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NORTH LITTLE ROCK WASTEWATER

Update to:

Technical Memorandum No. 9

Capital Improvement Plan

North Little Rock Wastewater Master Plan

August 2011

Prepared by:

North Little Rock Wastewater

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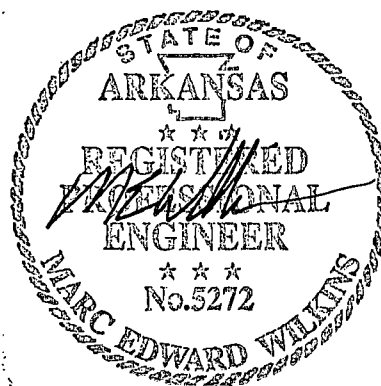


TABLE of CONTENTS

Section 1	Overview	Pages 1-1 – 1-3
1.1	Introduction/Overview	
1.2	Water Reclamation Facility (WRF) Improvements	
1.2.1	Five Mile Creek WRF	
1.2.2	Faulkner Lake WRF	
1.2.3	White Oak Bayou WRF	
1.3	Collection System Approach	
1.4	Annual SSES and Rehabilitation Program	
Section 2	Capital Improvement Projects	Pages 2-1 – 2-16
2.1	Project Phasing	
2.2	No Change	
2.3	Capital Improvement Projects	
2.4	Project Descriptions	
	Table 2-1 NLRW	Page 2-16
	Table 2-2 NLRW	Pages 2-17 – 2-18
Section 3	Recommendations Summary	Pages 3-1 – 3-2
Appendix		Pages A-1 – A-6
	Table 2-1 (from Master Plan 2011)	
	Table 2-2 (from Master Plan 2011)	

1.1 Introduction/Overview

On February 10, 2011, the North Little Rock Wastewater (NLRW) entered into a Consent Administrative Order LIS 10-218 (CAO), with The Arkansas Department of Environmental Quality (ADEQ) with the overall goal of eliminating non-capacity and capacity related SSOs. The CAO required the preparation of a wastewater master plan (Master Plan 2011) containing four (4) major components:

1. Capital Improvements Plan
2. Sewer System Evaluation Survey
3. Hydraulic Model and Pumping Station Design and Equipment Condition
4. Remedial Adequacy Evaluation Measures Plan

The Master Plan 2011 was completed August 2011, and the NLRW has been aggressively and systematically executing the recommendations. SSES fieldwork and reporting has followed the prioritization schedule outlined in the Master Plan 2011. The hydraulic model is being updated and amended for current projects, and the progress of the remedial measures plan has been outlined in the Annual Report. The Annual Report is due each February 1st for the years 2011 through 2021, or until closure of the CAO.

On February 6, 2018 NLRW made a request to ADEQ for termination of the CAO based on the reductions of SSOs, and ADEQ replied with a request for additional information including:

- An update to the 2011 Master Plan to reflect all completed projects
- A milestone schedule of projects identified in the 2011 Master Plan to be completed
- If any projects in the 2011 Master Plan have been deemed unnecessary, please specify those projects and why they are no longer needed.

This document is being submitted as an update to the Master Plan 2011, Technical Memorandum No. 9, Capital Improvement Plan. Technical Memorandum No. 9 (TM#9) contains projects scheduled to be implemented over a 20-year period and designed to address wet weather SSOs through the planning year 2030. The projects are grouped into four phases based upon improvements predicted to have the greatest effect at reducing model-predicted SSOs and utilizing NLRW staff input.

1.2 Water Reclamation Facility (WRF) Improvements

At the date the Master Plan 2011 was completed, NLRW operated three WRFs, however, in March 2016 the Maumelle Water Management facilities were acquired and have since been assimilated into NLRW's programs and operations.

1.2.1 Five Mile Creek WRF

Master Plan 2011 evaluated the Five Mile Creek WRF for future hydraulic expansion including the diversion of flow from the Sherwood South WRF. Recent developments indicate that Sherwood is now considering other alternatives and may not be interested in using the Five Mile Creek WRF. NLRW did proceed with improvements to the headworks including installation of barscreens, pumps, piping, valving and controls sized in accordance with Master Plan 2011 recommendations. However, NLRW intends to defer indefinitely additional major infrastructure improvements to leave the door open in the event Sherwood reconsiders the Five Mile Creek WRF as a long term treatment solution. NLRW has implemented projects expected to meet NPDES permit requirements for the foreseeable future.

1.2.2 Faulkner Lake WRF

NLRW has addressed all of the recommended issues and projects for the Faulkner Lake WRF in the Master Plan 2011. Individual capital improvements projects are detailed in Section 2 of this report.

1.2.3 White Oak Bayou WRF

The White Oak Bayou WRF was upgraded to a treatment capacity of 8.5 mgd in 2010 to allow for future growth. In March 2016, NLRW acquired the Maumelle Water Management Facilities including the Maumelle WRF, an aging mechanical plant in need of major upgrades. Design is currently underway for improvements to divert Maumelle wastewater to the White Oak Bayou WRF and then decommission the Maumelle WRF. This project, "Maumelle/White Oak Diversion Project", will include auxiliary power supplies at the diversion pump station in Maumelle and at the White Oak Bayou WRF.

1.3 Collection System Approach

Individual capital improvements projects are detailed in Section 2 of this report. NLRW is investigating sites for installation of permanent flow monitors and rain gauges to evaluate the effectiveness of the rehabilitation program and its effect on sizing and schedule of recommended future infrastructure improvements.

1.4 Annual SSES and Rehabilitation Program

Master Plan 2011 TM#9 recommends a rehabilitation program designed to maintain existing levels of rainfall dependent inflow and infiltration; however, NLRW has elected to implement a much more aggressive rehabilitation program.

<u>Activity</u>	<u>Master Plan 2011 Recommendation</u>	<u>NLRW Programs</u>
Cleaning	10%/year	40-50%/year
TV Inspection	10%/year	10-15%/year
Rehabilitate or Replace	2%/year	1-3%/year
SSES	-	8-12%/year

NLRWs proactive collection system maintenance programs have been very effective at eliminating non-capacity related SSOs.

The recommended prioritization schedule for SSES fieldwork has been followed and rehabilitation projects have been completed or are underway. NLRW is currently conducting flow monitoring and modeling updates in the Shillcutt basin and at the Maumelle WRF as part of the design effort for the "Maumelle/White Oak Bayou Diversion Project".

SECTION 2

Capital Improvement Projects

2.1 Project Phasing

Master Plan 2011 recommended projects scheduled to be implemented over twenty (20) years, broken into four phases of five years each. CAO LIS 10-218 has a ten (10) year reporting requirement ending February 1, 2021, but it does not give a specific time frame or milestone to define the completion of the CAO objective.

2.2 Capital Cost Estimates Development - No change

2.3 Capital Improvement Projects

To date, NLRW has addressed all of the major infrastructure projects recommended in phases 1 and 2 of the Master Plan 2011.

Projects 13, 14 and 15 are scheduled Phase 3 projects involving flow equalization and wet weather pump stations. NLRW is currently investigating sites for permanent flow monitors and rain gauges to gather data for sizing of these projects after the collection system rehabilitation projects are complete. Projects 12 and 18 were scheduled Phase 4 projects. Project 17 is a wet weather pumping station and will be reevaluated based on post collection system rehabilitation flow monitoring. Project 18 was moved up in priority and has been addressed ahead of schedule.

"Miscellaneous gravity Collection Improvements" and "SSES and Rehabilitation" are included as single line item projects. NLRW has been more aggressive in the SSES and rehabilitation program than recommended by Master Plan 2011 which will have the effect of reducing infiltration and inflow and has already had a positive impact in reducing wet weather SSOs.

The capital improvement projects are listed in Table 2-1 which is a listing of the major infrastructure improvements projects and their actual cost by year and phase.

2.4 Project Descriptions

The current status of each capital improvement project is summarized below.

Ref #s (Refer to Table 2-1 following Section 2)

Ref# 1 White Oak Basin - Shillcutt Pump Station Back-up Pump (WO-SLPS1)

This project was combined with the "Shillcutt Pump Station Improvements (WO-SLPS2)" project Ref. No. 2. A one (1) megawatt generator was installed.

Ref# 2 White Oak Basin - Shillcutt Pump Station Improvements (WO-SLPS2)

This project was completed in accordance with the original scope.

Ref# 3 White Oak Basin - WWTP Back-up Generator (WO-WWTP)

This project is included within the "Maumelle/White Oak Diversion Project", a new project currently in design (Crist Engineers, Inc., Craig A. Johnson, PE – project manager). The "Maumelle/White Oak Diversion Project" will include converting the existing Maumelle lagoons into flow equalization basins, modifying the Maumelle influent pump station and constructing a forcemain connecting the influent pump station to the newly constructed 36" White Oak Interceptor near its intersection with Counts Massie Road. Other modifications will include:

- New barscreens and parshall flume
- Improvements to the White Oak WRF influent pump station and barscreens
- Decommissioning the Maumelle activated sludge plant
- Installation of auxiliary power supplies at the Maumelle influent pump station and the White Oak WRF
- Environmental sustainability component
- Decommissioning of the Counts Massie Pump Station No. 1 and connection of the Counts Massie Pump Station No. 2 to the new forcemain

Ref# 4 Faulkner Lake Basin - Wilcox Pump Station Upgrade-Generator (FL-WPS1)

This generator was included in the "2013 Auxiliary Generators and Transfer Switches" project. A 100 kilowatt generator was installed for this site.

