

November 11, 2024

TASK ORDER – OPTION A

Mr. Chad Austin City of Kingsport 1113 Konnarock Road Kingsport, Tennessee 37664

RE: Engineering Services as Related to the Phase 2 Sanitary Sewer Inspection Project City of Kingsport, Tennessee LJA Task Order 20241111

Dear Mr. Austin,

LJA Engineering, Inc. ("LJA") is pleased to provide this Task Order for engineering services associated with the Phase 2 Sanitary Sewer Inspection Project for the City of Kingsport ("Client"). This task order is made pursuant to the terms and conditions of the Professional Services Agreement ("PSA") entered into on <u>November 28, 2022</u>, by and between LJA Engineering, Inc. and <u>the City of Kingsport</u>.

Background

The Client is actively working through inflow/infiltration (I/I) correction measures within the sanitary sewer collection system. LJA staff recently completed a flow monitoring study and Phase 1 Sanitary Sewer Evaluation Survey (SSES) Inspection Project in Basin 5438_12 which was one of the high priority areas identified in the flow monitoring study. LJA staff facilitated manhole inspections, manhole GPS and mapping corrections, smoke testing, and CCTV Inspections throughout the basin. The results indicated that a number of severe defects were observed.

The Client has requested LJA to provide a proposal for a similar project in Basin 5491_12 which was identified as a high priority area during the flow monitoring study. Basin 5491_12 is approximately 14,500 linear feet with approximately 75 manholes (See Exhibit A).

Approach

It is expected that project activities will begin (manhole inspections and CCTV inspections) once weather conditions are more wet and be completed by the end of March 2025. The manhole wet weather inspections will be performed utilizing NASSCO defect criteria such that all defects can be relatively ranked and prioritized. The inspections will provide a condition assessment for each manhole and identify defects to be prioritized. It is critical that these inspections be performed during wetter periods to identify those contributing Rain-dependent inflow & infiltration (RDII) into the system since manhole/line connections are a typical inflow and infiltration (I/I) source. During the manhole inspection process, system connectivity and map verification is also performed which is critical for the next phases of work. Survey grade GPS coordinates will be taken at each manhole during the process of identifying system connectivity. It is imperative to have a corrected map prior to beginning any rehabilitation projects in order to minimize change orders and provide the most efficient repairs.

Smoke testing efforts will be completed during the spring/summer of 2025, approximately between the months of April through July when groundwater levels are at the lowest. This will identify inflow type defects which contribute to the significant peaks observed with intense rainfall events. These type defects also significantly contribute to SSO events due to the quick response during intense storms.

CCTV inspections are necessary to identify defects within mainlines and provide a means to formulate a rehabilitation design. Once completed, the CCTV inspection results are analyzed (coupled with the smoke testing and wet weather manhole inspection results) to finalize the priority ranking of work to be performed during rehabilitation.

Upon completion of all field work, LJA staff will compile the findings into a summary spreadsheet to provide a general indication of defects observed. LJA staff would integrate the associated reports from the SSES activities into the Client's current GIS and provide an updated GIS map layer. LJA would work with the Client's GIS staff to incorporate the updated layers into the Client's current GIS system.

The associated Scope of Services outline the tasks to be performed to meet the approach discussed in the above narrative.

Scope of Services

1.0 SSES Activities, Field Services Management, & GIS Integration

SSES field activities performed during this Task include the following with approximate quantities based on Client's current GIS:

- <u>Manhole inspections</u> (approximately 75) Manhole inspections will be conducted during wet weather periods (~ January through March) to identify I/I sources. Data collected during manhole inspections will include the material of each manhole component (cover, frame, chimney, cone, wall, bench and invert) and will be based on NASSCO coding. The condition of each component will be assessed, defects identified, and pertinent photos will be taken. Additionally, connectivity will be verified with the GIS on each incoming and outgoing pipe segment such that map corrections can be made. A PDF report summarizing the information collected will be provided including photos. A sample is included in Exhibit B.
- <u>GPS Surveying of Manholes</u> (approximately 75) A GPS survey of each manhole will be performed to obtain x, y, and z coordinates. Each point will be gathered with survey grade accuracy using a Trimble GPS data collector. Manhole GPS work will be performed during the wintertime period (between February through April) when the tree canopy is at a minimum. Any manholes where survey grade accuracy cannot be obtained will be collected with mapping grade accuracy (+/- 3 feet). At the time a model is formulated utilizing the GPS data, other survey means will be utilized as part of that effort to obtain survey grade data for any locations required. LJA staff will coordinate with the Client to integrate the GPS data and revised sanitary sewer layer into the Client's existing GIS mapping system.
- <u>Smoke testing</u> (approximately 14,500 LF) Smoke testing will be conducted to identify cross connection defects and severe inflow sources. These activities will be conducted during drier periods of the year (~ April through July) when ground conditions are dry allowing the smoke to permeate through the soil and into the air. Strategic smoke testing points will be identified throughout the project area to accommodate approximately 600-800 foot stretches of sewer mainline. While smoke is being pushed through the mainlines by a smoke blower, GPS points will be taken of each observed defect where smoke is exiting the ground. A photo will

be taken of each defect and logged with the associated data collected. A summary report of each segment will be provided detailing the type of leak observed and an aerial map of the marked location. A sample is provided in Exhibit B.

In order to facilitate the field work listed above, LJA staff will perform the following:

- Provide oversight and direct management of subcontractors working on the project performing the above activities including scheduling, coordinating with the Client, coordinating during specific weather periods.
- Track progress throughout the project and provide updates to the Client as requested, including evaluating production logs and "cannot locate" lists for manholes. LJA staff will coordinate with subcontractor and the Client to get necessary access/manholes raised to facilitate work.
- A professional licensed surveyor (PLS) will validate any GPS shots taken to verify accuracy and ensure the points are imported into ESRI platform to be used in the Client's current GIS layer.
- Track progress during the smoke testing phase and provide updates to the Client as requested. Any significant findings will be submitted to the Client as they are identified.
- Perform various site visits during field activities.
- Conduct interim meetings/progress meetings with the Client during work to provide updates and discuss project progress and details.

Throughout the course of each field activity, LJA staff will receive preliminary data cuts of the database deliverable to ensure data is being collected properly, perform QA/QC checks, and verify accuracy. As each type of field work is completed, LJA staff will receive a final database submittal and perform a final review of the information collected. Upon receipt and final review of each dataset, LJA staff will integrate the data collected within the Client's currrent GIS layer. Using any GPS data collected, LJA staff will initially create the geometric network within the GIS to provide connectivity from manhole to manhole throughout the project area and enable the ability to perform tracing functions within ESRI. The manhole reports and individual data will be linked to each associated manhole within the manhole shape file. The smoke testing reports and individual data will be linked to each associated mainline segment within the sewer line shape file. LJA staff will compile the digital information and create point and linear defect events in personal geodatabases that will contain all the data to be served and gueried within the GIS. Specific information about the defect such as type, location and severity score will be available in tabular format via the "Identify Tool" of ArcGIS. LJA staff will provide the Client with a final layer set to be imported into current GIS system. The final layer will contain links to each manhole and smoke testing report submitted.

Upon finalization of the GIS integration, LJA staff will compile the findings and create a list of priority mainline segments to be CCTV inspected. A map book will be created in PDF format, with index pages and map numbering, to be provided to the CCTV subcontractor to complete inspection work. An associated listing of each segment will also be exported from the GIS layer to create an Excel spreadsheet which will also be provided to the subcontractor to be used during the project to facilitate work.

