



Executive Summary

ES.1 Purpose of Long Term Control Plan

The City of Lancaster owns and operates the Lawrence Street Water Pollution Control Facility (LSWPCF), located on the south side of the City, and the associated combined sewer wastewater collection system. The LSWPCF treats all of the flow from the City's combined sewer system. The LSWPCF is designed to treat an average flow of 10 MGD with a peak hydraulic capacity of 18 MGD, 12 MGD of which goes to secondary treatment. The LSWPCF was originally constructed in the late 1930s with the most recent upgrades occurring in 1997.

The original sewer system that serves the central part of the City is a combined sewer system. The oldest sections of the system are over 100 years old. In 1911, drainage districts were created to route flows to the rivers. Construction began on the core sanitary sewer system in 1939 and evolved to include pump stations and overflow structures.

The City owns and maintains approximately 52,600 linear feet of combined sewers and approximately 851,000 linear feet of separated sewers in the Lancaster wastewater collection system. The City's sanitary service area is over 18 square miles and serves approximately 99 percent of the City's population of 38,780 (2010 U.S. Census). The City also maintains approximately 447,000 linear feet of storm sewers.

The City is authorized to discharge pollutants from the LSWPCF and the combined sewer overflow (CSO) structures under a National Pollution Discharge Elimination System (NPDES) permit issued by the Ohio Environmental Protection Agency (EPA), Permit No. 4PD00001*LD, effective August 1, 2012 through July 31, 2017. The permit requires the following:

"As soon as possible but no later than March 1, 2014, the permittee shall submit a Phase II Long Term Control Plan that will include a further assessment of the costs, effectiveness (in terms of pollutant loading reductions, regardless of water quality impacts) and water quality benefits of a wide range of alternatives for eliminating, reducing and treating any and all of Lancaster's remaining CSO overflows or CSO outfalls. The evaluation of each alternative in this analysis shall include: costs; benefits, such as reduction in overflow events, volume, and load as compared to baseline conditions; impact on user rates; affordability; and construction and implementation schedules."

The City subsequently received an extension for submittal no later than September 1, 2014.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



The NPDES permit also states that:

“The permittee agrees to complete construction of the additional recommended alternative as soon as practical in accordance with the U.S. EPA's Combined Sewer Overflow-Final Guidance for Financial Capability Assessment and Schedule Development, February 1997, but in no case later than January 1, 2025.”

ES.2 History of Combined Sewer System Work in Lancaster

In July 1995, the City of Lancaster began in earnest to work on addressing issues associated with Lancaster's wastewater collection system. Major objectives of the initial work included:

- Addressing basement flooding issues that were historically prevalent in several areas of the City.
- Updating of and documentation of the City's wastewater collection system in electronic format.
- Taking proactive approach to address upcoming Ohio EPA requirements for the combined sewer system. The USEPA had adopted their CSO Control Policy in April 1994 and Ohio EPA established their CSO policy in 1995. Lancaster's NPDES permit expired on July 28, 1995.

In the next NPDES Permit that was effective December 1, 1997, the following items were included in the Schedule of Compliance:

- Combined Sewer System Operational Plan by April 1, 1998. Implementation of controls was required by June 1, 1998. This was essentially implementation of the nine minimum controls as defined by USEPA
- Monitoring program proposal by June 1, 1998.
- Combined Sewer System Characterization Report by December 1, 1999.
- Combined Sewer System Long Term Control Plan by June 1, 2000.

The LTCP was submitted in June 2000. Ohio EPA reviewed the initial LTCP and determined that the recommendations made per the requirements of the NPDES Permit were no longer acceptable. The Presumptive Approach of reducing overflow volumes by 85% as identified in the USEPA CSO Control Policy as an acceptable approach, and which was used in the LTCP, was not accepted by Ohio EPA.

The City of Lancaster then negotiated revised LTCP requirements with OEPA that were included in the Schedule of Compliance for the next NPDES Permit, effective 03/01/03 through 07/31/06. The requirements included the following:



PHASE II LONG TERM

Executive Summary

- Reduction or elimination of combined sewer overflows from four specific CSO structures as identified by the Ohio EPA.
- Plan for the provision of new facilities at the WPCF to treat increased peak flows caused by reduced CSO discharges.
- Plan to provide full treatment of wastewater flows from new and separately-sewered areas in high growth areas of the City.

Since the elimination or reduction in CSO volume likely would result in larger peak flows and volumes at the Lawrence Street WPCF, the Ohio EPA also required an analysis of the options available to treat the additional flow. These analyses were submitted to the Ohio EPA in the Long Term Control Plan Addendum on March 1, 2005.

Ohio EPA reviewed the Long Term Control Plan Addendum, and again determined that, even though it met the requirements of the NPDES Permit Schedule of Compliance, it could not be approved. Ohio EPA determined that compliance with the Ohio EPA CSO policy would require reducing all overflows within the City to allow only 2 to 4 events Citywide in a "typical year". Lancaster then negotiation with Ohio EPA to establish additional LTCP requirements to be included in the next NPDES Permit or to establish a Consent Order. It was mutually agreed to establish additional LTCP requirements via the NPDES Permit Schedule of Compliance.

