

# Managing & Assisting with State & Federal Enforcement Directives Related to Sanitary Sewer Overflows (SSOs)

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## ABSTRACT

The City of Lancaster, South Carolina and City of Eden, North Carolina have recently entered into Administrative Orders on Consent with US EPA Region 4. In order to obtain realistic and obtainable goals and requirements as well as time frames associated with the orders, substantial negotiation was conducted with US EPA Region 4. This paper primarily highlights and discusses the negotiation process with US EPA with each order and the innovative techniques used to negotiate scope and schedule as well as outline the requirements of each order and the activities being conducted to maintain / obtain compliance.

As a result of these Orders, each of the municipalities is being required to address numerous programmatic requirements.

<b>Table 1 – Typical Programmatic Requirements</b>
Sewer Overflow Response Plans (SORP)
Continuing Sewer Assessment Programs (CSAP)
Gravity Line Preventative Maintenance Programs (GLMP)
FOG Control Programs
Infrastructure Rehabilitation Plan (IRP) Work Plans
Management, Operation and Maintenance (MOM) Programs
System Evaluation and Rehabilitation Plans (SERP)
Pump Station Operations Programs (PSOP)
Pump Station Preventative Maintenance Program (PSPMP)
Sanitary Sewer Evaluation Survey (SSES) Work Plans
Wastewater Collection and Transmission System (WCTS) Remediation Plans

In addition, other elements and work items also being required.

<b>Table 2 – Other Required Elements &amp; Work Items</b>
Hydraulic Modeling
Information Management System (IMS)
Mobile GIS Applications
Mapping
Dyed Water Flooding
Corrosion Defect Identification
Routine Manhole Inspections
Rainfall & Flow Monitoring
CCTV Work
Gravity System Defect Analysis
Smoke Testing
Pump Station Performance and Adequacy Analysis
Customer Service Plan
Financial Planning and Assistance
Comprehensive Management Plan

This paper presents the challenges, opportunities and constraints with each project element as well as overall compliance with the Orders.

## INTRODUCTION

EPA Region 4 as well as State regulators like NCDENR and SCDHEC are currently and systematically entering into Orders for SSO / MOM programs and compliance with sewer systems throughout the Southeast. Under the current Administration, EPA intends to place the majority of systems in the Southeast under Order SSO / MOM programs serving a population of greater than 100,000 by 2016. After 2016, they intend to enter orders with all sewer systems serving between 50,000 to 100,000 people and so on. In the short term, it is estimated that if a utility (private or public) has greater than 5 – 8 SSO's a year per 100 miles of collection system, EPA is pursuing or will be pursuing these sanitary sewer collection systems shortly regardless of population served.

The results of these Orders typically require programmatic development as well as Sewer System Evaluation Surveys (SSES) and assessments which result in substantial sanitary sewer rehabilitation.

When owners elect to involve consultants in negotiating Orders with EPA and State agencies, successful strategies can be implemented to assist utilities in significantly decreasing the scope of their Orders as well as successfully negotiating realistic compliance schedules.

## ORDER COMPONENTS / ELEMENTS

MOM programmatic elements can be numerous.

<b>Table 3 – Typical MOM Programmatic Elements</b>	
Sewer Overflow Response Plans (SORP)	Sewer Mapping Program
Capacity Assurance Program	Corrective Action Plan
FOG Control Programs	Capital Improvement Program (CIP)
Gravity Line Preventative Maintenance Programs (GLMP) / Transmission system Operation & Maintenance Programs (TSOMP) / Gravity System Operation & Maintenance Programs (GSOMP)	Continuing Sewer Assessment Programs (CSAP) / Continuing Sewer System Assessment Programs (CSSAP)
Infrastructure Rehabilitation Plans (IRP)	WWTP Operations Plan
Information Management Systems (IMS)	WWTP Process Control Plan
Remediation Plans	WWTP Compliance Monitoring Plan
Sewer System Evaluation Surveys (SSES)	WWTP Training Program
Continuing Infrastructure Rehabilitation Program (CIRP)	Financial Analysis Program / Capability Assessments
Computerized Maintenance Management System (CMMS)	Satellite Sewer System Agreement / Inter-Jurisdictional Agreement Program
Contingency & Emergency Response Plan (CERP)	Sewer System Hydraulic Model

Compliance schedules have varied in length from 18 months to 5.5 years. Programmatic development and implementation typically requires all programs to be developed and implemented within six months to three years. Physical sanitary sewer collection system rehabilitation follows programmatic development and typically is required to occur within two to five years or longer depending on the size of the sanitary sewer collection system and the extent of problems or need for rehabilitation. Operation under the Order typically follows physical sanitary sewer system rehabilitation for two to five years or longer.