2.0 CCTV Surveys, Field Services Management, & GIS Integration

It is anticipated that approximately 14,500 linear feet will be inspected. Preconditioning (cleaning) will only be conducted when needed. It is not expected that each pipe will need to be cleaned prior to inspections. A budgeted quantity of 60% of the inspected footage will be used for

segments to be cleaned. However, this footage is a budgetary number and the segments that need to be cleaned in order to complete the work will be cleaned.

Of the pipe segments on the priority CCTV inspection list, only those mainlines requiring cleaning will be cleaned. It is expected that up to 60% (~8,700 LF) of the mainlines inspected may require preconditioning prior to inspection and 20% (~3,000 LF) of the mainlines may require heavy cleaning. However, should the pipes have a significant amount of debris, the totals could be higher. The projected footage to be cleaned and associated fees are only estimates. Should more cleaning be required than anticipated, fees will need to be increased appropriately or an associated reduction in scope for the inspection will be necessary. Although the service lateral connections within the mainline will be visible during the mainline inspections, the inspection of each individual service lateral via a lateral launch will <u>not</u> be included as part of the scope of this project. It will be required to inspect each lateral included in the rehabilitation project at the time of construction to verify final rehabilitation once that data becomes available.

CCTV mainline inspections will be performed utilizing NASSCO standards. The camera will stop and pan each defect and tap to record pertinent information. Pre-conditioning of the pipe will be performed as needed to obtain an unobstructed view of the pipe. Heavy cleaning may be required to remove roots, heavy debris/silt, or remove protruding taps. It is estimated/budgeted that approximately 20% of the pipelines will require heavy cleaning. This is only an estimate. Should the actual footage requiring heavy cleaning be higher than the estimated amount, additional monies would be required to complete the work or work would need to be eliminated accordingly. A log will be provided that indicates the footage inspected, the footage preconditioned, and the footage heavy cleaned. A PDF report will be created from the inspection summarizing each item observed along with pictures.

In order to facilitate the CCTV inspections listed above, LJA staff will perform the following:

- Provide oversight and direct management of subcontractors working on the project performing the above activities including scheduling, coordinating with Client, coordinating during specific weather periods
- Track progress throughout the project and provide updates to Client as requested, including evaluating production logs and manholes that have been located and marked for Client to raise.
- Perform various site visits during field activities.
- Conduct interim meetings/progress meetings with Client during work to provide updates and discuss project progress and details as needed.

Throughout the course work, LJA staff will receive preliminary data cuts of the database deliverable to ensure data is being collected properly, perform QA/QC checks, and verify accuracy. As field work is completed, LJA staff will receive a preliminary database submittal and perform a review of the information collected. Upon receipt and final review of each dataset, LJA staff will integrate the data collected within the GIS layer. LJA staff will compile the digital information and create point and linear defect events in personal geodatabases that will contain all the data to be served and queried within the GIS. Specific information about the defect such as type, location and severity score will be available in tabular format via the "Identify Tool" of ArcGIS. LJA staff will provide Client with a final layer set to be imported into Client's current GIS system. The final layer will contain links to the associated inspection report.

3.0 Engineering Summary of Findings

Upon finalization of the GIS integration, LJA staff will perform a general prioritization for each sewer mainline segment, taking into account each SSES activity completed. This summary of information will be shown in ESRI ArcGIS via symbology based on severity of defects or I/I observed. LJA staff will provide a summary spreadsheet with defects prioritized based on the NASSCO scoring system. LJA staff will present the findings to Client staff and discuss the criteria used during the evaluation. LJA staff and Client staff will jointly review the results and findings and discuss steps to perform the next phase of work (rehabilitation).

LJA staff will provide a summary GIS dataset that can be incorporated into Client's existing GIS network. LJA will coordinate with Client's GIS department to facilitate the delivery.