Ohio EPA ultimately accepted the recommendations in the Long Term Control Plan Addendum with the stipulation that once all the recommendations are implemented, that the City of Lancaster would re-monitor and model the collection system to determine what additional projects, if any, may be required to reduce overflow occurrences to 2 to 4 events Citywide in a "typical year".

The Current NPDES Permit for Lawrence Street was effective August 1, 2012 and will expire on July 31, 2017, of which this Phase II LTCP is a part of the Schedule of Compliance. Lancaster again negotiated with Ohio EPA regarding several components of the prior NPDES Permit Compliance Schedule.

The following is a list of some specific projects/milestones that have been completed:

1993 to 2003

- 1993 US EPA issued Combined Sewer Overflow (CSO) regulations and City initiated flow monitoring and system analysis
- 1995 Ohio EPA ordered submission of Long Term Control Plan (LTCP) by 2000
- Downtown Sewer Separation Project
- South Broad Street Storm Sewer Project
- Closure 6 CSO locations
- 2003 Ohio EPA orders addendum addressing 4 CSO locations

PHASE II LONG TERM CONTROL PLAN

Executive Summary



2004 to 2008

- Detailed look at each CSO location
- Formation of Stormwater Utility to pay stormwater share of CSO projects
- Lake Allen Maple Sewer Separation Project
- Closed or modified 21 CSO locations
- Submitted LTCP Addendum

2008 to 2012

- Ohio EPA issued compliance schedule for following
 - Completion of Lake Allen Maple Sewer Separation (2008)
 - Construction of Upper Hocking Water Pollution Control Facility (2012)
 - System Flow Monitoring and Modeling and Phase 2 LTCP (2014)
 - Construction of Baldwin Run Express Sewer (2013)
 - Construction of South Broad Street Express Sewer (2016)
 - Construction of Lawrence Street Equalization Basins (2017)
 - Full Compliance with CSO policy 2025
 - Construction of the Upper Hocking WPCF
- Upper Hocking WPCF comes on line 2011
- Elimination of Baldwin Run Express Sewer Project due to closure of CSO 1034
- Closed 1 CSO location

2012 to Present

- 2012 Renegotiated Compliance Schedule
 - Flow Monitoring and LTCP 2014
 - Forest Rose Storm Sewer Project 2013
 - CSO 1026 Project 2013
 - CSO 1014 Project 2015
 - CSO 1033 Project 2016
 - South Broad Street Express Sewer 2016
 - Lawrence Street Flow Equalization 2021
 - Full Compliance with CSO Policy 2025
- Flow Monitoring, Modeling and LTCP 2012
- Forest Rose Storm Sewer 2013
- Walnut Whiley (CSO 1027) 2013
- CSO 1026 Sewer Extension 2013

1993 to Present

- The total cost to date for the above projects is approximately \$69 million.
- The total CSO flow volume has been reduced from approximately 118 million gallons to approximately 63 million gallons in a "Typical Year"



The aggressive proactive approach taken by the City of Lancaster over the last 20 years to improve their combined sewer wastewater collection system has resulted in significant collection and water quality improvements. The 1997 NPDES Permit listed 31 permitted CSOs, with two additional overflows being identified during the system characterization work. As of July 1, 2014, there are only nine CSOs remaining.

ES.3 Stream Water Quality History

In 1985, 77% of the Hocking River between Lancaster and Enterprise exhibited “poor to very poor” conditions. However, by 1990 almost 67 % of the river was in Full or Partial Attainment of warm water habitat standards. In the 1991 Ohio EPA Water Quality Study, much of this improvement was attributed to upgrades at the Lancaster Lawrence Street WPCF that were completed in 1989. The 1989 upgrade of the plant not only improved the plant effluent, but also significantly reduced the volume of CSO discharges. Subsequent upgrades in 1996 at the Lawrence Street WPCF, as well as all the other collection system improvements documented in this report, have further improved this situation.

In the Ohio EPA’s 1995 Water Quality Study, continued improvement was documented. The entire Hocking River through Lancaster was either in Full or Partial Attainment of water quality standards for the first time since Ohio EPA began collecting data in 1982.

In the “Total Maximum Daily Loads for the Hocking River Watershed” Final Report dated August 27, 2009 (2009 TMDL), Hunters Run, Baldwin Run, Feters Run, and Pleasant Run were all in full attainment for aquatic life uses. In addition, the segment of the Hocking River through Lancaster was also in full attainment. There was no indication of any impairment of any aquatic life use as a result of the City of Lancaster wastewater collection and treatment systems.

However, the recreational use designation for the Lancaster streams is Primary Contact. The 2009 TMDL has indicated that there is a significant coliform load due to CSOs on the Hocking River and on Baldwin Run with a stated “Reduction Required” of 95% and 100% respectively. It is further stated that “The Lancaster Long Term CSO Control Plan should achieve this reduction in fecal coliform load once it is fully implemented.”