Most entities have been required to begin conducting Continuing Sewer Assessment Programs (another acronym for Sewer System Evaluation Surveys [SSES]) for all or part of their sewer basins.

<b>Table 4 – Typical SSES Requirements</b>
Hydraulic Modeling
Dyed Water Flooding
Corrosion Defect Identification
Routine Manhole Inspections
Flow Monitoring
CCTV
Gravity System Defect Analysis
Smoke Testing
Pump Station Performance and Adequacy Analysis

And, most if not all Orders are accompanied by a monetary fine or penalty. In the case of the City of Lancaster, South Carolina, the monetary fine was \$70,800. The cost of compliance has been estimated at \$7.5-15 Million. Field assessment tied to their Order only requires work in three of Lancaster’s 23 sewer basins. In the case of the City of Eden North Carolina, the cost of compliance has been estimated at \$10-\$15 Million.

Another recent Order includes the City of Columbia, South Carolina with a monetary fine or penalty of \$476,400 plus \$1 Million Supplemental Environmental Project (which resulted in a decreased penalty). The compliance cost associated with their order has been estimated at \$750 Million. In addition, field assessment work tied to their Order requires all sewer basins to be assessed within 5.5 years. Other recent Orders and their associated monetary penalties have included the City of Wilmington (\$300,000), the City of Dothan, Alabama (\$264,000), Tega Cay, South Carolina (\$10,000/day), the City of Chattanooga, Tennessee (\$464,400 with an \$800,000 Supplemental Environmental Project, Knoxville Utility Board, Knoxville, Tennessee; Montgomery Water Works and Sanitary Sewer Board of the City of Montgomery, Alabama; Hendersonville Utility District, Tennessee; Loudon Utilities in Loudon, Tennessee; City of Oak Ridge, Tennessee; DeKalb County, Georgia; Atlanta, Georgia; Lexington, Kentucky; Cincinnati, Ohio; Philadelphia, Pennsylvania.; Nashville, Tennessee; and, Memphis, Tennessee.

## **CITY OF LANCASTER CASE STUDY**

The City of Lancaster provides wastewater service to approximately 5,778 residential and 854 commercial customers. The City’s wastewater treatment and collection system includes approximately 135 miles of gravity sewer and force main, 2,700 manholes, 16 pump stations, and one wastewater treatment plant.

Wastewater treatment is provided by the City of Lancaster’s Catawba River Wastewater Treatment Plant that has a permitted capacity of 7.5 MGD, and a peak hydraulic capacity of 16 MGD. The facility incorporates screening, oxidation ditch for biological nutrient removal, clarification, chlorination, dechlorination, and post aeration. The wastewater treatment plant discharges into the Catawba River. Biosolids that are generated from the wastewater treatment plant are dewatered on a rotary fan press and produce Class B biosolids.

