April 28, 2021

Mr. Scott Shirley
Public Works Director
Village of Arlington Heights, IL
222 North Ridge Avenue
Arlington Heights, IL 60005

Subject: Continued Sewer Capacity Assessment in the South Arlington Heights Corridor Development Area

Dear Mr. Shirley:

RJN Group, Inc. (RJN) is pleased to provide this proposal for continuation of the sewer capacity study in the South Arlington Heights Road Corridor Area.

Key Project Goals and Objectives

Arlington Heights is planning a redevelopment project along South Arlington Heights Road involving multiple properties in two Tax Increment Financing (TIF) districts, TIF 4 and the South Arlington Heights Road TIF, shown on the attached map. RJN performed a preliminary capacity assessment using water usage data and standard assumptions for groundwater infiltration and wastewater production where water usage data was unavailable. The results of this preliminary assessment indicated that the sanitary sewers affected by the proposed developments should have sufficient capacity for conveyance of dry-weather flow; however, there is limited excess capacity for even small wet-weather events. The additional flow from the proposed development would further reduce the already limited capacity for wet-weather flows.

While the preliminary assessment concluded that the Village sewers may not be able to safely convey the additional flows from the proposed TIF developments, this finding was complicated with uncertainties of groundwater infiltration and of the effect from the MWRD interceptors, and the absence of monitored wet-weather flow data. The primary objective of the proposed scope of services is to address these uncertainties with real-world data and therefore provide a more confident recommendation regarding the approval of the proposed developments.

The most essential task for refining the recommendations of the preliminary assessment is flow monitoring. Flow monitoring of the areas impacted by the TIF projects will provide data critical to assessing whether the Village's existing sanitary sewer infrastructure can accommodate the addition of wastewater flows from the proposed developments. A flow monitoring program will both confirm and provide the basis for any necessary modifications to existing dry-weather flow assumptions and will also provide critical wet-weather data needed to assess the sufficiency of sanitary sewer capacity during large rain events.

The proposed flow monitoring duration is expected to produce a data set large and varied enough to calculate key flow data metrics, including average dry-weather flow, daily maximum flow, and wet-weather flows across a variety of rainfall patterns and intensities. The proposed flow monitoring locations, shown on the attached map, are as follows:

- 15" at MH-01704
- 18" at MH-00017
- 15" at MH-01960
- 16" at MH-01969
- 18" at MH-01676

The meters will be installed, calibrated, and maintained by RJN for 90 days. RJN will perform all maintenance needed as well as calibrations that will ensure the accuracy of the data. The meters will be on telemetry, with the data being available at the end of each day. One rain gauge will be installed for the duration of the flow monitoring period. After removal of the meters, RJN will process the data and prepare a final data set for analysis and a summary for the Village.

Additionally, the Village would like to put two (2) Village-owned SmartCovers on the model route to provide depth data for the same duration of the flow metering. The Village will install and maintain the SmartCovers. RJN will provide hosting services for the data on Clarity.

A skeletal hydraulic model of the sewer segments highlighted on the attached map (approximately 100 sewer segments) has already been developed. Following analysis of the flow monitoring data, this model will be calibrated using data from the proposed flow monitoring program. (The locations, rim elevations, pipe diameters, pipe materials, and invert elevations of sanitary sewer assets were updated as part of the amendment to the preliminary assessment contract.) Once the model is calibrated to the flow monitoring data, it will be used to assess the existing hydraulic capacity within the study area, project the impact of both rainfall and future development, and evaluate alternatives for improvements that may be necessary to accommodate the proposed developments.

Option 1:

The limited wet-weather capacity in the study area may result in a recommendation to upsize sewers. However, such improvements would require an MWRD permit, and the upsizing would likely not be approved until excess flow had been removed from the sanitary sewer system. Manhole inspections of the structures along the model run were included in the amendment to the preliminary assessment to identify sources of excess flow in these locations. However, the rehabilitation recommendations for those manholes were not included in that amendment and would be included as Option 1 of this proposal.

