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City of Akron

Akron Consent Decree 2010
Final CSO Long Term Control Plan Update Report
Volume I

February 28, 2011

Cuyahoga River Renewed
Combined Sewer Overflow Program
Akron, Ohio

AKRON
PUBLIC UTILITIES BUREAU
Your Clean Water Resource.

Department of Public Service
Akron Public Utilities Bureau
Water Pollution Control

Department of Public Service
Akron Engineering Bureau
Environmental Division

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City of Akron

Akron Consent Decree 2010
Final CSO Long Term Control
Plan Update Report

February 28, 2011

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EXECUTIVE SUMMARY

Introduction

The City of Akron is submitting the following Final Long Term Control Plan Update Report as required by Attachment A, Section II.B of the Consent Decree lodged in the United States District Court for the Northeastern District of Ohio, Eastern Division on November 13, 2009. The Consent Decree requires that the City implement CSO controls that will be constructed and achieve full operation no later than October 15, 2028.

This Long Term Control Plan Report is the culmination of decades of proactive efforts put forth by the City in order to reduce combined sewer overflows to local receiving streams. Since 1993 the City of Akron has completed numerous projects totaling in excess of $70 million dollars to help improve water quality within the Cuyahoga River, Little Cuyahoga River, Ohio Canal, and Camp Brook. This Long Term Control Plan Report demonstrates the City's continuing commitment to being a leader in environmental stewardship.

Plan Organization

The Final Long Term Control Plan (LTCP) Update Report is organized in accordance with the United States Environmental Protection Agency's *Combined Sewer Overflows Guidance for Long Term Control Plan*. The City's LTCP contains the following sections:

Section 1: Background
Section 2: Characterization, Monitoring, and Modeling
Section 3: Public Participation
Section 4: Consideration of Sensitive Areas
Section 5: Maximization of Treatment at Water Pollution Control Station
Section 6: Evaluation of Alternatives
Section 7: Cost Performance Considerations
Section 8: Recommended Plan
Section 9: Implementation Schedule
Section 10: Operational Plan
Section 11: Post Construction Monitoring Program
Section 12: Bibliography
Appendices

Section 9 (Implementation Schedule) contains the Long Term Control Plan Update required by the Consent Decree in Attachment A, Section II.A. Section 11 of this LTCP contains information on post construction monitoring required by Attachment B of the Consent Decree.

Recommended Plan

The City's selected CSO Long Term Control Plan will be the largest wastewater system capital program ever undertaken by the City in its long history. Once completed, the plan will deliver substantial environmental benefits to local waterways. However, this plan will also place an extremely high economic burden on local ratepayers.

Several related, yet sometimes very diverse factors influence the selection of a recommended Long Term Control Plan. When considered individually, these factors might suggest selection of different LTCPs. The City of Akron's approach to selecting its final recommended plan recognizes that these factors must be considered collectively in order to select the best overall plan. By doing so, the selected LTCP, per the intent of the CSO policy, will provide the best balance of measures that help improve the environmental conditions in local receiving streams, reduce existing combined sewer overflows, address regulatory requirements, and ensure that the economic impact to ratepayers is reasonable and affordable, while completing the plan within the remaining 17 years of the timeline set forth in the Consent Decree.

The City's recommended plan consists of the major elements shown in Table ES-1.

Table ES-1 Recommended Plan Major Elements

PROJECT TYPE	LEVEL OF CONTROL	ESTIMATED PROJECT COST (in 2010 dollars)
LTCP PROJECTS		
Storage Basins	3 overflows/year	$55,100,000
Ohio Canal Interceptor Tunnel	3 overflows/year	$183,900,000
North Side Interceptor Tunnel	3 overflows/year	$153,800,000
Sewer Separation Projects		$27,400,000
Total LTCP Projects		**$420,200,000**
CONSENT DECREE PROJECTS		
WPCS Improvements	Step Feed Process	$65,000,000
Mud Run Pump Station		$20,000,000
CMOM	$2M/year	$34,000,000

Table ES-1 Recommended Plan Major Elements (Continued)

PROJECT TYPE	LEVEL OF CONTROL	ESTIMATED PROJECT COST (in 2010 dollars)
CONSENT DECREE PROJECTS (Continued)		
Post Construction Monitoring		$2,000,000
Total Consent Decree Projects		**$121,000,000**
NON-CONSENT DECREE PROJECTS		
Existing System Reinvestment	$2M/year	$34,000,000
Disinfection Improvements		$7,000,000
Total Non-CD Projects		**$41,000,000**
TOTAL CLEAN WATER PROGRAM		**$582,200,000**