ES.4 The Cost of CSO Projects to Date

The City’s expenditures for the completed improvements related to reduction of CSO occurrences are summarized in the CSO Reduction Costs table below.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



CSO Reduction Costs

Completion Year	CIP	Total Cost ¹
Varies	Various In-House Improvements (See Appendix B, Table B1)	\$ 115,400
2014	Phase II Long Term Control Plan	\$ 1,100,000
2014	South Broad Street Express Sewer Planning and Design	\$ 480,000
2013	CSO 1011 Closure Project	\$ 760,000
2013	CSO 1026 Closure Project	\$ 365,500
2013	CSO 1027 Closure Project	\$ 205,000
2011	Upper Hocking WPCF	\$ 50,093,100
2009	Lake/Allen Sewer Separation	\$ 8,933,100
2002	S. Broad St. Storm Sewer	\$ 1,819,900
2001	Downtown Improvements	\$ 4,980,600
Total		\$ 68,852,600

1. Total Costs include property acquisition, engineering, and construction administrative services.

Although some of the actions taken by Lancaster have been required by various NPDES Permit Compliance Schedule requirements, as outlined in the prior discussion, many have been taken through the City's own initiative for the good of the system and ultimately the environment. However, the aggressive CSO related actions taken by the City of Lancaster has come at a large cost and has placed a considerable burden on its rate payers. To date, almost \$69,000,000 has been spent for CSO related improvements.

In addition, the above table does not include the cost for the 1987 and 1996 improvements to the Lawrence Street WPCF and to the four major pump stations, which amounted to approximately \$30,000,000.

ES.5 Phase II Long Term Control Plan Goals

The City desires to achieve a reasonable Level of Service (LOS) understanding that a collection system cannot feasibly be designed to convey every extremely large wet weather events. With that in mind, the following is a summary of the Ohio EPA and City of Lancaster Compliance Goals:



Ohio EPA Compliance Goals:

- 2 – 4 overflow events Citywide in a “Typical Year”
- Routing of separated sewer areas around combined sewer areas
- Maximizing treatment capacity
- Achieve Water Quality Standards

City of Lancaster Compliance Goals:

- Comply with 2 -4 events in “Typical Year”
- Where possible, close CSO
- Where possible, 0 events in “Typical Year”
- Maximize Interceptor Flows
- Maintain hydraulic grade lines to avoid water in basements (WIBs)
- Eliminate catch basin connections

ES.6 Flow Monitoring

In 1999, the City completed their first collection system model using XP-SWMM software as part of the City’s Combined Sewer System Characterization Report. This 1999 XP-SWMM model was used as the tool for planning all the previous CSO reduction capital improvement projects. As part of negotiations with OEPA for the June 1, 2007 Lawrence Street WPCF NPDES Permit, the City requested that the Permit Compliance Schedule include a model update to capture the collection system improvements, flow changes due to industry closures, and demographic shifts that have occurred since 1999. In order to calibrate the updated model, current flow monitoring data was required.

As part of the City’s Phase II LTCP, the City completed a comprehensive flow, rainfall, and stream gauge monitoring program to collect data for calibrating the updated model. The flow and rainfall monitoring program started on March 15, 2012 and ended on August 15, 2012. Twenty-nine rainfall events occurred during the flow monitoring period. The flow monitoring program included the following components:

- Flow monitoring at 40 locations throughout the collection system
- Rain gauging program utilizing four temporary rain gauges
- Stream gauge monitoring at one location along the Hocking River

A “Typical Year” of rainfall events was developed to predict the “Typical Annual” CSO volumes and number of occurrences. Development of a typical year rainfall hyetograph provided a platform upon which to evaluate the system characterization and develop alternatives for the City of Lancaster’s collection systems under the Phase II LTCP effort. Evaluating historical rainfall data, understanding the annual patterns and assembling a typical year is a location specific process.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



ES.7 Wastewater Collection System Model

The existing XP-SWMM model was updated to represent the current collection system based on conditions that existed during the 2012 flow monitoring period. To complete the model update, the existing XP-SWMM model was migrated to a more robust software platform, PCSWMM (utilizing the US EPA SWMM5 engine), and was updated and calibrated to accomplish the following:

- Incorporate all collection system improvements since the last model update including the Lake Allen Maple Sewer Improvement project completed in 2008.
- Incorporate the numerous CSOs that have been closed or modified as a result of the ongoing operation and maintenance improvements. As of the 2012 flow monitoring period, there were twelve remaining CSOs. Subsequent to completion of the 2012 flow monitoring, three additional CSOs were closed. For the calibration of the Existing Conditions Model, the twelve CSOs were active in order to simulate conditions during the flow monitoring period.

Once the 2012 Existing Conditions Model was calibrated, the model was used as a tool to understand the impact of the typical year on the existing system hydraulics and CSOs, based on data collected and observations made during the 2012 flow monitoring period. The model was then updated to the 2014 Baseline Conditions Model.

The 2014 Baseline Conditions Model was used to develop various alternatives that met current regulatory requirements and the City's long term goals. The 2014 Baseline Conditions Model is a modification of the 2012 Existing Conditions Model to include the following projects:

- The closure of CSOs 1011, 1026, and 1027. (Completed)
- The South Broad Street Express Sewer. (In Design / Bid Phase)
- The Cherokee CDBG Project (Planned Construction)

The projects listed above have been completed since the 2012 flow monitoring was completed, or are planned to be completed in the near future and are therefore included in the 2014 Baseline Condition Model. This provides a consistent platform to evaluate alternatives for future projects. The City is moving forward with the above listed projects in good faith to further improve water quality and meet their goals.