Client's Responsibilities

Client shall be responsible for the following items:

- Provide assistance and coordinate with property owners as needed for property access.
- Assist LJA staff by locating manholes not easily identified both above and below grade.
- Provide access to buried manholes that are below grade (raising manholes to facilitate entry).
- Provide water at no charge during cleaning and CCTV inspections. Contractors will provide an accounting of water used for water loss purposes.
- Provide access at the WWTP to offload debris from the Vac-truck during cleaning and inspections.
- Allow CCTV inspections to be performed during Monday through Saturday if needed to ensure deadlines are met.

Compensation

We propose to provide the specific services described above to be billed as follows:

Task 1.0 SSES Activities, Field Services Management, & GIS Integration

Item No.	Description	Units	Unit Cost	Total
1a.	Manhole Inspections	75	\$165	\$12,375
1b.	Manhole GPS	75	\$55	\$4,125
1c.	Smoke Testing	14,500	\$0.65	\$9,425
1d.	Engineering/GIS integration Field/Management	LS	\$15,250	\$15,250
Sub-Total Task 1				\$41,175

Task 2.0 CCTV Inspections, Field Services Management, & GIS Integration

Item No.	Description	Units	Unit Cost	Total
2a.	Mobilization	1	\$4,200	\$4,200
2b1.	CCTV Inspection 6-inch to 8-inch	14,000	\$1.93	\$27,048
2b2.	CCTV Inspection 12-inch	500	\$2.03	\$1,014
2c1.	Preconditioning 6-inch to 8-inch	8,400	\$2.07	\$17,405
2c2.	Preconditioning 12-inch	300	\$2.17	\$652
2d1.	Heavy Cleaning Adder to Preconditioning 6-inch to 8-inch	2,800	\$1.40	\$3,931
2d2.	Heavy Cleaning Adder to Preconditioning 12-inch	200	\$1.54	\$307
2e.	Reverse Setup	10	\$210	\$2,100
2f.	Locate, Sonde, Mark MH	10	\$158	\$1,580
2g.	CCTV Reports and Data Delivery	LS	\$6,000	\$6,000
2h.	Engineering/GIS CCTV & Management	LS	\$18,750	\$18,750
tal Task 2				\$82,987

Sub-Total Task 2

Task 3.0 Engineering Summary of Findings

Item No.	Description	Units	Unit Cost	Total
3	Engineering Reporting	LS	\$15,500	\$15,500

Total Not-to-Exceed Amount	<u>\$</u>	139,662

Any work not authorized within three (3) months of the date of this agreement will be subject to renegotiations based on current rates.

Schedule

LJA staff would tentatively schedule to begin manhole inspections and manhole GPS work immediately upon approval. It is anticipated the manhole inspections will take approximately 4-5 weeks to complete pending weather conditions. CCTV inspections will begin within 2-3 weeks of authorization. It is anticipated that CCTV inspections will take approximately 3-4 weeks to complete the field portion of the work. It is anticipated that smoke testing would begin in the when groundwater conditions are at the lowest. Timing to complete smoke testing would tentatively be between April 2025 and July 2025. It is anticipated that smoke testing would take approximately 2 weeks to complete pending weather conditions. Upon completion of all field work, LJA staff will present the findings and discuss the recommendations for the rehabilitation project and design parameters. LJA staff will then coordinate with the Client to determine the tentative schedule for advertisement and bidding of the project.

Reimbursables and additional services

Included in the above fees are reimbursable expenses incurred on the project's behalf, including: mileage, printing, plotting, photocopies, reproduction, express mail, and/or courier services. Any regulatory agency review fees associated with plan reviews shall be the responsibility of the Client. Reimbursable expenses will be billed at cost plus ten percent (10%). LJA will bill monthly for all work performed and expenses incurred on the project's behalf. Unpaid invoices after thirty (30) days will accrue service charges at 1-1/2% per month and include any costs of collections and reasonable attorney's fees.

Authorization

If this proposal meets with your approval, your signature below and on the attached Professional Services Agreement will be sufficient authorization for LJA to commence the stated work as indicated in the above Scope of Services.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions, please contact me at 931.273.8999.

