



LETTER OF TRANSMITTAL

DATE: April 27, 2015 JOB NO.: 1441027.1
 TO: Arkansas Dept. of Environmental Quality RE: Blytheville WWTF Assessment and
5301 Northshore Drive Recommended Plan for Corrective
North Little Rock, AR 72118 Measures
 ATTN: Jacqueline Trotta, Enforcement Analyst

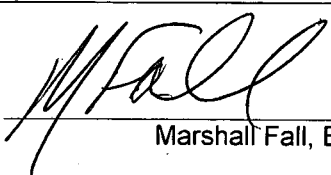
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 Shop drawings Copy of letter Change order Samples
 Prints Plans Specifications Other: Contract Dwgs and Specs

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1	1 ea	N/A	CAO Update reports; North, South and West WWTF	AS

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|---|---|--|
| <input type="checkbox"/> FA For Approval | <input type="checkbox"/> MCN Make Corrections Noted | <input type="checkbox"/> REJ Rejected |
| <input type="checkbox"/> F For Your Use | <input type="checkbox"/> AR Amend and Resubmit | <input type="checkbox"/> RC Review and Comment |
| <input checked="" type="checkbox"/> AS As Requested | <input type="checkbox"/> NET No Exceptions Taken | <input type="checkbox"/> NR Not Reviewed |
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| <input type="checkbox"/> Prints returned after loan to us | <input type="checkbox"/> Other: _____ | |

Remarks:
 Jacqueline, enclsed are the reports and the certification letter from Mayor Sanders. If you have any questions, please feel free to contact me.

Copy to: File (1)
Thomas Jones

Signed: 
 Marshall Fall, E.I.



Office of the Mayor
JAMES W. SANDERS

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April 27, 2015

Jacqueline Trotta
Enforcement Analyst
Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

This letter represents my response to the issues addressed regarding the City of Blytheville's Wastewater system. Enclosed with this letter you will find the Updated Corrected Action Plans for case numbers AR0022560 (West Plant), AR0022578 (South Plant) and AR0022586 (North Plant) that were prepared by our engineering firm, SSR. I have examined these plans, along with my Treatment Coordinator, and believe they will assist us in continuing to upgrade our system. I will be presenting these plans to East Arkansas Planning and Development and the USDA to search for grant opportunities to assist in funding. I will keep your office updated on the status of any funding we are able to secure.

Sincerely,

A handwritten signature in cursive script, appearing to read "James W. Sanders", is written over the typed name and title.

James W. Sanders
Mayor

CITY OF BLYTHEVILLE

BLYTHEVILLE, ARKANSAS

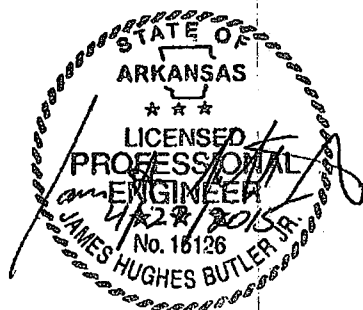
CORRECTIVE ACTION ORDER UPDATE

BLYTHEVILLE WEST WASTEWATER TREATMENT FACILITY
ASSESSMENT AND RECOMMENDED PLAN FOR CORRECTIVE MEASURES

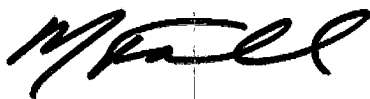


CORRECTIVE ACTION ORDER UPDATE

Blytheville West Wastewater Treatment Facility
Assessment and Recommended Plan for Corrective Measures



Bo Butler, P.E.
Senior Principal



Marshall Fall, E.I.
Project Manager

Prepared for:
City of Blytheville

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SSR Project No.:
14-41-027.1

Date:
April 27, 2015

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1 Executive Summary

In April 2014, the City of Blytheville (City) received a Notice of Violation (NOV) from the Arkansas Department of Environment Quality (ADEQ). The NOV was in response to a review of monthly operating reports (MORs) from the City's West Wastewater Treatment Facility (WWWTF). This facility had 13 violations of NPDES Permit No. AR0022560. The violations included excessive fecal coliform (colonies), ammonia concentrations, and total suspended solids (TSS) concentrations in the WWWTF effluent.