In addition, Option 1 of this proposal includes review of televising data from sewers in the commercial and multi-family areas within the study area to determine the sewer condition. These areas have experienced significant changes and redevelopments over the years, and it is likely that there are abandoned service connections, which are known to be significant sources of excess flow in

sanitary systems. Based on past RJN experience, uncapped or improperly capped abandoned service laterals can account for over 25% of service connections in commercial areas. The televising will be performed as part of a separate contract.

This proposal includes:

- Flow Monitoring/Maintenance
- I/I flow analysis
- Assessment of existing system capacity
- Determination of proposed system capacity needed
- Development of recommendations for system capacity improvements and limitations on discharge locations for developments.

Option 1:

- Manhole rehabilitation recommendations based upon existing inspections
- Sewer condition assessment and rehabilitation recommendations based upon existing CCTV

Assuring Quality and Safety

RJN is committed to providing **quality** deliverables. The data, analysis, and recommendations provided by RJN will be used to make decisions going forward in the TIF areas. RJN's use of electronic forms for data collection with standardized entry and error trapping, the use of QC tools in our in-house data management software, as well as our corporate training and QA processes in place will ensure that results and recommendations will provide value to the Village.

As an employee-owned firm, RJN's commitment to the **safety** of our employees and of the community is paramount. That commitment to safety is demonstrated in our internally-developed and audited safety program where our goal is to have all field staff, engineers, and project managers "RJN Safety Certified." Included in the certification is confined-space entry training, temporary traffic control, OSHA 10-hour, fall protection, and many more. Every project has a project-specific RJN Health and Safety Plan (HASP) developed prior to commencing any field work. This HASP includes project specific details on traffic control, pedestrian and field personnel safety, and emergency response.

Price and Schedule Summary

This project will be invoiced on a Time and Material, Unit Billing, or a Lump Sum Basis as appropriate for a total base fee for the Flow Metering and Hydraulic Modeling of $79,750. Adding the services for Option 1, would put the total fee at $120,500. The project is expected to be completed be completed by January 15, 2022. Complete Scope of Services, Pricing, Schedules, and Maps are provided in the following exhibits:

- Exhibit A – Scope of Services
- Exhibit B – Pricing
- Exhibit C – Schedule

- Exhibit D – Project Map

It is our pleasure to submit this proposal to you continuing the work in the South Arlington Heights Road TIF areas, and we are looking forward to the opportunity to work with the Village of Arlington Heights on this important project. Please feel free to contact Karol Giokas at 630.364.4362 if you would like to discuss this proposal or have any questions.

Sincerely,

Karol G. Giokas, P.E.
Senior Project Manager

Marissa Villafuerte, P.E.
Lead Project Engineer

EXHIBIT A
SCOPE OF SERVICES

RJN is proposing the following scope of services to conduct the 2021 Capacity Assessment for Arlington Heights.

Flow Metering and Analysis

1. Provide the rental of **five** flow meter units with, at a minimum, one velocity, dual depth sensors, and telemetry for the **90 day** duration of the project. Provide the rental of **one** rain gauge with telemetry for the **90 day** duration of the project.
2. Investigate targeted sites for flow meter and rain gauge installation. Confirm that the meter sites are hydraulically suitable for flow monitoring. Prepare Site Investigation Reports for approval by the Village.
3. Prepare equipment for installation. Install equipment at approved locations. Provide standard traffic control measures (portable signs and cones) at each site as necessary.
4. During installation, calibrate each flow meter by taking manual depth and velocity measurements and comparing with meter readings. Perform tipping tests on rain gauge.
5. Prepare the host system for handling the data. Review the data at least twice per week during the "settling in" period, once per week thereafter, and report any equipment service needs to the Project Manager.
6. Take a second round of calibration measurements within two weeks of installation and a third during the flow monitoring period. Use the calibrations to adjust the data and prepare final data sets.
7. Provide maintenance as necessary to keep equipment in proper operation for the duration of the monitoring period.
8. Review data with the Village approximately two weeks prior to meter removal to discuss options to extend the meter duration or remove at scheduled removal time.
9. Perform final calibration measurements at each site (for a minimum of four calibrations per site total) and remove the flow meters and rain gauge.
10. Process the collected raw data. Analyze the processed data for wet- and dry-weather flow patterns.
11. Perform an inflow and infiltration analysis, including:
    - Inflow peaking factors
    - Regression analysis for peaking factor prediction
    - Scattergraphs, hydrographs, and rainfall hyetographs and
    - Assess downstream control and surcharging at each meter location.
12. Provide hosting services on Clarity for the duration of the flow metering, for data obtained from two (2) Village-owned SmartCovers. The Village is responsible for installing and maintaining them.