Ref# 5 Five Mile Creek Basin - Oakbrook Pump Station (FMC-OBPS)

The master plan scope for this project called for construction of a new pump station on a site closer to Manor Drive; however, the property owner was unwilling to sell. Therefore, since the pump station serves a relatively small basin, staff elected to rehabilitate the collection system and upgrade the existing pump station. Following is a summary of activities related to this effort:

<u>Activity</u>	<u>Quantity</u>	<u>Completed</u>	<u>Project</u>
CCTV Inspections	28,355 LF	2014	NLRW
Smoke Testing	8,775 LF	5/19/2015	"2014 SSSES"
Manhole Inspections	163 Ea	5/19/2015	"2014 SSSES"
CCTV Inspections	2,584 LF	5/19/2015	NLRW
Dyed Water Testing	1 Ea	5/19/2015	"2014 SSSES"

<u>Activity</u>	<u>Quantity</u>	<u>Completed</u>	<u>Project</u>
Manhole Rehabilitation	38 Ea	6/11/2015	NLRW
Point Repairs	2 Ea	7/21/2015	NLRW
Cured-In-Place Pipelining	707 LF	11/25/2015	"Lakewood Basin CIPP 2015"
Replace Pumps/Control Panels	2 Ea	-	NLRW
CCTV Inspections	199 LF	3/28/2016	NLRW
Wetwell Rehabilitation	1 Ea	3/24/2016	NLRW
Point Repairs	25 Ea	7/31/2016	NLRW
Manhole Grade Adjustment	1 Ea	3/22/2016	NLRW
Install SCADA System	1 Ea	-	NLRW

Ref# 6 & 13 Five Mile Creek Basin - WWTP Upgrade Headworks and Influent Pump Station (FMC-WWTP-1)

This project was completed in accordance with the original scope. Additionally, pumps, valves, piping and controls for the "Equalization Pump Station (FMC-EQPS), Ref. No. 13" were completed integral to the influent pump station.

Ref# 7 & 8 Faulkner Lake Basin - Equalization Storage at FLWWTP (FL-EQ)

This project was combined with the "Faulkner Lake Equalization Storage Pump Station (FL-EQPS)" project Reference Number 8.

Improvements related to project Ref. Nos. 7 and 8 include:

- Replace two (2) existing 28 mgd pumps with 400 HP motors
- Installed two (2) new 9 mgd submersible pumps in existing wet well
- Installed new piping, valves and controls to allow diversion of flow from the influent pump station to the existing lagoons (24.8 mg total storage)
- Variable frequency drives for all pumps
- New influent parshall flume
- Miscellaneous hydraulic improvements, piping, valves, and structure improvements

Ref# 9 All Basins - Master Plan Update

The Master Plan 2011 is a 20-year plan covering the years 2012 through 2031. Table 2-1 (TM#9) lays out the "Major Infrastructure Improvements" and "Pipeline Improvements" in a timeline format. NLRW has addressed all of the "Major Infrastructure Improvements" projects scheduled prior to calendar year 2021 and has exceeded the "Pipeline Improvements" projects spending levels each year to date. We believe the basic plan is still useful with the understanding that the flow equalization projects and the pipeline enlargement projects have been diminished as a result of NLRW's collection system

rehabilitation program and may not even be necessary within the foreseeable future. We also believe that a formal master plan update, other than this document update is not necessary at this time. NLRW receives loan funds through the Arkansas Natural Resources Commission (ANRC) Revolving Loan Fund Program. The ANRC requires that a preliminary engineering report and facility plan be submitted to enter their programs. NLRW submitted facility planning documents in 2011 and 2015 to secure loans, and will be pursuing another loan within 12 to 24 months. Going forward with our collection system rehabilitation program we plan to complete a facility plan during calendar year 2019 and do not see the need for an additional "Master Plan Update" at this time.

Ref# 10 Faulkner Lake Basin - Wilcox Pump Station Upgrade (FL-WPS2)

Related Improvements Completed to Date:

Replace two 20 HP pumps

- New influent piping and junction box
- New discharge piping
- Wetwell rehabilitation

Ref# 11 Faulkner Lake Basin - FLWWTP Sludge Process Upgrade (FL-SLDG)

This project was included as a long range planning option "to be outlined in a future Preliminary Engineering Study". Staff negotiations with Waste Management, Inc. resulted in an agreement for hauling of primary and secondary blended solids to landfill resulting in a net savings of approximately \$190,000 over a three-year period.

Related Improvements:

- "Faulkner Lake Belt Press 2016 Project"
- "Faulkner Lake Belt Press 2017 Project"

The "Faulkner Lake Belt Press 2016 Project" and the "Faulkner Lake Belt Press 2017 Project" were complete factory rebuilds of the existing Andritz belt presses. It is expected that these improvements will provide a reliable solution for biosolids disposal at the Faulkner Lake WRF for the foreseeable future.

Ref# 12 Five Mile Creek Basin - WWTP Upgrade and EQ Basin (FMC-WWTP2)

Master Plan 2011 (Technical Memorandum No. 9, "Capital Improvement Plan", 1.2.1 Five Mile Creek WWTP, pp 1-2) considered "future hydraulic expansion to include additional growth within the sewerage basin and include the flow from the South Sherwood WWTP". Recent developments indicate that Sherwood is now considering other alternatives and may not be interested in using the Five Mile Creek WRF as an alternative.

Related improvements and measures include:

- NPDES Permit No. AR0020320 has been modified to change the existing BOD 5 limits (30 mg/l Mo. Avg., 45 mg/l 7-Day Avg.) with CBOD limits (25 mg/l Mo. Avg., 40 mg/l 7-Day Avg.) A multi-year biosolids removal project "2018 Biosolids Removal and Land Application at Five Mile Creek WRF" was awarded May 21, 2018 to DRT Biosolids, Inc. of Bloomer, WI to remove and land apply up to 6000 dry tons per year on NLRW permitted land application sites in 2018, 2019 and 2020.

The NLRW would like to defer this project indefinitely to leave the door open in the event Sherwood reconsiders the Five Mile Creek WRF as a long term treatment solution.

Ref# 13 & 6 Five Mile Creek Basin - Equalization Pump Station (FMC-EQPS)

Pumps, valves, piping and controls were included in the "Five Mile Creek WWTP Upgrade Headworks and Influent Pump Station FMC-WWTP (Ref. No. 6)" project to allow diversion of 27 mgd influent flow to a future equalization basin.

Ref# 14 Faulkner Lake Basin - Lakewood Equalization Storage Basin (FL-LWEQ)

This project will be re-evaluated in future master plans.

Ref# 15 Faulkner Lake Basin - Lakewood Equalization Pump Station (FL-LWPS)

This project will be re-evaluated in future master plans.

Ref# 16 White Oak Basin - Shillcutt Equalization Storage Basin and Pump Station (WO-EQPS)

This project will be re-evaluated in future master plans.

Ref# 17 Five Mile Creek Basin - Getty Drive Wet Weather Pump Station (FMC-GDPS)
This project will be re-evaluated in future master plans.

Ref# 18 White Oak Basin - Marche-Morgan Increase Pump Station Capacity (WO-MMPS)

Staff recognized two unique opportunities during their evaluation of this project:

- 1 - An extension of the "White Oak Interceptor Phase II" intersected the Morgan Forcemain and allowed the Morgan Forcemain to be shortened by approximately 9,800 LF greatly reducing the pump discharge head.

2 – The existing 160 HP pumps could be replaced with 35 HP pumps that better fit the new system curve while also increasing the overall capacity of the pump station from 291 gpm to 551 gpm. This upgraded capacity is adequate for the foreseeable future.

Ref# 18.1 All Basins – Miscellaneous WRF Improvements

Following is a list of “Infrastructure Improvements at WRFs” which were not separately included in the Master Plan 2011 (TM#9, Table 2-1) which have been completed:

<u>Year</u>	<u>Project Name</u>	<u>\$</u>
2012	Land Purchase Five-Mile	<u>852,685</u>
		\$852,685 TOTAL 2012
2013	White Oak Influent Diversion Structure Epoxy Rehab 13,000	13,000
	Faulkner Lake Junction Box Leak Repair	3,270
	Land Purchase Faulkner Lake	222,432
	Faulkner Lake Concrete Structures Rehabilitation Project	<u>98,844</u>
		\$337,546 TOTAL 2013
2014	Maintenance & Emergency Equipment Storage	673,199
	Faulkner Lake Phase III – BRB Construction	3,678,878
	Faulkner Lake Primary Diversion Structure Repair	<u>3,350</u>
		\$4,355,427 TOTAL 2014
2015	Faulkner Lake Phase III – BRB Construction	<u>910,648</u>
		\$910,648 TOTAL 2015
2016	Faulkner Lake Belt Press 2016 Project	188,435
	Faulkner Lake Plant Epoxy Rehab 2016 Project	<u>131,072</u>
		\$319,507 TOTAL 2016
2017	Faulkner Lake Belt Press 2017 Project	190,128
	2017 Auxiliary Generators	286,844
	Five Mile Curtain Project	58,425
	Epoxy Rehab 2017 Project	118,895
	Faulkner Lake Clarifier Valve Project	129,018
	Faulkner Lake 60" Process Pipe Repair	19,045
	Five Mile Lagoon Aerator Replacement Project	39,813
	Maumelle Wastewater Plant Effluent Pump #1 Replacement	<u>24,670</u>
		\$866,838 TOTAL 2017
2018	Maumelle Wastewater Plant Effluent Pump #2 Replacement	<u>25,680</u>
		\$ 25,680 TOTAL 2018 YTD

Ref# 18.2 All Basins – Miscellaneous Pump Station Improvements

Following is a list of "Pump Station Improvements" projects which were not separately included in the Master Plan 2011 (TM#9, Table 2-1) which have been completed:

<u>Year</u>	<u>Project Name</u>	<u>\$</u>
2011	Bridgeway – Install New Pump in #1 Slot	N/A
	Chapel Ridge – Rebuild Pump #2	N/A
	Burns Park East – New #1 & #2 Pumps Check Valve Upgrades	N/A
	Wilcox - #1 Pump Rebuild	<u>N/A</u>
		N/A TOTAL 2011
2012	Maryland Place – Rebuild #1 Pump	N/A
	Gap Creek – Install New Pump	N/A
	Wilcox – Install New #1 Pump	N/A
	5-Mile Plant – Install Rebuilt #3 Influent Pump	N/A
	Faulkner Lake – Rebuild Main Pump 20" for Spare	<u>N/A</u>
		N/A TOTAL 2012
2013	Dixie – Rebuild Rotating Assembly in Pump #2	N/A
	Chapel Ridge – New #1 & #2 Pumps	N/A
	2013 Auxiliary Generators	<u>392,922</u>
		\$392,922 TOTAL 2013
2014	Counts Massie – Install New Impeller Pump #1	N/A
	Gap Creek – Install New #2 Pump	N/A
	I-440 Industrial – Rebuild #2 Pump	N/A
	Bridgeway – Install New Pump #2	N/A
	Marche' – Rebuild Pump #2	N/A
	2014 Auxiliary Generators	191,995
	Oakbrook – Rebuild Pumps #1 & #2 with Small Impeller	<u>15,863</u>
		\$207,858 TOTAL 2014
2015	Wilcox – New Pump #1 & Flange	18,738
	Wilcox – New Pump #2	N/A
	Wilcox – Install New Effluent Piping on #1 & #2	N/A
	Counts Massie – Rebuild Pump	4,961
	Marche' – New 35 HP Pump	28,025
	Maybelline - New Impeller	3,088
	Oakbrook – New 40 HP Control Panel & Motors	<u>11,900</u>
		\$ 66,714 TOTAL 2015
2016	Maybelline – New Impeller Unit	6,349
	Frontier Drive – New Pump	6,828
	Eureka Gardens – Repair Pump	2,869
	Oakbrook – Upgrade Pumps to 12.75 Impellers with New Suction Flanges	<u>14,007</u>
		\$ 30,055 TOTAL 2016

Ref# 18.2 CON'T

<u>Year</u>	<u>Project Name</u>	<u>\$</u>
2017	3306 E. 10 th St Pump Station Improvements	371,090
	2017 Auxiliary Generators	286,844
	Morgan – New 35 HP Pump to Complete Upgrade	28,035
	Wilcox – Emergency Pump Repairs on 2 Pumps	N/A
	Maybelline – Upgrade Both Pumps	50,707
	Chapel Ridge – New Impeller	1,672
	Burns Park Soccer Fields – Install New Pump #2	9,336
	Trammel Estates – Upgrade Controller	8,087
	Lakewood Place – Install New Pump #2	3,892
	SCADA Additions – Install Omni System Units at 41 PSs	<u>61,946</u>
		\$ 821,611 TOTAL 2017
2018	Austin Lake – Install New Pump #2	11,461
	Counts Massie – Install New Pump #2	12,799
	Burns Park Soccer - #2 Pump Repair	5,584
	Murphy Drive – Upgrade Station with New Pumps	89,062
	Bridgeway – New #1 Pump	3,960
	Chapel Ridge – New Impeller	1,840
	Counts Massie – New Impeller	<u>1,544</u>
		\$ 126,253 TOTAL 2018 YTD

Ref# 18.3 **Maumelle Basin – Miscellaneous Maumelle Pump Station Improvements**

Following is a list of repairs to Maumelle pump stations which were not separately included in the Master Plan 2011 (TM#9, Table 2-1) which have been completed:

<u>Year</u>	<u>Project Name</u>	<u>\$</u>
2016	Town Center-Repaired Electrical Panel/Installed New Stands	N/A
	CC Ballfields – Replaced Auxiliary Contactor	N/A
	Osage Falls – Replaced Relay, Pump #2	N/A
	MWTP – Replaced Transducer, Pump Station 3	N/A
	MWTP – Installed Flow Meter, Pump Station 4	N/A
	Seminole E.-Pulled Pump, Repaired, Reinstalled	N/A
	Seminole E.- Pump #3 Repaired for Spare Installed New Pump	N/A
	CC Ballfields – Installed Stainless Steel Top Support Rail Brackets	N/A
	Maranes – Replaced Start/Run Capacitors & Relays	N/A
	MWTP- Installed Rebuilt 25 HP Pump @ Surge Basin PS	N/A
	Murphy Dr.-Motor Starter Lugs Faulty, Replaced Disconnect with Spare	N/A
	MWTP-Installed CO2 & SO2 Detectors & PLC @ Station 4	N/A
	Bouries – Repaired Faulty Wires on Capacitors	N/A
	CC Ballfields – Repaired Alarm on Station	N/A
	Maumelle Valley – Replaced Audible Horn on Alarm	N/A
	MWTP – Replaced Faulty Wiring on #4 Aerator	N/A
	New Bedford - Repaired Broken Guide Rails	N/A
	Maumelle Valley - Repaired Float Rack w/Stainless Steel Studs in Concrete	N/A
	Diamond Point – Repaired Guide Rails on Both Pumps	N/A
	Murphy Drive – Replaced Bad Grease Fittings on the Pumps	N/A
	Odom/Blue Mountain-Repaired Guide Rail Brackets	N/A
	Seminole W. – Repaired Guide Rail Brackets	N/A
	Counts Massie #2 – Installed New Guide Rails & Brackets on Pump #1	N/A
	Repaired Top Bracket on Pump #2	N/A
	Palisades – Repaired Guide Rails	N/A
	Ridgeland – Installed Stainless Steel Chain on Pump #1	N/A
	New Bedford – Installed Stainless Steel Chain on Pump #1	N/A
	MWTP – Repaired #3 Drain Valve on Digester	N/A
	Palisades – Relocate Force Main Into Utility Easement	N/A
	MWTP - Replace All Cables on Aerators in Surge Basin	N/A
	MWTP – Replace Faulty Wiring on Main Feed to Aerators in Surge Basin	N/A
	Palisades – Install 2 New Pumps in Station	N/A
	All Stations – Performed Clean Up	N/A
	All Stations – Signage Added	N/A
	All Stations – Completed Updating Omni Sites to 3G	N/A
2016 TOTAL		\$ N/A

Ref# 18.3 CON'T

<u>Year</u>	<u>Project Name</u>	<u>\$</u>
2017	Town Center- Replaced Discharge Coupling	N/A
	Osage Hills (New Station) – Installed Pumps #1 & #2	N/A
	Masters Place – Installed New #2 Pump	N/A
	Seminole W. – Repaired Float Hanger	N/A
	Norfolk – Installed Rebuilt #2 Pump, Put Back in Service	N/A
	Osage Falls – Repaired Wet Well Lid	N/A
	Murphy Drive – Removed Old Generator From Building	N/A
	Diamond Point – Replaced Bad Motor Saver Breaker	N/A
	Murphy Drive – Installed New Fence Around Property	N/A
	Murphy Drive – Installed New Sump and Valve	N/A
	Masters Place – Installed New Pump	N/A
		<u>N/A</u>
		N/A TOTAL 2017
2018	River Run -Impeller Broke/Installed New Impeller	N/A
	Counts Massie #2 – Pump Went Out/Installed Rebuilt Pump	N/A
	Palisades – Installed New Impeller on Pump #1	N/A
	Diamond Point – Repaired Flange on Pump	N/A
	Murphy Drive – Repaired Hoist Trolley	N/A
	Norfolk – Installed New Pump in #2 Slot	N/A
	Murphy Drive – Installed #2 Dry Pit Pump in Station Upgrade	N/A
	Maumelle Woods – Repaired Upper Guide Rail Brackets	N/A
	Murphy Drive – Start Up #2 Pump (New Flygt)	N/A
		<u>N/A</u>
		\$ N/A TOTAL 2018
		YTD

Ref# 19 All Basins - Miscellaneous Gravity Collection Improvements

Technical Memorandum No. 9 of the Master Plan 2011 provided a list of 28 projects which are mostly pipeline improvements projects intended to increase capacity of existing pipelines. These projects were then combined into a single line item in Table 2-1 of TM No. 9 to “give NLRW the flexibility to implement pipeline improvements projects in conjunction with SSES program if so desired”. NLRW has elected to exercise this option rather than immediately replace existing pipelines. This approach assumes that in most cases the original design of the collection system was correct, and that if any obstructions are removed and if enough I/I is removed, it may not be necessary to construct all of the recommended projects.

NLRW’s approach to the gravity collection system can be generally stated as follows: “Ramp up the cleaning program to keep the pipelines open and free flowing, and conduct SSESs and rehabilitate the collection system, starting with the basins identified by the Master Plan as having the highest priority.” With this approach, many of the projects listed in the Master Plan 2011 have been addressed.

Ref# 19 CON'T

Following is an update to the "Pipeline Improvements" listed in the Master Plan 2011 (TM #9, Table 2.2, Items 19-46, pp 2-7 and 2-8):

<u>Line</u>	<u>Item</u>	<u>Qty</u>	<u>Date</u>	<u>Related Activity</u>
19	70 LF		2/2016	Point Repair on 54" influent pipeline at FL WRF
	3,457 LF			Baring Cross Basin CIPP 2016 Rehabilitation Project
	6,212 LF		3/17/14 – 7/24/17	NLRW cleaning forces
	4,344 LF			Currently in design. Lower Riverside 54" Interceptor Lining
20				Currently in design. Construction deferred pending stabilization of the rock slide by others.
24	768 LF		5/31/2015	2013 Cured In Place (CIPP) Rehabilitation
26	1 L.S.			New Pump Station 3306 E 10 St Pump Station
	1,028 LF			Forcemain replacement 3306 E 10 St Pump Station
	1,400 LF			Forcemain replacement NLRW forces
33	864 LF			Baring Cross Basin CIPP 2016 Rehabilitation Project
34	+/-400 LF			Currently in design. NLRW forces
39	122 LF		5/31/2015	2013 CIPP Rehabilitation Project
40	2,973 LF		5/31/2015	2013 CIPP Rehabilitation Project
	594 LF			Baring Cross Basin CIPP 2016 Rehabilitation Project
43	3,505 LF		1/20/2017-9/7/2017	NLRW cleaning forces
44	794 LF		6/30/2016	Lakewood Basin CIPP 2015 Rehabilitation Project

All other "Miscellaneous Gravity Improvements Projects" listed in Table 2-2 of the Master Plan 2011 will be deferred indefinitely until addressed through future pipeline rehabilitation projects or as determined necessary following SSES and rehabilitation efforts.