In August of 2014, the facility was mandated by the NPDES to start meeting a specified limit for total recoverable mercury (Hg) concentrations in the effluent. The facility at this time does not meet the limit on a consistent basis.

In February 2015, ADEQ requested that the City issue a detailed Corrective Action Order Update (CAOU). The CAOU report should address the status of the facility's compliance to I&I issues, the potential effluent violations and additional measures to be taken to maintain compliance of the NPDES. The report should also address the status of compliance in regards to total recoverable mercury (Hg) concentrations, and address measures to be taken by the City to begin locating any sources of contamination in the waste stream.

After reviewing plant data and the existing operations at the facility, the following corrective actions were developed. Once implemented by the City, these corrective actions should allow the treatment facility to return to compliance with the NPDES permit.

1. Based on previous completed studies, complete collection system rehabilitation on a priority basis focusing on high priority areas first.
2. Aggressively track and locate sources of Hg in the waste stream flow and require sources to incorporate pre-treatment to remove the Hg from the flow.
3. Conduct rate study and review capital expenditure plans to ensure adequate revenue stream to allow for effective operation, maintenance, repair, and replacement of WWWTF equipment.
4. Install synthetic media in the primary basin of the plant to encourage the growth of nitrifying bacteria and prevent bacteria from washing out of the facilities during heavy flow events.

2 General Information

2.1 Description of Wastewater Treatment Facility

The City treats wastewater at three treatment facilities. This CAOU will address issues at the (WWWTF). The facility is a modified lagoon that incorporates the BIOLAC® technology and consists of traveling screens, a primary aeration and mixing basin, integral clarifiers to facilitate settling, a basin that incorporates both aerated and non-aerated polishing, and ultra-violet disinfection. The design capacity of the WWWTF is 1.5 million gallons per day (MGD). The facility was built adjacent to a retired non-aerated lagoon that was repurposed as sludge disposal basin for the facility. The facility was constructed and commissioned in 1989.

The source of wastewater flow for the WWTF is 17 pumping stations with a combined total capacity of 5,565 GPM. The capacity of each pumping station is summarized in Table 2.1.

Table 2.1- Flow Source (PS Capacities)

West Facility	Shop Lift	1,000 GPM
	21 st Street	600 GPM
	Cypress	200 GPM
	Howard	80 GPM
	Division	800 GPM
	Wards	300 GPM
	5 th Street	225 GPM
	Broadmoor	225 GPM
	East Jr. High	180 GPM
	River Oaks	200 GPM
	Alert Pad	225 GPM
	Dog Pound	180 GPM
	820	600 GPM
	705	300 GPM
	1649	200 GPM
	2000	250 GPM

2.2 Description of Need

In the last eighteen months, the WWTF has experienced ongoing effluent violations of the NPDES permit. Violations have included ammonia (both concentrations and loads), fecal coliform colonies, TSS concentrations, and since April, 2014, total recoverable mercury (Hg). Recent analysis of monitoring records show the facility continues to have an issue meeting the limits set forth in the NPDES due to I&I and also the limits for Hg mandated by the NPDES in April, 2014.

