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December 31, 2020

Ms. Danielle Harbin
Enforcement Analyst
Arkansas Energy & Environment
Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: City of Hot Springs, Arkansas, Garland County
LIS 08-099, AFIN 26-00145 and Permit No. AR0033880
Updated Milestone Schedule Status

Dear Ms. Harbin:

Per your request we are providing this written correspondence to formally provide an update for the City of Hot Springs submission for an updated milestone schedule to be utilized in amendment to the subject consent administrative order executed on June 28, 2011.

The City of Hot Springs will be prepared to submit to you a complete milestone schedule for collection system projects on or about February 26, 2021. Outlined in **Table 1: - Davidson Drive WWTP Milestone Status** is the current milestone status for addressing NPDES permit excursions at the Davidson Drive WWTP. Outlined in **Table 2 - Collection System Milestone Status** is the current milestone status for the collection system.

Attached with this document are two Exhibits. **Exhibit 1 – Davidson Drive WWTP Near Term Projects for Compliance**, and **Exhibit 2 - SECAP Update of Projects from the 2010 SECAP**.

We look forward to working with you and AEE/DEQ staff to amend the consent administrative order to establish a milestone for completion.

Should you have any questions regarding this correspondence please don't hesitate to contact me at 501.993.2922.

Sincerely,
Crist Engineers

A handwritten signature in blue ink that reads "Craig A. Johnson, P.E." The signature is written in a cursive style.

Craig A. Johnson, P.E.
Vice President

Cc: Bill Burrough, CHS
Gary Carnahan, CHS

Kevin Brownlee, CHS
Monty Ledbetter, CHS

Todd Piller, CHS

Item No.	Davidson WWTP Milestone Description	Initiation Date	Completion Date
1.	Headworks and UV Disinfection Improvements – Design and Construction (\$9MM)	January 2017	May 2018
2.	Tertiary Filter Improvements – Design and Construction (\$5MM)	April 2018	May 2021
3.	WWTP Masterplan	April 2019	May 2021
4.	Near Term Delivery Project Identification	April 2019	September 2019
5.	Funding for Wastewater System Improvements	September 2019	September 2020
6.	Professional Services Contract for AEE/DEQ Regulatory Assistance	July 2020	Ongoing
7.	Professional Services Contract for Near Term Delivery Projects for NPDES Compliance	September 2020	Ongoing
8.	AEE/DEQ Permit Modification Submission	July 2020	December 2021
9.	AEE/DEQ Permit Modification Approval	December 2021	July 2022
10.	Construction Contract Complete	September 2022	April 2024
11.	Performance and Demonstration Period	April 2024	September 2024
12.	Final Compliance for WWTP Improvements	-	September 2024

Table 1: Davidson Drive WWTP Milestone Status

Item No.	Collection System Milestone Description	Initiation Date	Completion Date
1.	Reduction of collection system SSO's: 2010 – 18 occurrences per 100 miles of collection system pipe 2020 – 3 occurrences per 100 miles of collection system pipe	2010 to 2020	Ongoing
2.	SECAP Update of Projects from the 2010 SECAP	July 2020	August 2020
3.	Development of Proposed Funding CIP	August 2020	Ongoing
4.	Presentation to Engineering Staff and Administration	-	December 2020
5.	Board of Directors Workshop	-	January 2021
6.	Collection System Milestone and Project Schedule Update to AEE/DEQ		February 2021

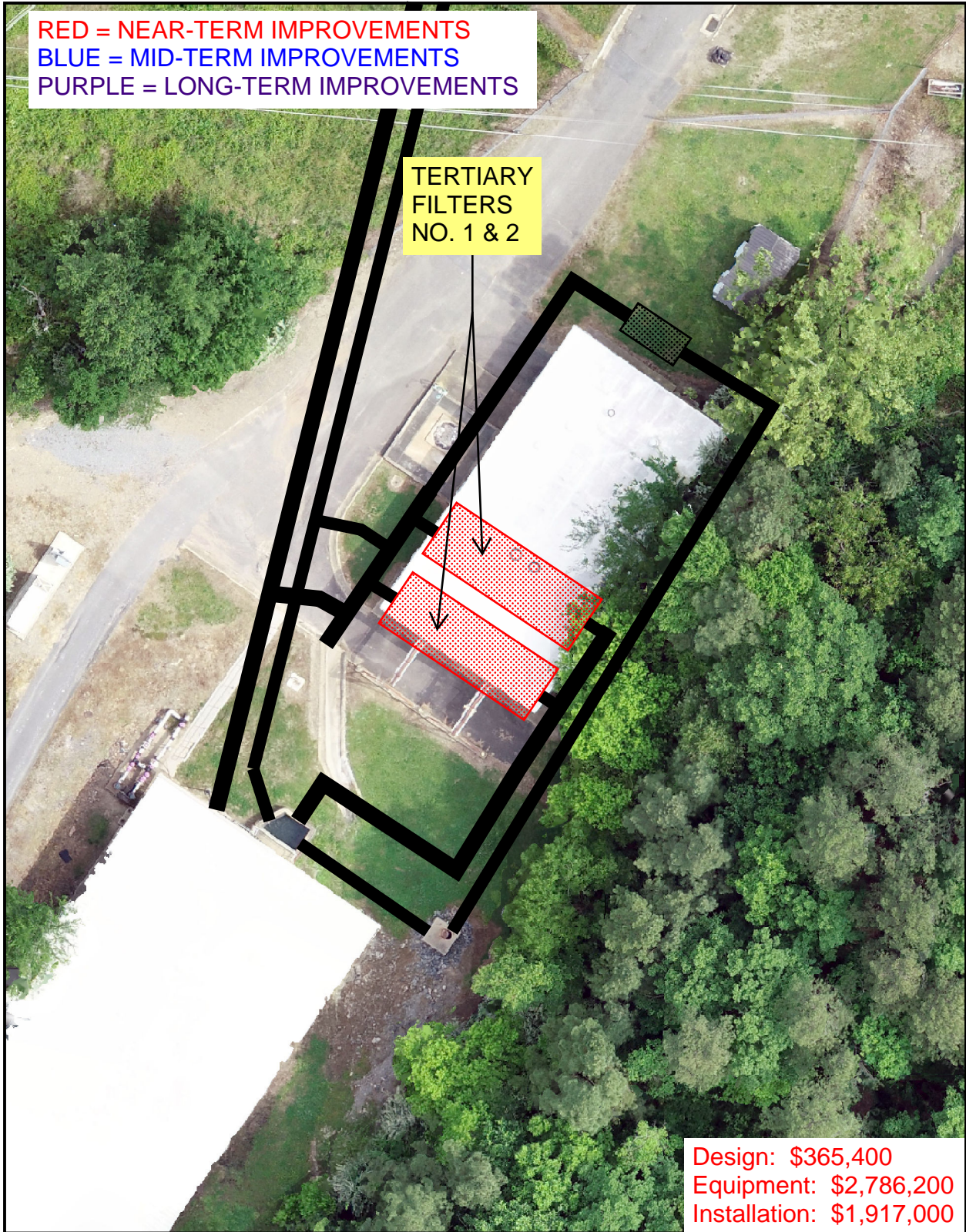
Table 2: Collection System Milestone Status

Exhibit 1

Davidson Drive WWTP Near Term Projects for NPDES Compliance

RED = NEAR-TERM IMPROVEMENTS
BLUE = MID-TERM IMPROVEMENTS
PURPLE = LONG-TERM IMPROVEMENTS

TERTIARY
FILTERS
NO. 1 & 2

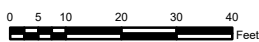


Design: \$365,400
Equipment: \$2,786,200
Installation: \$1,917,000

TERTIARY FILTERS NO. 1 & 2

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
WASTEWATER SYSTEM MASTER PLAN



1 inch = 35 feet

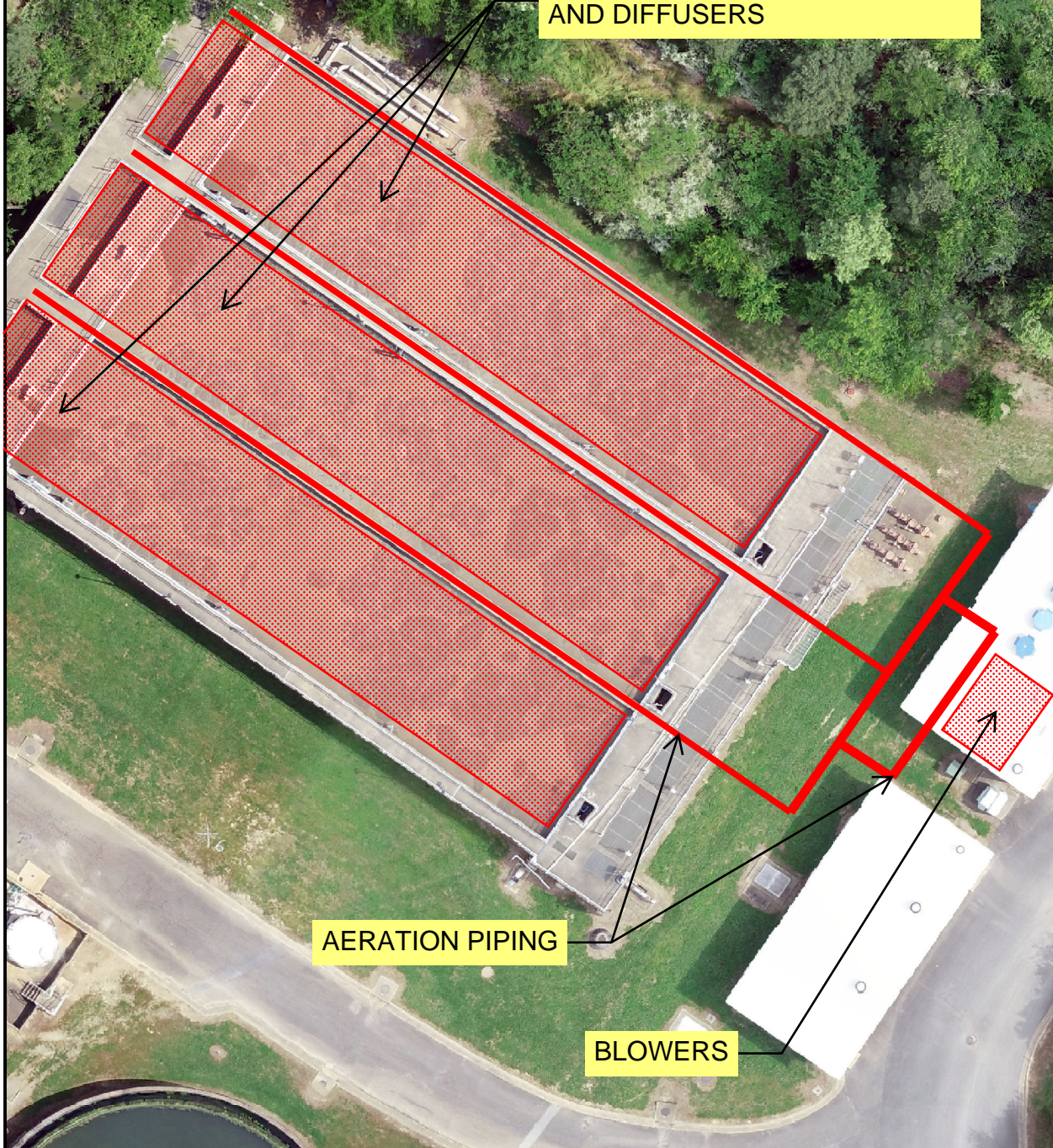


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CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

RED = NEAR-TERM IMPROVEMENTS
BLUE = MID-TERM IMPROVEMENTS
PURPLE = LONG-TERM IMPROVEMENTS

AERATION BASIN LATERALS
AND DIFFUSERS



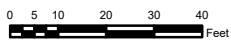
AERATION PIPING

BLOWERS

AERATION BASINS AND BLOWERS

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
WASTEWATER SYSTEM MASTER PLAN



1 inch = 40 feet



CRIST ENGINEERS, INC.
CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

CRIST ENGINEERS, INC.