In many other CSO communities around the country, sewer rates representing 2% of median household income (MHI) for residential customers are considered to place a high burden on ratepayers. The recommended plan that Akron is proposing will push our ratepayers to the 2% threshold in very short order (by 2014), as shown in Figure ES-1. At the conclusion of the 17 year implementation period, Akron Retail Service Area customer's monthly sewer bills will represent close to 2.4% of their median household income. This equates to a typical Akron residential customer paying approximately $120 per month for sewer service in 2028 after the CSO projects are constructed.

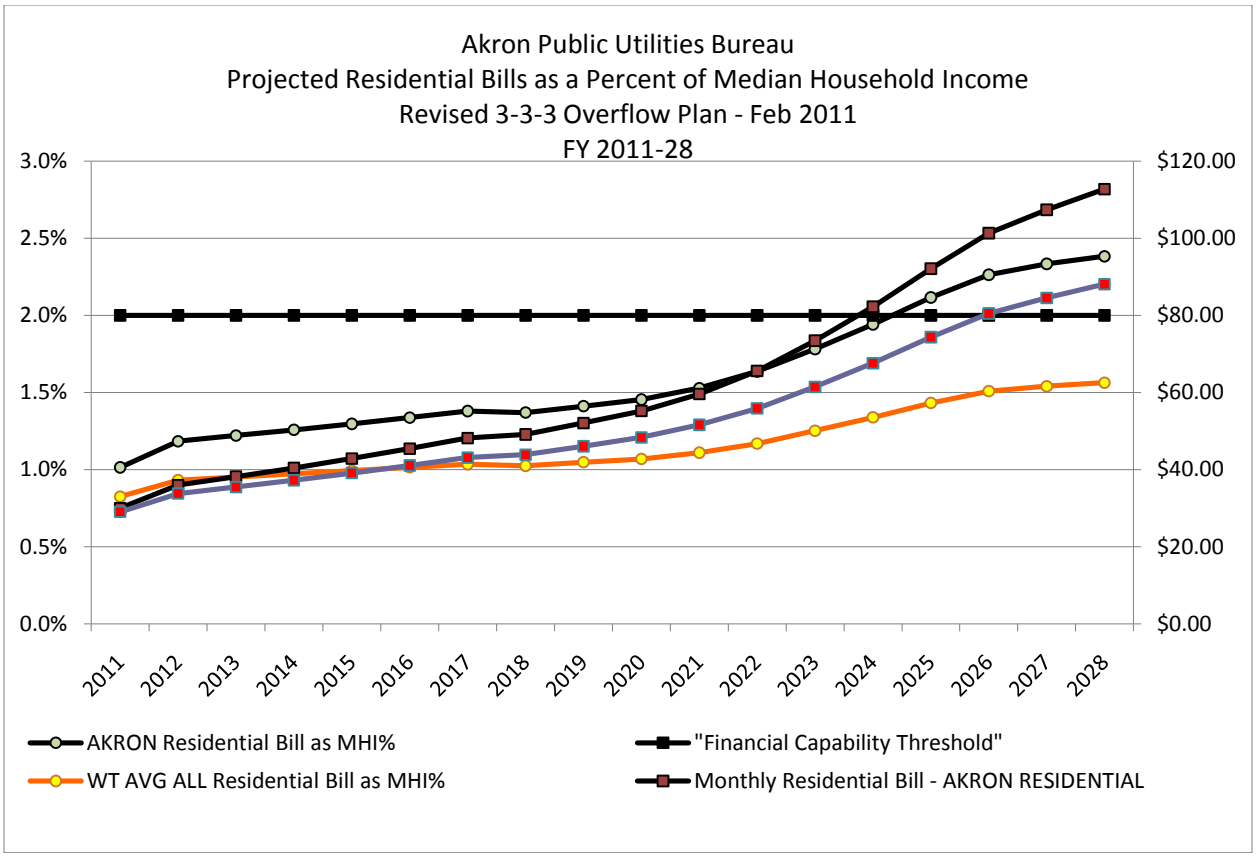

Figure ES-1 Projected Residential Sewer Bills as a Percent of Median Household Income Benefits of Recommended Long Term Control Plan

Implementing the City's recommended LTCP will produce several benefits within local receiving streams. Figure ES-2 shows that the City's plan, along with the previously completed Rack 40/Cuyahoga Street Storage Facility, will reduce overflow volume by approximately 77% in a typical year as compared to current conditions. Figure ES-3 illustrates that approximately 13 additional hours of compliance with Ohio's E. coli water quality standard will result from the recommended plan. Figure ES-4 shows that when comparing CSO only contributions to water quality, the City's recommended plan will have a significant benefit to local receiving water quality.