Hydraulic Modeling and Alternative Analysis

1. Utilize the flow monitoring data to calculate existing dry-weather flows and diurnal flow patterns during dry-weather conditions. Use this data to refine dry-weather flow inputs in the SewerGEMS skeletal model that was developed during the preliminary capacity assessment.
2. Analyze wet-weather events to develop RTK parameters for projection of existing wet-weather flows in the model.
3. Calibrate the model to both dry-weather and wet-weather conditions. Use the calibrations to verify the accuracy of physical model network data and hydrological parameters.
4. Following calibration, model and evaluate the system. Simulate dry-weather and wet-weather conditions both with and without the addition of the projected flows from the new development. Compare existing and proposed conditions to assess the impact of the development on downstream sewers.
5. Develop alternatives for system improvements based on the following decision criteria:
    - Routing of sanitary flows from the proposed TIF developments, particularly those that can feasibly be routed to either the Lincoln and Douglas MWRD connection or the Dempster and Busse MWRD connection
    - Capacity improvements necessitated by the proposed developments, including sewer upsizing and/or relief sewers
    - Excess flow reduction, as an alternative and/or complement to capacity improvements
    - Design storm intensity—recommended capacity and/or flow reduction alternatives will be developed for up to two design storms of established recurrence interval

Capacity Assessment Recommendations and Report

1. Prepare a pdf draft report of capacity assessment findings and recommendations, including:
    - Summary of work completed
    - Flow metering findings and I/I analysis
    - Modeling findings, including calibration results, analysis of existing conditions, and impacts of proposed developments
    - Recommendations regarding capacity of existing sewer to receive flow from new development
1. Incorporate Village comments into the draft report and provide a pdf of the final report and up to 3 hard copies.
2. Provide a copy of digital documents and processed flow-monitoring data.

Project Management

1. Provide project management services for the duration of the project.
2. Up to 2 meetings with Village staff.

OPTION 1: Sewer and Structure Assessment

Sewer CCTV Review and Recommendations

1. Provide maps for the Village's televising contractor for areas to be televised and obtain televising PACP export database, media, and reports from contractor.
2. Provide equipment and personnel as necessary for review of PACP coded CCTV data from a PACP export database, and including media and reports for the TV.
3. A review of 10% of the total CCTV footage (approximately 7,500 lf) will be performed to ensure that the coding adequately follows PACP requirements. If the coding is not adequate the CCTV will be returned to the CCTV contractor for recoding.
4. Based on received PACP coding sewers **with no** observations rated by MACP standards as a 4 or a 5 level defects or selected other observations agreed upon with the Village will be reviewed to ensure completeness and quality of video.
5. Based on received PACP coding sewers **with** observations rated by MACP standards as a 4 or a 5 level defects as well as selected other observations agreed upon with the Village will be reviewed in detail (up to 25,000 lf).
    - Review CCTV with identified MWRD high priority defects using PACP qualified personnel to identify defects that will require rehabilitation. (CCTV is not included in this scope.)
    - Determine an appropriate rehabilitation method and estimate an associated cost for each defect or segment.

Manhole Condition Assessment and Recommendations

1. Review previously inspected manholes (up to 96 structures) using MACP qualified personnel to identify defects that will require rehabilitation. (Manhole inspections are not included in this scope.)
2. Provide data analysis as follows:
    - Compile field data and develop complete list of defects
    - Map results in GIS
    - Assign an estimated flow to each defect and
    - Determine an appropriate rehabilitation method for each manhole and estimate an associated cost.