Sincerely,

Time E. Wilm

Travis E. Wilson, PE Vice President

Accepted By: City of Kingsport

By:_____ Name:_____ Title:_____ Date:_____

TEW

Attachments: Exhibit A – Basin Maps Exhibit B – Sample Field Reports

EXHIBITS

EXHIBIT A Basin Maps



EXHIBIT B Sample Field Reports

Manhole Inspection Report

Manhole ID: <u>139</u> Crew: FB		Street Address: 2 General Location: N	272 RIVER EDGE CT Next to street		
Inspection Type:	Internal	Cover Type:	Pick	Ponding Type:	None
Structure Type:	Standard	Cover Fit:	Good	Ponding Depth:	0
Location:	Grass	# Holes in Cover:	2	Grade +/-:	0
Surface Type:	Dirt/Grass	Riser Present?:	0	Inflow Dish?:	No
Weather:	Dry	Riser Height:	0	Frame Offset:	0 in
Chimney Material:	Pre-Cast	Wall Material:	Pre-Cast	Bench Type:	Poured
Chimney Height:	4 in	Wall Lining Type:	Cementitious	Trough Type:	Poured
Cone Material:	Pre-Cast	Wall Length:	0	Step Type:	Plastic
Cone Shape:	Eccentric	Wall Width/Dia:	48 in		
Manhole Depth:	5.15 ft	Evidence of Surcharge?:	No	Surcharge Depth:	0

Comments: Roughness increased on cover and frame. Deposits on bench.

Area Photo



Manhole Defect Information

Components with Defects: Bench,Cone,Chimney,Frame,Cover

Internal Photo

Date: 05/21/2024

	I/I Code Type	Broken	Lining Failure	Deposits	Roots	Fracture	Crack	Hole	Surface Damage	Brickwork	Joint
Cover:									Roughness		
Frame:									Roughness		
Frame Seal:									increased		
Chimney:	Staining										
Cone:	Staining										
Wall:											
Bench:				Settled - Fine							
Trough:											
Manho	le Defect I	Photos:									



Manhole Inspection Report - Pipes

Pipe #:1Upstream MH:139Downstream MH:5584Clock Position:6Shape of Pipe:RoundDiameter/Height:8 in

Material:PVCRim to Invert:5.15 ftFlow Depth:0 in





Comments: None

Pipe #:2Upstream MH:5733Downstream MH:139Clock Position:12Shape of Pipe:RoundDiameter/Height:8 in

Material:PVCRim to Invert:5 ftFlow Depth:1 in





Comments: None

Smoke Test Inspection Report

Observation:	1-1
Collected By:	Finn Basler
Date Inspected:	8/5/2024
Address:	305 Pleasley Road
Upstream Manhole:	5526
Downstream Manhole:	5448
Property Type:	Private
Source:	Service Cleanout
Smoke Intensity:	Heavy
I & I Rating:	Moderate
Comments:	Smoke from 6" cleanout. Cleanout missing cap.











Project:		Date/Time:	May 7 2024 - 16:02
Street and City:	256 River Edge Dr - Kingsport	Weather:	Dry - No precipitation during survey
Owner:	Kingsport	Inspection Status:	Complete Inspection
Customer:	LJA	Segment:	5404_24908
Surveyor Name and Certificate:	Spencer Seidel P0039857-112022	Direction:	Downstream
Reviewer Name and Certificate:	Elisabeth Lowery U-0220-70308547	Up MH:	5404
P.O. #	3236-0003	Down MH:	24908

Pipe Details and Measurements

Pipe Use:	SS	Material:	СР
Height:	15	Lining:	Ν
Width:		Joint Length:	4
Shape:	С	Purpose:	В
Pre-Cleaning:	No Pre-Cleaning	Additional Info:	

Pipe Ratings

Overall Quick Rating: 3121

Structural Quick Rating: 3	3100	O&M Quick Rating:	2112
Structural Pipe Rating Index: 3	3.0	O&M Pipe Rating Index:	1.3