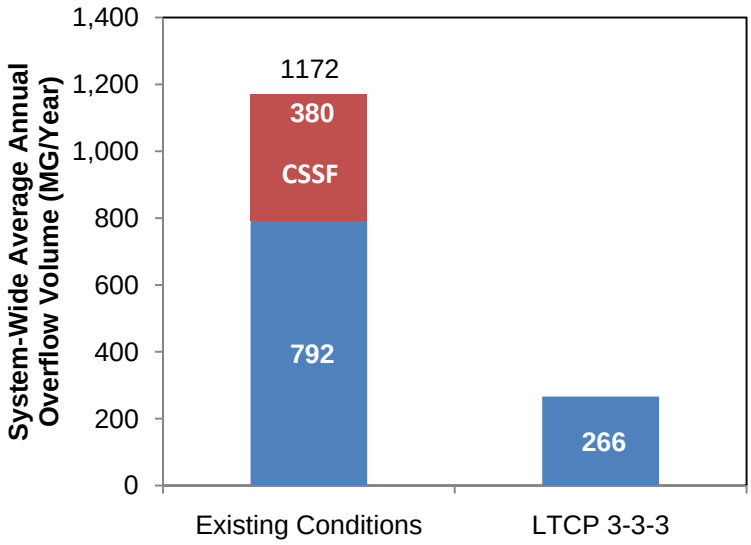

Figure ES-2 Typical Year Estimated Overflow Volume for 3-3-3 Plan

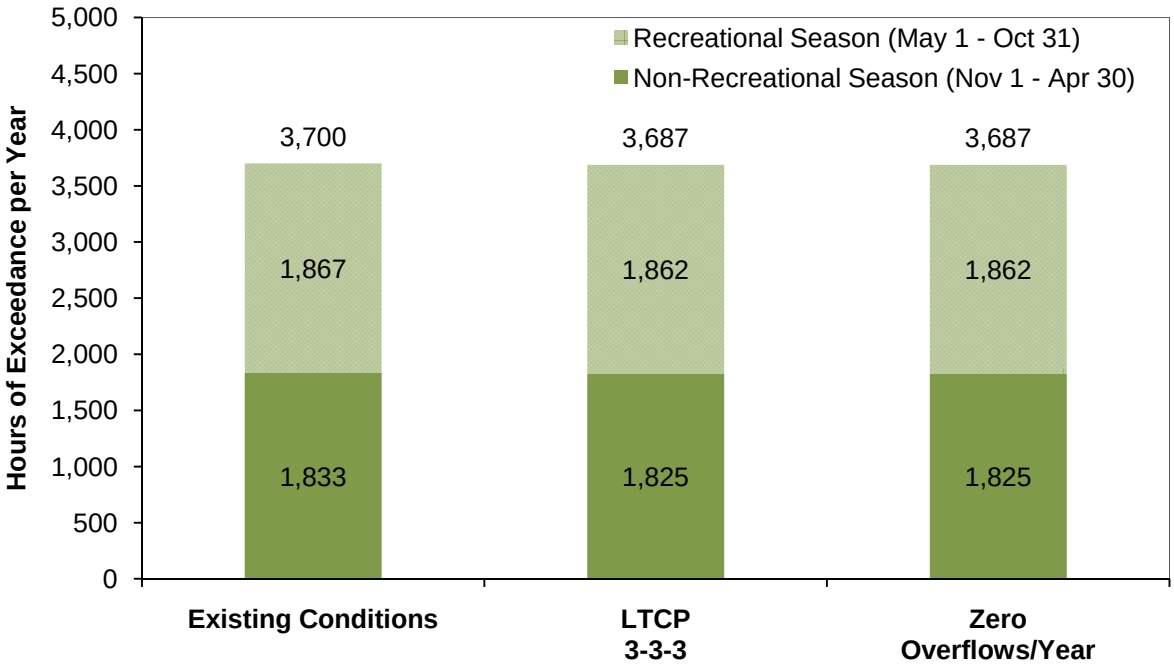

Figure ES-3 Estimated E. coli Hours of Exceedance per Year

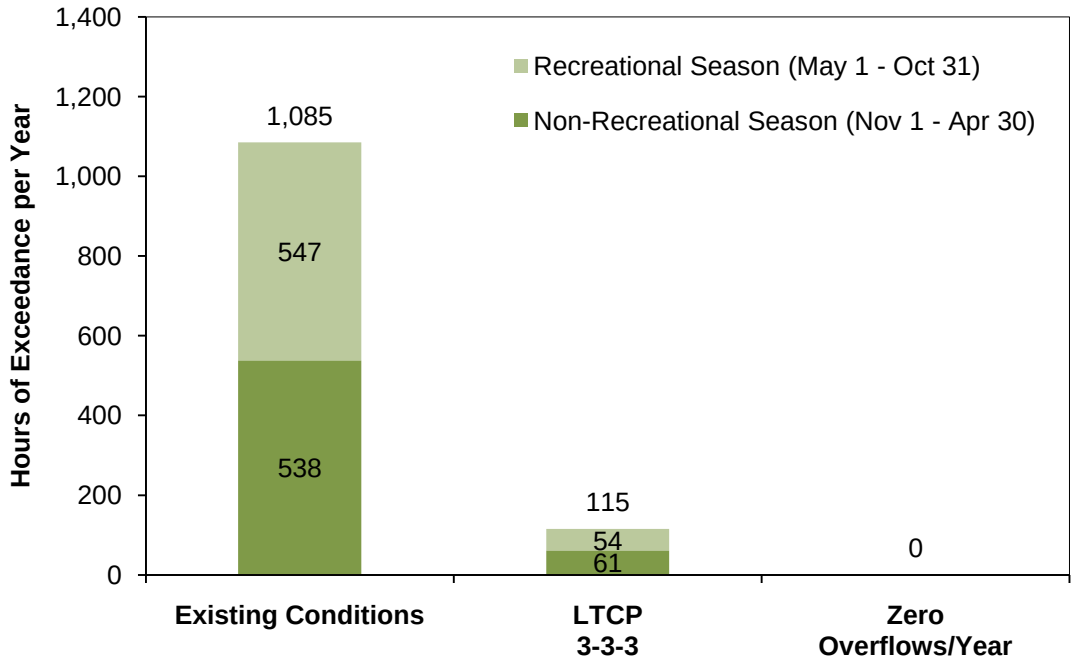

Figure ES-4 Estimated E. coli Hours of Exceedance per Year – CSOs Only

Alternative Proposed Recommended Plan

The City's recommended plan reduces overflow occurrences within the combined sewer system to approximately 3 times in a typical year. As demonstrated above, the City cannot go to a higher level of control (less overflow occurrences) within the 19 year time frame prescribed by the Consent Decree while still keeping rates affordable. However, as an alternative proposal, the City is willing to implement projects that achieve a higher level of CSO control so long as the City has an adequate amount of time to implement these projects. As part of the financing plan for these projects the City will commit to a rate structure that keeps rates at or near 2.1% MHI for as long as it takes to implement the controls. USEPA and Ohio EPA can select the level of control and the order of the projects so long as there is a demonstrated cost benefit and water quality benefit. See Section 8 for a more detailed explanation of the alternative plan.

Table 1: LTCP Update Report (Consent Decree Requirements, Attachment A, Section I)

Consent Decree Location	Consent Decree Requirements	LTCP Update Section
I.A & I.B	Results of updated NFA (submitted by November 30, 2009).	5
