

June 11, 2018

Mr. John J. Ingram  
Infrastructure Maintenance Director  
Village of Orland Park  
15655 Ravinia Avenue  
Orland Park, Illinois 60462

**SUBJECT: PROPOSAL FOR PROFESSIONAL ENGINEERING SERVICES FOR  
2018 SMOKE TESTING, DYED WATER FLOODING & MANHOLE INSPECTIONS –  
MWRD PRIORITY SEWER BASIN 2<sup>ND</sup> HALF**

Dear Mr. Ingram:

RJN Group, Inc. (RJN) is pleased to submit this proposal to provide Professional Engineering Services to assist the Village of Orland Park (Village) in the completion of a Smoke Testing and Manhole Inspection Program for the 2<sup>nd</sup> half of the MWRD priority sanitary sewer Basin.

In 2015, RJN was selected by the Village for the Comprehensive Sanitary Sewer Evaluation consultant role to, "Provide assistance in developing and implementing a Village-wide comprehensive sanitary sewer evaluation & repair program." This proposal is for sewer evaluation services as part of "Year-3" of the Village's Sanitary Sewer Inflow and Infiltration (I/I) Capital Improvement Program (CIP).

RJN is a civil engineering and field services firm that specializes in inspecting, studying, analyzing, and designing sewer collection systems. RJN's service offerings include flow monitoring, hydraulic modeling, smoke testing, manhole inspections, dyed water flooding, private property inspections, televising review, and a full range of rehabilitation and new design related to collection systems, lift stations, and storage facilities. We have worked with hundreds of communities and have evaluated over a quarter-billion feet of sewers in our 43-year history.

#### **PROJECT UNDERSTANDING AND APPROACH**

RJN conducted comprehensive flow monitoring for the Village's sanitary sewer system in 2016. Based on these results, three basins came up as the highest priority for follow up SSES and rehabilitation. One of these basins is also identified as the Short-Term High Priority Area identified and submitted to the Metropolitan Water Reclamation District of Greater Chicago (MWRD) for the new Inflow and Infiltration Control Program (IICP). Smoke testing, manhole inspections, closed circuit television inspection and rehabilitation for "High Priority" defects found in this critical area are mandatory under the new MWRD IICP program. It is our understanding that the Village is

interested in conducting the second half of the inspections for this basin in 2018. This work includes approximately 409 manhole inspections and 82,603 LF of smoke testing in 2018 as shown in the attached exhibit.

Benefits to doing these inspections are identifying inflow and infiltration (I/I) entering the collection system through public sector and private sector sources as well as ensuring manholes are thoroughly investigated so that proper rehabilitation techniques are applied at each structure.

The scope of this proposal is to perform smoke testing and manhole inspections, take detailed measurements and observations for each defect observed and make rehabilitation recommendations for all defects identified in the service areas as shown on the attached exhibit.

**Manhole Inspections** – Manhole inspections provide the system owner with an accurate assessment of the physical attributes of existing structures, including location, structural defects, potential I/I sources, and rehabilitation recommendations. A typical RJN manhole inspection program uses both surface as well as full-descent techniques to inspect and document all topside and subsurface manhole components. Physical dimensioning and evaluation of the manhole cover, adjustment, cone, wall, trough, bench, and connecting sewers are performed for each structure.

Using the methods outlined below, RJN will inspect manholes to identify various defects and make rehabilitation recommendations for each structure. RJN's use of state-of-the-art technology to collect, manage, and analyze manhole inspection data ensures accuracy and completeness of data. Inspectors record data in the field with handheld iPad devices, on iForm software with GPS locating technology. This data is managed in the office using ArcGIS software. In house software tools assist with evaluation of the data for determination and prioritization of the repairs necessary to keep the system in its best condition while getting the most value for your dollar.

Some structures may be inaccessible (paved over, buried, seized, etc.) and thus there may be a minimum percentage (~1%-3%) of structures that cannot be inspected. RJN will provide a list of inaccessible structures to the Village and can return to the structures if they are made accessible while RJN inspections are ongoing.