JOB ESTIMATE COST SUMMARY

PROJECT: Davidson Dr. WWTP - Aeration Basins and Blowers	
OWNER: City of Hot Springs Wastewater Utilities	
LOCATION: Hot Springs, AR	
DATE: 6/17/2020	ESTIMATED BY: Brian N. Wintle, PE, PhD, BCEE
JOB NO: 1923	

Item No.	Description	Unit	Quantity	Unit Price	Estimate
1	Mobilization		Lump Sum		\$67,000
2	Demolition		Lump Sum		\$65,000
3	Aeration Intake and Discharge Piping Improvements		Lump Sum		\$155,000
4	Blower Equipment, Complete		Lump Sum		\$1,200,000
5	Aeration Basins Laterals and Diffusers		Lump Sum		\$450,000
6	Blower Building HVAC Modifications		Lump Sum		\$80,000
7	Process Monitoring		Lump Sum		\$72,000
8	Project Electrical, Complete		Lump Sum		\$191,000
9	Project Scada, Complete		Lump Sum		\$64,000
^{1,2} Construction Cost					\$2,344,000
30% Contingency					\$704,000
³ 15% Project Costs					\$352,000
Total Cost Estimate					\$3,400,000

¹Costs assume a traditional design-bid-build project approach. All estimated total costs should be considered conceptual and to be used for planning purposes only. All estimates are recommended to be revisited and updated as information becomes available during future project planning or preliminary design phases.²Use Engineering News Record (ENR) Construction Cost Index (CCI) for all future base adjustments to present worth dollars, May 2020 ENR CCI = 11418. ³Project costs include geotechnical investigations, surveying, preliminary/ final design, construction administration and resident project representative (RPR) related expenses.

Summary of Improvement

Improvement includes new blower piping, insulated 304 stainless steel distribution and drop piping, sch. 40 CPVC distribution manifolds (submerged), 280 diffuser arms (fine bubble) at 11.9 SCFM each for a total of 3,334 SCFM each basin for a total firm aeration capacity of 10,000 SCFM, new blowers, dissolved oxygen (DO) and/ or oxidation-reduction potential (ORP) process monitoring and blower building HVAC improvements.

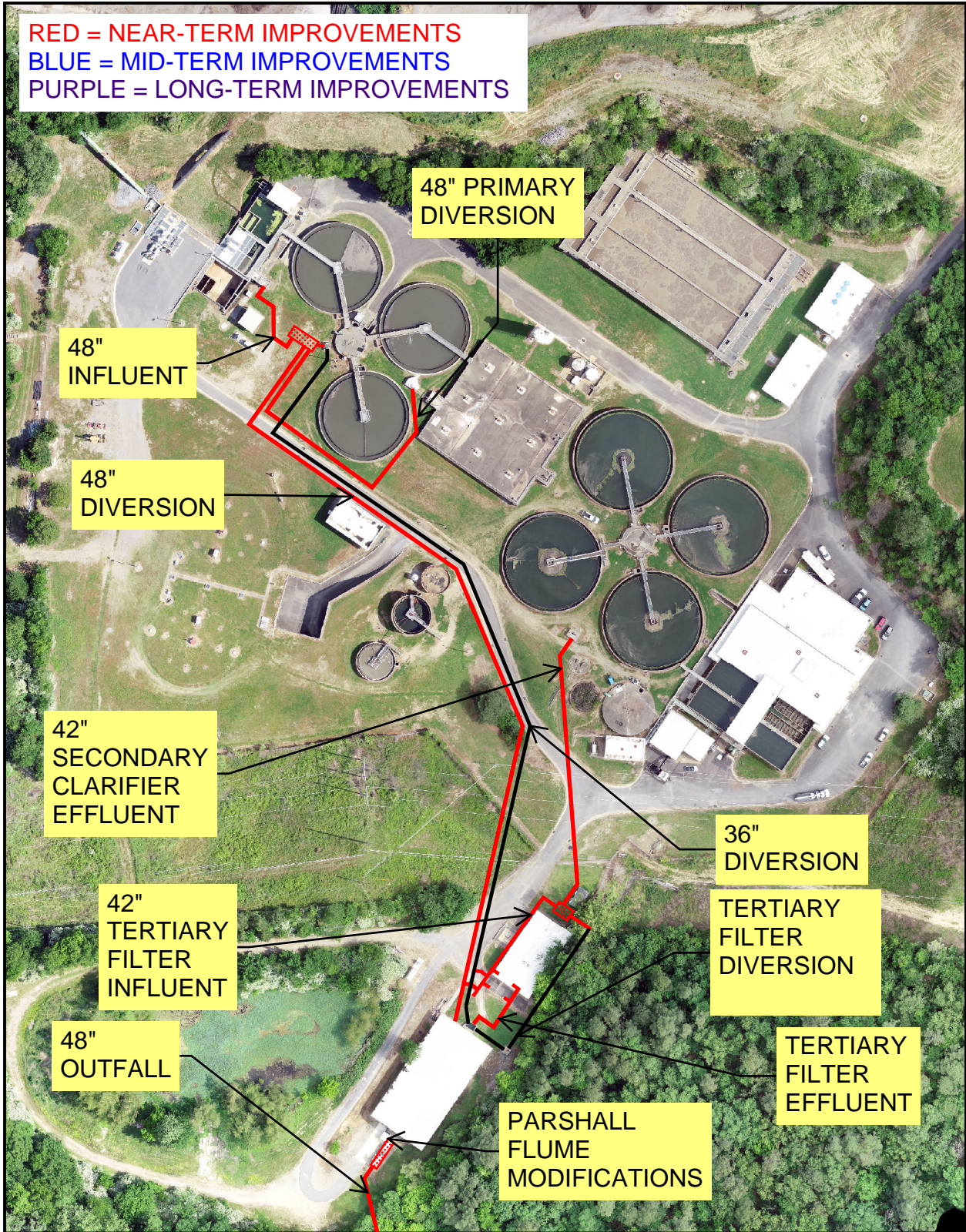
Quick Summary of Project Considerations

- Aeration system upgrades will need to occur concurrently with piping improvements (i.e. elimination of primary clarifiers).
- Existing aeration blowers and headers appears to cause blowers to go into surge when three blowers are in operation.
- Existing aeration capacity is insufficient for future aeration needs when elimination of primary clarifiers occurs.
- Aeration piping and laterals are in poor condition, increasing the risk of failure.
- Aeration system is inefficient in currently condition and configuration.
- Improve the biological capacity of the WWTP.
- Aeration system provides oxygen as an electron acceptor that is needed for biological conversion of cBOD and ammonia (i.e. permit compliance).
- Additional control and monitoring systems will aid in the efficiency of oxygen addition thus reducing the overall cost to the WWTP.

Ranking	Near Term Improvement	
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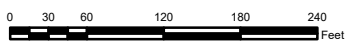
RED = NEAR-TERM IMPROVEMENTS
 BLUE = MID-TERM IMPROVEMENTS
 PURPLE = LONG-TERM IMPROVEMENTS



PIPING IMPROVEMENTS

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
 WASTEWATER SYSTEM MASTER PLAN



1 inch = 150 feet



CRIST ENGINEERS, INC.
 CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

CRIST ENGINEERS, INC.

JOB ESTIMATE COST SUMMARY

PROJECT: Davidson Dr. WWTP - Piping Improvements

OWNER: City of Hot Springs Wastewater Utilities

LOCATION: Hot Springs, AR

DATE: 6/17/2020

JOB NO: 1923

ESTIMATED BY: Brian N. Wintle,
PE, PhD, BCEE

Item No.	Description	Unit	Quantity	Unit Price	Estimate
1	Mobilization		Lump Sum		\$82,000
2	Tertiary Filter Piping		Lump Sum		\$800,000
3	Influent Piping		Lump Sum		\$200,000
4	Primary Clarifier Diversion Piping		Lump Sum		\$275,000
5	Diversion Piping		Lump Sum		\$600,000
6	Outfall Piping		Lump Sum		\$725,000
7	Parshall Flume Modifications		Lump Sum		\$50,000
8	Project Electrical, Complete		Lump Sum		\$50,000
9	Project Scada, Complete		Lump Sum		\$25,000
			^{1,2} Construction Cost		\$2,807,000
			30% Contingency		\$843,000
			³ 15% Project Costs		\$422,000
			Total Cost Estimate		\$4,072,000

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Summary of Improvement

Improvements includes splitter boxes, unclassified excavation, rock excavation, unclassified backfill, select backfill, DIP pipe, DIP fittings, flow measurement, slide gates, weir gates, electrical and SCADA

Quick Summary of Project Considerations

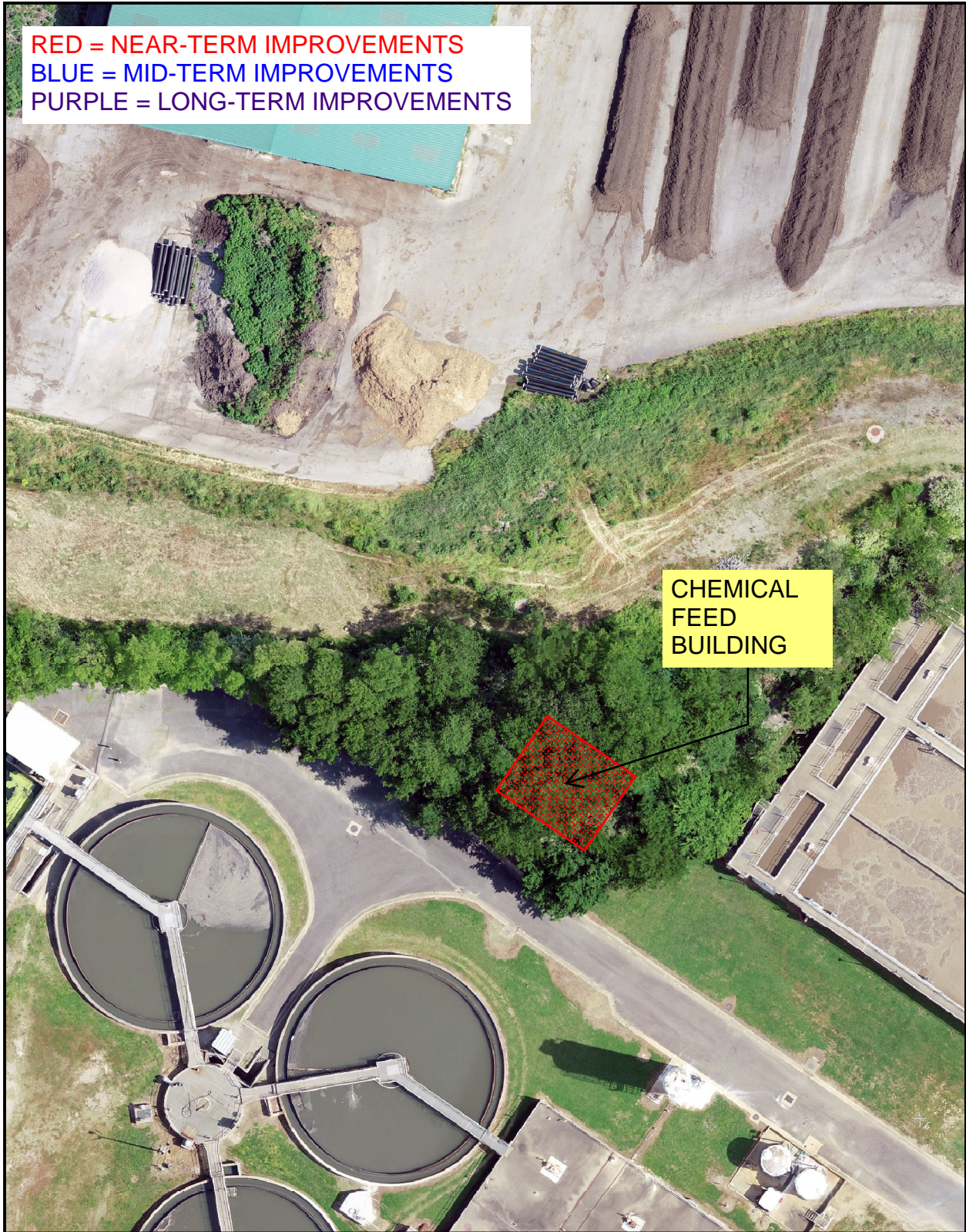
- Piping improvements need to occur concurrently with the construction of the tertiary filters.
- Existing hydraulic constraints within the conveyance piping generates flow management challenges during high flow events.
- Facilitates maximizing the use of existing screening and grit removal processes.
- Increases the diversion hydraulic capacity.
- Provides for flow diversion and secondary effluent flow measurement.
- Provides for the splitting capability of secondary effluent into the tertiary filters or diversion.
- Replaces failing conveyance piping.
- Increases the effluent flow metering capability of the WWTP.
- Piping improvements need to occur concurrently with the construction of the tertiary filters.
- Additional control and monitoring systems will aid in effectively controlling flow through the WWTP.