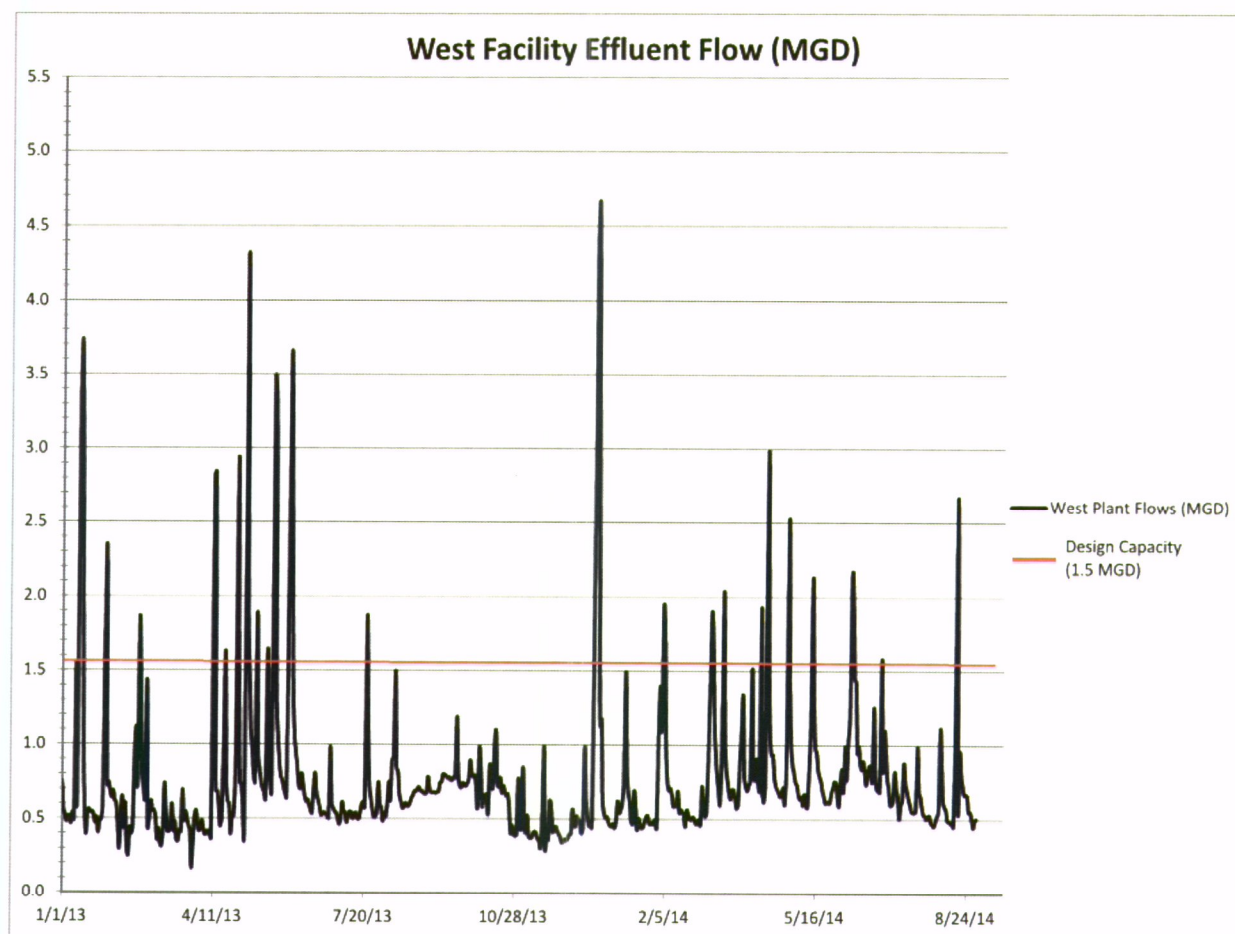
2.3 Influent and Effluent Flows

The daily effluent flows for the facility are summarized in Table 2.2. During a heavy rain event, the facility can go multiple days where the influent flows exceed the facility's design capacity, as evidenced by Figure 2.1 below. Over the last two years, influent flows have exceeded the design flow by as much as 350 percent.

Table 2.2 – Daily Effluent Flows

Flow Condition	West Facility (million gallons)
Minimum Day	0.148
Average Day	0.687
Maximum Day	5.274

Figure 2.1 – Daily Effluent Flows



These flow excursions are directly related to rainfall events as identified in the Daily Operation Reports (DOR's) provided by the City. During these spikes, the plant loses a majority of its microbial treatment ability due to the washout of the nitrifying organisms from the treatment basins. This is confirmed by the Daily Monitoring Reports (DMRs) that show lower-than-normal mixed liquor suspended solids (MLSS) concentrations in the primary mixing basin (as compared to pre-rainfall concentrations) and high total suspended solids (TSS) concentrations in the effluent after every rain event that increased plant flow. The carbonaceous biochemical oxygen demand (CBOD) loading in the influent flow also drops significantly during and immediately after every rainfall event that affects flow. This is due to dilution by inflow and infiltration. This diluted CBOD loading further promotes degradation of the biomass used to treat the wastewater.