**Smoke Testing** – RJN will use smoke testing to identify various defects in the collection system, as well as to find contributing sources of I/I. Common identified concerns include leaky manholes, cracked main lines and laterals, connected downspouts, directly connected storm sewers, connected foundation drains, area, patio, and driveway drains, and broken cleanouts. Additionally cross connections such as leaking storm sewers crossing sanitary sewers can also be identified.

In the smoke testing process, non-toxic air/smoke mix is blown into a sewer segment through manholes at both ends. Defects are identified by where smoke exits the ground or a structure. Smoke testing is only as effective as the process used. RJN's process is to use a 4-person crew and smoke test only one segment at a time with two smoke blowers, one on each manhole at the two

ends of a sewer segment. When necessary, sandbagging is used to minimize smoke entering other segments. RJN uses handheld mobile data collectors to collect smoke testing results. A GPS mapping grade location is provided for each defect, and a digital photo is taken. This data is then integrated into GIS in order to assist in mapping defects and organizing the results.

**Dyed Water Flooding** – Dyed water flooding is a follow-up to defects identified during smoke testing. It helps to pinpoint and quantify cross connection defects such as directly connected catch basins and cross-connected storm sewers so that necessary rehabilitation can be made. Typically, RJN performs dyed water flooding in conjunction with Closed Circuit Televising (CCTV) inspection of the sanitary sewer. There are 12 locations identified for dyed water flooding from the 2017 smoke testing area. RJN group will perform dyed water flooding in conjunction with televising crews from the Village. It will also be required of the Village to have access to water through hydrants nearby to each dyed water flooding setup.

## **SCOPE OF SERVICES**

Our proposed scope of services is as follows:

### **Manhole Inspections:**

1. Provide equipment and personnel as necessary for manhole inspections.
2. Use handheld electronic data collection equipment for collecting manhole inspection data.
3. Complete surface manhole inspections for approximately (409) manholes as outlined. Collect the following attribute data, as it can be determined:
  - a. Mapping grade GPS locate of manhole;
  - b. Manhole diameter;
  - c. Manhole material;
  - d. Pipe invert measurements;
  - e. Connecting sewer diameter(s), material(s); and flow direction.
4. Identify and document manhole condition, including:
  - a. Direct evidence of I/I;
  - b. Open pick holes in lid;
  - c. Frame and adjusting ring condition, including needed adjustments and chimney seals;
  - d. Cone condition and defects;
  - e. Wall condition and defects;
  - f. Trough, bench and pipe seal condition and defects.
5. Take a minimum of four digital photographs at each manhole structure
  - a. Surrounding area;
  - b. Manhole cover;
  - c. Topside - looking down; and

- d. Manhole frame.
- 6. Complete full-descent manhole inspections for approximately (10) manholes as outlined. Provide all tasks above as well as perform a confined space entry, full-depth inspection with additional digital photographs and observations of the bench, trough and all pipe connections.
- 7. Provide standard traffic control measures (portable signs and cones) at each site in or near a roadway. If a higher level of traffic control is required, RJN crews will contact Village staff and request **traffic control assistance**.

#### Smoke Testing

- 8. Prepare a draft resident smoke testing notification letter for the Village to send to the affected residents and business owners. The letters will include RJN contact information for use during smoke testing.
- 9. Prepare smoke testing door hangers to be hung by RJN staff at each address less than one week prior to smoke testing. These hangers will also include RJN contact information.
- 10. Notify the Village, County, or Township as necessary and the local fire and police dispatch and departments of planned smoke testing activities, including daily email updates.
- 11. Provide equipment, personnel, and smoke as necessary for smoke testing.
- 12. During smoke testing, erect smoke testing signs near the testing area and answer resident and the Village's questions on-site as well as through phone calls.
- 13. Use handheld electronic data collection equipment for collecting smoke testing data.
- 14. Smoke test approximately 82,603 linear feet of sanitary sewers as shown in the attached exhibit.
- 15. GPS locate (mapping grade) each identified defect and take a minimum of one digital photograph of each defect.