ES.8 Alternatives Development and Evaluation

In the 2005 LTCP Addendum, the City narrowed their CSO control technologies to the following:

- Sewer system optimization
- Sewer separation



- Storage
- No modifications

A CSO control technologies screening process was used to streamline the selection of potentially feasible technologies for further evaluations. As the City has already begun implementing their CSO LTCP improvements, the City strongly wanted to continue applying sewer separation and storage technologies. The City stressed the importance of developing alternatives that would be maintainable by City staff.

Feasible alternatives were developed based on the City’s goals, Ohio EPA’s goals, and preferred technologies. The CSOs on the west side of the City were grouped in “Planning Area ALTW” and the CSOs on the east side were grouped in “Planning Area ALTE”. A primary consideration in modeling all alternatives was to store all flow that could be conveyed to the Lawrence Street WPCF, at the Lawrence Street WPCF, that was in excess of the plant’s treatment capacity.

The alternatives evaluated for Planning Area ALTW addressed CSOs 1008, 1009, 1012, 1013, 1014 and 1033 with the goal to reduce CSO activations to no more than four activations in a typical year. Each alternative listed in the table below was incorporated into the model and evaluated for the typical year. The components of each alternative were iteratively evaluated until the model successfully captured the fifth largest event (signifying that the CSO only activated for four or fewer events in a typical year). All alternatives include a new equalization facility at the Lawrence Street WPCF, although the necessary size of the EQ tank and the associated pump station varies by alternative.

Summary of Developed West Side Alternatives

Alternative Name	Alternative Description
2W7A	Weir and underflow modifications to maximize flow to the interceptor
3W3A	EQ at the YMCA Pump Station capturing flows from CSOs 1014 & 1033
3W4A	EQ at the YMCA Pump Station capturing flows from CSOs 1013, 1014, & 1033
4W3A1	EQ at the YMCA Pump Station with 2025 storm separation
4W3A2	EQ at the YMCA Pump Station with 2050 storm separation
5W7A1	2025 Storm Separation without weir or underflow modifications
5W7A2	2050 Storm Separation without weir or underflow modifications
6W7A1	2025 Storm Separation with weir or underflow modifications
6W7A2	2050 Storm Separation with weir or underflow modifications
7W7A	Weir and underflow mods at CSOs and Interceptor Capacity Improvements

PHASE II LONG TERM CONTROL PLAN

Executive Summary



The alternatives evaluated for Planning Area ALTE addressed CSOs 1019, and 1029 with the goal to reduce CSO activations to no more than four activations in a typical year. Each alternative listed in the table below was incorporated into the model and evaluated for the typical year. The components of each alternative were iteratively evaluated until the model successfully captured the fifth largest event (signifying that the CSO only activated for four or fewer events in a typical year). All alternatives include a new equalization facility at the Lawrence Street WPCF, although the necessary size of the EQ tank and the associated pump station varies by alternative.

Summary of Developed East Side Alternatives

Alternative Name	Alternative Description
Alt2E1A	Weir and underflow modifications to CSO 1019 & 1029 to maximize flow to the interceptor
Alt3E1A1	2025 storm separation without weir or underflow modifications
Alt3E1A2	2050 storm separation without weir or underflow modifications

As the City wishes to avoid water in basement (WIB) incidents, an analysis was performed to determine if the potential alternatives may cause an increase in WIB events. Using GIS contours, basement elevations were assumed to be eight feet below grade with an additional two foot safety factor being applied. Based on the relative difference between the maximum HGL observed during the typical year and the estimated basement elevation, potential compliance locations were identified. At these locations, the potential for WIB incidents may exist. Thirty-two compliance points were identified and tracked during the alternative evaluation process.

For each alternative, the maximum hydraulic grade line was compared to the projected basement elevations. If the model predicted HGLs were within 10 feet of grade, the area was flagged and the alternative was considered unacceptable.

ES.9 Opinion of Probable Capital Costs for Alternatives

Using the Association for the Advancement of Cost Engineering (AACE) standards for estimating capital improvement projects, the opinion of probable capital costs developed in this report are Class 4 Planning Phase costs, which provide the necessary accuracy capital project funding.



Construction cost contingencies include costs for change orders and construction cost markups such as mobilization, bonds, insurance, and contractor overhead and profit. The material and labor costs were increased by 30% to account for these costs and the calculation is shown in the following equation.

$$\text{Subtotal} = \text{labor and material costs} + 30\% (\text{labor and material costs})$$

Non-construction cost markups include fees associated with permits, surveys, geotechnical, legal and design. The cost also includes fees for engineering during construction and resident engineering fees. The subtotal costs identified above were increased by 23% to account for the non-construction cost markups. This calculation is shown below.

$$\text{Total Cost} = \text{subtotal} + 23\% (\text{subtotal})$$

The opinions of probable capital costs include the costs required to complete the project, from design through construction. A summary of these costs is shown below.