Manhole and Sewer Rehabilitation Report

3. Prepare a pdf technical memorandum containing system rehabilitation recommendations, including:
    - Summary of work completed
    - List of manholes prioritized by severity of defects
    - List of sewers prioritized by severity of defects
    - Recommendations for rehabilitation of sewers inspected in the target area including engineer's estimate of cost
    - Recommendations for rehabilitation of structures inspected in the target area including engineer's estimate of cost
4. Provide a copy of digital documents.

Items Requested from the Village

1. Assistance locating or opening manholes as needed.
2. Assistance with traffic control as needed.
3. Installation and maintenance of the Village-owned SmartCovers
4. **Option 1:** CCTV Data in PACP export format, with reports, media, database export

Items Not Included in this Proposal

1. Installation or maintenance of the Village SmartCovers
2. **Option 1:** Manhole inspections (amendment to preliminary study)
3. **Option 1:** CCTV of sewers or management of CCTV contractor (Village contract with RedZone Robotics)
4. **Option 1:** Review of non-PACP CCTV data

EXHIBIT B
PRICING

Pricing for the 2021 Capacity Assessment is shown below.

Description		Type	Unit Cost	Unit Quantity	Total
Flow Metering and Analysis					
Flow Metering					
	Installation	per meter	$ 1,900.00	5	$ 9,500.00
	Maintenance	per meter-month	$ 1,850.00	15	$ 27,750.00
Flow Analysis		T&M			$ 8,500.00
				SubTotal	**$ 45,750.00**
Hydraulic Modeling and Recommendations					
Hydraulic Modeling		T&M			$ 6,000.00
Alternatives Analysis		T&M			$ 12,000.00
Report and Recommendations		T&M			$ 10,000.00
Project Management		LS			$ 6,000.00
				SubTotal	**$ 34,000.00**
				TOTAL	**$ 79,750.00**
OPTION 1					
Sewer and Structure Assessment					
Sewer CCTV Review		Per Foot	$ 0.25	75,000	$ 18,750.00
MH Condition Assessment		T&M			$ 6,500.00
MH and Sewer Rehab Rec Memo		T&M			$ 14,000.00
Additional Project Management		LS			$ 1,500.00
				SubTotal	**$ 40,750.00**
				TOTAL	**$ 120,500.00**

The pricing for Option 1 is applicable only if services are provided as part of the scope presented herein.

Hourly Rate Schedule

Classification		2021 Rates*
PD	Project Director	$245.00
SPM	Senior Project Manager	$195.00
PM	Project Manager	$175.00
SCM	Senior Construction Manager	$160.00
CM	Construction Manager	$150.00
SPE	Senior Project Engineer	$145.00
PE	Project Engineer	$130.00
CO	Construction Observer	$120.00
EI	Engineer I	$110.00
GSS	GIS Specialist	$110.00
SDA	Senior Data Analyst	$110.00
GIS	GIS Analyst	$100.00
FM	Field Manager	$95.00
DA	Data Analyst	$85.00
FT	Field Technician	$75.00
AS	Administrative Support	$80.00

Notes

- The Hourly Rate Schedule is valid until December 31, 2021. Following that date, rates may be subject to a 3% annual increase.
- The rates for reimbursables such as travel, postage, document fees, and in-house printings/media are applied based on the normal on-going charges.