Ref# 20 All Basins – SSES and Rehabilitation

Technical Memorandum No. 9 of the Master Plan 2011 recommended that NLRW implement "a thorough, aggressive annual SSES and rehabilitation program". NLRW has accepted that recommendation and to date SSES fieldwork has been completed or is currently underway for 82% of the collection system that existed prior to the addition of Maumelle, and 46% of the Maumelle collection system is complete or currently underway. Only the basins designated with low priorities have not been addressed with SSES fieldwork.

Ref# 20 CON'T

The Master Plan 2011 also recommends 10% of the system be cleaned and inspected and 2% of the system be replaced or rehabilitated each year. Related activities include:

	CLEANING		CCTV INSPECTION		PIPELINE REHABILITATION				
					CIPP or PB	NLRW	CONTRACTOR	TOTAL	PERCENT
	LF	%	LF	%	LF	LF	LF	LF	%
2011	739,263.00	24.5%	153,035.00	5.1%		1,843.00		1,843.00	0.1%
2012	1,192,468.00	39.5%	276,870.00	9.2%	9,942.00	1,321.00		11,263.00	0.4%
2013	1,411,877.00	46.7%	229,503.00	7.6%	19,279.00	757.00		20,036.00	0.7%
2014	1,425,744.00	47.2%	317,521.00	10.5%	15,646.00	4,242.00		19,888.00	0.7%
2015	1,804,036.00	48.6%	544,811.00	14.7%	27,518.00	1,367.00	3,976.00	32,861.00	1.1%
2016	1,725,048.00	46.5%	437,809.00	11.8%	45,693.00	894.00	770.00	55,800.00	1.8%
2017	2,041,119.00	55.0%	483,594.00	13.0%	67,261.00	1,391.00	17,874.00	86,526.00	2.9%
2018 YTD	755,967.00	20.4%	186,004.00	5.0%	26,608.00	485.00	4,585.00	31,678.00	1.0%
								259,895.00	8.6%

Following is a list of SSES projects and their recommended rehabilitation projects using the cured in place or pipe bursting method:

<u>Project Name</u>	<u>Status</u>	<u>Construction \$</u>
SSES and Rehabilitation		
2012 SSES	100%	\$276,723
2012 Cured In Place (CIPP) Rehabilitation	100%	\$398,685
2013 SSES	100%	\$457,098
2013 Cured In Place (CIPP) Rehabilitation	100%	\$1,632,213
2014 SSES	100%	\$486,133
2015 SSES	100%	\$534,621
Lakewood Basin CIPP 2015 Rehabilitation	100%	\$1,329,121
Lakewood Basin Pipe Bursting 2015 Rehabilitation	100%	\$1,850,064
2016 SSES	100%	\$549,062
E. Levy Basin Pipe Bursting Rehabilitation 2016	100%	\$1,660,350
Baring Cross Basin CIPP 2016 Rehabilitation	89%	\$1,671,026
Baring Cross Basin Pipe Bursting 2016 Rehabilitation	86%	\$3,339,007
W. Levy/212 Basin CIPP 2016 Rehabilitation	7%	\$112,020
W. Levy/212 Basin Pipe Bursting 2016 Rehabilitation	0%	\$1,283
2017 SSES	100%	\$678,439
South Levy/Indian Hills CIPP 2017 Rehabilitation	In Design	
South Levy/Indian Hills Pipe Bursting 2017 Rehabilitation	In Design	
Lower Riverside Interceptor	In Design	
2018 SSES	4%	\$26,948
	TOTAL	\$15,002,793

Ref# 20.1 All Basins - "Miscellaneous Rehabilitation (Repairs, Replacements and Relocations)" projects not included in the Master Plan 2011.

Following is a list of pipeline replacements, re-routes and main extensions completed using NLRW forces which were not itemized separately in the Master Plan 2011:

<u>Date</u>	<u>Qty(LF)</u>	<u>\$</u>	<u>Activity</u>	<u>Location</u>
2011	236	28,320	Replacement	2505 Fairway
	687	82,440	Replacement	5000 Hampton Road
	250	30,000	Replacement	5203 Schaer St
	147	17,640	Replacement	16 th & Orange
	294	35,280	Replacement	CAC School
	<u>229</u>	<u>27,480</u>	Main Extension	6205 Southwind
	1,843 LF	\$221,160	Totals 2011	
2012	405	48,600	Replacement	3521 Lakeshore
	88	10,560	Replacement	2120 Broadway
	340	40,800	Replacement	410 Mills St
	87	10,440	Replacement	112 Laurel
	331	39,720	Replacement	701 Bishop
	<u>70</u>	<u>8,400</u>	Main Extension	North Little Rock Airport
	1,321 LF	\$158,520	Totals 2012	
2013	72	8,640	Replacement	228 E Emily
	88	10,560	Replacement	3605 Loch Lane
	141	16,920	Replacement	5320 John F Kennedy
	55	6,600	Re-route	3601 Lakeshore
	<u>401</u>	<u>48,120</u>	Re-route	Bay Oaks Dr
	757 LF	\$90,840	Totals 2013	
2014	314	37,680	Replacement	1301 Pine
	187	22,420	Replacement	900 Pershing
	120	14,400	Replacement	19 th & Marion St
	261	31,320	Replacement	2323 Poplar St
	41	4,920	Replacement	620 W Broadway
	135	16,200	Replacement	416 W 13 th
	85	10,200	Replacement	1733 Augusta
	162	19,440	Replacement	714 Mills
	133	15,960	Replacement	E Maryland
	199	23,880	Replacement	720 Mills
	109	13,080	Replacement	114 Redwood
	1,600	192,000	Forcemain Replacement	918 Douglas
	390	46,800	Re-route	16 th & Julian
	350	42,000	Re-route	2323 Poplar
	94	11,280	Re-route	114 Redwood
	<u>62</u>	<u>7,440</u>	Main Extension	3516 N Cedar
	4,242 LF	\$509,040	Totals 2014	

Ref# 20.1 CON'T

<u>Date</u>	<u>Qty(LF)</u>	<u>\$</u>	<u>Activity</u>	<u>Location</u>
2015	405	48,600	Replacement	1405 N Olive
	93	11,160	Replacement	404 E "H" St
	81	9,720	Re-route	26 th & Parker
	300	36,000	Main Extension	20 th & 21 st St
	108	12,960	Main Extension	209 E 21 st St
	112	13,440	Main Extension	106 Larkspur Lane
	<u>168</u>	<u>20,160</u>	Main Extension	914 Olive St
	1,367 LF	\$164,040	Totals 2015	
2016	88	10,560	Replacement	212 E 21 st St
	386	46,320	Replacement	1207 Parker
	145	17,400	Replacement	3715 John F Kennedy
	<u>275</u>	<u>33,000</u>	Replacement	312 Hemlock
	894 LF	\$107,280	Totals 2016	
2017	192	23,040	Replacement	1521 E 16 th St
	131	15,720	Replacement	22 Riverwood
	122	14,640	Replacement	2011 Orange St
	340	40,800	Replacement	3100 Magnolia
	123	14,760	Replacement	2410 W 16 th St
	329	39,480	Replacement	523 W 16 th St
	<u>154</u>	<u>18,480</u>	Replacement	4307 Broadway
	1,391 LF	\$166,920	Totals 2017	
2018	41	4,920	Replacement	305 Pickwick
	60	7,200	Replacement	165 Manitou
	<u>384</u>	<u>46,080</u>	Re-route	5414 MacArthur
	485 LF	\$58,200	Totals 2018 YTD	

Ref# 20.2 Following is a list of pipeline replacements, re-routes and extensions completed using outside contractors which were not itemized separately in the Master Plan 2011:

<u>DATE</u>	<u>Qty(LF)</u>	<u>Activity</u>	<u>\$</u>	<u>Project Name or Location</u>
2012	-	Cave-in Beneath Water Table	144,667	New Sewer Line Emily Street
	-	Cave-in Beneath Water Table	<u>102,763</u>	504 Parkdale
			\$247,430	Total 2012
2013	-	Cave-in Beneath Water Table	43,899	Delta Lawn Gravity to Pmp Sta
		Cave-in Beneath Water Table	245,881	6401 Lynch Drive
		Cave-in Beneath Water Table	156,691	West Emily
		Cave-in Beneath Water Table	<u>61,568</u>	East Emily
			\$508,039	Total 2013
2014	-	Repair Forcemain	<u>79,702</u>	Morgan Forcemain Repair
			\$79,702	Total 2014

Ref# 20.2 CON'T

<u>DATE</u>	<u>Qty(LF)</u>	<u>Activity</u>	<u>\$\$</u>	<u>Project Name or Location</u>
2015	5 Ea	Point Repairs	17,300	2014 Contract Point Repairs
	-	Cave-In Beneath Water Table	169,606	512 Water St.
	-	Cave-In Beneath Water Table	90,205	Emergency Repair Riverfront@Virginia
	-	Replacement	127,499	Emergency Erosion Shillcutt Bayou
	182	Re-route	71,213	Norman Road Forcemain Relocation
	504	Re-route	55,106	Parkway/MacArthur Sewer Relocation
	<u>3,290</u>	Re-route	<u>512,991</u>	McCain/Fairfax Sewer Relocation
	3,976 LF		\$1,043,920	Totals 2015
2016	-	Cave-In Beneath Water Table	1,963,302	Faulkner Lake Plant Near Bar Screen
	-	Cave-In Beneath Water Table	57,020	409 Water Street
	-	Cave-In Beneath Water Table	25,281	4617 Bethany
	-	Replacement	39,958	20 th & Main NLR Funeral Home
	-	Replacement	46,213	5205 S. Woodland
	120	Replacement	32,002	Water Street Emergency Replacement
	<u>650</u>	Relocate	<u>664,996</u>	W-O Bayou Relocation & Bank Stabilization
	770 LF		\$2,828,772	Totals 2016
2017	12	Replacement	48,623	RV Park Emergency Point Repair
	<u>17,862</u>	Extension	<u>4,565,701</u>	White Oak Interceptor, Phase II
	17,874 LF		\$4,614,324	Totals 2017
2018	2,419	Extension	250,000	Bridgeway Pump Station
	495	Relocate	75,000	Skyline Sewer Relocation
	<u>1,671</u>	Relocate	<u>105,796</u>	East Maryland Forcemain Relocation
	4,585 LF		\$430,796	Totals 2018