ES.10 Recommended Alternative

In order to select the recommended alternative, each alternative was analyzed and ranked during an Alternatives Review Workshop based on the criteria listed below:

- Capacity and Condition
- Water in Basement
- Maintenance
- Constructability
- Regulatory Requirements
- Land Acquisition
- Degree of Effectiveness
- Infrastructure Investment Long Term
- Wellhead Protection

The following table summarizes the results of the criteria ranking and the associated opinion of probable construction costs. The alternatives were initially ranked based on criteria prior to consideration of the associated costs. The table below summarizes the ranking and costs:

PHASE II LONG TERM CONTROL PLAN

Executive Summary



Alternatives Ranking and Opinion of Probable Construction Costs

Alternative	Total Ranking Points	Alternative Opinion of Probable Construction Cost - Planning
5W7A2	201.5	\$9,624,000
8W7A	197.0	\$9,252,000
5W7A1	190.5	\$6,227,000
4W3A1	177.0	\$13,525,000
7W7A	175.0	\$4,226,000
6W7A2	155.5	\$9,689,000
3W3A	141.0	\$5,799,000
2W7A	138.0	\$2,212,000
3W4A	116.5	\$6,171,000
3E1A2	189.0	\$27,278,000
4E1A	178.0	\$23,867,000
2E1A	167.5	\$21,162,000
3E1A1	158.0	\$21,116,000

The April 8, 2014 Alternative Review Workshop concluded with Alternative 5W7A2 and Alternative 4E1A as the suite of projects to review and optimize to develop the final suite of Recommended Solution Projects to meet the attributes that led highest ranked alternatives. The total cost of combining Alternative 5W7A2 and Alternative 4E1A without optimization would result in total cost of approximately \$33,491,000.

Following the April 8, 2014 Alternative Review Workshop, the project team began working to develop the Recommended Solution projects. With the goal of the selected projects to meet the attributes discussed in Section 5.2 and to minimize sewer separation due to the additional costs and impacts to the neighborhoods, the optimization of the recommended projects were developed based on specific conditions in each basin and are described hereafter. For example, in the CSO 1014 and CSO 1033 basins, underflow pipes were upsized and the degree of sewer separation was reduced.



PHASE II LONG TERM

Executive Summary

Recommended Projects and Costs

CSO Basin	Project Description	Opinion of Probable Construction Cost
1004	Lawrence Street WPCF Equalization	\$13,092,000
1008	Include all 2025 Stormwater Separation Projects with a 7-inch height increase of the CSO 1008 weir (Note: Raising the Weir elevation shall include increasing the weir length to decrease the existing wet weather HGL)	321,000
1009	Include all 2050 Sewer Separation Projects	\$1,451,000
1012	Include all 2050 Sewer Separation Projects	\$2,802,000
1013	Include all 2050 Sewer Separation Projects	\$1,478,000
1014	Increase underflow pipe that extends from the CSO 1014 Structure to Interceptor Sewer from 12-inch-diameter to 18-inch-diameter	\$253,000
1019	Increase the underflow opening and increase the underflow pipe from 18-inch-diameter to 30-inch-diameter to maximize flow to Lawrence Street WPCF.	\$503,000
1029	Include the necessary 2025 separation projects and increase the CSO 1029 weir elevation so that the maximum HGL is near the crown of the 48-inch-diameter interceptor sewer. The City indicated that the Sixth Avenue Storm Sewer would be the only preferred stormwater separation project in the CSO 1029 basin.	\$2,324,000
1033	Increase Underflow Pipe that extends from the CSO 1014 Structure to Interceptor Sewer from 10-inch-diameter to 15-inch-diameter	\$349,000
Total		\$22,573,000

PHASE II LONG TERM CONTROL PLAN

Executive Summary



ES.11 Post Construction Monitoring

The LTCP requirements under the CSO Policy require that the effectiveness of the controls be measured to determine if the goals of the CSO Policy and the requirement of the CWA have been met. The City of Lancaster currently monitors a wide array of assets for performance including sewer lines, pump stations, treatment plant components, and overflow monitoring blocks to aid in quantifying CSO activations at the nine active CSOs. To understand the duration and intensity of the wet weather events in the City, the City has rain gauges that collect and store data.

To periodically assess the benefits of the improvement projects, it is recommended that the City update their collection system model by incorporating the new projects into the model. Using the collected rain gauge data, the City can run model simulations to depict the current conditions in the collection system, including accounting for already implemented new projects or planning for new projects. The accuracy of the updated collection system model can be determined using the overflow occurrence data that is obtained with the overflow monitoring blocks. If the model simulations depict a number of overflow occurrences similar to those recorded, then the updated model can be deemed accurate.

Using the updated collection system model, the City will be able to assess the effectiveness of the implemented CSO control measures. An important outcome of the monitoring and documentation are the production of computer simulations of the collection system model. The computer simulations will allow the City to estimate the frequency, volume, and duration of CSOs using the typical year simulation to compare against the typical year simulations in this report.