Ranking

Near Term Improvement



RED = NEAR-TERM IMPROVEMENTS
BLUE = MID-TERM IMPROVEMENTS
PURPLE = LONG-TERM IMPROVEMENTS

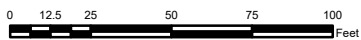


CHEMICAL
FEED
BUILDING

CHEMICAL FEED BUILDING AND NON POTABLE WATER SYSTEM

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
WASTEWATER SYSTEM MASTER PLAN



1 inch = 60 feet



CRIST ENGINEERS, INC.
CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

CRIST ENGINEERS, INC.

JOB ESTIMATE COST SUMMARY

PROJECT: Davidson Dr. WWTP - Chemical Feed Building and Non Potable Water System

OWNER: City of Hot Springs Wastewater Utilities

LOCATION: Hot Springs, AR

DATE: 6/17/2020

JOB NO: 1923

ESTIMATED BY: Brian N. Wintle, PE,
PhD, BCEE

Item No.	Description	Unit	Quantity	Unit Price	Estimate
1	Mobilization		Lump Sum		\$30,000
2	Rock Excavation		Lump Sum		\$85,000
3	Chemical Feed Building, Complete		Lump Sum		\$280,000
4	Chemical Storage and Feed System, Complete		Lump Sum		\$389,500
5	Non-Potable Water System, Complete		Lump Sum		\$166,000
6	Driveway Improvements		Lump Sum		\$35,000
7	Project Electrical, Complete		Lump Sum		\$77,000
8	Project Scada, Complete		Lump Sum		\$38,500
^{1,2} Construction Cost					\$1,101,000
30% Contingency					\$331,000
³ 20% Project Costs					\$221,000
Total Cost Estimate					\$1,653,000

¹Costs assume a traditional design-bid-build project approach. All estimated total costs should be considered conceptual and to be used for planning purposes only. All estimates are recommended to be revisited and updated as information becomes available during future project planning or preliminary design phases. ²Use Engineering News Record (ENR) Construction Cost Index (CCI) for all future base adjustments to present worth dollars, May 2020 ENR CCI = 11418. ³Project costs include geotechnical investigations, surveying, preliminary/ final design, construction administration and resident project representative (RPR) related expenses.

Summary of Project Improvement

Improvement includes new chemical storage building, bulk chemical storage, day chemical feed systems for supplemental alkalinity/ coagulant/ T-P removal and new plant-wide non-potable water pumping/ conveyance system.

Quick Summary of Project Considerations

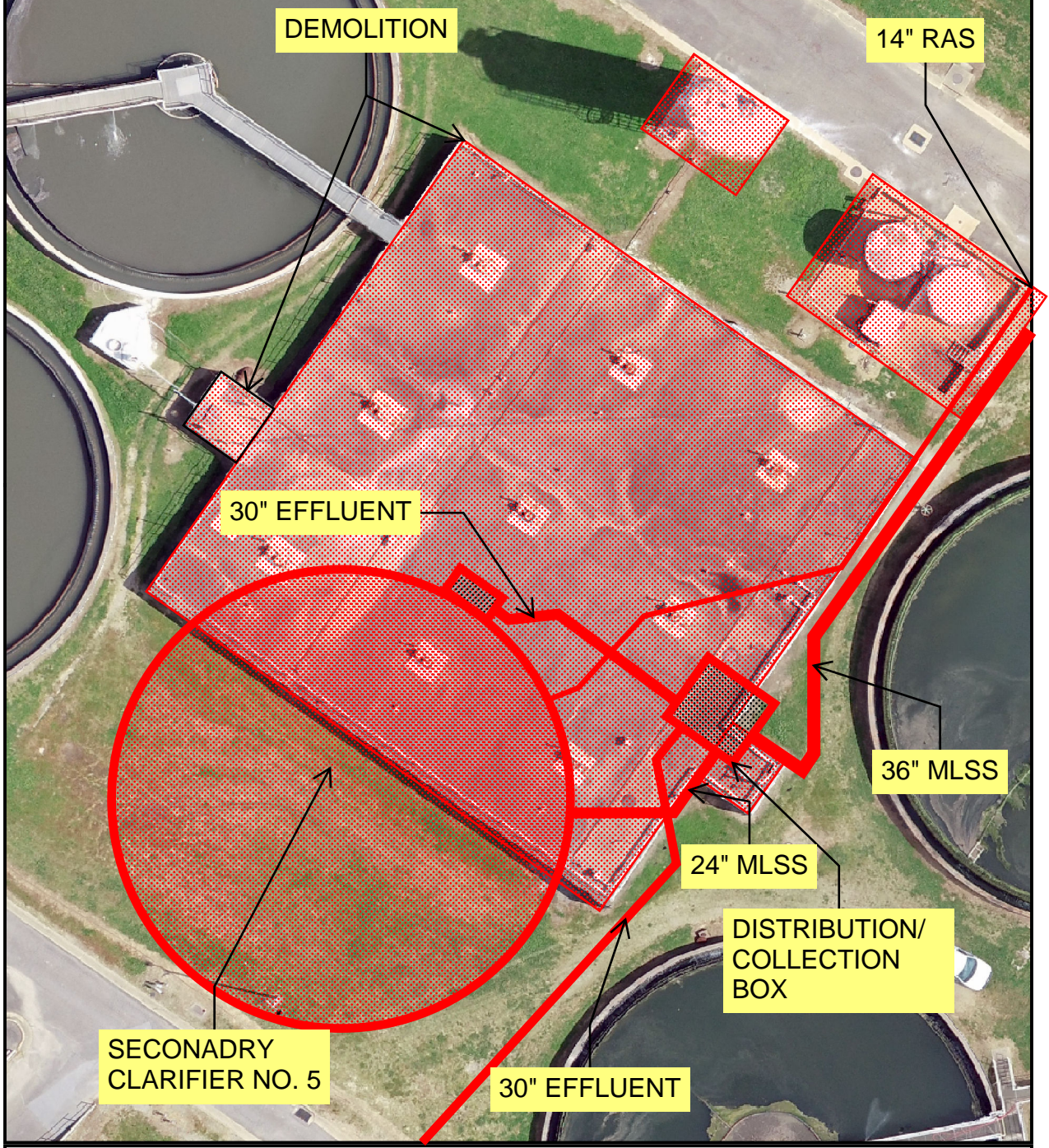
- Chemical addition will need to occur concurrently with piping improvements, aeration system and secondary clarifier improvements.
- Failing supplemental alkalinity (lime) storage and feed equipment.
- Lime use provides additional solids loading to the secondary processes, increases secondary clarifier effluent TSS and increases the overall solids handling process, thus increasing costs.
- Preliminary approach is to utilize magnesium hydroxide to provide supplemental alkalinity.
- Influent alkalinity is insufficient at times to provide NPDES permit compliance.
- Supplemental alkalinity will minimize the risk of effluent quality excursions.
- Does not directly improve the hydraulic or biological capacity of the WWTP.
- Additional chemical storage and feed for sodium aluminate and aluminum chlorohydrate (ACH).
- Used for T-P removal and settlement aid.
- Sodium aluminate and ACH have a direct impact on T-P removal that is required by NPDES permit compliance. Reduces overall cost to the WWTP.
- Plant wide non-potable water pumping and conveyance system will aid secondary clarifiers and aeration basins with foam/ floatable control.
- Use of non-potable water eliminates the demand on the potable water supply system. Reduces overall cost to the WWTP.
- Plant wide non-potable water does not have a direct impact on the hydraulic or biological capacity of the WWTP.

Ranking

Near Term Improvement



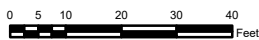
RED = NEAR-TERM IMPROVEMENTS
BLUE = MID-TERM IMPROVEMENTS
PURPLE = LONG-TERM IMPROVEMENTS



SECONDARY CLARIFIER NO. 5

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
WASTEWATER SYSTEM MASTER PLAN



1 inch = 35 feet



CRIST ENGINEERS, INC.
CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

CRIST ENGINEERS, INC.

JOB ESTIMATE COST SUMMARY

PROJECT: Davidson Dr. WWTP - Secondary Clarifier No. 5	
OWNER: City of Hot Springs Wastewater Utilities	
LOCATION: Hot Springs, AR	
DATE: 6/17/2020	ESTIMATED BY: Brian N. Wintle, PE, PhD, BCEE
JOB NO: 1923	

Item No.	Description	Unit	Quantity	Unit Price	Estimate
1	Mobilization		Lump Sum		\$50,000
2	Demolition		Lump Sum		\$200,000
3	Secondary Clarifier, Complete		Lump Sum		\$1,000,000
4	Clarifier Piping		Lump Sum		\$350,000
5	Process Monitoring		Lump Sum		\$10,000
6	Project Electrical, Complete		Lump Sum		\$75,000
7	Project Scada, Complete		Lump Sum		\$25,000
			^{1,2} Construction Cost		\$1,710,000
			30% Contingency		\$513,000
			³ 15% Project Costs		\$257,000
			Total Cost Estimate		\$2,480,000

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Summary of Improvement

Improvement includes demolition, RAS/ MLSS/ Effluent piping, distribution/ collection box, clarifier structure, rock excavation, 100x15 ft clarifier equipment, clarifier equipment installation, process monitoring equipment and electrical/ SCADA improvements.

Quick Summary of Project Considerations

- Additional secondary clarification is needed to increase the peak day secondary capacity of the WWTP.
- Improve the hydraulic capacity of the secondary process of the WWTP.

Ranking	Near Term Improvement	
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RED = NEAR-TERM IMPROVEMENTS
BLUE = MID-TERM IMPROVEMENTS
PURPLE = LONG-TERM IMPROVEMENTS

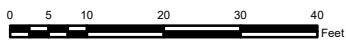
ADD 4TH
BANK OF UV
LAMPS AND
ASSOCIATED
EQUIPMENT



UV DISINFECTION - 4TH BANK OF UV LAMPS TO CHANNEL 1 & 2

DAVIDSON DR. WWTP IMPROVEMENTS

CITY OF HOT SPRINGS, AR
WASTEWATER SYSTEM MASTER PLAN



1 inch = 25 feet



CRIST ENGINEERS, INC.
CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS

MAY, 2020

CRIST ENGINEERS, INC.

JOB ESTIMATE COST SUMMARY

PROJECT: Davidson Dr. WWTP - UV Disinfection - Add 4th Bank of UV Lamps to Channel 1 and 2	
OWNER: City of Hot Springs Wastewater Utilities	
LOCATION: Hot Springs, AR	
DATE: 6/17/2020	ESTIMATED BY: Brian N. Wintle, PE, PhD, BCEE
JOB NO: 1923	

Item No.	Description	Unit	Quantity	Unit Price	Estimate
1	Mobilization		Lump Sum		\$19,000
2	Add 4th Bank of UV Lamps, Complete		Lump Sum		\$550,000
3	Project Electrical, Complete		Lump Sum		\$50,000
4	Project Scada, Complete		Lump Sum		\$25,000
			^{1,2} Construction Cost		\$644,000
			30% Contingency		\$194,000
			³ 20% Project Costs		\$97,000
			Total Cost Estimate		\$935,000

¹Costs assume a traditional design-bid-build project approach. All estimated total costs should be considered conceptual and to be used for planning purposes only. All estimates are recommended to be revisited and updated as information becomes available during future project planning or preliminary design phases. ²Use Engineering News Record (ENR) Construction Cost Index (CCI) for all future base adjustments to present worth dollars, May 2020 ENR CCI = 11418. ³Project costs include geotechnical investigations, surveying, preliminary/ final design, construction administration and resident project representative (RPR) related expenses.

Summary of Improvement

Improvements includes adding the 4th banks of UV and associated equipment to expand the disinfection to 75 MGD.

Quick Summary of Project Considerations

- Additional UV disinfection equipment bank increases the disinfection capability from 44 to 75 MGD (increase of 70%).
 - Provides additional equipment redundancy during average day flow events.

Ranking	Near Term Improvement	
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Exhibit 2

SECAP Update of Projects from the 2010 SECAP

STATUS UPDATE OF PROJECTS FROM 2010 SECAP

In 2010 RJN Group, Inc. was retained by the City of Hot Springs to develop a Sewer Evaluation and Capacity Assurance Plan (SECAP). The SECAP was developed as part of the City's effort to respond to an Arkansas Department of Environmental Quality (ADEQ) Administrative Order (AO) to alleviate the frequency of reoccurring sanitary sewer overflows (SSO). The following Technical Memorandum (TM) examines the recommended projects from the 2010 SECAP and provides a status update. The City most certainly made additional improvements to the sanitary sewer systems as part of typical maintenance operations which have not been captured in this status evaluation.