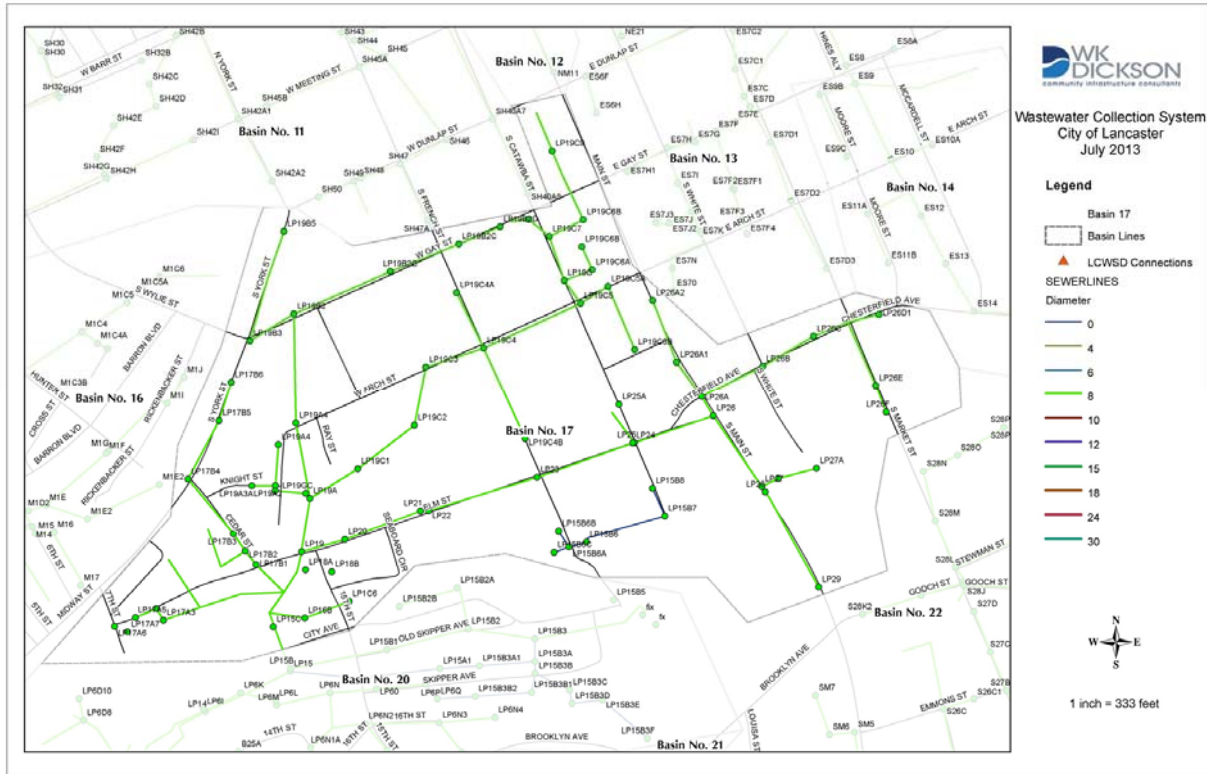
The City of Lancaster operates under a Council-Manager form of government with seven elected Council Members, one of them being the Mayor. The Council has appointed a City Manager to administer to the various City departments including the Public Works Department. Oversight to the Public Works Department is also provided in the form of the Public Works and Public Utilities standing committee which is composed of three Council Members. The Director of Public Works oversees the water distribution system and wastewater collection system.

The City maintains a GIS database of sanitary sewer lines that the City owns and operates. The sewer collection system has been divided into 23 sewer sub-basins.



Following receipt of an Administrative Order in September of 2013 the City's team successfully negotiated the scope and schedule with the EPA. The strategy utilized for negotiating scope included assessing the location, frequency, and root cause of sanitary sewer overflows (SSOs) within the City's sewer collection system for the given time period. As a result of this assessment, the City's team was able to determine that the primary cause of overflows within the City's system appeared to be related to fats, oils, and grease. And, only three of the City's 23 sewer sub-basins appeared to have multiple events related to overflows associated with excessive inflow and infiltration (I&I). As a result, the City's team was able to successfully negotiate with EPA for the Order to only list compliance schedules with these three sewer sub-basins.

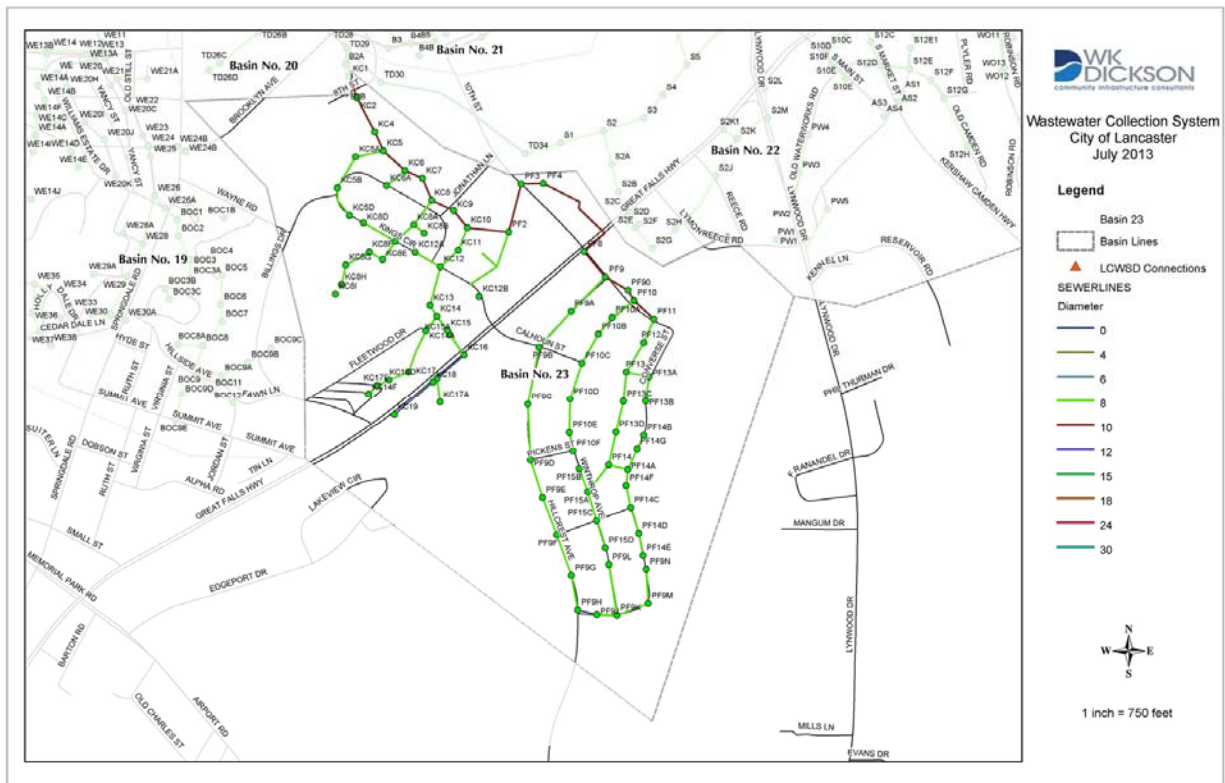
Sewer sub-basin 17, West Arch Street, consists of approximately 20,000 LF of gravity sewer and 85 manholes.