The facility was originally designed to have a hydraulic residence time of between 24 and 48 hours to allow for adequate treatment. When the facility receives flows in excess of the design maximum flow, three conditions occur that affect the treatment capabilities of the facility: (1) the hydraulic residence time is reduced such that there is not adequate time for treatment to occur; (2) the additional flow has a very low concentration of CBOD, sharply decreasing the strength of the waste stream, and depriving the biomass of needed nutrients for growth and treatment abilities; and (3) the MLSS concentration in the treatment basin is significantly reduced due to washout of the biomass from the basins, thereby preventing adequate treatment of subsequent incoming flows. As a result of these conditions, the facility could possibly be out of compliance for multiple permit limits for several days while the biomass attempts to reestablish itself.

2.4 Influent and Effluent Quality

Plant MORs were analyzed for the WWTF to diagnose the violations reported by ADEQ. The information submitted covered nearly four years of operating data from 2011 to 2014 for the facility. The data included influent and effluent properties that are monitored on a regular basis to verify the plant's compliance with the NPDES permits and ability to treat the waste stream.

2.4.1 Ammonia

The ammonia level in the effluent flow is a direct reflection of the amount of nitrification provided by biological processes within the lagoon treatment facility. Ammonia is removed from the waste stream by conversion into nitrites and nitrates by nitrifying bacteria. The NPDES permit has three effluent discharge limitations that must be met to avoid violations (i.e., monthly average concentration, 7-day average concentration, and monthly mass loadings). MOR data suggests that the facility will have continued difficulty meeting permit requirements during and after heavy rain events unless the I&I is reduced. A summary of the average effluent ammonia data is provided in Table 2.4.

Table 2.4 – Effluent Ammonia Readings

Effluent Reading	Reading/Permit Limit	
	Winter Months (Oct - Mar)	Summer Months (Apr-Sept)
7-day avg. (mg/L)/Permit Limit	2.1/5.0	2.8/5.0
Monthly Avg. (mg/L)/Permit Limit	2.1/3.0	1.8/2.8
Mass (lb//Day)/Permit Limit	12.5/38	14.0/35.0

2.4.2 Total Suspended Solids (TSS)

TSS is a measurement of solids of a particular size in the waste stream. This measurement is typically reported in units of mg/L (concentration) or lbs/day (mass). Excessive levels of TSS in a plant effluent can have several adverse effects on the receiving waters. High levels of TSS can cause scum to collect at or near discharge sites which can harbor harmful pathogens. TSS can also block out sunlight that native organisms in the receiving water body depend on for survival. One of the most important effects of high TSS levels is the effect it has on disinfection. High TSS levels will inhibit the effectiveness of the UV disinfection process by limiting the transitivity of the ultraviolet rays. In short, the suspended solids block the ultraviolet rays from reaching the target organisms. A high level of TSS in an effluent stream can also indicate that the hydraulic residence time for treatment is insufficient.

Based on MOR data, as influent flows increase beyond the design capacity of the plant, the TSS concentrations in the effluent also increases due to solids being washed out of the plant. Additionally, MOR data suggests that the facility will have continued difficulty meeting permit requirements during and after

heavy rain events unless the I&I is reduced. A summary of the average effluent TSS data is provided in Table 2.6.

Table 2.6 – TSS Readings

Effluent Reading	Reading/Limit
7-day Average (mg/L)	12.9/45
Monthly Average (mg/L)	13.1/30
Monthly Average (lb/day)	102.3/375

2.4.3 Fecal Coliform

Fecal coliform is a bacterium found in the intestines of warm blooded animals. It is an indicator organism that can suggest the presence of more harmful pathogenic organisms. High levels of fecal coliform can indicate poor treatment process performance of the plant. The plant has violated the NPDES discharge permit twice by exceeding the allowable concentration of fecal coliform in the plant effluent. An analysis of the plant data indicates that the dates of the violations correlate to the dates the plant received an excessive volume of flow causing solids to be washed out of the plant. A high concentration of solids in the effluent stream can reduce the effectiveness of the UV disinfection system causing pathogens to survive through the process. MOR data suggests that the facility will have continued difficulty meeting permit requirements during and after heavy rain events unless the I&I is reduced. A summary of the average effluent fecal coliform readings for the 2011-2014 data is provided in Table 2.7.