2010 SECAP RECAP

The 2010 SECAP provided recommendations for capacity enhancements and inflow/infiltration (I/I) rehabilitation. A comprehensive evaluation of the sanitary collection system was undertaken to develop a detailed plan to reduce I/I, along with increasing capacity where needed. Along with surveying all ten-inch and greater diameter sewers to build a hydraulic model, all 12,000+ manholes in the system were inspected. Additionally, smoke testing of 90% of the sewer lines was completed in combination with over 50 dye tests to pin-point high contributors of I/I to the system.

As mentioned, a hydraulic model was built and calibrated to utilize as the tool to evaluate which projects together collectively removed SSO's and was most cost effective. The Innovyze software, InfoWorks ICM, was the modeling software selected.

Sixty-five (65) flow meters were installed throughout the system for a period of 75 days. The meter locations can be seen on Figure 1. The flow meters provided dry and wet-weather flows and was utilized to calibrate the model. Also, the meters furnished the data necessary to understand which areas of Hot Springs was experiencing high levels of I/I. Understanding this, allowed RJN and the City information of where to try to "shave" off these peak flows with infrastructure renewal projects and also where capacity enhancements were necessary.

The sanitary collection evaluation identified 4,735 manholes with defects contributing approximately 3.5 MG of inflow. Smoke testing determined 2,585 defects throughout the system contributing approximately 6.6 MG of inflow. Dye testing established 5.1 MG of inflow and also found two direct connections from the storm sewer tied into the sanitary system. These locations can be seen on Figures 2 and 3 and were disconnected by the City and reestablished to the storm system.

Garver Engineers completed a full assessment of pump stations and submitted a separate document to the City of Hot Springs. This report outlined a litany of pump station improvements which to the best of our knowledge was completed by the City. These recommendations were for overall maintenance and upkeep and not based on capacity analysis.

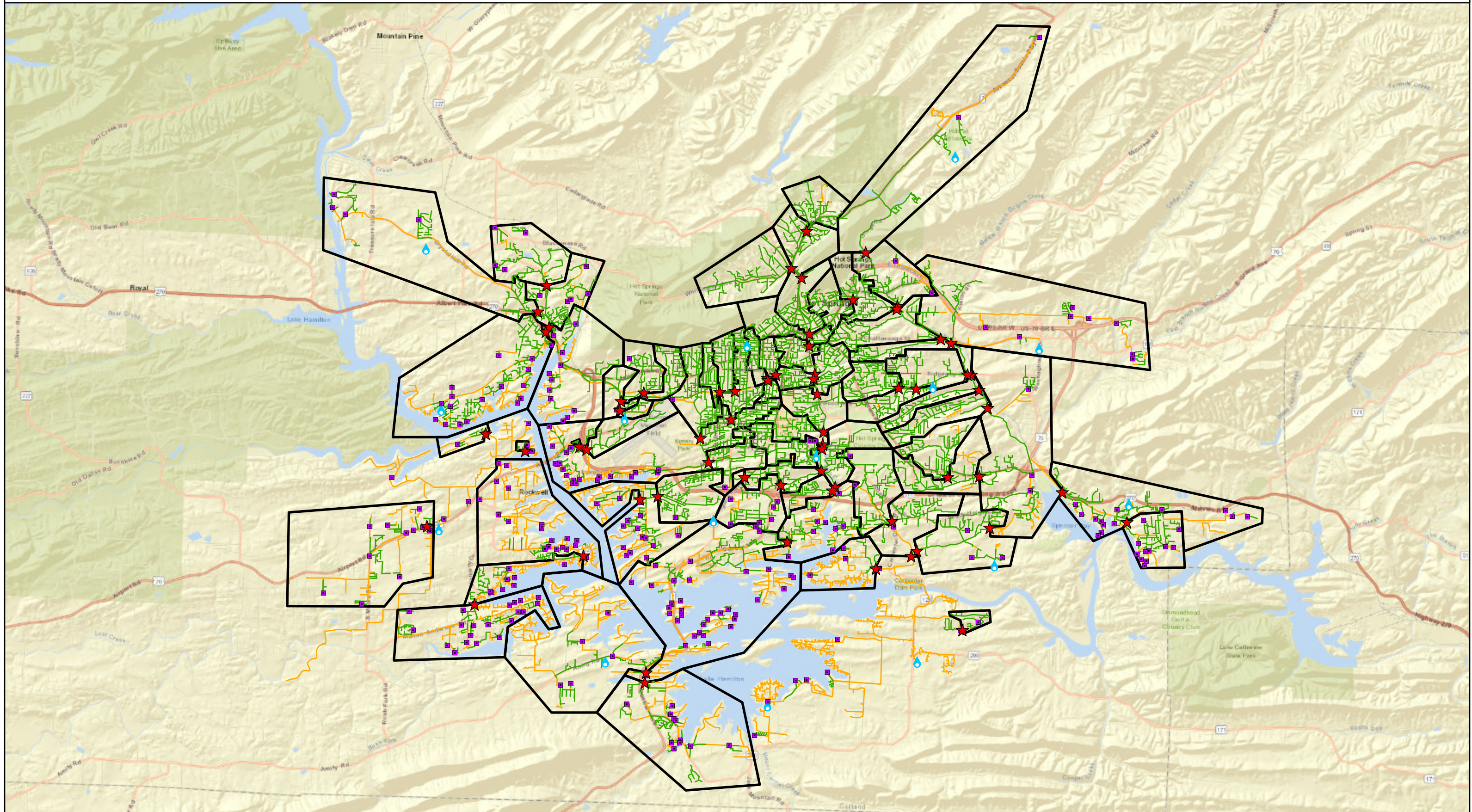
This memo outlines projects recommended in the SECAP and provides updates to those that have been completed, those which are still scheduled, and those which were not performed. The SECAP provided recommendations for the following asset classifications:

- Pump Stations
- Force Mains

- Gravity Mains
- Manholes

The City has undertaken a number of rehabilitation projects targeting I/I removal. The City initially started by rehabilitating manholes. The 4,735 manholes recommended for rehabilitation were further evaluated and proceeded through design and construction. Gravity mains contributing high amounts of I/I were also targeted for rehabilitation. A total of 18,917 linear feet and 9 point repairs were designed and constructed to remove I/I from the sanitary sewer system. The tributary areas of the Davidson Wastewater Treatment Plant and Southwest Treatment Plant have seen reductions of 21.9 percent and 10.4 percent respectively due to the City's rehabilitation efforts as a result from post flow monitoring after construction projects had been completed.

CITY OF HOT SPRINGS, AR



CITY OF HOT SPRINGS, AR

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CITY OF HOT SPRINGS, AR



PUMP STATION IMPROVEMENTS

The 2010 SECAP evaluated 293 pump stations located within the sanitary sewer system. Information provided from Garver Engineers Pump Station Evaluations was utilized along with personnel doing additional investigations. Generally, wherever available, pump curves, wet well dimensions, along with fore main information was added to the InfoWorks ICM model. Some key pump stations modeled were the Fairwood Pump Station, Gulpha Pump Station, Highway 270 Pump Station, Hogan Creek Pump Station, Hot Springs Creek Pump Station, Molly Creek Pump Station, and Mazarn #1-4 Pump Station. Capacity analysis determined eleven (11) pump stations were undersized and required capacity improvements. An additional four (4) stations were recommended for improvements, however, were not deemed necessary to eliminate SSO's.

In the table below the column "Output Required with I/I Reduction (MGD)" translates to an overall 10% reduction in I/I across the system. Capital Improvement Projects (CIP) were modeled and selected under the assumption that the City would achieve a 10% reduction in I/I. It should be noted that the City accomplished slightly over a 20% reduction in overall I/I in their priority inflow removal projects as mentioned previously.

TABLE 1

PUMP STATION CAPACITY IMPROVEMENT RECOMMENDATION STATUS

City Basin	Pump Station	Existing Output (MGD)	Output Required with I/I Reduction (MGD)	Required/Recommended Improvement	Status
Gulpha	Gulpha	13.10	24.70	Required	Under further consideration
Stokes	Highway 270	0.28	1.87	Required	Completed
Stokes	Hogan Creek	3.40	Adjust Pump Levels	Required	Completed
Stokes	Molly Creek	2.77	3.07	Required	I/I Reduction in tributary area eliminated capacity upgrade
Stokes	PS20	0.19	1.01	Required	Under further consideration
Stokes	Stokes	11.85	Ensure fully operational	Required	Completed
Hot Springs Creek	Fairwood	1.80	5.53	Required	Completed

TABLE 1

PUMP STATION CAPACITY IMPROVEMENT RECOMMENDATION STATUS

Hot Springs Creek	Lakeside	0.58	2.38	Required	Not Completed
Hot Springs Creek	Hot Springs Creek	40.00	51.00	Required	I/I Reduction coupled with removing flows from the Fairwood PS flows with new FM, coupled with use of diesel pump eliminated capacity upgrade
Mazarn	Mazarn #1	0.90	1.00	Required	Completed
Mazarn	Mazarn #4	0.38	0.90	Required	Completed
Gulpha	Wilson-Mill	0.47	0.87	Recommended	Under further consideration
Stokes	Harold Drive	0.53	0.57	Recommended	Completed, changed duty points at station
Hot Springs Creek	Quail House	0.74	1.08	Recommended	Under further consideration
Hot Springs Creek	Moonlight Bay	0.19	0.20	Recommended	Completed, changed duty points at station

At the time of the 2010 SECAP the largest pump station in Hot Springs was the Hot Springs Creek Pump Station. The station was configured with triplex pumps and a design capacity of 40 MGD. At the time a planned force main was in development (Fairwood Force Main) that would divert flows from the Fairwood Basin. Even with this planned flow reroute the Hot Springs Creek Pump Station will still be under capacity.

The Stokes Pump Station was designed with a capacity of 20 MGD and configured with triplex pumps. During the 2010 SECAP flow monitoring period it was discovered that only one or two of the pumps would operate during wet weather. Making all three pumps fully operational would provide adequate capacity at the pump station.

FORCE MAIN IMPROVEMENTS

The 2010 SECAP determined that 66,176 linear feet of force main capacity improvements were required. The recommendations included increasing the diameter of existing force mains or construction of parallel force mains. Table 2 summarizes the force main capacity improvement recommendations from the 2010 SECAP.

TABLE 2 FORCE MAIN CAPACITY IMPROVEMENT RECOMMENDATION STATUS					
City Basin	Project	Length (ft)	Existing Diameter (in)	Required Diameter with I/I Reduction (in)	Status
Hot Springs Creek	Fairwood FM Phase IV	11,182	0	36 & 42	The SECAP had Fairwood FM Phase I, II, and III in model. Phase IV has been completed.
Gulpha	Gulpha FM	16,016	0	27	I/I Reduction has been focus. Still under consideration and is very likely necessary
Mazarn	Mazarn FM	4,966	0	10	This project was recommended for efficiency purposes. Would eliminate pumping flow through 4 pump stations. Has not been completed.
Stokes	Stokes FM	29,751	0	24	Completed, however was tied into Fairwood Phase IV FM, reducing overall length.

TABLE 2 FORCE MAIN CAPACITY IMPROVEMENT RECOMMENDATION STATUS					
Fairwood	Albert Pike Rd FM	3,010	4	8	Not Completed
Hot Springs #2	Farrs Landing FM	732	6	6	I/I Reduction eliminated project
Catherine Heights	Carpenter Dam Rd FM	519	8	10	I/I Reduction eliminated project

During the 2010 SECAP development a new force main from the Fairwood Pump Station to the Davidson WWTP (Fairwood PM Phase IV) was under construction. The intent of this force main was to divert flow from the Hot Springs Creek Pump Station reducing the needed capacity at the pump station. The current 30-inch force main from Hot Springs Creek Pump Station would then manifold into the new force main. Construction of the Fairwood FM Phase IV has been completed.

Several alternatives were evaluated to convey flow from the Stokes Pump Station to the Davidson WWTP. Ultimately it was determined that constructing a new 24-inch parallel force main was the most viable solution. The station would be configured to allow dry-weather to use the existing 24- inch diameter main. During wet weather events, the peak flow through the existing main would be limited to 7.6 MGD. This prevents overloading of the downstream gravity sewer main.

GRAVITY SYSTEM IMPROVEMENTS

CAPACITY – GRAVITY MAINS

The need for 79,728 linear feet of capacity improvements for gravity mains were identified in the 2010 SECAP. Projects were developed based upon line proximity. The vast majority of these capacity projects targeting gravity collection lines were eliminated from I/I reduction projects the City undertook.