Surveyed Length: 350

Total Length: 353





Kingsport – May 7 2024

Up MH: 5404

Pipe: 5404_24908

Down	мн∙	24908
DOWII	IVITI.	24900

Photo	Distance	Description	Time
Date: 05/07/2024 16:04 City: Kingsport Pipe Beg. Ref: 5404_24908 Direction: D	0	AMH - Manhole Remark = 5404	00:00:17
Date: 05/07/2024 16:10 City: Kingsport Bips Beg. Kef: 5404_24908 Direction: D 0.8 ft	0	MWL - Miscellaneous Water Level Percent: 30	00:01:33
Date: 05/07/2024 16:10 City: Kingsport Pipe Beg. Ref: 5404_24908 Utection: 0	0.1	MGO - Miscellaneous General Observation Remark = Pipe Diameter Confirmation	00:01:11
Date: 05/07/2024 16:17 City: Kingspont Pipe Beg. Ref: 5404_24908 Direction: D	226.7	RFJ - Roots Fine Joint Joint: True Clock from 10 to 11 Grade = 1	00:07:58



Kingsport — May 7 2024

Pipe: 5404_24908

Up MH: 5404

Down MH: 24908

Photo	Distance	Description	Time
Date: 05/07/2024 16:20 City: Kingsport Eipe Seg. Ref: 5404_24908 Direction: D	316.7	DAGS - Deposits Attached Grease Percent: 5 Clock from 10 to 1 Grade = 2	00:11:13
Date: 05/07/2024 16:20 City: Kingsport Pipe Seg. Ref: 5404_24908 Difference for the second	321.1	MWLS - Miscellaneous Water Level Sag Percent: 50 Grade = 3	00:11:29
Date: 05/07/2024 16:23 Up MH: 5404			
City: Kingsport Down Md: 24900 Pipe Seq. Ref: 5404_24909 Direction: D	338.4	RFJ - Roots Fine Joint Joint: True Clock At 11 Grade = 1	00:14:54
Date: 05/07/2024 16:24 Up Mil: 5404			
City: Kingsport Pipe Seg. Ref: 5404_24908 Direction: D	345.4	MWL - Miscellaneous Water Level Percent: 35	00:15:13



Kingsport – May 7 2024 Up MH: 5404

Pipe: 5404_24908



Down MH: 24908



Kingsport - May 7 2024

Up MH: 5404

Pipe: 5404_24908

Down MH: 24908

Time	Dist.	Code	Cont.	Dim. 1	Dim. 2	%	Joint	Clock From	Clock To	Remarks
00:00:17	0	АМН								5404
00:01:33	0	MWL				30				
00:01:11	0.1	MGO								Pipe Diameter Confirmation
00:07:58	226.7	RFJ					True	10	11	
00:11:13	316.7	DAG S				5		10	1	
00:11:29	321.1	MWL S				50				
00:11:29	338.4	RFJ					True	11		
00:15:13	345.4	MWL				35				
00:16:13	350	AMH								24908

Kingsport - May 7 2024

Up MH: 5404



Down MH: 24908

Additional PACP Header Information

Media Label:		Up Rim to Invert:	
Work Order:	24-06639	Up Rim to Grade:	
Sheet Number:		Up Grade to Invert:	
Date Cleaned:	Unknown	Up Northing:	
Flow Control:	Ν	Up Easting:	
Consequence of Failure		Up Elevation:	
Pressure Value:		Down Rim to Invert:	
Drainage Area:	5	Down Rim to Grade:	
Location Code:	D	Down Grade to Invert:	
Location Details:		Down Northing:	
Coating Method:		Down Easting:	
Pipe Joint Length:	4	Down Elevation:	
Year Constructed:	1900	Coordinate System:	
Year Renewed:	1900	Vertical Datum:	
		GPS Accuracy:	
Reverse Setup:		Imperial?:	True