Table 2-1
Collection System and Water Reclamation Facility
Remedial Measures Plan
North Little Rock Wastewater

MASTERPLAN INFRASTRUCTURE IMPROVEMENTS																	
PHASE 1	Reference Number	Basin	Project Name	NOTES	Status Complete	%	Construction Cost (Total)	2012	2013	2014	2015	2016	2017	YTD - May2018	2019	2020	2021
	1	WO	Shillcutt Pump Station Back-Up Pump (WO-SLPS1)	Ref. Nos. 1 and 2 Combined	100%		\$ 5,259,233	\$ 164,048	\$ 1,484,051	\$ 3,611,134							
	2	WO	Shillcutt Pump Station Improvements (WO-SLPS2)														
	3	WO	WWTP Back-up Generator (WO-WWTP)	In Design. Included in "Maumelle/WO Diversion Project"													
	4	FL	Wilcox Pump Station Upgrade/Generator (FL-WPS1)		100%		\$ 81,031	\$ 15,383	\$ 48,976		\$ 16,672						
	5	FMC	Oakbrook Pump Station (FMC-OBPS)		100%		\$ 46,238			\$ 15,972	\$ 16,259	\$ 14,007					
	6	FMC	WWTP Upgrade Headworks & Influent PS (FMC-WWTP1)	Includes Ref. No. 13	100%		\$ 5,997,185	\$ 241,019	\$ 2,220,930	\$ 3,535,236							
	7	FL	Equalization Storage (FL-EQ)	Ref Nos. 7 and 8 Combined	100%		\$ 2,317,483		\$ 1,911,835	\$ 405,648							
8	FL	Equalization Pump Station (FL-EQPS)															
Subtotal - Phase 1							\$ 13,701,170	\$ 420,450	\$ 5,665,792	\$ 7,567,990	\$ 32,931	\$ 14,007	\$ -	\$ -	\$ -	\$ -	\$ -
PHASE 2	9		Master Plan Update	Update to TM#9, June 2018	100%												
	10	FL	Wilcox Pump Station Upgrade (FL-WPS2)	Costs included with Ref.No. 18.2	100%		See Notes										
	11	FL	Sludge Process Upgrade (FL-SLDG)	Costs included with Ref.No. 18.1	100%		See Notes										
	12	FMC	WWTP Upgrade & EQ Basins (FMC-WWTP2)	Deferred indefinitely pending Sherwood actions													
PHASE 3	13	FMC	Equalization Pump Station (FMC-EQPS)	Costs included with Ref. No. 6	100%		See Notes										
	14	FL	Lakewood Equalization Storage Basin (FL-LWEQ)														
	15	FL	Lakewood Equalization Pump Station (FL-LWPS)														
PHASE 4	16	WO	Shillcutt Equalization Storage Basin & PS (WO-EQPS)														
	17	FMC	Getty Drive Wet Weather Pump Station (FMC-GDPS)														
	18	WO	Marche-Morgan Increase Pump Station Capacity (WO-MMPS)		100%		\$ 56,060				\$ 28,025		\$ 28,035				
	18.1	ALL	Miscellaneous WRF Improvements		100%		\$ 6,991,782	\$ 852,685	\$ 337,546	\$ 3,678,878	\$ 910,648	\$ 319,507	\$ 866,838	\$ 25,680			
	18.2	ALL	Miscellaneous Pump Station Improvements		100%		\$ 1,645,413		\$ 392,922	\$ 207,858	\$ 66,714	\$ 30,055	\$ 821,611	\$ 126,253			
Subtotal - Phase 2 - 4							\$ 8,693,255	\$ 852,685	\$ 730,468	\$ 3,886,736	\$ 1,005,387	\$ 349,562	\$ 1,716,484	\$ 151,933	\$ -	\$ -	\$ -
PIPELINE IMPROVEMENTS																	
	19	ALL	Miscellaneous Gravity Collection Improvements	Cost included with Ref.No. 18.2, 20 and 20.1			See Notes										
	20	ALL	SSS and Rehabilitation				\$ 15,002,793	\$ 533,661	\$ 479,983	\$ 1,522,385	\$ 1,765,018	\$ 3,857,264	\$ 5,793,889	\$ 1,050,593			
	20.1	ALL	Miscellaneous Pipeline Improvements-NLRW Staff				\$ 1,254,840	\$ 158,520	\$ 90,840	\$ 509,040	\$ 164,040	\$ 107,280	\$ 166,920	\$ 58,200			
	20.2	ALL	Miscellaneous Pipeline Improvements-Outside Contractors				\$ 9,752,983	\$ 247,430	\$ 508,039	\$ 79,702	\$ 1,043,920	\$ 2,828,772	\$ 4,614,324	\$ 430,796			
Subtotal - 19 & 20							\$ 26,010,616	\$ 939,611	\$ 1,078,862	\$ 2,111,127	\$ 2,972,978	\$ 6,793,316	\$ 10,575,133	\$ 1,539,589	\$ -	\$ -	\$ -
Subtotal - Cost per Year							\$ 48,405,041	\$ 2,212,746	\$ 7,475,122	\$ 13,565,853	\$ 4,011,296	\$ 7,156,885	\$ 12,291,617	\$ 1,691,522	\$ -	\$ -	\$ -
GRAND TOTAL (to Date May 2018)							\$ 48,405,041										

Shaded cells indicate the years work was performed



Table 2-2
Milestone Schedule
CIP Projects
(for projects to be completed)
North Little Rock Wastewater



Ref. No.	Project Name	Begin	End
3	WWTP Back-up Generator (WO-W#WTP)	Jan 2018	Dec 2020
9	Master Plan Update		
	Facility Plan	2019	2019
	Facility Plan	2022	2022
12	WWTP Upgrade & EQ Basins (FMC-WWTP2)	2019	Indefinite
	Defer indefinitely. Evaluate internally on year to year basis		
14	Lakewood EQ Storage Basin (FL-LWEQ)	2019	Indefinite
	Re-evaluate with each Facility Plan		
15	Lakewood Equalization Pump Station (FL-LWPS)	2019	Indefinite
	Re-evaluate with each Facility Plan		
16	Shillcutt EQ Basin & PS (WO-EQPS)	2027	Indefinite
	Re-evaluate with each Facility Plan		
17	Getty Drive Wet Weather PS (FMC-GDPS)	2030	Indefinite
	Re-evaluate with each Facility Plan		
19.20	Cedar Street Sewer Improvements	2018	2019
19.21	Gravity Pipe Replacement (FL-GS0203)	2019	Indefinite
	Defer pending post EQ flow monitoring		
	Re-evaluate with each Facility Plan		
19.22	Gravity Pipe Replacement (FL-GS02)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.23	Gravity Pipe Replacement (WO-GS05)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.25	Chicopee Pipeline Replacement	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.27	Five Mile Creek/Woodruff Interceptor (FMC-GSNM)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.28	Gravity Pipe Replacement (FMC-GS16)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.29	Gravity Pipe Replacement (WO-GSNME)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.30	Gravity Pipe Replacement (FL-GS03)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.31	Gravity Pipe Replacement (FL-GS07)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.32	Gravity Pipe Replacement (FL-GS02N)	2019	Indefinite
	Re-evaluate with each Facility Plan		
19.34	Melrose Circle Sewer Improvements	2018	2019
	In Design		

Table 2-2
Milestone Schedule
CIP Projects
(for projects to be completed)
North Little Rock Wastewater



Ref. No.	Project Name	Begin	End
19.35	Gravity Pipe Replacement (WO-GS06) Re-evaluate with each Facility Plan	2019	Indefinite
19.36	Gravity Pipe Replacement (WO-GS06) Re-evaluate with each Facility Plan	2019	Indefinite
19.37	Clayton Chapel Gravity Pipe Replacement Re-evaluate with each Facility Plan	2019	Indefinite
19.38	Getty Drive Force Main (FMC-GDFM) Re-evaluate with each Facility Plan	2019	Indefinite
19.39	Gravity Pipe Replacement (WO-GS09) Re-evaluate with each Facility Plan	2019	Indefinite
19.41	FMC Gravity Pipe Replacement (FMC-GS12) Re-evaluate with each Facility Plan	2019	Indefinite
19.42	FMC Gravity Pipe Replacement (FMC-GS13) Re-evaluate with each Facility Plan	2019	Indefinite
19.45	Gravity Pipe Replacement (FL-GS10) Re-evaluate with each Facility Plan	2019	Indefinite
19.46	Wilcox Pump Station Force Main Upgrade-Phase 2 (FL-WFM) Re-evaluate with each Facility Plan	2019	Indefinite

Section 3

Recommendations Summary

3.1 Overview of master Plan 2011 Recommendations

Master Plan 2011 recommendations balanced between rehabilitation designed to maintain current rates of I/I and collection system transportation projects with flow equalization. NLRW has emphasized the SSES and rehabilitation efforts to reduce I/I and subsequently reducing or eliminating the need for collection system transportation projects with flow equalization. A side benefit of the additional rehabilitation is extending the life of an aging concrete and clay pipe collection system.

3.2 Post Rehabilitation Remedial Measures Plan

A. Collection System Maintenance Program

NLRW's proactive collection system maintenance programs have a greater impact in reducing SSOs than the capital improvements program. Therefore, NLRW will maintain current levels of production:

<u>Activity</u>	<u>Quantity</u>
Cleaning	1,500,000 - 2,000,000 LF/Year
CCTV Inspections	375,000 - 500,000 LF/Year
Collection System Repairs Requiring Excavation	500 - 600 /Year
Manhole Rehabilitation	1,200 -2,000 /Year

New rapid assessment technologies may allow NLRW to reduce the overall quantity of pipeline segments cleaned and televised in the future.

B. Public Education

Continue to seek opportunities to educate the public with the "Maintain YOUR Drain" program:

<u>Activity</u>	
Presentations	500 Attendees/Year
Mailers	175,000/Year
Vehicle Signs	

C. Flow Monitoring

Install permanent flow monitors and rain gauges in locations to evaluate future "pipeline improvements" projects included in the Master Plan 2011.