TABLE 3

GRAVITY MAIN CAPACITY IMPROVEMENT RECOMMENDATIONS

City Basin	Project	Length	Status
Hot Springs Creek	4 th St & Greenwood Ave	5,564	I/I Reduction eliminated project
Second Street	4 th St & Greenwood Ave	248	I/I Reduction eliminated project
Fairwood	Albert Pike Rd	2,303	Completed
Highway 270	Albert Pike Rd	404	Completed
Carpenter Dam	Carpenter Dam	269	I/I Reduction eliminated project
Catherine Heights	Carpenter Dam	817	I/I Reduction eliminated project
Gulpha	E Grand Ave	295	Not Complete, necessary for SSO removal
Gulpha	Gulpha Interceptor	20,192	I/I Reduction is target, however downstream sections may need to be constructed
Hot Springs Creek	Hot Springs Creek Interceptor	12,465	I/I Reduction nearly eliminated project. Further I/I Reduction recommended
Hot Springs #2	Lake Hamilton Dr	1,570	Under further consideration
Mazarn	Marion Anderson Rd	306	I/I Reduction eliminated project
Hot Springs Creek	Park Ave	775	Under further consideration
Gulpha	Ridgeway St	8,159	I/I Reduction is target

TABLE 3 GRAVITY MAIN CAPACITY IMPROVEMENT RECOMMENDATIONS			
Hot Springs Creek	Seneca St	3,354	I/I Reduction eliminated project
Hot Springs Creek	Shady Grove Rd	5,425	I/I Reduction eliminated project
Gulpha	Spring St & Festival St	248	Not Complete, necessary for SSO Removal
Hot Springs Creek	Stokes Interceptor	9,775	Completed
Gulpha	Upper Gulpha Interceptor	5,887	I/I Reduction reduced overall length, however sections need to be completed for SSO Removal
Hot Springs Creek	W Saint Louis St	1,672	I/I Reduction eliminated project

INFLOW/INFILTRATION REDUCTION

Over 100,000 linear feet of gravity mains were determined to have defects that allowed inflow/infiltration into the sanitary sewer system. The 2010 SECAP recommended that 97,723 linear feet be completely replaced through either CIPP Liners, pipe bursting, or open cut. Another 93 point repairs were also recommended. Tables 4 and 5 summarized the linear footage of complete replacement and point repairs by City Basin from the 2010 SECAP. Additionally, 4,735 manholes were identified as requiring rehabilitation to alleviate inflow/infiltration issues.

The City has completed the targeted I/I removal to date. Manhole rehabilitation is the most cost-efficient method for I/I removal and the City elected to make that it a priority. It can be advantageous to rehabilitate gravity mains with large amounts of I/I. The City had identified 22,793 linear feet gravity mains in high I/I areas that were contributing a large amount of I/I to the system. These gravity mains were selected for rehabilitation and 18,917 linear feet has been constructed mostly in the Hot Springs Creek and Gulpha Basins.

TABLE 4 GRAVITY MAIN INFLOW/INFILTRATION REDUCTION COMPLETE REPLACEMENT STATUS			
City Basin	Complete Replacement (LF)	Designed (LF)	Constructed (LF)
Fairwood	1,073	1,073	1,073

TABLE 4			
GRAVITY MAIN INFLOW/INFILTRATION REDUCTION COMPLETE REPLACEMENT STATUS			
Hot Springs Creek, HWY 270, Halteria, Port Au Prince	61,077	12,752	8,876
2nd Street	438	0	0
Molly Creek	3,839	2,879	2,879
Hogan Creek	375	375	375
Hot Springs #4	394	394	394
Beverly Hills	463	463	463
Gulpha, Belvedere	29,849	4,642	4,642
Hot Springs #1, Lakeside	215	215	215

TABLE 5			
GRAVITY MAIN INFLOW/INFILTRATION REDUCTION POINT REPAIR STATUS			
City Basin	Point Repairs (EA)	Designed (EA)	Constructed (EA)
Fairwood	2	1	1
Hot Springs Creek, HWY 270, Halteria, Port Au Prince	60	8	2
2nd Street	2	0	0
Molly Creek	4	3	3
Hot Springs #4	2	1	1
Beverly Hills	1	1	1
Gulpha, Belvedere	19	1	1
Catherine Heights	2	0	0
Carpenter Dam	1	0	0

SUMMARY

The projects outlined above were original recommendations from the 2010 SECAP. As projects were completed and more information became available, adjustments to remaining projects were made. The most significant adjustment to original projects was the elimination of many capacity upgrades as a result from the success of the I/I reduction program.

The rehabilitation of over 4,500 manholes and 23,000 linear feet of high I/I contributing gravity mains eliminated over 20% of peak wet-weather flows. This adjusted many isolated capacity line upgrades and/or pump station upgrades. However, several large capacity enhancements were still necessary to alleviate many reoccurring SSO's. Primarily these were the Stokes Interceptor up-sizing, the Stokes Pump Station Upgrades, and the parallel Stokes force main. Additionally, the new Fairwood Force Main which conveys flow from the northwest portion of the collection system to Davidson WWTP was integral in removing SSO's. The Fairwood force main along with conveying northwest flows removed large amounts of flow from the gravity system which was conveyed to Hot Springs Pump Station.

The combination of these works took the City of Hot Springs from experiencing 18 SSO's per 100 miles of gravity sewer to presently experiencing less than 3 per 100 miles. A separate technical memorandum to this memo has been provided which correlates recorded SSO's to rainfall events in Hot Springs for a period of six months.

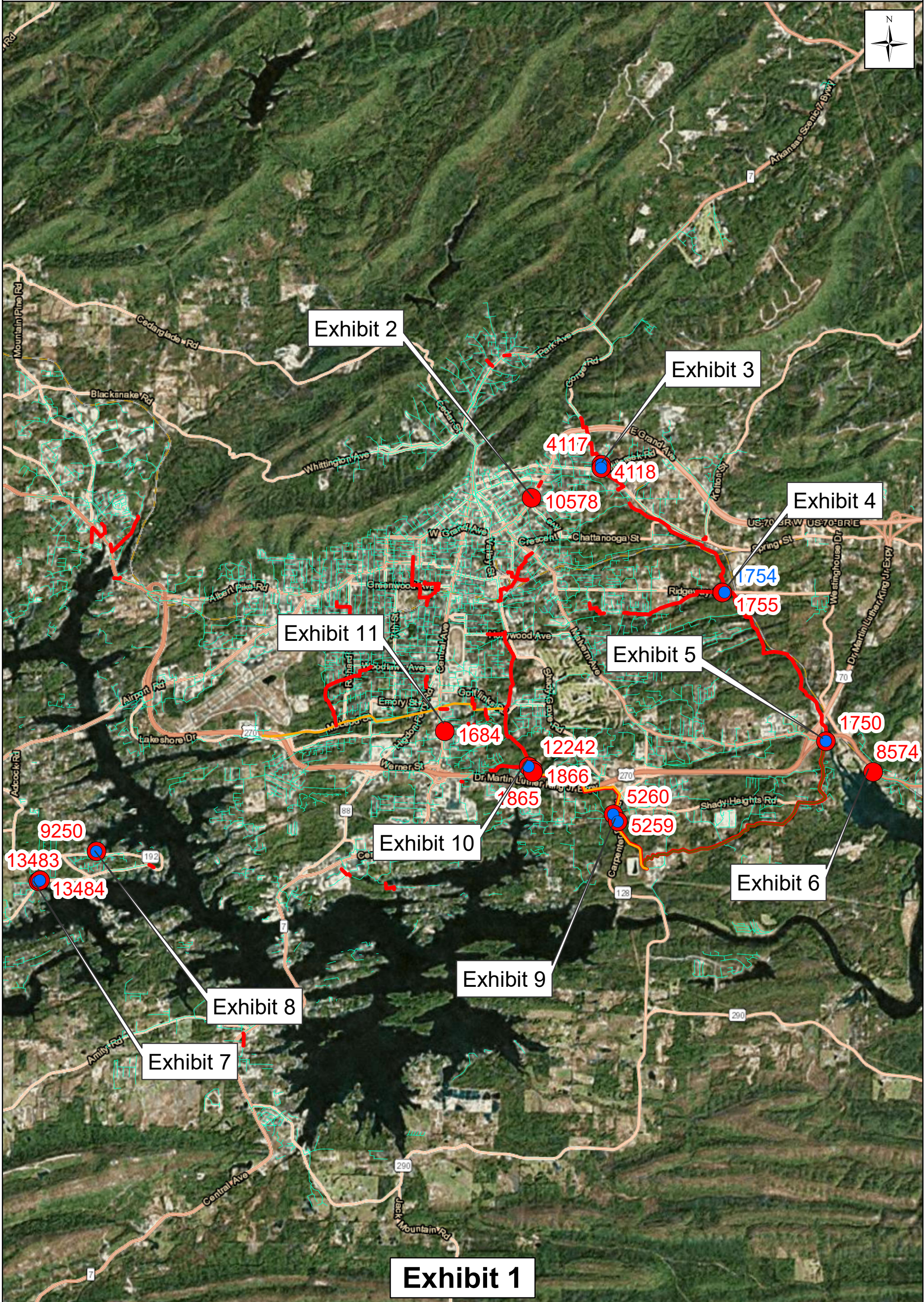
Based upon the SSO information, it is our belief that the following projects, which were outlined in the original SECAP but yet to be constructed are still necessary to eliminate the remaining overflows.

- Overall Map Exhibit 1
- E Grand Ave Capacity Improvement Exhibit 2
- Upper Gulpha Interceptor (Spring St.) Exhibit 3
- Gulpha Interceptor (Evaluate I/I Removal) Exhibit 4
- Gulpha Parallel Force Main Exhibit 5
- Pump Station Power Failure Exhibit 6
- SWWWTP (Evaluate I/I Removal) Exhibit 7
- Mazarn 1 Pump Station Capacity Improvements Exhibit 8
- Lakeside Pump Station Capacity Improvement Exhibit 9
- Hot Springs Creek Interceptor (Evaluate I/I Removal) Exhibit 10
- MH 1684 (Monitor For Additional SSOs) Exhibit 11