I.D.1(a)	Results of assessing cost and effectiveness of Ohio Canal Tunnel both with and without treatment for eliminating or reducing and/or treating CSOs (Racks 4, 16-20, 23, 24, and 37).	7
I.D.1(b)	Results of assessing cost and effectiveness of Northside Tunnel both with and without treatment for eliminating or reducing and/or treating CSOs (Racks 32-35, and 40).	7
I.D.2	Results of assessing cost and effectiveness of constructing storage basins for eliminating or reducing CSOs from Racks 3, 5/7, 10/11, 12, 14, 15, 22, 26/28, 27/29, and 36.	7
I.D.4(a)	Results of evaluating a range of sizes of each alternative that will reduce the number of untreated CSOs down to a range of numbers of overflows per year per CSO outfall.	7
I.D.4(b)	Results of the evaluation of the project costs for each control measure that is evaluated as capital, O&M, and total present worth.	7
I.E	Results of alternative sizes, associated costs, and benefits for each CSO outfall/rack that results in a minimum of 0-4 overflows (submitted by May 15, 2010).	7
I.F.1	Results of cost benefit interim submission, preliminary report on modeling to predict sizes and number of overflows for OCI Tunnel Facilities, NSI Tunnel Facilities, and Remote Storage Facilities (submitted by January 15, 2010).	7
I.F.2	Results of cost benefit interim submissions, preliminary report on cost-benefit comparison to predict sizes and number of overflows for Requested Facilities (submitted by March 15, 2010).	7
I.G	Results of Financial Capability Information (submitted by May 15, 2010).	8