D. Expedite Large Diameter Pipeline and Manhole Rehabilitation

NLRW experienced a catastrophic failure to the 54-inch gravity interceptor at the headworks to the Faulkner Lake WRF in January 2016 related to a 100-year flood event on the Arkansas River. As a result, NLRW has added projects to the capital

3.2 CON'T

improvements program to rehabilitate and extend the service life of the Riverside Interceptor and to improve access to manholes for maintenance and rehabilitation. The "Lower Riverside Interceptor" project is currently in the final stages of design prior to submittal for review with the Arkansas Natural Resources Commission. Additional segments of large diameter pipelines are being included with current rehabilitation projects.

E. Modify the SSES/Rehabilitation Effort

1. Reduce outside services expense (currently \$750,000/Yr), by using staff for all CCTV reviews and reducing the size of basins being investigated. Target and focus basins based on flow monitoring, SSOs, pipe age and pipe material.
2. Apply a portion of the savings from outside services to add an engineering technician position for CCTV reviews, flow monitoring field installations, equipment and data review.
3. Apply the remainder of the savings to an ongoing pipeline rehabilitation program (CIPP and pipe bursting).

F. Establish an ongoing pipeline rehabilitation program budget designed to rehabilitate approximately one to two percent of the gravity collection system per year (\$3-5,000,000/Yr).

G. Establish a forcemain rehabilitation program to evaluate the condition, needs and priority for extending the service life of existing force mains. Include considerations for size, location, access, signage and retardant chemical feed (\$50-100,000/Yr).

APPENDIX

Update to:

Technical Memorandum No. 9

Capital Improvement Plan

North Little Rock Wastewater Master Plan

August 2011

June 2018

Major Infrastructure Improvements														
Reference Number			Total Project Cost	Professional Services	PHASE 1					PHASE 2				
				Construction										
	Basin	Project Name		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
1	WO	Shilcutt Pump Station Back-Up Pump (WO-SLPS1)	\$ 575,000	\$ 75,000 \$ 500,000	\$ 75,000 \$ 500,000.00									
2	WO	Shilcutt Pump Station Improvements (WO-SLPS2)	\$ 6,210,000	\$ 810,000 \$ 5,400,000	\$ 270,000 \$ 1,080,000	\$ 270,000 \$ 2,160,000	\$ 270,000 \$ 2,160,000							
3	WO	White Oak WWTP Back-up Generator (WO-WWTP)	\$ 88,550	\$ 11,550 \$ 77,000	\$ 11,550 \$ 25,667	\$ 51,333								
4	FL	Wilcox Pump Station Upgrade - Generator (FL-WPS1)	\$ 57,500	\$ 7,500 \$ 50,000	\$ 7,500 \$ 16,667	\$ 33,333								
5	FMC	Oakbrook Pump Station (FMC-OBPS)	\$ 770,500	\$ 100,500 \$ 670,000	\$ 67,000 \$ 223,333	\$ 33,500 \$ 446,667								
6	FMC	Five Mile Creek WWTP Upgrade Headworks and Influent PS (FMC-WWTP1)	\$ 2,558,750	\$ 333,750 \$ 2,225,000	\$ 133,500 \$ 1,335,000	\$ 133,500 \$ 890,000	\$ 66,750							
7	FL	Equalization Storage at FLWWTP (FL-EQ)	\$ 920,000	\$ 120,000 \$ 800,000	\$ 40,000	\$ 40,000 \$ 342,857	\$ 40,000 \$ 457,143							
8	FL	Faulkner Lake - Equalization Pump Station (FL-EQPS)	\$ 3,910,000	\$ 510,000 \$ 3,400,000	\$ 170,000	\$ 170,000 \$ 1,457,143	\$ 170,000 \$ 1,942,857							
9		Masterplan Update	\$ 500,000	\$ 500,000					\$ 500,000					
10	FL	Wilcox Pump Station Upgrade (FL-WPS2)	\$ 2,645,000	\$ 345,000 \$ 2,300,000					\$ 345,000 \$ 2,300,000					
11	FL	FLWWTP Sludge Process Upgrade (FL-SLDG)	\$ 4,600,000	\$ 600,000 \$ 4,000,000					\$ 200,000 \$ 2,000,000	\$ 200,000 \$ 2,000,000	\$ 200,000 \$ 2,000,000			
12	FMC	Five Mile Creek WWTP Upgrade and EQ Basin (FMC-WWTP2)	\$ 13,311,250	\$ 1,736,250 \$ 11,575,000					\$ 868,125	\$ 289,375 \$ 2,893,750	\$ 289,375 \$ 4,340,625	\$ 289,375 \$ 4,340,625	\$ 289,375 \$ 4,340,625	
13	FMC	FMC - Equalization Pump Station (FMC-EQPS)	\$ 10,925,000	\$ 1,425,000 \$ 9,500,000							\$ 356,250	\$ 356,250		
14	FL	Lakewood Equalization Storage Basin (FL-LWEQ)	\$ 6,325,000	\$ 825,000 \$ 5,500,000								\$ 165,000		
15	FL	Lakewood Equalization Pump Station (FL-LWPS)	\$ 13,800,000	\$ 1,800,000 \$ 12,000,000								\$ 300,000		
16	WO	Shilcutt Equalization Storage Basin and PS (WO-EQ,PS)	\$ 10,925,000	\$ 1,425,000 \$ 9,500,000										
17	FMC	Getty Drive Wet Weather Pump Station (FMC-GDPS)	\$ 2,760,000	\$ 360,000 \$ 2,400,000										
18	WO	Marche-Morgan - Increase Pump Station Capacity (WO-MMPS)	\$ 609,500	\$ 79,500 \$ 530,000										
SUBTOTAL - INFRASTRUCTURE PROJECTS			\$ 81,491,050		\$15,090,300					\$22,233,750				
Pipeline Improvements														
19	ALL	Miscellaneous Gravity Collection Improvements	\$ 39,709,500	\$ 5,179,500 \$ 34,530,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 300,000 \$ 2,000,000	\$ 300,000 \$ 2,000,000	\$ 300,000 \$ 2,000,000	\$ 300,000 \$ 2,000,000	
SUBTOTAL - GRAVITY COLLECTION					\$5,750,000					\$11,500,000				
20	ALL	SSES and Rehabilitation	\$ 23,000,000	\$ 3,000,000 \$ 20,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	\$ 150,000 \$ 1,000,000	
SUBTOTAL - SSES AND REHAB					\$5,750,000					\$5,750,000				
SUBTOTAL - COST PER YEAR					\$ 4,710,217	\$ 6,763,333	\$ 5,896,750	\$ 4,310,000	\$ 4,910,000	\$ 6,795,000	\$ 6,518,125	\$ 8,833,125	\$ 8,436,250	\$ 8,901,250
SUBTOTAL - TOTAL PER PHASE					\$26,590,300					\$39,483,750				
GRAND TOTAL			\$ 144,200,550	\$ 19,243,550 \$ 124,957,000										

Table 2-1
Collection System and
Wastewater Treatment Plant
Remedial Measure Plan



North Little Rock
Wastewater Utility

Prepared by:

CDM

Camp Dresser and McKee Inc.

August 2011

Major Infrastructure Improvements																
Reference Number			Total Project Cost	Professional Services	PHASE 3					PHASE 4						
	Basin	Project Name		Construction	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
1	WO	Shillicutt Pump Station Back-Up Pump (WO-SLPS1)	\$ 575,000	\$ 75,000 \$ 500,000												
2	WO	Shillicutt Pump Station Improvements (WO-SLPS2)	\$ 6,210,000	\$ 810,000 \$ 5,400,000												
3	WO	WO WWTP Back-up Generator (WO-WWTP)	\$ 88,550	\$ 11,550 \$ 77,000												
4	FL	Wilcox Pump Station Upgrade - Generator (FL-WPS1)	\$ 57,500	\$ 7,500 \$ 50,000												
5	FMC	Oakbrook Pump Station (FMC-OBPS)	\$ 770,500	\$ 100,500 \$ 670,000												
6	FMC	Five Mile Creek WWTP Upgrade Headworks and Influent PS (FMC-WWTP1)	\$ 2,558,750	\$ 333,750 \$ 2,225,000												
7	FL	Equalization Storage at FLWWTP (FL-EQ)	\$ 920,000	\$ 120,000 \$ 800,000												
8	FL	FLK - Equalization Pump Station (FL-EQPS)	\$ 3,910,000	\$ 510,000 \$ 3,400,000												
9		Masterplan Update	\$ 500,000	\$ 500,000												
10	FL	Wilcox Pump Station Upgrade - Phase 1 (FL-WPS2)	\$ 2,645,000	\$ 345,000 \$ 2,300,000												
11	FL	FL WWTP Sludge Process Upgrade (FL-SLDG)	\$ 4,600,000	\$ 600,000 \$ 4,000,000												
12	FMC	Five Mile Creek WWTP Upgrade and EQ Basin (FMC-WWTP2)	\$ 13,311,250	\$ 1,736,250 \$ 11,575,000												
13	FMC	FMC - EQ Pump Station (FMC-EQPS)	\$ 10,925,000	\$ 1,425,000 \$ 9,500,000	\$ 356,250	\$ 356,250										
14	FL	Lakewood Equalization Storage Basin (FL-EQ)	\$ 6,325,000	\$ 825,000 \$ 5,500,000	\$ 165,000	\$ 165,000	\$ 165,000	\$ 165,000								
15	FL	Lakewood Equalization Pump Station (FL-EQPS)	\$ 13,800,000	\$ 1,800,000 \$ 12,000,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000						
16	WO	Shillicutt Equilization Storage Basin and PS (WO-EQ,PS)	\$ 10,925,000	\$ 1,425,000 \$ 9,500,000			\$ 285,000	\$ 285,000	\$ 285,000	\$ 285,000	\$ 285,000	\$ 285,000	\$ 285,000			
17	FMC	Getty Drive Wet Weather Pump Station (FMC-GDPS)	\$ 2,760,000	\$ 360,000 \$ 2,400,000												
18	WO	Marche-Morgan - Increase Pump Station Capacity (WO-MMPS)	\$ 609,500	\$ 79,500 \$ 530,000												
SUBTOTAL - INFRASTRUCTURE PROJECTS			\$ 81,491,050		\$30,442,500					\$13,724,500						
Pipeline Improvements																
19	ALL	Miscellaneous Gravity Collection Improvements	\$ 39,709,500	\$ 5,179,500 \$ 34,530,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 229,500		
SUBTOTAL - GRAVITY COLLECTION					\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 1,530,000		
					\$11,500,000					\$10,959,500						
20	ALL	SSES and Rehabilitation	\$ 23,000,000	\$ 3,000,000 \$ 20,000,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000		
SUBTOTAL - SSES AND REHAB					\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000		
					\$ 5,750,000					\$ 5,750,000						
SUBTOTAL - COST PER YEAR					\$ 9,021,250	\$ 10,854,583	\$ 9,748,333	\$ 10,033,333	\$ 8,035,000	\$ 6,901,667	\$ 6,901,667	\$ 7,021,667	\$ 4,809,750	\$ 4,799,250		
SUBTOTAL - TOTAL PER PHASE					\$47,692,500					\$30,434,000						
GRAND TOTAL			\$ 144,200,550	\$ 19,243,550 \$ 124,957,000												