ES.12 Financial Capability and Affordability

A detailed Financial Capability Assessment and Affordability Study was completed for the City of Lancaster Water, Wastewater, and Stormwater utilities. The goal of the study was to assess the current and projected future customer affordability and community financial capability for implementing the Phase II LTCP, and to provide justification to support a regulatory implementation schedule for the Phase II LTCP.

The assessment and study evaluated affordability from a broad perspective, including the assessment outlined in the 1997 United States Environmental Protection Agency (USEPA) guidance document *Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development*. The USEPA Financial Capability Assessment methodology is intended to assess customer affordability and the financial capability of the utility and its community to pay for a LTCP.



While this assessment is focused on wastewater and LTCP costs, our analysis included a broader assessment of affordability and financial capability by considering the cost of combined water, wastewater, and stormwater service, and the community's ability to pay for these services. Important socioeconomic indicators that help to provide a more complete picture of a community's economic and social characteristics such as population, labor force, unemployment, income distribution, public assistance, and other economic indicators are also considered.

It was found that Lancaster's annual residential rates for wastewater, water, and wastewater are currently the third highest in the region, and considerably higher than the Ohio median. Data was taken from the Ohio EPA rate survey published in 2012 which is based on a monthly usage of 7,756 gallons per customer.

The Residential Indicator was calculated to be 2.9 percent by dividing the wastewater cost per household by the MHI. The Residential Indicator was compared to the USEPA financial impact ranges provided in the USEPA guidance document (and shown in the table below) to assess the financial impact that wastewater treatment and LTCP costs may have on the community's residential customers, and indicates a financial impact in the "High" range.

USEPA Financial Impact Ranges

Financial Impact	Residential Indicator
Low	Less than 1.0 percent
Mid-Range	1.0 percent-2.0 percent
High	Greater than 2.0 percent

Due to the variability of income levels across the City's service area, some neighborhoods within the service area will experience more severe economic hardship as a result of implementation of the LTCP, and will have residential cost as a percentage of household income that is much greater than the median.

The City has an overall Financial Capability Indicator score of 2.3 which corresponds to a "Mid-Range" financial capability indicator rating based on the USEPA methodology. The table below summarizes the financial indicators, the scores associated with each indicator and the average score for all indicators. The average score is used to determine the overall indicator score. It should be noted that USEPA's methodology assigns equal weights to each category.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



Financial Capability Indicator Score: Wastewater System

Indicator	Actual Value	Indicator Range	Score
Bond Rating	Aa3, AA	Strong	3
Overall Net Debt as a Percentage of Full Market Value	2.9 percent	Mid-Range	2
Unemployment Rate	6.9 percent	Strong	3
Adjusted Median Household Income	\$39,411	Weak	1
Property Tax Revenues as a Percentage of Full Market Property Value	0.59 percent	Strong	3
Property Tax Revenue Collection Rate	97.3 percent	Mid-Range	2
Overall Financial Capability Indicator Score		Mid-Range	2.3

Using the USEPA methodology, the results of the Residential Indicator and the Financial Capability Indicators assessments were combined into a Financial Capability Matrix to evaluate the level of financial burden that WWT and LTCP costs may impose on the City. The original purpose of the matrix in the 1997 CSO Guidance Document was to assist the utility and regulatory agencies in establishing a CSO control implementation schedule. The Financial Capability Matrix populated for the City is shown in the table below.

Wastewater Financial Capability Matrix Score

Financial Capability Indicators Score (Socioeconomic, Debt and Financial Indicators)	Residential Indicator (Cost per Household as a Percent of MHI)		
	Low (Less than 1.0%)	Mid-Range (1.0% to 2.0%)	High (Greater than 2.0%)
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 to 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

Based on a “High” financial impact Residential Indicator of 2.9 percent and a “Mid-Range” Financial Capability Indicator score of 2.3, the City’s financial capability matrix score is



estimated as “**High Burden**”. This indicates that a typical LTCP proposed to control CSOs would be a significant burden on the City and its customers.

Similar to the wastewater financial capability analysis, the Residential Indicator was calculated for the combined water, wastewater, and stormwater systems by first determining the total cost of treatment for water and stormwater systems separately. The combined CPH is the sum of the water, wastewater, and stormwater system CPHs. Once the combined CPH was estimated, the Residential Indicator was calculated by dividing the combined CPH by the MHI of the community. As shown in Table 6-4, the Combined Residential Indicator was calculated to be 4.7 percent.

Calculation of Combined Residential Indicator

Adjusted MHI	\$39,411
Combined Cost per Household, Annual	\$1,841.22
Combined Residential Indicator (CPH as percent of MHI)	4.7 percent

EPA’s stated view on potable water is that it is affordable if it costs less than 2.5 percent of a small community’s MHI. It is commonly inferred that EPA would consider a combined annual water and wastewater bill of less than 4.5 percent to be affordable. **Many households, more than 50 percent, would pay more than 4.5 percent of their income on combined utilities.** It should be noted that for grant review purposes, the Ohio Public Works Commission defines the threshold of affordability as 1.74 percent for both water and wastewater in District 17.