Table 2: LTCP Update Report (Consent Decree Requirements, Attachment A, Section II)

Consent Decree Location	Consent Decree Requirements	LTCP Update Section
II.B.1	Provide results of all analyses, evaluations, and assessments performed under Section I of the Work Plan.	See Table 1
II.B.1(a)	Evaluation of Alternatives (costs, benefits, effectiveness) for eliminating or reducing and/or treating CSOs and secondary treatment bypasses, including a discussion of why Akron selected the design and performance criteria presented in the Proposed LTCP Update.	6, 9
II.B.1(b)	Explanation of why CSO control measures comply with CSO Control Policy, CWA requirements, R.C. Chapter 6111, and the Current NPDES Permit.	8
II.B.1(c)	If not achieving zero-bypass of secondary treatment, an explanation of why it is not feasible either technically or financially.	5
II.B.1(d)	Description of why the implementation schedule realizes Full Operation of all Control Measures as expeditiously as possible.	8
II.B.1(e)(i)	Analysis of the impact each control measure will have on peak instantaneous and sustained flows to the WPCS during the 1994 adjusted typical rainfall year.	6
II.B.1(e)(ii)	Analysis of the impact that an increase in the capacity of the WPCS may have on the overflow events and alternatives in the system.	6
II.B.1(f)	Proposed Financial Capability Assessment.	8

FINAL CSO LONG TERM CONTROL PLAN UPDATE REPORT

February 28, 2011

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APPENDICES

ABBREVIATIONS AND ACRONYMS

ACF	Akron Composting Facility
ACMS	Akron Construction and Material Specifications
ACP	Asbestos Cement Pipe
AIRS	Aerometric Information Retrieval Study
AMATS	Akron Metropolitan Area Transportation Study
APUB	Akron Public Utilities Bureau
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BOD_5	5-day Biochemical Oxygen Demand
CAG	Community Action Group
CBOD	Carbonaceous Biochemical Oxygen Demand
$CBOD_5$	5-day Carbonaceous Biochemical Oxygen Demand
CCT	Chlorine Contact Tank
CCTV	Closed Circuit Television
CFR	Code of Federal Regulations
CIP	Cast-In-Place
CIP	Capital Improvement Project
City	City of Akron, Ohio
CMMS	Computerized Maintenance Management System
CMOM	Capacity, Management, Operations, and Maintenance
CMP	Corrugated Metal Pipe
County	Summit County, Ohio
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
cts	Counts
CWA	Clean Water Act
cy	Cubic Yards
DAF	Dissolved Air Flotation
DCS	Distributed Control System
DFFOs	Director's Final Findings and Orders
DIP	Ductile Iron Pipe
DO	Dissolved Oxygen
DPU	Distributed Processing Unit

DT	Detention Time
EAES&T	EA Engineering, Science, and Technology
EHRC	Enhanced High Rate Clarification
EPA	Environmental Protection Agency
FCD	Federal Consent Decree
FOG	Fats, Oils, and Grease
fps	Feet per Second
FSE	Food Service Establishments
FST	Final Settling Tanks
FWPCA	Federal Water Pollution Control Act Amendments
GBT	Gravity Belt Thickeners
GIS	Geographic Information System
GLUMRB	Great Lakes Upper Mississippi River Basin
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
H_2O_2	Hydrogen Peroxide
HGL	Hydraulic Grade Line
ICR	Industrial Cost Recovery
lf	Linear Feet
I/I	Inflow/Infiltration
I/O	Input/Output
JEDD	Joint Economic Development District
KV	Kilovolt
LAN	Local Area Network
lbs/day	Pounds per Day
LCI	Little Cuyahoga Interceptor
LRW	Limited Resource Water
LSP	Lime Stabilization Plant
LTCP	Long Term Control Plan
MBR	Membrane Bioreactor
MCL	Maximum Contaminant Level
MCRT	Mean Cell Residence Time
MG	Million Gallons
MGD	Million Gallons per Day
mg/l	Milligram per Liter
MHI	Median Household Income
MLSS	Mixed Liquor Suspended Solids
mm	Millimeter
MSL	Mean Sea Level
MWH	Modified Warm Water Habitat
NAAQS	National Ambient Air Quality Standards
NEFCO	Northeast Ohio Four County Regional Planning & Development Organization
NFA	No Feasible Alternative
NH_3-H	Ammonia Nitrogen
NMC	Nine Minimum Controls
No.	Number (#)
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