Table 2-1
Collection System and
Wastewater Treatment Plant
Remedial Measure Plan
Page 2 of 2



North Little Rock
Wastewater Utility

Prepared by:

CDM
Camp Dresser and McKee Inc.
August 2011

2.4 Project Descriptions

Table 2-2 CIP Project Descriptions

				Professional Services
				Construction
	Ref #	Basin	Project Description	
Major Infrastructure Improvements				
PHASE 1	1	WO	Shillcutt Pump Station Back-up Pump (WO-SLPS1) Install a back-up pump driven by a diesel engine to provide stand-by pumping capability.	\$ 75,000
				\$ 500,000
	2	WO	Shillcutt Pump Station Improvements (WO-SLPS2) Replace existing Pump Station to provide larger Pump Capacity (16,5 MGD) and deeper wetwell to reduce surcharges.	\$ 810,000
				\$ 5,400,000
	3	WO	White Oak WWTP Back-up Generator (WO-WWTP) Install new backup power source for White Oak WWTP	\$ 11,550
				\$ 77,000
	4	FL	Wilcox Pump Station Upgrade – Generator (FL –WPS1) Install new backup power source	\$ 7,500
				\$ 50,000
	5	FMC	Oakbrook Pump Station (FMC-OBPS) Increase the Peak Hydraulic capacity of the Oakbrook Pump Station from 0.72 to 1.4 MGD	\$ 100,500
			\$ 670,000	
6	FMC	Five Mile Creek WWTP Upgrade Headworks and Influent PS (FMC-WWTP1) Upgrade the influent pumps station and headworks.	\$ 333,750	
			\$ 2,225,000	
7	FL	Equalization Storage at FLWWTP (FL-EQ) Construct a 23.5 MG EQ Facility at Faulkner Lake WWTP to detain flows during rain events.	\$ 120,000	
			\$ 800,000	
8	FL	Faulkner Lake - Equalization Pump Station (FL-EQPS) Construct a 28 MGD Pump Station to convey flows to and from the FLWWTP Equalization Storage Basin.	\$ 510,000	
			\$ 3,400,000	
PHASE 2	9	ALL	Master Plan Update – Update the Master Plan with new flow monitoring data that will include the effects of the installed improvements. Remaining projects scope and budgets to be updated in the Master Plan.	\$ 500,000
				\$ 345,000
	10	FL	Wilcox Pump Station Upgrade (FL-WPS2) Design and Construct a new 5 MGD Pump Station for conveying flows to Faulkner Lake WWTP	\$ 2,300,000
				\$ 600,000
11	FL	FLWWTP Sludge Process Upgrade (FL-SLDG) Improvements to the sludge processing and disposal at FLWWTP. The Improvements are to be outlined in a future Preliminary Engineering Study.	\$ 4,000,000	

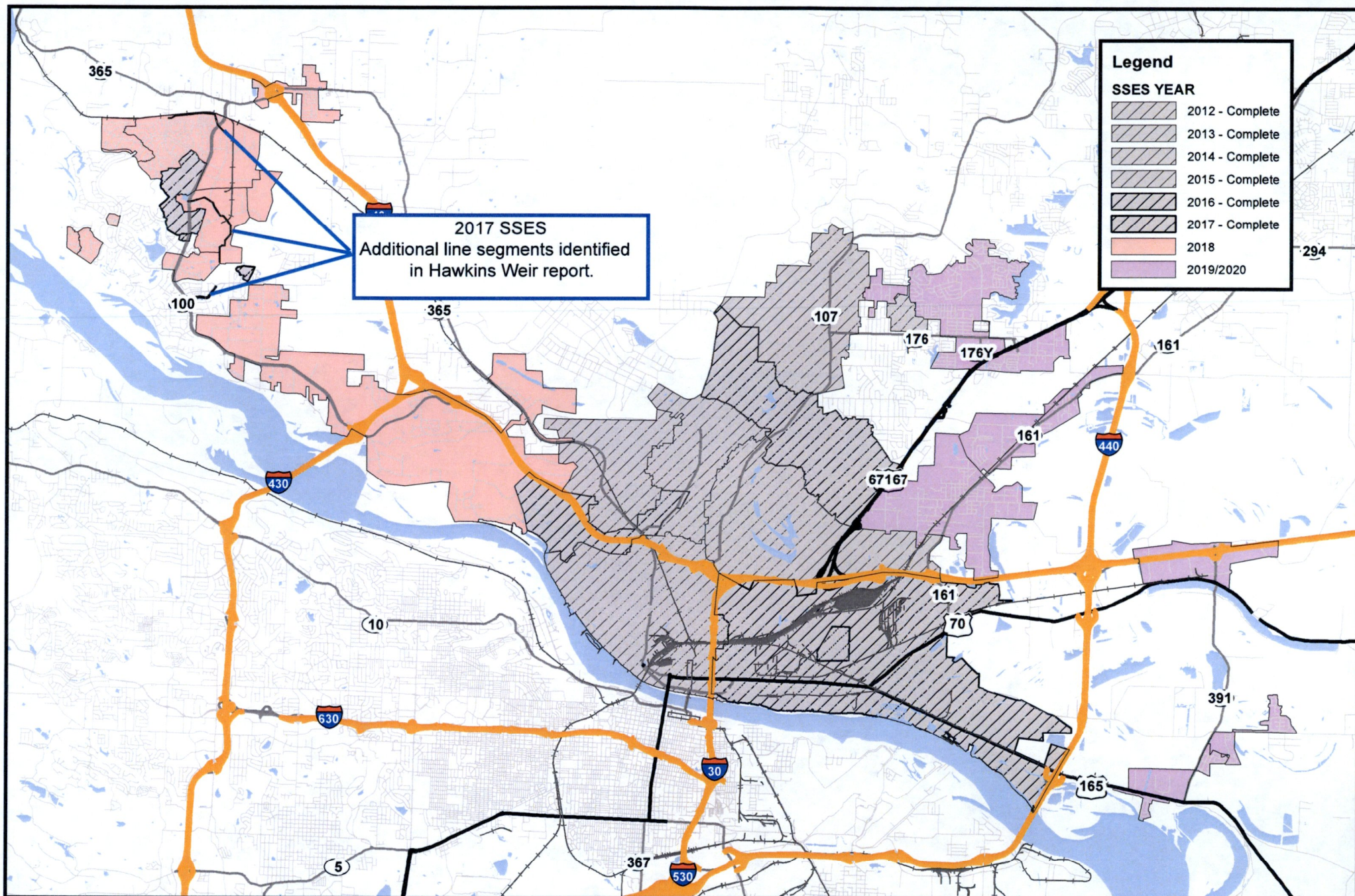
Section 2
Capital Improvement Projects

PHASE 2			Five Mile Creek WWTP Upgrade and EQ Basin (FMC-WWTP2)	\$ 1,736,250
	12	FMC	Convert the Five Mile Creek WWTP to a Sequential Batch Reactor (SBR) or equivalent upgrade. The major improvements for the SBR improvements include install SBR equipment in the existing aerated ponds and lining the cells with concrete, new waste sludge pump station, partitioning the facultative pond into two waste sludge storage basins and one peak flow equalization basin, back-up generation, and yard piping and miscellaneous modifications required for the upgrade.	\$ 11,575,000
PHASE 3			FMC-Equalization Pump Station (FMC-EQPS)	\$ 1,425,000
	13	FMC	—Construct a 27 MG Pump Station used for filling and draining the Flow EQ Tank	\$ 9,500,000
			Lakewood Equalization Storage Basin (FL-LWEQ)	\$ 825,000
	14	FL	Design and construct a 30.8 MG EQ Storage Basin. Water will be held during rain events and pumped to the WWTP when flows subside.	\$ 5,500,000
	15	FL	Lakewood Equalization Pump Station (FL-LWPS)	\$ 1,800,000
PHASE 4			Design and Construct a 28 MGD Pump Station to convey flows at Lakewood EQ Storage.	\$ 12,000,000
			Shilcutt Equalization Storage Basin & Pump Station (WO-EQ,PS)	\$ 1,425,000
	16	WO	Design and Construct a 13.1 MG EQ Basin and a 18 MGD pump station. This basin, proposed near I-40 will attenuate higher peak flows and prevent surcharging the Pump Station	\$ 9,500,000
			Getty Drive Wet Weather Pump Station (FMC-GDPS)	\$ 360,000
	17	FMC	Design and Construct a new 5.4 MGD pump Station to convey flow and decrease upstream overflows during rain events.	\$ 2,400,000
	18	WO	Marche-Morgan —Increase Pump Station Capacity (WO-MMPS)	\$ 79,500
			Upgrade existing capacity from 0.75 MGD to 1.1 MGD.	\$ 530,000