In order to present a more comprehensive picture of the City’s financial capability and customer affordability, an analysis was completed that considered the long-term rate impacts of future capital improvements. Year-by-year costs are presented as a percentage of MHI. In this analysis, annual rate increase needs were estimated based on the estimated annual revenue requirements. The total annual bill per customer was then divided by the adjusted MHI to calculate a typical residential customer’s annual bill as a percentage of MHI.

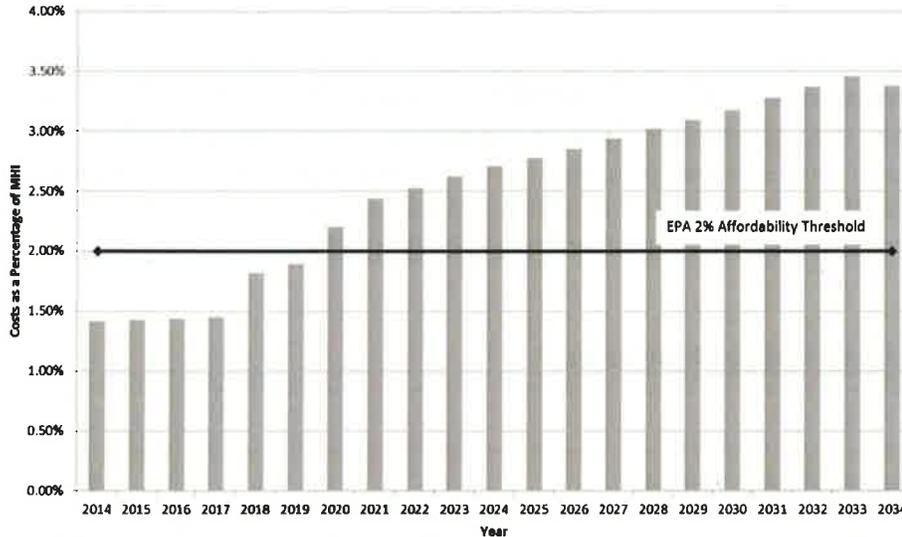
The figure below shows that the estimated wastewater bill will exceed the EPA affordability threshold beginning in FY2020, and indicate that significant economic hardship may occur over the forecast period, and the City would have limited capacity to fund other programs or additional Federal or State mandates in the future. Therefore, the City should receive the maximum amount of schedule relief for implementing its LTCP.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



Annual Estimated Wastewater Bill as a Percentage of MHI



Although the financial capability assessment focuses on the City and residential community's financial capability, industrial affordability should not be neglected. The City desires to boost its economy by attracting new industries and keeping existing ones. If the City were to lose a key customer such as Anchor Hocking, which is their largest wastewater and water customer, the effects would be devastating. For example, Anchor Hocking contributed 3 percent of wastewater revenues and 2 percent of water revenues to the system. If Anchor Hocking were to shut its doors in Lancaster, the majority of the revenues would need to be collected from remaining customers. In addition to losing revenue from this customer and all of the associated jobs, the City would have to raise rates and decrease their ability to bring in new industries. Therefore, the City must strive to also have rates that are competitive to other Cities in the mid-west. This goal is challenging because rates are already high when compared to other similar communities. For example, Anchor Hocking competes with other similar manufacturers, including Libby Glass, which has a manufacturing facility located in the CSO community of Toledo, Ohio. A facility the size of Anchor Hocking operating in Toledo would pay 18 percent and 62 percent less for wastewater and water usage, respectively as shown in the table below.

Anchor Hocking Location Comparison

	2013 Usage (100 CF)	Cost in Toledo	Cost in Lancaster	Percent Change in Cost
Anchor Hocking - Wastewater	60,577	\$243,224	\$294,945	(18 percent)
Anchor Hocking - Water	41,166	\$51,966	\$137,833	(62 percent)



ES.13 Socioeconomic Conditions

The evaluation of affordability must also focus on important socioeconomic indicators that can help to provide a more complete picture of a community's economic and social characteristics such as population, labor force, unemployment, income distribution, public assistance, and other economic indicators. The following is a synopsis of numerous critical socioeconomic characteristics that were identified for Lancaster:

- As a result of a decrease in the City's general fund over the last several years, staff reductions, including fire and police, have occurred. There are unfilled positions in the utility department due to lack of funds.
- The annualized population growth has averaged approximately 0.7 percent over the last five years.
- Approximately 27 percent of the population is over 55 years old.
- The local labor force has benefitted by access to jobs in the Columbus area. In 2012, the unemployment rate for Ohio was 7.4 percent, while the unemployment rate for the City was slightly below the state rate at 6.9 percent. Approximately 10.5 percent of the civilian labor force within the City is employed outside the City of Lancaster.
- Despite modest population growth and moderate unemployment rates, the poverty rate for the City have increased since 1990 and was at 20.2 percent in 2012, as compared to 16.1 percent for the State of Ohio.
- As of 2012, the average earned income in the City was 20 percent below the Ohio average and 27 percent below the national average. In 2007, the City was 15 percent and 22 percent below the Ohio average and national average, respectively. Therefore, the gap between both the state and national average MHI and the City's MHI is widening.
- The lowest 20 percent of households in the City earn less than \$16,034 per year. This is 18.2 percent and 24.4 percent below Ohio and the U.S., respectively.
- The income levels in the City are more concentrated toward the lower end of the income spectrum than Ohio and the U.S., and are substantially lower than the incomes at the upper end.
- The incomes for the elderly households in Lancaster are more concentrated in the lower end of the income spectrum as compared to all households.
- The Home Energy Assistance Program (HEAP) is a social service provided by the Lancaster – Fairfield Community Action Agency. HEAP offers heating bill assistance during the winter heating season. This program is available to households that are at or below 175 percent of the federal poverty threshold. The number of households participating in HEAP during the last two winter seasons has been almost 10 percent each year. This provides an indication of the extent of economic hardship within the service area.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