Sewer sub-basin 18, Erwin Farms, consists of approximately 60,000 LF of gravity sewer, 165 manholes, and two pump stations.



Sewer sub-basin 23, Poovey Farms, consists of approximately 30,000 LF of gravity sewer and 95 manholes.



In regards to negotiating schedule, the City's team worked with EPA to formulate a schedule that allowed the City to systematically address their Order in realistic time frames that the City and their consultant could approach in a step wise fashion. The compliance schedule for the City of Lancaster's order is a minimum of seven years. The City's Order required them to update numerous programmatic elements including their Sewer Overflow Response Plan (SORP), a Continuing Sewer Assessment Program (CSAP), a FOG Control Program, a Gravity Line Maintenance Program (GLMP), and an Infrastructure Rehabilitation Program (IRP) Work Plan as well as conduct detailed assessments of three of their 23 sewer sub-basins.

## CITY OF EDEN CASE STUDY

The City of Eden provides wastewater service to approximately 6,325 customers. The City's wastewater treatment and collection system includes approximately 161 miles of gravity sewer and 20 miles of force mains, 19 pump stations, and one wastewater treatment plant.

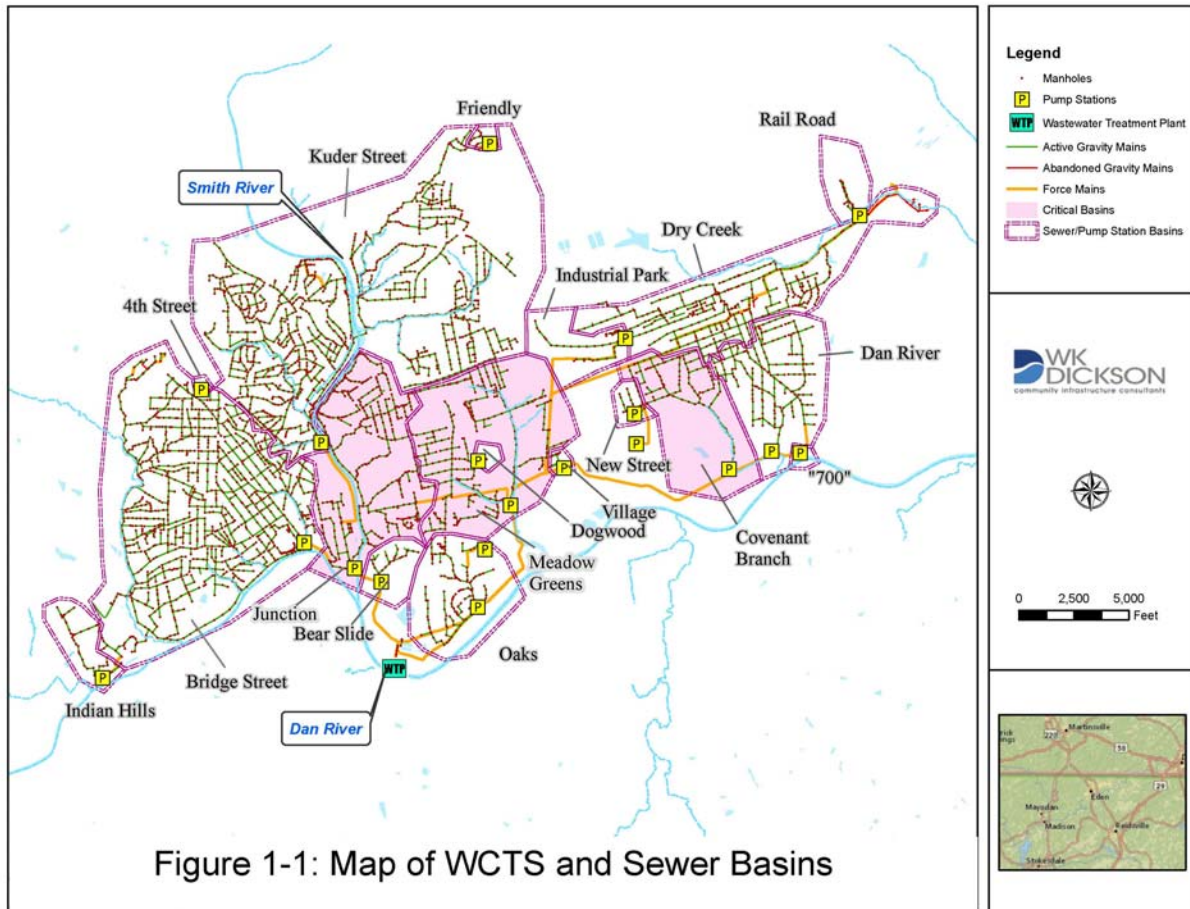
Wastewater treatment is provided by the City of Eden's Mebane Bridge Wastewater Treatment Plant that has a permitted capacity of 13.5 MGD. The facility incorporates screening and grit removal, activated sludge extended aeration, clarification, chlorination, dechlorination, aerobic digestion, and sludge storage. The wastewater treatment plant discharges into the Dan River. Biosolids that are generated from the wastewater treatment plant are dewatered on a belt press and produce Class B biosolids.