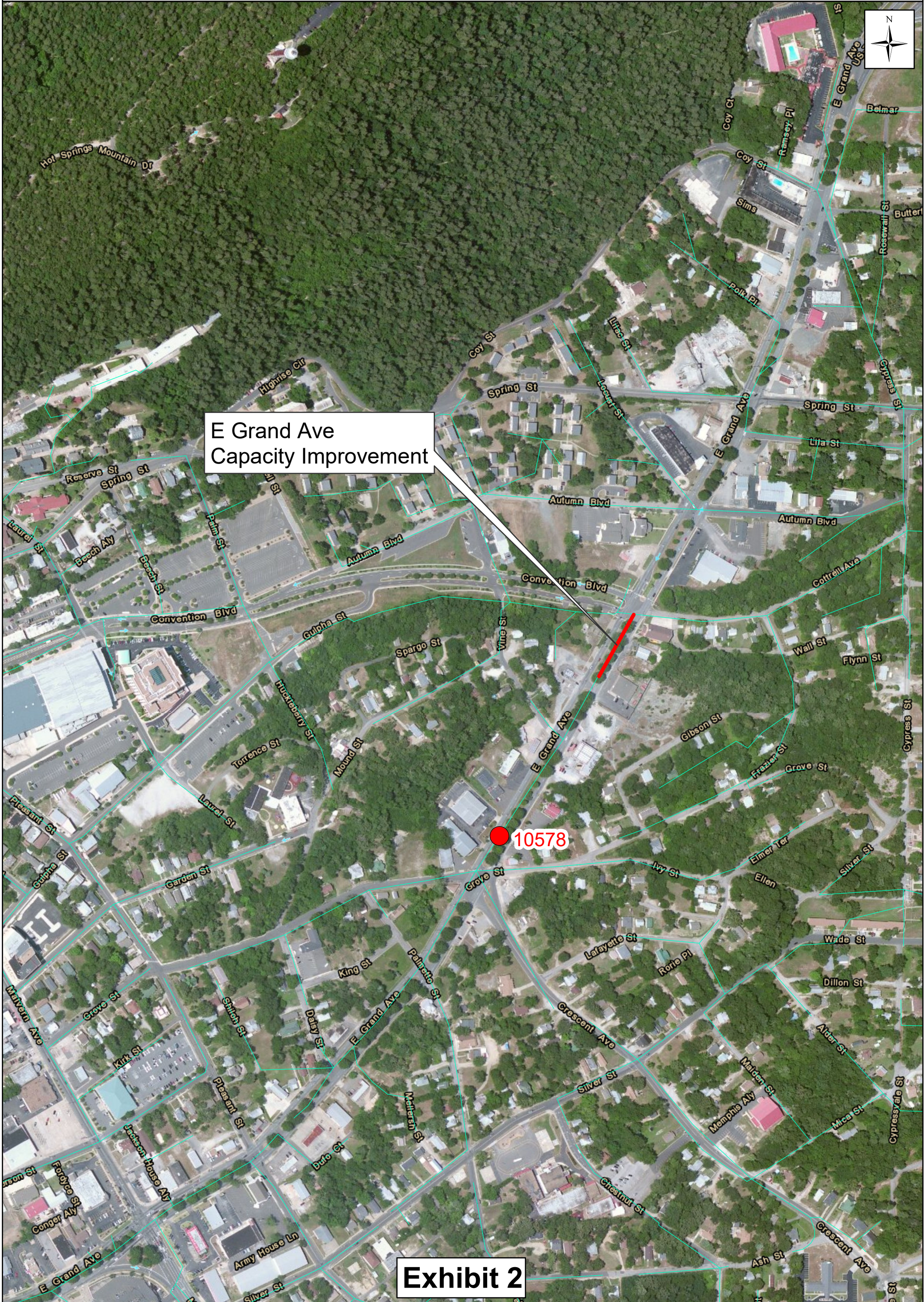
EXHIBITS

SSO MITIGATION MAPS

Hot Springs, AR



Hot Springs, AR



E Grand Ave
Capacity Improvement

10578

Exhibit 2

Hot Springs, AR



Upper Gulpha Interceptor (Spring Street)
Capacity Improvement

Exhibit 3

Hot Springs, AR

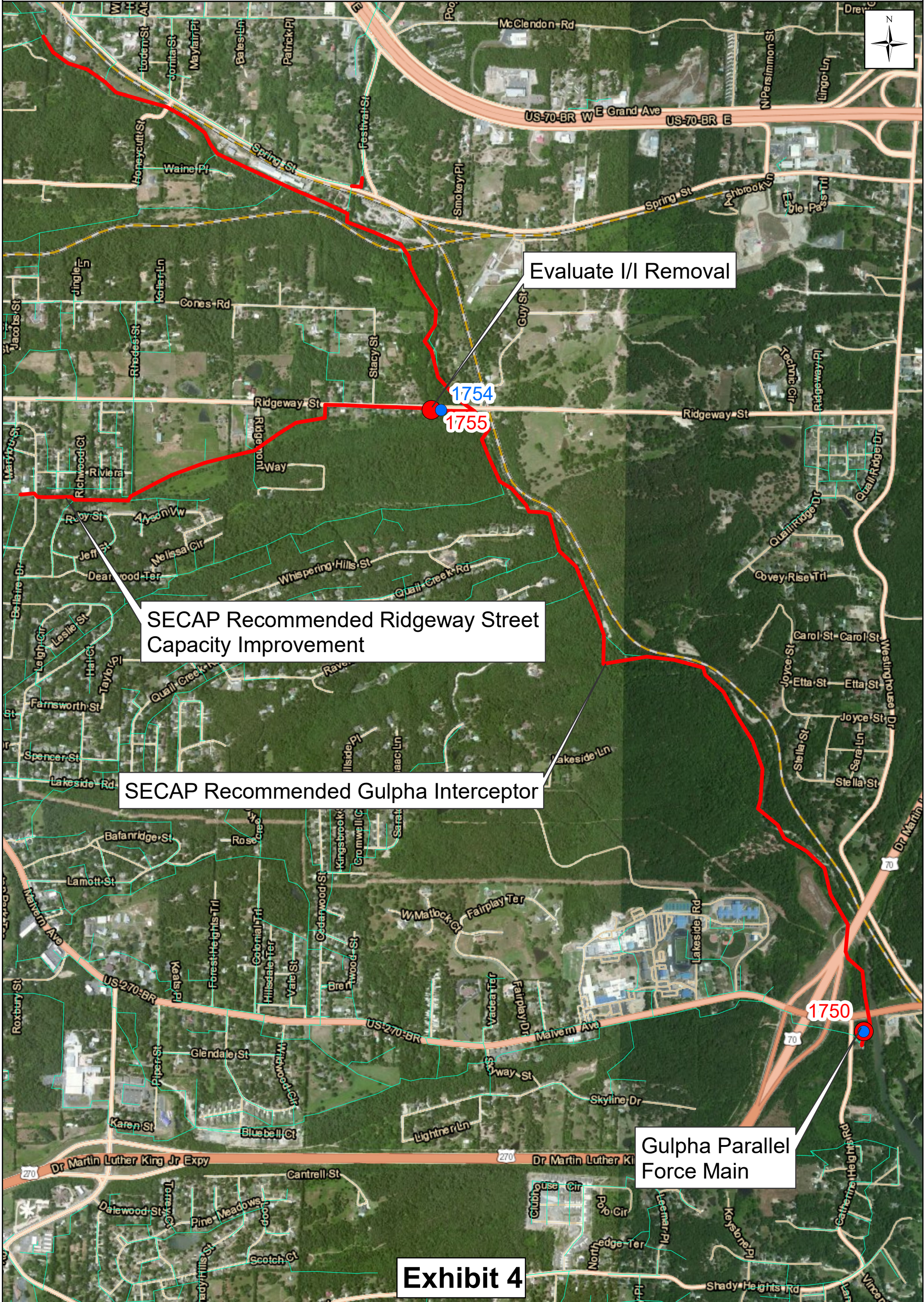
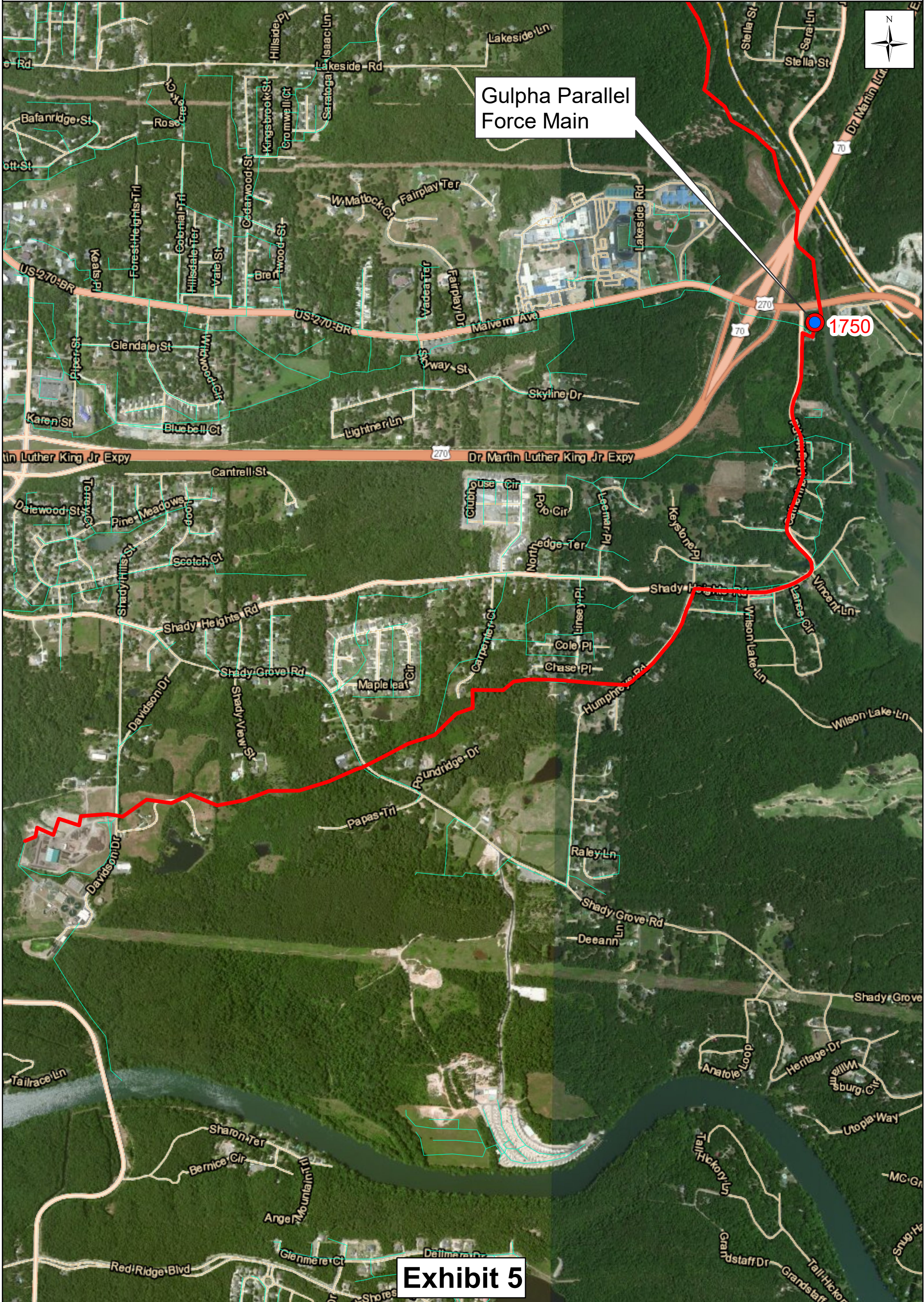


Exhibit 4

Hot Springs, AR



Hot Springs, AR



Pump Station
Power Failure

Malvern Hwy

8574

Exhibit 6

Hot Springs, AR

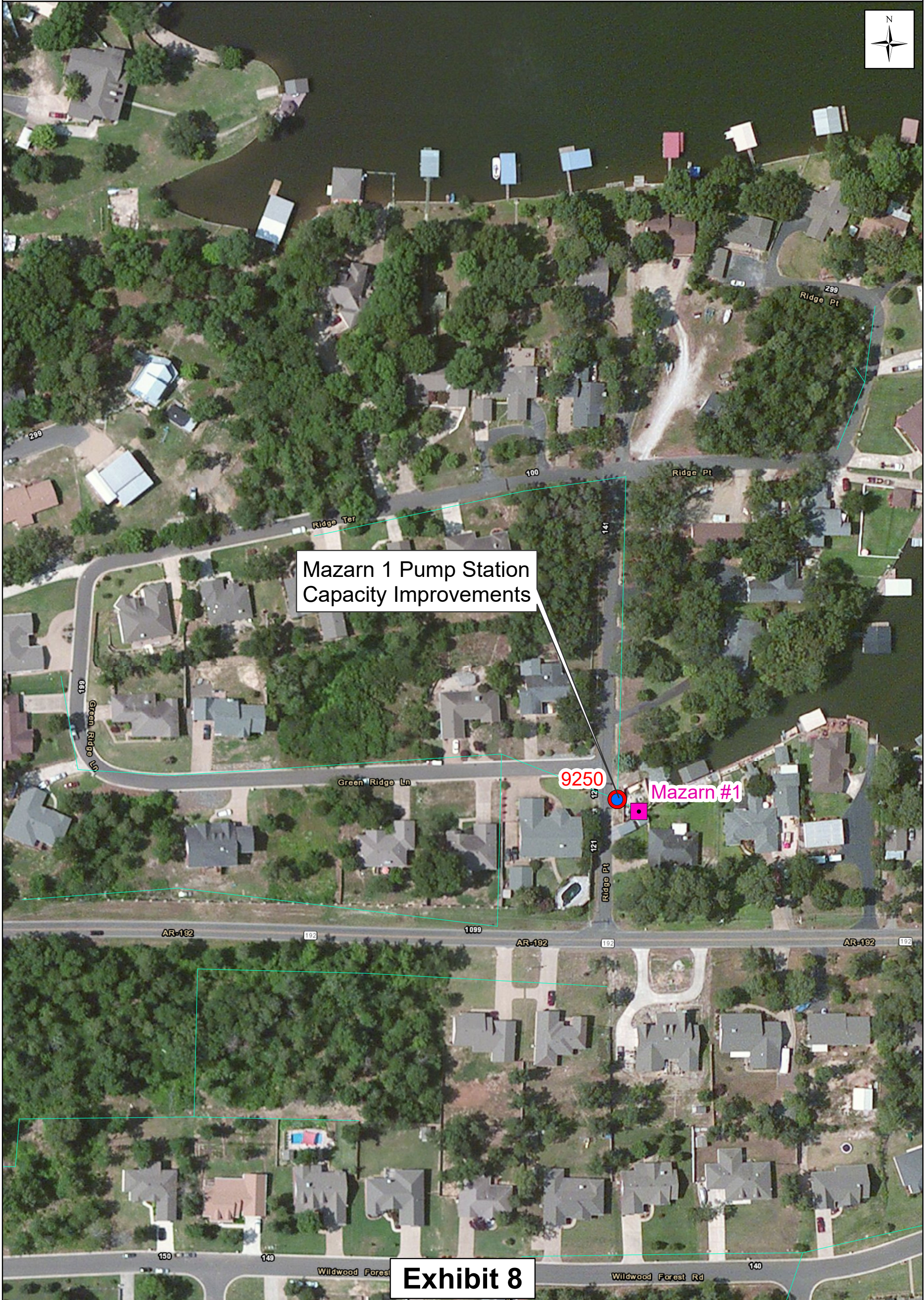


Large Inflow Source Suspected
Evaluate I/I Removal

Evaluate Capacity Improvements
Up-sizing from 6" to 8"