Table 2.7 – Fecal Coliform Readings

Effluent Reading	West Plant/Permit Limit	
	Winter Months (Oct - Mar)	Summer Months (Apr-Sept)
7-day avg. (colonies/100 ml)	361/2000	172/400
Monthly Avg. (colonies/100 ml)	400/1000	238/200

2.4.4 Total Recoverable Mercury (Hg)

For several years, the WWTP has been reporting higher than acceptable Hg limits in the effluent stream. In April of 2014, three years after the issuance date of the current permit, the facility was required to meet a specified limit for Hg for failing to reduce the concentration in the effluent. According to the recent MORs, there has not been any improvement in the concentrations of Hg in the effluent and additional measures must be taken to trace and locate sources. A study of data collected back to October of 2005 shows a spike in the influent concentrations of Hg in late 2008 and looks to be consistent through the South Plant also. Also a study of the data graphed shows a pattern of spikes in the concentrations every 3 or 4 months.

3 Proposed Treatment Plant Corrections

The proposed treatment facility corrective actions described below intend to mitigate violations of the facility's NPDES permit by attempting to utilize existing facilities and personnel to the greatest extent practical. Recommendations are made on the basis of priority ranking, high priority, medium priority, and low priority.

3.1 High Priority

1. Based on Appendix A, from a report titled "Sanitary Sewer Collection System Report" issued to ADEQ in February of 2012 by Smith, Seckman, Reid, Inc. (SSR), the city shall focus on fixing the sections of pipe listed as "high priority" as funds become available.
 - a. If additional funding is necessary to accomplish this in a timely matter, application to the proper authority should be submitted as soon as possible.
 - b. The City shall continue efforts to indentify additional inflow and infiltration locations within the collection system.
 - c. This action shall be an immediate and continuous effort. Inflow and infiltration should show signs of reduction by June 2016.
2. Re-confirm previous sources of mercury discharge based on prior studies, and confirm whether or not the proper equipment has been installed and is in working order. If a source is identified that does not incorporate proper pre-treatment, equipment such as amalgam particle separators shall be installed at the source.
 - a. A review of customer records shall be completed to determine any actions that may have taken place in 2008 that might be contributing to the high concentration levels in the flow stream.
 - b. A review of customer records shall be completed to help determine any actions that may be repeated every 3 or 4 months.
 - c. Testing and monitoring should continue until all sources are identified and have pre-treatment installed.
 - i. A database shall be created to track and monitor testing results to ensure appropriate recording/reporting procedures are followed and for proper enforcement.

- d. This action shall be an immediate and continuing effort. Concentrations of Hg in the influent and effluent streams should show reasonable potential to meet the allowable permit limits by May, 2016.
 - e. If amalgam particle filters are found to be inadequate at removing contaminants, the city shall require the customers that continue to discharge contaminants to design and construct activated carbon adsorption beds.
3. Review budget capital plans and fares for adequate revenue stream.

3.2 Medium Priority

1. Based on Appendix B, from a report titled "Sanitary Sewer Collection System Report" issued to ADEQ in February of 2012 by Smith, Seckman, Reid, Inc. (SSR), the city shall focus on fixing the sections of pipe listed as "medium priority" as funds become available.
2. Testing of the existing sludge for Hg contamination should be completed. If the sludge should be found contaminated, a plan shall be developed immediately to have the sludge removed from the pond and disposed of as funds become available.
3. Repair and or replace any equipment that may not be performing as designed or is not operable.

3.3 Low Priority

1. If after extensive pipeline repairs have taken place within the collection system do not fix the I&I problem and the plant continues to be washed out during rain events, the City shall install a system of synthetic media in the primary basins of each plant to provide the nitrifying bacteria a surface area for attached growth. This improvement will mitigate washout of ammonia removing bacteria during high flow events. The anticipated date for completion of this action is January 2018.