The City of Eden operates under a Council-Manager form of government with eight elected Council Members, one of them being the Mayor. The Council has appointed a City Administrator to administer to



the various City departments including the Environmental Services Department. The Director of Public Works oversees the water distribution system and wastewater collection system.

The City maintains a GIS database of sanitary sewer lines that the City owns and operates. The sewer collection system has been divided into 17 sewer sub-basins.



The City of Eden received an Administrative Order from EPA in January of 2012. During the negotiation of the Order, EPA accepted the City's request to define their critical basins as Bridge Street, Meadow Greens and Covenant Branch provided the selection of these basins and the exclusion of the others were substantiated as part of a Capacity Assessment Plan (CAP).

Through the development of a System Evaluation and Rehabilitation Plan (SERP), which included the Capacity Assessment Plan (CAP) as well as a hydraulic model, the City's team successfully negotiated the scope of the Order to exclude the other basins based on mitigating factors. These factors included infrequent occurrence of SSOs, as system wide SSOs were normally caused by extremely large rainfall events that were categorized as isolated, as well as completed and scheduled improvements. Several ongoing and completed Capital Improvement Projects were already under way to address the few chronic or repetitive SSOs in the other basins. As a result, statistical analysis of the SSOs and the corresponding rainfalls through a Rainfall Intensity-Duration-Frequency Analysis, along with other mitigating factors, were provided to EPA in the City's effort to negotiate the scope of their Order.

The City's team worked with EPA to formulate a schedule that allowed the City to systematically address their Order in realistic time frames that the City and their consultant could approach in a step-by-step fashion. The compliance schedule for the City of Eden's order is a minimum of four years. The City's

Order required them to update numerous programmatic elements including their Management, Operation and Maintenance (MOM) Programs, a System Evaluation and Rehabilitation Plan (SERP), a Pump Station Operations Program (PSOP), a Pump Station Preventative Maintenance Program (PSPMP), and a Sewer Overflow Response Plan (SORP). The SERP included a Capacity Assessment Plan, a Capacity Assessment Report, a Sanitary Sewer Evaluation Survey (SSES) Work Plan, and a Wastewater Collection and Transmission System (WCTS) Remediation Plan.

## **CONCLUSIONS**

The City of Lancaster, South Carolina and City of Eden, North Carolina have successfully negotiated Administrative Orders on Consent with US EPA Region 4. They obtained realistic and obtainable goals and requirements as well as time frames associated with the orders by conducting substantial negotiations. Using innovative techniques, scope and schedule as well as the requirements of each order and the activities being conducted to maintain / obtain compliance were successfully negotiated.

## **KEY WORDS**

Administrative Order on Consent, Consent Decrees, EPA, SCDHEC, NCDENR, Enforcement, Compliance, Sanitary Sewer Overflows (SSOs), MOM Programs, SORP, GLMP, CSAP, SSES, PSOP