Exhibit 7

Hot Springs, AR



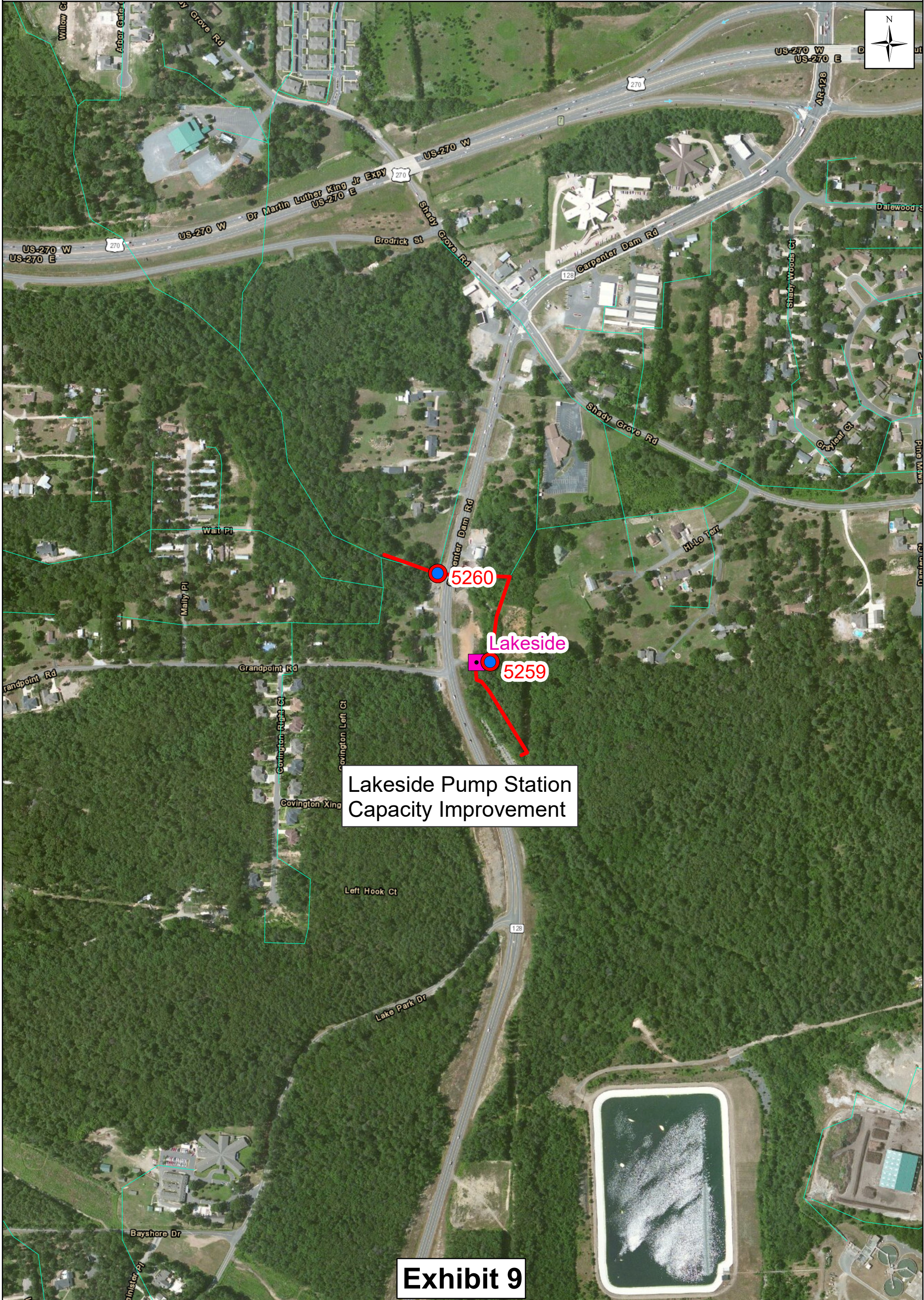
Mazarn 1 Pump Station
Capacity Improvements

9250

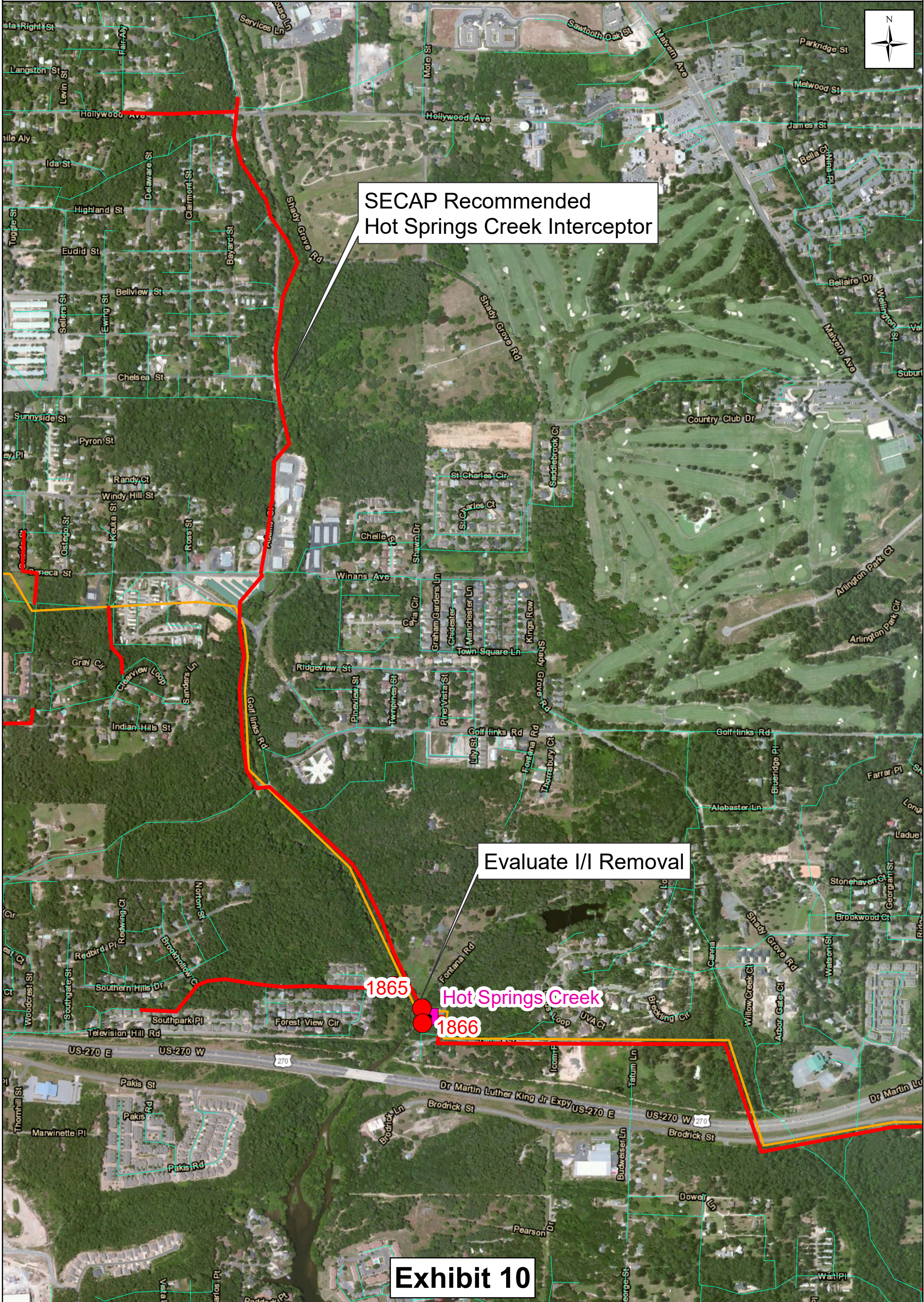
Mazarn #1

Exhibit 8

Hot Springs, AR



Hot Springs, AR



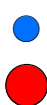
SECAP Recommended
Hot Springs Creek Interceptor

Evaluate I/I Removal

1865
Hot Springs Creek
1866

Exhibit 10

Hot Springs, AR



TECHNICAL MEMORANDUM – UPDATE ON SECAP PROJECTS FOR SSO REMOVAL WITHIN COLLECTION SYSTEM

To: Craig Johnson, P.E. (Crist Engineers)
From: Daniel Jackson, P.E. (RJN) / Mac Compton, P.E. (RJN)
Date: August 20th, 2020
RE: Engineers Opinion of Probable Cost of Required Projects to Eliminate Remaining SSO’s

INTRODUCTION

This technical memo provides cost estimates for the remaining, required projects to eliminate the continuing SSO’s in the Hot Springs sewer system as well as additional remedial measures for SSO manholes without a designated project. Model predicted SSO volumes are given where applicable. Due to most of the model not being updated since 2011, several SSO’s reported by Hot Springs staff the last several years are not replicated or produced within the model and subsequent volumes cannot be given.

All improvements were outlined in the 2010 SECAP for the City to undertake, however have been re-evaluated based upon recent SSO information as well as updated for current costs to reflect 2020 dollars vs. 2011.

EAST GRAND AVE

TABLE 1 East Grand Ave Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST						RJN Group Inc Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)	
3109	3108	305	8	10	\$114,375	
3108	3106	295	8	10	\$110,625	
Total		600			\$225,000	

Segments 3109:3108 and 3108:3106 will both require upsizing from an 8-inch to a 10-inch pipe to limit the amount of surcharging occurring within the sewer line, along with recorded overflows. A sizeable

area of the sewer system, approximately 9,500 linear feet conveys its flow thru this line. The hydraulic model predicts only heavy surcharging during the design storm and no overflows; however, the City of Hot Springs has reported repeating SSO's at manhole 10578. The February 18, 2020 storm estimated overflow volume was 400 gallons. Exhibit 2 illustrates the East Grand Ave capacity improvement project.

SPRING STREET (UPPER GULPHA)

TABLE 2 Spring Street Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST						RJN Group Inc Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)	
1805	3299	56	10	15	\$23,520	
1806	1807	198	10	15	\$83,118	
1807	4115	238	10	15	\$100,128	
3279	3296	220	10	15	\$92,484	
3288	3279	245	10	15	\$102,816	
3289	3289A	213	10	15	\$89,418	
3290	3289	108	10	15	\$45,360	
3295	3290	290	10	15	\$121,800	
3296	1806	440	10	15	\$184,842	
3297	3295	185	10	15	\$77,826	
3298	3297	372	10	15	\$156,156	
3299	3298	155	10	15	\$64,890	
3938	4005	72	12	18	\$32,400	
4005	4006	154	12	18	\$69,255	
4006	4007	154	12	18	\$69,075	
4007	4008	39	10	18	\$17,550	
4008	4009	181	10	18	\$81,450	
4009	4010	122	10	18	\$54,720	
4010	4011	417	10	18	\$187,695	
4011	4012	302	10	18	\$136,035	
4012	4013	164	10	18	\$73,935	
4013	4014	202	10	18	\$90,855	
4014	4015	66	10	18	\$29,790	
4108	4116	62	10	15	\$26,166	
4114	4108	110	10	15	\$46,368	
4115	4114	294	10	15	\$123,270	
4116	4117	242	10	15	\$101,682	
4117	4118	202	10	15	\$84,630	
4118	4119	52	10	15	\$21,966	
4119	4143	78	10	15	\$32,718	

TABLE 2					
Spring Street Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST					RJN Group Inc Updated: 08/17/2020
4142	3938	28	12	15	\$11,844
4143	4142	128	10	15	\$53,760
3289A	3288	98	10	15	\$41,160
3315	3314	208	12	15	\$87,360
3314	3313	96	12	15	\$40,143
3313	3311	77	12	15	\$32,278
3311	3309	471	12	15	\$197,637
3309	3301	112	12	15	\$46,930
3301	3300	146	12	15	\$61,381
3300	1805	274	12	15	\$115,068
Total		7,270			\$3,109,479

Completion of the Spring street (Upper Gulpha) interceptor capacity improvement will eliminate SSO's at manholes 4117 and 4118. Model predicted overflow volumes during the design storm for manholes 4117 and 4118 are 0.44 million gallons (MG) and 0.46 MG, respectively. Exhibit 3 illustrates the Spring Street capacity improvement project.