APPENDIX A
HIGH PRIORITY AREAS

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
705-1								
WD5	346.1	LINER	2	FAIR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 25,227.00
WD4								
							705-1 Subtotal:	\$ 25,227.00
705-2								
WD33	121	CONC	1	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 8,970.00
WD32								
WD34	156.4	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 11,448.00
WD33								
WD35	336.8	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,576.00
WD34								
WD40	232.7	LINER	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 16,289.00
WD2								
WD47	234.1	CONC	1	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 16,887.00
WD46								
WD53	197.4	CONC	1	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,318.00
WD51								
WD55	163	CONC	?	POOR/FULL OF GROUT	RELAY	\$ 90.00	\$ 500.00	\$ 14,670.00
WD54								
							705-2 Subtotal:	\$ 107,158.00
705-3								
WD16	249.1	CONC	2	FAIR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,437.00
WD7								
WD21	172.1	CONC	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 13,047.00
WD20								
WD22	216.1	CONC	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 16,127.00
WD21								
							705-3 Subtotal:	\$ 47,611.00

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
1767-1								
WP18	245.2	CONC	3	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,664.00
WP17								
WP21	75.2	CONC	1	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 5,764.00
WP20								
WP27	206.1	CONC	3	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,927.00
WP24								
WP29	168.2	CONC	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 12,774.00
WP22								
WP30	199.1	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,437.00
WP31								
WP35	400	CONC	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 30,000.00
WP34								
WP44	363.9	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 26,973.00
WP42								
WP40	410.3	LINER	6	FAIR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 31,721.00
WP39								
1767-1 Subtotal:								\$ 72,410.00
1767-2								
WP78	464	CONC	5	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 34,980.00
WP2								
WP79	350.2	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 25,014.00
WP78								
WP80	80	CONC	0	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 5,600.00
WP79								
WP82	391.6	CONC	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 28,412.00
WP81								
1767-2 Subtotal:								\$ 94,006.00
Ruddle-1								

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
ND6	17.2	CLAY	?	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 1,204.00
ND6A								
ND7	216.7	CLAY	1	POOR/SMOKE LEAK	RELAY	\$ 90.00	\$ 500.00	\$ 20,003.00
ND6								
ND8	282	CLAY	3	POOR	RELAY	\$ 90.00	\$ 500.00	\$ 26,880.00
ND7								
ND9	290	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,300.00
ND8								
ND10	404	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 30,280.00
ND9								
ND11	160.6	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 11,742.00
ND10								
ND12	205	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,850.00
ND11								
ND15	146.5	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 12,255.00
ND14								
ND16	182.3	CLAY	4	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,761.00
ND15								
ND17	92.1	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 6,947.00
ND13								
ND19	140.9	PVC	0	FAIR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 9,863.00
ND6A								
ND21A	174.5	CLAY	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,715.00
ND21								
ND20	120.6	CLAY	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 9,942.00
ND22								
ND21A	209.7	CLAY	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,679.00
ND23								
ND22	233.8	CLAY	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,366.00
ND26								

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
ND25	570	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 41,900.00
ND27	235.4	CLAY	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,978.00
ND25								
Ruddle-1 Subtotal:								\$ 288,665.00
Walker Park 1								
NC49A	231.3	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,191.00
NC49								
NC49B	246.4	CLAY	8	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,248.00
NC8								
NC49	288.0	CLAY	9	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,660.00
NC49B								
NC50	117.1	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 9,197.00
NC9								
NC51	215.8	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,106.00
NC50								
NC53	273.0	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 19,610.00
NCS2								
NC54A	43.3	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 3,531.00
NC54								
NC54	98.6	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 7,902.00
NC10A								
SERVICE CAP	143.8	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 11,066.00
NC52								
SERVICE CAP	47.2	CLAY	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 3,804.00
NC54A								
Locust & Lilly	229	CLAY	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,530.00
Popular & Lilly								
NC 20A	703	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 50,710.00
NC19								
NC15A								

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
NC15	426.2	CLAY	9	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 34,334.00
NC15	23.7	CLAY	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 1,659.00
NC16								
NC24	291	CLAY	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,370.00
NC23								
NC25A	344	CLAY	11	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 29,580.00
NC25								
NC25	193.9	CLAY	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,073.00
NC24								
Walker Park 1 Subtotal:								\$ 306,571.00
Walker Park 2								
1	67.6	CLAY	1	POOR	RELAY	\$ 90.00	\$ 500.00	\$ 6,584.00
2								
NC66	80.6	CONC	2	POOR	BURST/RELAY	\$ 85.00	\$ 500.00	\$ 7,851.00
NC65								
NC86	349.5	CLAY	9	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 28,965.00
NC85								
NC87	397	CLAY	12	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 33,790.00
NC86								
NC89	232.4	TRUSS	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,768.00
NC88								
NC93	343	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 25,510.00
NC92								
NC94	300.1	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,507.00
NC93								
NC95	320.3	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,921.00
NC94								
NC99	240	CONC	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 19,300.00
NC98								
NC100								

