no change in the delivery of services under the Lease.

**CUSTOMER SERVICE CENTER** - As required by the Lease, LCA established an office within the City of Allentown to provide customer service by renovating the entranceway and offices area at the Water Filtration Plant at 1300 Martin Luther King Jr. Drive. The Customer Service Center (CSC) is open from 8:15 am until 4:45 pm Monday through Friday except holidays. Bill payments by cash or credit card can be made at three windows in the CSC. A parking lot is available for customer's use and includes a secure drop box for bill payments.

CSC staff fielded an average of 1,854 calls per month, which include bill payments, complaints, requests for water or sewer services, emergencies, and other inquiries. Several of the staff are bilingual. Records are maintained of all calls and responses, which may include dispatching service technicians.

All calls are classified into 14 categories depending on the subject of the incoming call. LCA received a total of 22,242 calls in 2016 of which 18,659 (84%) were inquiries about billing or credit card payments. LCA is required by the OS to track the calls by categories for the present and prior two years to look for trends. LCA call volumes in 2016 show a significant decrease over 2015 results, primarily due to implementation of automated payment system.

**CUSTOMER SURVEYS** - LCA is required by the lease to conduct customer surveys to measure customer satisfaction. LCA has customer survey programs in effect in its other service areas and

maintains a service satisfaction goal of 91%. The 2016 Allentown customer survey satisfaction rate was 88%. This was a decrease from 90.1% recorded in 2015.

**CUSTOMER CONCERNS** - All customer questions or concerns are directed to the CSC. LCA has very specific policies and protocols in place to address customer concerns and complaints. If customers do not accept that LCA has adequately addressed their concern, the next step is to contact the OoC. Not all complaints are resolvable, such as a leaky toilet that results in an unusually high bill. In 2016, 17 customers contacted the OoC, a 35% decrease from 2015.

- **Completed Major Capital Improvement Projects**

Major Capital Improvement Projects (MCIP) are necessary capital improvements to the water or wastewater systems, which have a total cost of over one million dollars (\$1,000,000.00). This qualifying total project cost threshold increases annually beginning in 2016 based on the CPI-U (Consumer Price Index for all urban consumers). Costs include debt service, construction services, materials and equipment, engineering, permitting, consultants, project management, and other directly related costs. Per the Lease, LCA will provide funding and overall project management for MCIPs. The Lease details the phases and related requirements of a MCIP, all of which require presentation to the City for review. Those phases begin with inclusion of a MCIP in the Capital Plan, and then continue with conceptual design, substantially complete design, and project closeout.

The CPI-U percentage change for the 2017, annual period ending on June 30, 2016 is 0.8; therefore, the threshold amount for a Major Capital Improvement Project increases to one million eight thousand dollars (\$1,008,000.00).

Under the terms of the Lease, LCA is allowed to recover all costs associated with a MCIP. Sewer project MCIPs costs are shared by Allentown ratepayers and the other sewer signatories, including LCA, in conformance to the 1981 Master Sewer Agreement. Water project MCIPs costs are shared by Allentown ratepayers and bulk water customers (South Whitehall Township, Salisbury Township, and Hanover Township).

**CAPITAL COST RECOVERY CHARGE** - The determination of the actual rate increases is based on a Capital Cost Recovery Charge (CCRC), which spreads the cost of a MCIP out over the life expectancy of a MCIP, not to exceed 30 years. The annual cost will be billed to the ratepayer as an incremental increase to the cost per thousand gallons, which will be listed as a line item on a customer's bill. LCA will provide information on the MCIPs with the first bill of the new year. Charges for MCIPs will be added to the bill after rate adjustments (CPI-U and margin) have been made to the base rate as allowed under the Lease.

Capital projects associated with addressing the Administrative Orders (AO) may not exceed the threshold amount. However, the funding for all AO projects, regardless of project costs, is to be

paid out of the Administrative Order Fund (AO Fund) which the City must maintain. Costs for AO projects will also be included as a line item on customer bills. The mechanism for determining the AO projects charge is different than the CCRC; it is based primarily on the debt service associated with the AO Fund.

Currently, two MCIPs for which CCRCs were developed are included in the 2016 water and sewer bill:

1. Water Main Replacements- Cycle II, 2015
2. Replacement of WWTP Motor Control Centers

- **Administrative Orders**

The United States Environmental Protection Agency (EPA) issued Administrative Orders (AO) in 2007 and 2009 as a result of excessive Inflow and Infiltration (I&I) entering the collections systems of Allentown and the sewer signatories. I&I caused SSOs in the collection systems and at the Headworks of the WWTP during periods of significant precipitation. These orders direct the parties to address the problems. Allentown and the sewer signatories have been developing and implementing projects and programs to address I&I and submitting mandated progress reports with EPA every six months to document those activities.