Pipeline Improvements			
19	FL	Sediment Removal Remove sediment from 30,000 LF of pipe.	\$ 52,000
			\$ 290,000
20	FMC	Cedar Street Sewer Improvements: Repair sewer service for residents on Cedar Street. Includes the installation of individual grinder pump stations and a small diameter force main to connect to the residential pump stations.	\$ 40,000
			\$ 220,000
21	FL	Gravity Pipe Replacement (FL-GS0203) Replace 1600 LF of 30" & 36" gravity sewer line.	\$ 230,000
			\$ 1,300,000
22	FL	Gravity Pipe Replacement (FL-GS02) Replace a combined 11,850 LF of 15", 18", 21", 30" & 36" gravity sewer lines.	\$ 200,000
			\$ 1,100,000
23	WO	Gravity Pipe Replacement (WO-GS05) Replace 570 LF of 21-inch gravity sewer line.	\$ 20,000
			\$ 110,000
24	WO	Gravity Pipe Replacement (WO-GS07) Replace a combined 2,750 LF of 15-inch & 18-inch gravity sewer line	\$ 160,000
			\$ 900,000
25	FL	Chicopee Pipeline Replacement Replace 4,700 LF of 24-inch gravity main	\$ 200,000
			\$ 1,100,000
26	FL	Dixie Lane Pump Station Bypass Eliminate existing pump station with 1,750 LF of 10-inch gravity main.	\$ 49,000
			\$ 270,000
27	FMC	Five Mile Creek/Woodruff Interceptor (FMC-GSNM) Replace a combined 2,940 LF of 36-inch through 48-inch pipeline	\$ 170,000
			\$ 940,000
28	FMC	Gravity Pipe Replacement (FMC-GS16) Replace 2950 LF of 18-inch gravity sewer line.	\$ 86,000
			\$ 480,000
29	WO	Gravity Pipe Replacement (WO-GSNME) Replace 1240 LF of 36-inch gravity sewer line	\$ 74,000
			\$ 410,000
30	FL	Gravity Pipe Replacement (FL-GS03) Replace 1530 LF of 30-inch & 36" gravity sewer line	\$ 250,000
			\$ 1,400,000
31	FL	Gravity Pipe Replacement (FL-GS07) Replace a combined 8000 LF of 15-inch through 42-inch gravity pipeline	\$ 1,100,000
			\$ 6,300,000
32	FL	Gravity Pipe Replacement (FL-GS02N) Replace 1200 LF of 42-inch gravity line.	\$ 94,000
			\$ 520,000
33	FL	Gravity Pipe Replacement (FL-GS01N) Replace a combined 11,750 LF of 15-inch through 42-inch gravity line.	\$ 500,000
			\$ 2,800,000
34	WO	Melrose Circle Sewer Improvements Relocate services to approximately 12 customers, abandon & fill an existing 30-inch concrete pipe	\$ 22,000
			\$ 120,000

Section 2
Capital Improvement Projects

35	WO	Gravity Pipe Replacement (WO-GS06)	\$ 83,000
		Replace 3,120 LF of 15-inch gravity line	\$ 460,000
36	WO	Gravity Pipe Replacement (WO-GS06)	\$ 85,000
		Replace 2,460 LF of 24-inch pipeline	\$ 470,000
37	FMC	Clayton Chapel Gravity Pipe Replacement (FMC-GS04)	\$ 230,000
		Replace a combined 7,000 LF of 15-inch through 21-inch gravity line	\$ 1,300,000
38	FMC	Getty Drive Force Main (FMC-GDFM)	\$ 200,000
		Install 7,900 LF of 18-inch force main to convey flows from the wet-weather pump station	\$ 1,100,000
39	FL	Gravity Pipe Replacement (FL-GS09)	\$ 580,000
		Replace 5,800 LF of 42-inch gravity sewer line	\$ 3,200,000
40	FL	Gravity Pipe Replacement (FL-GS08)	\$ 220,000
		Replace a combined 5,880 LF of 21-inch & 24-inch gravity line	\$ 1,200,000
41	FMC	FMC Gravity Pipe Replacement (FMC-GS12)	\$ 200,000
		Replace 6125 LF of 21-inch gravity sewer line	\$ 1,100,000
42	FMC	FMC Gravity Pipe Replacement (FMC-GS13)	\$ 36,000
		Replace 1100 LF of 18-inch gravity sewer line	\$ 200,000
43	WO	Sediment Removal (WO-SR04)	\$ 6,000
		Remove sediment from 3,500 LF of existing line.	\$ 33,000
44	FL	Gravity Pipe Replacement (FL-GS11)	\$ 85,000
		Replace 2252 LF of 21-inch gravity sewer line.	\$ 470,000
45	FL	Gravity Pipe Replacement (FL-GS10)	\$ 430,000
		Replace 680 LF of 21-inch and 1700 LF of 24-inch gravity sewer line	\$ 2,400,000
46	FL	Wilcox Pump Station Force Main Upgrade - Phase 2 (FL-WFM)	\$ 830,000
		Construct a new pump station to convey 5 MGD to Faulkner Lake WWTP	\$ 4,600,000
		Subtotal Pipeline Improvements	\$ 39,700,000

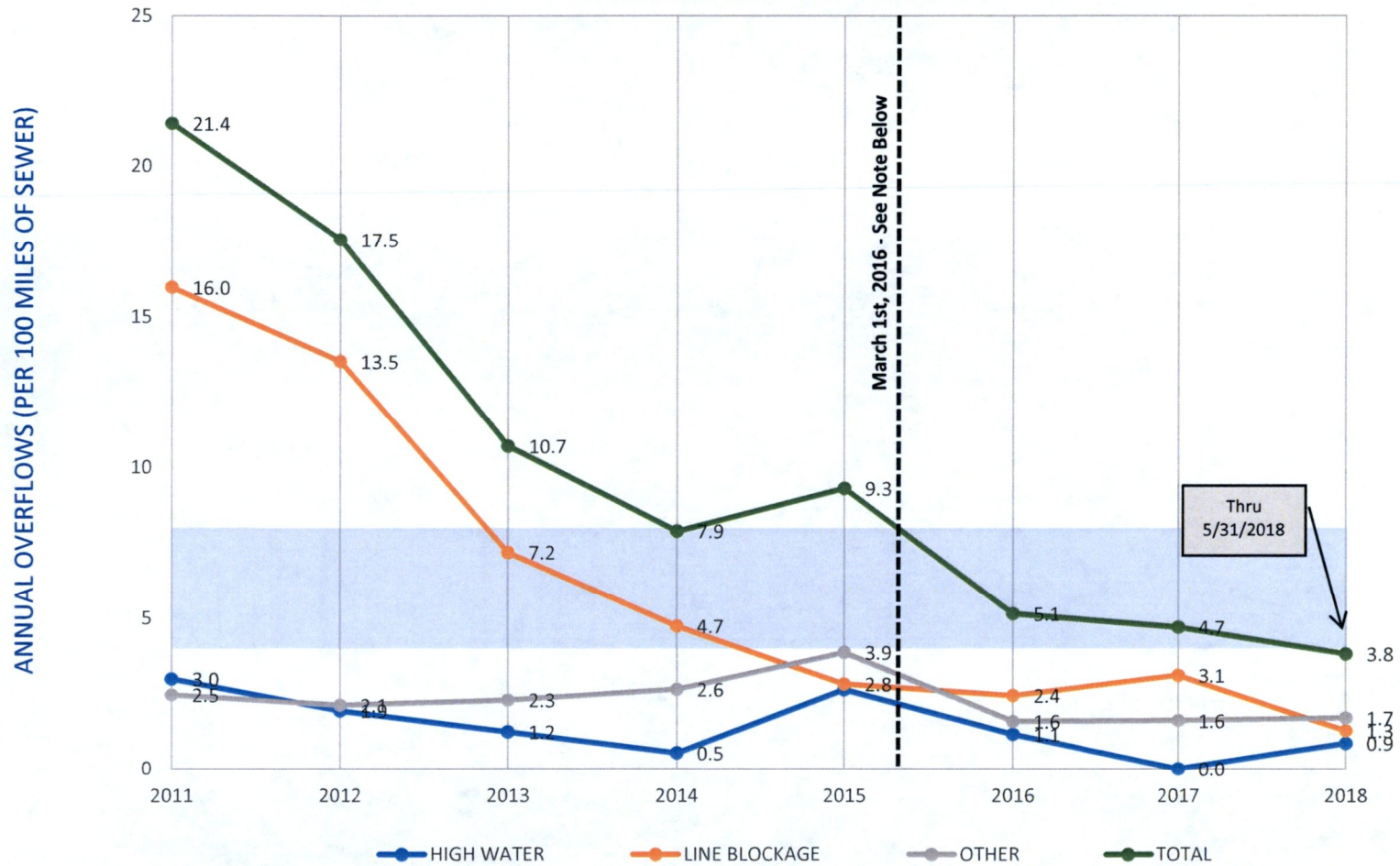


North Little Rock Wastewater SSES Schedule

Printed 6/4/18

The data contained herein was compiled from various sources for the sole use and benefit of the North Little Rock Waste Water Utility. Any use of the data by anyone other than the North Little Rock Waste Water Utility is at the sole risk of the user; and by acceptance of this data, the user does hereby hold the North Little Rock Waste Water Utility and the City of North Little Rock harmless and without liability from any claims, costs, or damages of any nature against the North Little Rock Waste Water Utility and the City of North Little Rock, including cost of defense arising from improper use of the data or use by another party. Acceptance or use of this data is done without any expressed or implied warranties.

APPENDIX A
ANNUAL OVERFLOWS BY CATEGORY (PER 100 MILES OF SEWER)
 NORTH LITTLE ROCK WASTEWATER



Note: On March 1st, 2016, the NLRW assumed O&M responsibilities of the Maumelle SID 500 of Pulaski County (d/b/a MWM). The MWM collection system contained 131 miles of pipeline.
 NLRW collection system prior to March 1st, 2016: 572 miles
 NLRW collection system following March 1st, 2016: 708 miles

Jim Milum
 Printed 6/11/18

APPENDIX A