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
NC99	217.1	CONC	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,697.00
NC102	263.2	CONC	6	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,424.00
NC101								
NC103	361.9	CLAY	7	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 28,833.00
NC92								
NC104	563	CLAY	4	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 41,410.00
NC103								
NC105	246	CLAY	1	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,720.00
NC104								
NC108	250	CLAY	3	POOR	RELAY	\$ 90.00	\$ 500.00	\$ 24,000.00
NC107								
NC109	242.7	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,989.00
NC108								
NC110	160.7	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 13,249.00
NC109								
NC111	264.9	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 20,543.00
NC110								
NC72	257.4	CONC	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 20,018.00
NC71								
NC74	335.5	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,485.00
NC73								
NC75	245.9	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,213.00
NC74								
NC112	86.1	CLAY	2	POOR/SMOKE LEAK	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 7,027.00
NC109								
EOL	148.3	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 11,381.00
NC24								
Walker Park 2 Subtotal:								\$ 469,185.00
Ward 1								
90W3								

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
90W2	323.7	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,659.00
LOCUST & LILY POPLAR & LILY	272.4	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 21,068.00
MICHAELS JEWEL TEE IN LINE	183.9	CONC	6	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,873.00
WF105 WS31	225	CONC	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,250.00
WF108 WF107	296.4	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,248.00
WF109 WF108A	206.9	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,983.00
WF110 WF109	340.7	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 25,349.00
WF111 WF110	305.8	CONC	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,906.00
WF115 WF114	507.2	CONC	12	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 41,504.00
WF116 WF107	347.6	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 25,832.00
WF118 WF117	287.2	CONC	5	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,604.00
WF119 WF118	359.8	CONC	8	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 29,186.00
WS1 PS	51	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 3,570.00
WS30 WS29	247.4	CONC	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 19,318.00
WS31 WS29	62.4	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 5,368.00
WS18 WS15	115	CLAY	2	FAIR	PC & INSTALL MH	\$ 2,000.00	-	\$ 2,000.00

TABLE 1 - HIGH PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length (ft)	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Cost
WS24	175.2	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 14,264.00
WS23								
Ward 1 Subtotal:								\$ 328,982.00
Ward 2								
WF57	94.4	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 6,608.00
WF56								
WF63	138.5	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 10,195.00
WF62								
WF68	252	PVC	?	PIPE MISSING	RELAY	\$ 90.00	\$ 500.00	\$ 22,680.00
WF67								
WF72	447.4	CONC	17	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 39,818.00
WF71								
WF71	319.8	CONC	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,386.00
WF70								
Ward 2 Subtotal:								\$ 103,687.00
High Priority Area Total:								\$ 1,843,502.00

*Unit costs for BURST/RELAY/CIPP=\$70 per LF, RELAY/BURST=\$85 per LF, RELAY=\$90 per LF, REPAIR SERVICE or POINT REPAIR=\$1000 EA, SMH=\$2000 EA

APPENDIX B
MEDIUM PRIORITY AREAS

TABLE 2 - MEDIUM PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length	Pipe Size	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Total Cost
705-2									
WD3	238.4	8"	LINER	1	POOR	RELAY/BURST	\$ 85.00	\$ 500.00	\$ 20,764.00
WD2									
WD27	184.9	10"	LINER	0	POOR	PT. REPAIR	\$ 1,000.00	\$ 500.00	\$ 1,000.00
WD2									
WD42	252.2	8"	LINER	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 18,154.00
WD41									
								705-2 Subtotal:	\$ 39,918.00
705-3									
WD20	110.9	8"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 7,763.00
WD19									
WD24	40.7	8"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 2,849.00
WD23									
								705-3 Subtotal:	\$ 10,612.00
1767-1									
WP41	379.6	8"	CONC	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 28,572.00
WP40									
WP48	249	8"	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 17,930.00
WP47									
								1767-1 Subtotal:	\$ 46,502.00
1767-2									
WP81	384.8	8"	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 27,936.00
WP80									
								1767-2 Subtotal:	\$ 27,936.00
Ruddle-1									
EOL	82.8	6	CLAY	2	POOR	NEEDS M/H	\$ 2,000.00		\$ 2,000.00
ND10									