In 2016, six rain-derived SSOs occurred between February 24-26. As previously discussed in the Sewage Collection System section, these were caused by excessive flows from heavy precipitation and elevated ground water levels.

The 2009 AO was directed at system wide SSOs and had a 12/31/2014 deadline for compliance. The deadline was not met. On September 10, 2014, an informational meeting was held between representatives of EPA, PaDEP, Allentown, LCA, and other sewer signatories. The purpose of the meeting was to review the efforts made to control I&I to date, to indicate that the municipalities and authorities were truly committed to resolving the problems, and to state that a formal request would be made to EPA to extend the deadline. As part of that commitment, a list of tasks and projects with a milestone chart would be provided to EPA for its consideration. It was noted that ultimately several multimillion-dollar capital projects would be required. The local representatives indicated that the magnitude of the solution(s) required extensive system wide study and planning which would be initiated by a modelling effort that would look at not only current but also future needs with the goal of providing a onetime fix. Modeling specialists and engineers would look at the sizing of pipes, structures, and facilities and consider the timing and scheduling to address engineering, planning, permitting, sequencing, and financing involved in a system wide plan. The regulatory representatives indicated they would review submitted information, but noted that they had several options to consider.

A formal extension request letter was sent to EPA on November 14, 2014. On October 14, 2015, EPA responded to the formal request letter with a proposed “Order Extension on Consent (OEC).” The OEC letter acknowledges the significant efforts made by the respondents to eliminate SSOs from their respective systems, including working cooperatively, as well as the commitments expressed to continue those efforts. The OEC provided for an extension to December 31, 2017 which allowed for the conceptual development of a program and projects, including legal and financial matters, to address the elimination of SSOs under the current flow conditions. The associated capital projects have been termed Phase 1.

After the completion of Phase 1 and system modelling, Phase 2 projects may be developed depending on projected growth. All respondents signed the OEC by February 10, 2016.

As promised to EPA, the City and LCA have retained consultants who, with representatives from both organizations, have formed a technical work group focusing on development of the future treatment needs, modelling of the infrastructure, impacts from I&I, and ultimately the options available. These meetings are held monthly with additional meetings held semi-annual to discuss and track project milestones with parties subject to the AO.

**AO PROJECTS** - In addition to the technical assessment and planning work being done for the Phase 1 effort, two separate projects to address the AOs were completed in 2016:

- **Sanitary Sewer Manhole Linings** - As discussed in the Sewage Collection System section, 82 manholes were lined. Additional 16 manholes were grouted and/or required a Chimney seals. Cost- \$199,312. This project is complete.
- **Sanitary Sewer Manhole Collars & Water Tight Covers** - As discussed in the Sewage Collection System section, 57 manhole structures were reinforced with collars and/or bolt down frames. Manhole collars and frames will be an annual project per the City’s commitment to EPA. Cost- \$276,108.

As of the completion of the 2017 program, approximately 410 Manholes have with been retrofitted with either collars or water-tight covers; consequently, all manholes with site history of SSOs or surcharging, or identification thru inspections, or predicted by modeling through the year 2040 were addressed.

- **Security**

Security is a significant concern to utilities because of the potential health risks to the public, the need to keep treatment systems functional and to prevent possible damage to very expensive equipment. Additional security requirements were implemented after the establishment of the Federal Department of Homeland Security.

The treatment facilities use key card systems so that access is limited to authorized personnel. Visitors to the treatment facilities are required to enter through the main entrances, note with whom they are meeting, and sign in after being cleared for entrance. Video surveillance is also utilized. Remote facilities are gated and protected by intrusion alarms. The perimeters of the treatment facilities are inspected daily to check the condition of the fence lines and to look for signs of breaching. Security procedures are covered in the treatment plant SOP manuals. LCA has also developed Emergency Response Plans, which are required to be reviewed annually.

One security breach was reported in 2016. Three individuals made their way onto the WFP plant property by the Little Lehigh intake and threw two rakes for cleaning the bar screen and a chair into the creek.

- **Notices of Violation (NOV)**

In June 2016, PaDEP issued a Monitoring and Reporting Violation for failure to submit results of all water tests to the state within the required reporting period. LCA responded to the violation by submitting the missing data. The violation is recorded in the 2016 Consumer Confidence Report (CCR).

No notices of violation were issued by the Office of Compliance

- **Awards and Acknowledgements**

LCA received the Partnership for Safe Water's Directors Award for 2016. The Partnership program sponsored by EPA, PaDEP, and the Association of Drinking Water Administrators is established to recognize drinking water utilities, which institute and maintain operating procedures to optimize drinking water quality above state and federal standards. The award was based on LCA's optimization of drinking water treatment processes as determined by filter data collected throughout the year.