- The lowest income category, representing 25 percent of households, already has an average wastewater bill amounting to more than 5.3 percent of their MHI. The total utility bill is approximately 19 percent of their MHI.
- A notice is sent to the customer if they are more than ten days late in paying their utility bill. In 2013, the average number of notices generated per month was 2, 271, which is approximately 13 percent of all customers and a strong indicator that some customers are struggling to pay their current utility bills. The average number of monthly shut-offs was 19.

ES.14 Implementation Schedule

The goal of the Implementation Schedule is to provide a phased construction and financing schedule based on the relative importance of the specific projects in the plan that is consistent with the financial capability of the rate payers in the City of Lancaster service area and that are consistent and coordinated with other City utility projects.

To evaluate affordability for stormwater and wastewater related services, this Phase II LTCP Alternative Analysis and Recommended Improvement Plan provides two scenarios for meeting compliance. The first scenario includes completing the Recommended Solution by 2025. This plan was evaluated in the Financial Capability Assessment and Affordability Study to determine if the residents of the City can afford the costs of the 2025 CSO Compliance CIP.

The second scenario includes completing the Recommended Solution by 2035. The US EPA Guidance for Financial Capability recommends a 20 year implementation which would provide a more affordable option for the City's residents than the 2025 capital improvement plan.

ES.15 Conclusions

The following are the conclusions of the Financial Capability Assessment and Affordability Study:

- Currently, the City's water, wastewater, and stormwater rates are already among the highest when compared similar sized cities and economic competitors.
- Despite modest population growth and moderate unemployment rates, the poverty rates for the City have significantly increased since 1990, which may be due to the fact that the City has a low percentage of population with a bachelor's degree as compared to other municipalities in Ohio and across the U.S.
- The City's median household income is low in comparison to other municipalities in Ohio and across the U.S. The distribution of income across the service area demonstrates that the population of a large portion of the City has incomes that are significantly below the MHI.



PHASE II LONG TERM

Executive Summary

- Over half of the households are defined as low and moderate income, indicating that many households would experience added hardship by increasing utility rates to fund proposed CIP and LTCP costs associated with permit compliance by 2025.
- The City has a significant population of elderly households, and many of these households have incomes that are significantly below the MHI.
- The City has implemented assistance programs to provide relief to customers with affordability problems, but the number of “Notices of Termination” from delinquent accounts demonstrates that affordability is already a major concern.
- The City’s financial capability matrix score is estimated as high burden based on a “High” financial impact Residential Indicator of 2.9 percent and a “Mid-Range” Financial Capability Indicator score of 2.5. This indicates that a typical LTCP proposed to control CSOs would be a significant burden on the City and its customers.
- The combined residential indicator for wastewater, water, and stormwater is 4.7 percent. Many households would pay more than 4.5 percent of their income on combined utilities.
- It is anticipated that the City would need to more than triple the wastewater rates between 2014 and 2034 in order to pay for the LTCP and other identified capital needs of the system. The projected rate increases are much higher than the anticipated rate of cost inflation, and would quickly increase the wastewater bill for the median residential customer above 2 percent of the MHI. By 2034, the wastewater bill as a percentage of MHI could exceed 3 percent. These increases would likely result in rate shock and economic hardship for City wastewater customers.
- Small businesses and industries would also experience significant increases to their wastewater bills over the forecast period, similar to residential bills, impacting the City’s ability to provide cost competitive wastewater service to its customers, and likely placing added pressure on commercial and industrial customer’s ability to be cost competitive, and possibly impacting their economic viability and ability to continue doing business in Lancaster.
- The City’s economy is sensitive to losing large industries, and thus, the City is making every effort possible to attract new industries. Increasing utility rates to fund proposed CIP and LTCP costs associated with permit compliance by 2025 would make it hard for the City to remain competitive as a destination for new and existing industries, further exacerbating the local economic issues.
- With the current LTCP costs and projected implementation schedule, the City would have limited capacity to fund other programs or additional Federal or State mandates in the future.
- It is anticipated that water rates will need to increase moderately over the forecast period (2014 through 2031) in order to keep water infrastructure in good working condition and to pay for water system operating costs.
- Although stormwater revenue requirements will continue to increase, the City is planning to keep stormwater rates flat through 2025 due to the fact that City stormwater rates are already among the highest when compared to similar sized cities and economic competitors.

PHASE II LONG TERM CONTROL PLAN

Executive Summary



- Given these considerations, the City should receive the maximum amount of cost and schedule relief for implementing its LTCP.