TABLE 2 - MEDIUM PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length	Pipe Size	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Total Cost
EOL									
ND22	83.1	6	CLAY	1	POOR	NEEDS M/H	\$ 2,000.00		\$ 166,200.00
ND6A									
ND5	320.5	8	PVC	1	POOR	RELAY	\$ 90.00	\$ 500.00	\$ 29,345.00
ND14									
ND13	293.7	6	CLAY	8	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,559.00
ND20									
ND19	381	6	CLAY	8	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 30,670.00
ND24									
ND23	200.6	6	CLAY	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,542.00
ND25									
ND21	315.3	6	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,071.00
Ruddle-1 Subtotal:									\$ 291,387.00
Walker Park 1									
NC27									
NC26	61.4	6"	CONC	?	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 4,298.00
NC28									
NC20	154.7	6"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 10,829.00
NC52									
NC51	353.3	6"	CLAY	6	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 27,731.00
NC16									
NC37	485.6	10"	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 34,992.00
NC17									
NC16	27.9	10"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 1,953.00
NC18									
NC30	42.3	10"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 2,961.00
NC19									
NC18	18.9	10"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 1,323.00
NC30									
NC17	234.2	10"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 16,394.00

TABLE 2 - MEDIUM PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length	Pipe Size	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Total Cost
Walker Park 1 Subtotal: \$ 100,481.00									
Walker Park 2									
NC81A	162	8"	CLAY	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 11,340.00
NC58									
NC81	318.9	8"	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,323.00
NC81A									
NC85	152.7	8"	CLAY	4	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 12,689.00
NC84									
NC91	319.4	10"	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,358.00
NC91A									
NC107	512.8	8"	CLAY	9	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 40,396.00
NC106									
NC73	316.8	8"	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,676.00
NC68									
NC88	328.1	8"	TRUSS	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 23,467.00
NC59									
NC57	434.1	12"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 30,387.00
NC56									
Walker Park 2 Subtotal: \$ 187,636.00									
Ward 1									
WS20	400.2	10"	CLAY	4	FAIR	PC & REPAIR SERVICE	\$ 1,000.00	\$ 500.00	\$ 1,000.00
WS19									
WF102	506.9	6"	CONC	13	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 41,983.00
WF101									
WF106	168.7	10"	CONC	1	FAIR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 12,309.00
WF93									
WF107	200.5	10"	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 15,535.00
WF106									
WF108A									

TABLE 2 - MEDIUM PRIORITY REPAIRS

Upst MH # to Dnst MH#	Line Length	Pipe Size	PIPE TYPE	No. of Services	Line Conditions	Recommendations	Unit Cost*	Service Connect	Total Cost
WF108A	123.9	6"	CONC	3	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 10,173.00
WF114	48	8"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 3,360.00
WF113									
WF117									
WF116	299.9	8"	CONC	8	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,993.00
WS6	364.1	8"	CLAY	6	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 28,487.00
WS5									
WS29									
WS28	305	6"	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,350.00
WS21	382.9	8"	CLAY	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 27,803.00
WS20									
Ward 1 Subtotal:									\$ 187,993.00
Ward 2									
WF4A	56	10"	CONC	0	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 3,920.00
WF57									
WF56	428.9	12"	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 30,523.00
WF55									
WF60									
WF59	307	8"	CONC	2	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,490.00
WF62	313.8	8"	CONC	6	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 24,966.00
WF61									
WF70									
WF59	311.6	8"	CONC	1	POOR	BURST/RELAY/CIPP	\$ 70.00	\$ 500.00	\$ 22,312.00
Ward 2 Subtotal:									\$ 104,211.00
Medium Priority Total Cost:									\$ 996,676.00

*Unit costs for BURST/RELAY/CIPP=\$70 per LF, RELAY/BURST=\$85 per LF, RELAY=\$90 per LF, REPAIR SERVICE or POINT REPAIR=\$1000 EA, SMH=\$2000 EA

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