#### Dyed Water Flooding

- 16. Provide equipment, personnel, and dye as necessary for dyed water flooding. Water to be provided by Village.
- 17. Work with sub-contracted televising crew to perform televising during dyed water flooding setups by a PACP-certified televising contractor.
- 18. Set up and complete dyed water flooding as outlined. Document results with digital photographs of the dye test setup and if possible dyed water entering the sewer (where applicable).
- 19. Use handheld electronic data collection equipment for collecting dyed water flooding data.
- 20. GPS locate (mapping grade) each identified defect and take at least one digital photograph

or video of each defect (where applicable).

21. Provide data analysis as follows:

- a. Compile field data and develop complete list of defects;
- b. Incorporate results into GIS;
- c. Assign an estimated flow to each defect; and
- d. Determine an appropriate rehabilitation method and estimated cost for each defect.

#### Data Analysis, Program Management & Reporting:

22. Provide data analysis as follows:

- a. Compile field data and develop complete list of defects;
- b. Incorporate results into GIS;
- c. Assign an estimated flow to each defect; and
- d. Determine an appropriate rehabilitation method and estimate an associated cost for each defect.

23. Provide the following in a summary letter report:

- a. Summary of work completed
- b. GIS maps of identified defects;
- c. List of defects prioritized by cost effectiveness for rehabilitation;
- d. Summary of I/I identified, and analyzed;
- e. Recommendations for follow up SSES, rehabilitation and construction.

24. Submit up to three (3) color copies and a pdf of draft report.

25. Provide digital copies of data, GIS geodatabase, and photographs.

26. Address Village comments on draft report and submit up to three (3) bound color copies of final report and a pdf of final report files.

27. Provide project management services for the duration of the project.

28. Attend (2) meetings with Village to discuss project phases & recommendations.

#### ITEMS REQUESTED FROM ORLAND PARK

We request the following items from the Village:

1. Access to the manholes for inspections.
2. Assistance with traffic control where needed in high traffic locations.
3. We request that the Village finalize the draft smoke testing letters and send to the businesses and residents within the study area.
4. Sewer cleaning & televising as needed by Village crews working in conjunction with RJN Group during dyed water flooding.

5. Access to water from nearby hydrants for each dyed water flooding setup.

## SCHEDULE

In order to achieve the best results, manholes inspections should be conducted during wet weather conditions, while for smoke testing a period of dry weather is necessary. Based on proper weather conditions and a Notice to Proceed by August 1, 2018. RJN will complete the project including all field services, data analysis and project correspondence by February 28, 2019.

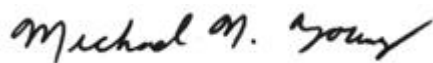
## PROPOSED FEE

The proposed Scope of Services will be invoiced on a unit price basis per the following fee schedule.

Task Description	Quantity	Units	Unit Price	Cost
Perform Surface Manhole Inspection & Data Analysis	409	MH	\$80.00	\$32,720.00
Follow Up Full-Descent Manhole Inspection & Data Analysis	10	MH	\$120.00	\$1,200.00
Perform Smoke Testing & Data Analysis	82,603	LF	\$0.85	\$70,212.55
Perform Dyed Water Flooding & Data Analysis	12	EACH	\$850.00	\$10,200.00
Draft Report, Final Report & Digital Data Deliverables	1	LS	\$8,000.00	\$8,000.00
Meetings & Project Management	1	LS	\$4,950.00	\$4,950.00
				<b>\$127,282.55</b>

It is our pleasure to submit this proposal to the Village of Orland Park. Please feel free to contact us at (630) 682-4700 x 337 if you would like to discuss this proposal in detail. We are looking forward to the opportunity to continue working with the Village on this important project.  
Sincerely,

RJN Group, Inc.



Michael N. Young, P.E.  
Principal



Joseph Sullivan  
Project Manager