NSI	Northside Interceptor
NWI	National Wetlands Inventory
N/A	Not Applicable
ºF	Degrees Fahrenheit
O&M	Operations and Maintenance
OAC	Ohio Administrative Code
OCI	Ohio Canal Interceptor
ODNR	Ohio Department of Natural Resources
OEDP	Overall Economic Development Plan
OEPA	Ohio Environmental Protection Agency
OPWC	Ohio Public Works Commission
ORC	Ohio Revised Code
ORP	Oxidation Reduction Potential
OWDA	Ohio Water Development Authority
PACP	Pipeline Assessment and Certification Program
PCHD	Portage County Health Department
PESBP	Primary Effluent Secondary Bypass
PI	Primary Influent
POTW	Publicly Owned Treatment Works
PST	Primary Settling Tanks
PVC	Polyvinyl Chloride
RAS	Return Activated Sludge
RCP	Reinforced Concrete Pipe
RES	Recycle Energy System
RSA	Retail Service Area
RSI	Raw Sewage Influent
RTU	Remote Terminal Unit
RWET	Recycle Water Equalization Tank
SCADA	Supervisory Control and Data Acquisition
SCDOES	Summit County Department of Environmental Services
SCHD	Summit County Health Department
SCMSD	Summit County Metropolitan Sewer District
SDB	Sludge Disposal Building
SI/SE	Secondary Treatment Influent/Secondary Treatment Effluent
SOP	Standard Operating Procedures
SOR	Surface Overflow Rate
SORNP	Sewer Overflow Response and Notification Plan
sq ft	Square Feet
SRT	Stormwater Retention Tank
SRTI	Storm Retention Tank Influent
SRW	State Resource Water
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
SWD	Side Water Depth
TAG	Technical Advisory Group
TMDL	Total Maximum Daily Loads
TSBP	Total Secondary Bypass
TSS	Total Suspended Solids
typ	Typical

UCS	User Charge System
UGRs	Underground Utility Records
USEPA	United States Environmental Protection Agency
USF&WS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VCP	Vitrified Clay Pipe
VSP	Vitrified (Standard) Clay Pipe
WAS	Waste Activated Sludge
WPCLF	Water Pollution Control Loan Fund
WPCS	Water Pollution Control Station
WWH	Warm Water Habitat
WWTP	Wastewater Treatment Plant

1. BACKGROUND

This section provides background information on the purpose, scope, and organization of the Final Long Term Control Plan (LTCP) Update Report, existing sewer collection system, City of Akron land use data and demographics, regulatory framework, and history of Combined Sewer Overflow (CSO) compliant projects.

1.1 Report Purpose, Scope, and Organization

The CSO Final LTCP Update Report has been developed by the City of Akron (City) to comply with the Consent Decree that was lodged with the U.S. District Court in November 2009, the current National Pollutant Discharge Elimination System (NPDES) permit, and the CSO Control Policy. This Final LTCP Update Report contains a comprehensive CSO control plan that recognizes the site-specific nature of CSOs and their impacts on receiving water bodies, along with CSO control measures that are cost effective, feasible, and consistent with the USEPA CSO Control Policy. The document addresses the nine elements of the LTCP, states a recommended plan, and is organized as follows:

- Background (Section 1)
- Characterization, Monitoring, and Modeling (Section 2)
- Public Participation (Section 3)
- Consideration of Sensitive Areas (Section 4)
- Maximization of Treatment at WPCS (Section 5)
- Evaluation of Alternatives (Section 6)
- Cost Performance Considerations (Section 7)
- Recommended Plan (Section 8)
- Implementation Schedule and Long Term Control Plan Update (Section 9)
- Operational Plan (Section 10)

- Post-Construction Monitoring Program (Section 11)
- Bibliography (Section 12)

This CSO Final LTCP Update Report shall serve as the basis for future CSO control projects, including projects at the Akron Water Pollution Control Station (WPCS).