RIDGEWAY STREET

TABLE 3					
Ridgeway Street Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST					RJN Group Inc Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)
1564	4627	163	8	12	\$47,427
1565	1564	153	8	12	\$41,003
1566	1565	183	8	12	\$49,043
1567	1566	369	8	12	\$98,890
1568	1567	22	8	10	\$5,559
1569	1568	316	8	10	\$79,847
1753	1713	311	15	21	\$98,587
1754	1753	141	15	21	\$44,697
1755	1754	136	15	21	\$43,112
1756	1755	84	15	21	\$23,798
1757	1756	400	15	21	\$122,512
1758	1757	322	15	21	\$98,622
1759	1758	405	15	21	\$133,347
1760	1759	246	15	21	\$83,633

TABLE 3
 Ridgeway Street Capacity Improvements
 2020 COLLECTION SYSTEM IMPROVEMENTS
 ENGINEERS OPINION OF PROBABLE COST
 RJN Group Inc
 Updated: 08/17/2020

1761	1760	178	15	18	\$61,878
1762	1761	400	15	18	\$134,763
1763	1762	278	15	18	\$93,660
1764	1763	405	15	18	\$136,448
1765	1764	390	15	18	\$131,394
1766	1765	304	15	18	\$102,420
1767	1766	491	15	18	\$165,422
1768	1767	250	15	18	\$84,227
1769	1768	376	15	18	\$126,677
4561	4562	193	12	15	\$50,245
4562	4563	65	12	15	\$17,917
4563	4564	116	12	15	\$36,417
4564	4565	350	12	15	\$109,878
4565	4566	50	12	15	\$14,548
4566	4567	364	12	15	\$114,273
4567	4568	278	12	15	\$87,274
4568	4569	96	12	15	\$30,138
4569	1769	65	14	15	\$18,913
4627	4543	262	10	12	\$70,215
Total		8,162			\$2,556,786

Completion of the Ridgeway street capacity improvement will eliminate SSOs at manholes 1754 and 1755. Manhole 1754 overflows because it is a relief point for the main trunk sewer running along Gulpha Creek. Infiltration and inflow (I/I) removal upstream will have minimal impact at relieving the SSO at manhole 1754. Model predicted overflow volumes for manhole 1754 is 0.40 MG. Exhibit 4 illustrates the Ridgeway Street capacity improvement project.

GULPHA INTERCEPTOR

TABLE 4 Gulpha Interceptor Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST					
					RJN Group Inc
					Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)
1701	1702	394	21	30	\$301,686
1702	1703	396	21	30	\$294,121
1703	1704	207	21	30	\$153,745
1704	1705	117	21	30	\$86,899
1705	1706	293	21	30	\$217,620
1706	1707	421	21	30	\$322,360
1707	1708	197	21	30	\$150,843
1708	1709	264	21	30	\$202,145
1709	1710	160	21	33	\$134,763
1710	1711	372	21	33	\$313,324
1711	1712	399	21	33	\$340,343
1712	1713	290	21	33	\$164,319
1713	1714	312	21	33	\$266,133
1714	1715	175	21	33	\$147,397
1715	1716	269	21	33	\$226,571
1716	1717	354	21	33	\$298,164
1717	1718	185	21	33	\$155,820
1718	1719	300	21	33	\$252,681
1719	1720	99	21	33	\$84,446
1720	1721	183	21	33	\$156,097
1721	1722	101	21	33	\$82,749
1722	1723	519	21	33	\$437,138
1723	1724	311	24	33	\$261,946
1724	1725	326	24	33	\$274,580
1725	1726	377	24	33	\$317,536
1726	1727	305	24	36	\$287,252
1727	1728	396	24	36	\$377,202
1728	1729	602	24	36	\$573,424
1729	1730	371	24	36	\$349,412
1730	1731	415	24	36	\$390,852
1731	1732	101	27	36	\$95,123
1732	1733	339	27	36	\$319,274
1733	1734	390	27	42	\$404,336
1734	1735	396	27	42	\$406,311
1735	1736	402	27	42	\$412,467
1736	1737	416	27	42	\$426,832
1737	1738	130	27	42	\$133,385

TABLE 4					
Gulpha Interceptor Capacity Improvements					RJN Group Inc
2020 COLLECTION SYSTEM IMPROVEMENTS					
ENGINEERS OPINION OF PROBABLE COST					Updated: 08/17/2020
1738	1739	351	27	42	\$360,139
1739	1740	200	27	42	\$205,208
1740	1741	353	30	42	\$365,976
1741	1742	337	30	42	\$345,775
1742	1743	366	30	42	\$375,530
1743	1744	474	30	42	\$491,423
1744	2351	370	30	42	\$281,609
1745	1746	260	32	42	\$266,770
1746	1747	335	32	42	\$336,027
1747	1748	397	32	42	\$407,337
1748	1749	63	30	42	\$64,640
1749	1750	77	30	42	\$77,236
1750	Gulpha PS	192	30	42	\$199,057
2351	1745	102	30	42	\$67,480
4004	4283	255	21	27	\$169,871
4073	4074	213	21	24	\$127,213
4074	4075	213	21	24	\$127,213
4075	4076	504	21	24	\$306,415
4076	4077	307	21	24	\$183,355
4077	4078	321	21	24	\$184,342
4078	4079	172	21	24	\$102,726
4079	4080	162	21	24	\$98,490
4080	4081	269	21	27	\$182,080
4081	4004	455	21	27	\$303,102
4083	4084	399	21	27	\$265,797
4084	4141	376	21	30	\$291,934
4100	4073	294	21	24	\$175,590
4101	4100	271	21	24	\$161,854
4102	4101	258	21	24	\$154,089
4103	4102	254	21	24	\$151,700
4141	1701	116	21	30	\$88,821
4283	4083	199	21	27	\$132,566
Total		20,199			\$16,870,662

This project in conjunction with the Gulpha parallel force main project and Spring Street project will eliminate the SSOs at manhole 1750 and others further upstream. Model predicted overflow volumes for manhole 1750 is 2.80 MG. Exhibit 4 illustrates the Gulpha Interceptor capacity improvement project.

GULPHA PARALLEL FORCE MAIN

TABLE 5 Gulpha Parallel Force Main 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST			RJN Group Inc Updated: 08/17/2020
Capacity Improvements	Item	Capital Cost (\$)	
Additional Force Main	16,016 LF	\$6,622,346	
Additional Pumping Capacity	24 MGD	\$9,848,433	
Total		\$16,470,780	

The Gulpha parallel force main project is critical in not only eliminating the SSO at manhole 1750, but for all SSO's upstream of the Gulpha pump station. Without constructing the parallel force main and installing new pumps none of the other Gulpha related projects will result in any net impact, overflows upstream of the pumping station will still occur. As stated in the 2010 SECAP, the new, parallel force main should be 30-inches in diameter and 24 million gallons per day (MGD) of new pumping should be added to the existing 6 MGD pumping capacity for a total of 30 MGD worth of pumping capacity. Exhibit 5 illustrates the Gulpha parallel force main capacity improvement project.

SOUTHWEST WWTP CAPACITY IMPROVEMENTS

TABLE 6 SWWWTP Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST						RJN Group Inc Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)	
9292	9293	74	6	8	\$25,900	
9291	9292	63	6	8	\$22,050	
13483	13484	120	6	8	\$42,000	
13482	13483	99	6	8	\$34,650	
13481	13482	121	6	8	\$42,350	
9293	Mazarn #3 PS	15	6	8	\$5,250	
9291A	9291	17	6	8	\$5,950	
13484	13485	81	6	8	\$28,350	
13480	13481	217	6	8	\$75,950	
Total		807			\$282,450	

Most of the west side of Hot Springs which includes the SWWWTP has not been updated in the model since 2009, therefore model predicted overflow volumes cannot be given at this time for manholes 13483 and 13484. However, the current model predicts approximately 0.16 MG of flooding upstream of Mazarn #3 pump station without taking into account the extra influence from the newly developed subdivision to the north. Nevertheless, RJN is recommending at a minimum, upsizing the 6-inch gravity mains north of Mazarn #3 pump station connecting the newly constructed subdivision to an 8-inch to appropriately handle the additional influent. Exhibit 7 illustrates the SWWWTP capacity improvement project.

MAZARN #1 PUMP STATION

The current model predicts 0.11 MG overflowing from manhole 9250. As previously stated, the west side of Hot Springs has not been updated in the model since 2009, so flow regimes into this pump station cannot be determined, consequently, preventing appropriate recommendations on required pump upgrades for the time being. Exhibit 8 illustrates the Mazarn #1 pump station capacity improvement project.

LAKESIDE PUMP STATION

TABLE 7 Lakeside Pump Station Capacity Improvements 2020 COLLECTION SYSTEM IMPROVEMENTS ENGINEERS OPINION OF PROBABLE COST						RJN Group Inc Updated: 08/17/2020
USMH	DSMH	Length (Feet)	Existing Diameter (Inch)	Proposed Diameter (Inch)	Capital Cost (\$)	
5257	5258	195	10	12	\$78,029	
5260	5257	338	10	12	\$135,189	
5258	5259	216	10	12	\$86,360	
5263	5260	276	10	12	\$110,575	
5259	PS	63	10	12	\$25,353	
Pump Station Upgrade to 2.8 MGD					\$275,000	
Total		1,089			\$710,506	

Completion of the Lakeside pump station capacity improvement will eliminate the SSO at manhole 5260. The current model does not predict that any overflows will occur at manhole 5259 during the design storm. Model predicted overflow values for manhole 5260 are 0.23 MG. Exhibit 9 illustrates the Lakeside pump station capacity improvement project.

HOT SPRINGS CREEK INTERCEPTOR AND PUMP STATION

There is some uncertainty in the current model about which pumps are working at the Hot Springs Creek pump station. Judging from the results given by the model, it seems that not all three Flygt pumps are pumping into the new Fairwood force main as well as a diesel Fairbanks Morse pump discharging into the “old” 30-inch force main shared with Stokes. Clarification about pump station performance will determine which SECAP projects need to be addressed to eliminate the SSOs at manholes 1865 and 1866. The reported SSO volume by the City of Hot Springs for both manholes 1865 and 1866 for the February 18, 2020 storm were 10,000 gallons. Exhibit 10 illustrates the Hot Springs Creek capacity improvement project, which was outlined in the 2010 SECAP. However, due to the Fairwood Pump Station and force main project, along with the parallel force main out of Stokes Pump Station, the best solution here would be to remove I/I upstream of Hot Springs Pump Station.

MANHOLE 1684

The current model does not predict that any overflow should occur at manhole 1684. RJN is recommending that the manhole be monitored for additional SSO’s and if SSO’s continue to occur, that further investigation immediately downstream of the manhole be pursued to check for blockage and/or collapsed pipe. Exhibit 11 illustrates the location of the SSO at manhole 1684.

SUMMARY

TABLE 8 SUMMARY OF REQUIRED PROJECTS		
Project	Cost (\$)	SSO Volume Removed (MG)
East Grand Ave	\$225,000	0.0004
Spring Street (Upper Gulpha)	\$3,109,479	0.90
Ridgeway Street	\$2,556,786	0.40
Gulpha Interceptor	\$16,870,662	2.80
Gulpha Parallel Force Main	\$16,470,780	4.10 ^{1/}
SWWWTP	\$282,450	0.16
Mazarn #1	-	0.11
Lakeside Pump Station	\$710,506	0.23
Hot Springs Creek	-	0.02
Manhole 1684	-	-
Total	\$40,225,663	4.62

1/ Without completion of the Gulpha Parallel Force Main all other Gulpha projects will have no net impact

The majority of the costs associated with eliminating the remaining SSOs in the Hot Springs sewer system are attributed to the Gulpha basin projects specifically, Ridgeway Street, Gulpha interceptor, and Gulpha parallel force main. These three projects combined account for \$35,898,228 and would eliminate SSOs at three manholes (1750, 1754, 1755) resulting in a reduction of 3.20 MG of overflow volume as predicted by the model. The East Grand Ave, Spring Street, South West WWTP, and Lakeside pump station projects combined cost \$4,327,435 and will eliminate SSOs at approximately 12 manholes resulting in a reduction of 1.29 MG of overflow volume. The cost to remove twelve locations at \$4.3 million is advantageous, however alternatives for the SSO's occurring at Gulpha Pump Station should be evaluated due to the high cost of the station upgrade, interceptor up-sizing, and parallel force main construction. These could include storage at Gulpha or intensive field studies to locate I/I entering the Gulpha Basin.