1.2 Planning Area

The City of Akron's existing sewer system contains storm, sanitary, and combined sewers. These sewers are located within the planning area, consisting of approximately 183 square miles and servicing over 356,000 people as shown in Figure 1-1.

1.2.1 The Existing Sewer System

The City has been continuously updating their sewer system to meet the demands of their consumers as well as local, state, and federal requirements and standards. The following subsections describe the location, components, maintenance, general background of the WPCS, and history of the sewer system.

General Location

The majority of the existing sewer system is located within the Akron Metropolitan Area in Summit County. The Akron Metropolitan Area consists of the City of Akron, City of Cuyahoga Falls, City of Fairlawn, City of Munroe Falls, Village of Lakemore, Village of Mogadore, Village of Silver Lake, and parts of the City of Stow, City of Tallmadge, Bath Township, Copley Township, Coventry Township, and Springfield Township.

Sewer System Components

The sewer collection system consists of approximately 490 miles of storm sewer, 700 miles of sanitary sewer, and 170 miles of combined sewer pipes, totaling approximately 1,360 miles. The system contains approximately 28,600 manholes and 37 pump stations. Dry weather flow in the sanitary and combined sewer systems is conveyed to the WPCS, located in Akron at 2460 Peninsula Road. A map of the sanitary and combined sewer systems is shown in Figure 1-2. Storm sewers convey storm water to points of discharge to nearby streams. In the existing sanitary sewer system there are defined Combined Sewer Overflows (CSOs). CSO is the discharge from a combined sewer system at a point prior to the POTW. There is also an overflow from the Mud Run

WPCS

CUYAHOGA FALLS

STOW

BATH

SILVER LAKE

MUNROE FALLS

FAIRLAWN

TALLMADGE

COPLEY

AKRON

MOGADORE

NORTON

BARBERTON

SPRINGFIELD

COVENTRY

NEW FRANKLIN

GREEN

Northside Interceptor

Riverside Drive District

Carpenter Heights District

Merriman Road outlet

Portage-Sunnyside district

Cuyahoga Street/Peck Road District

Gorge Boulevard District

Tallmadge Avenue (Memorial Parkway)

Uhler Ave/Carpenter Street

Aqueduct Street Outlet

Old Cuyahoga

North Hill Trunk

Home Ave. District

Forest Hill Street

West Market Outlet

North Maple Street

West North Street

Madeira Street

North Howard Street

Mill Street

West Market Street

North Forge Street

Hazel Street Trunk

Willow Run Trunk

Exchange St./Opportunity Parkway

Old Ledge Creek

River Street

North Case and Dillin

Case Ave

Factory Street

Opportunity Park

Legend

- Ultimate Service Area Boundary
- City of Akron Boundary
- CSO Districts
- Parks
- Lakes
- Rivers

Cuyahoga River Renewed
Combined Sewer Overflow Program
Akron, Ohio

CSO LONG TERM CONTROL PLAN UPDATE

FIGURE 1-1

OVERALL VIEW CITY OF AKRON'S SEWER SYSTEM

WPCS

Mudbrook Meter Station

Fairlawn Meter Station

Yellow Creek Meter Station

Babb Run Meter Station

Main Street Meter Station

Howe Meter Station

Campbrook Meter Station

Eastwood Meter Station

Lakemore Meter Station

Springfield Meter Station

R36 R32 R33 R34 R35 R31 R40 R30 R29 R27 R28 R26 R25 R23 R24 R22 R20 R21 R15 R12 R13 R14 R18 R19 R04 R39 R37 R17 R16 R11 R10 R09 R08 R07 R05 R06 R03 2N & 2S

Legend

- Ultimate Service Area Boundary
- 27" & Larger Combined
- 27" & Larger Sanitary
- Sanitary Master Meters
- Sewer Pump Stations
- Racks
- Eliminated Racks
- Rivers

Cuyahoga River Renewed
Combined Sewer Overflow Program
Akron, Ohio

ALL-AMERICA CITY AKRON 1981 1995 2008

CSO LONG TERM CONTROL PLAN UPDATE

FIGURE 1-2

CITY OF AKRON SEWER SYSTEM