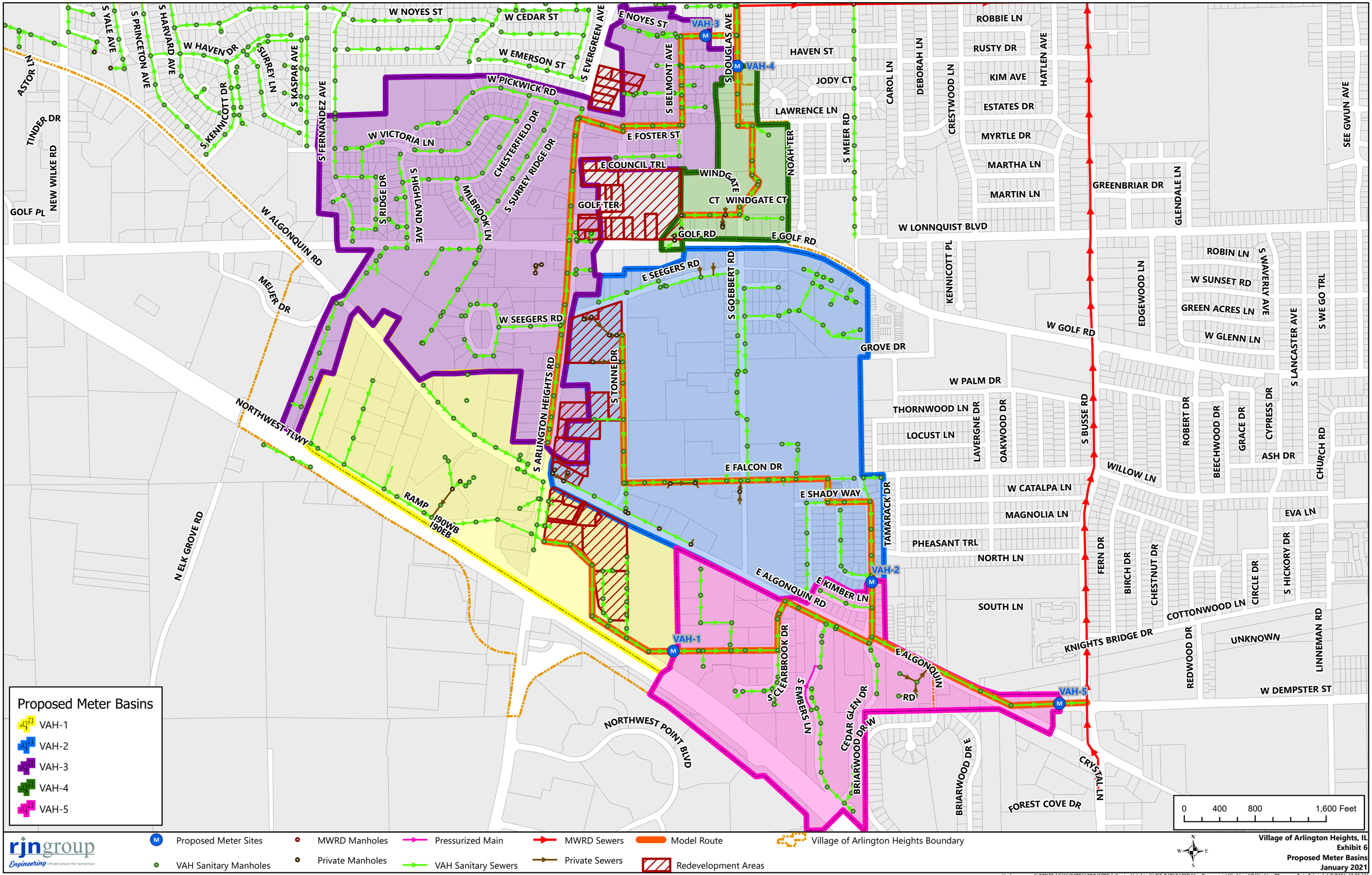
EXHIBIT C
SCHEDULE

RJN is prepared to begin work on this project within two weeks of receiving a signed contract and the Village GIS data. The following schedule is proposed assuming a signed contract by June 1, 2021.

- Flow Monitoring – July 1, 2021 – September 31, 2021
- Flow analysis complete – November 30, 2021
- Modeling recommendations draft report – January 15, 2022

Option 1:

- Rehabilitation recommendation memo (manhole and sewer) – 3 months following receipt of complete CCTV data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S FERNANDEZ AVE
W VICTORIA LN
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ROBBIE LN
RUSTY DR
KIM AVE
ESTATES DR
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CRESTWOOD LN
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GREENBRIAR DR
GLENDALE LN
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EDGEWOOD LN
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S LANCASTER AVE
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E SEEGERS RD
S GOEBBERT RD
W SEEGERS RD
S TONNE DR
ARLINGTON HEIGHTS RD
GROVE DR
W PALM DR
THORNWOOD LN
LOCUST LN
LAVERGNE DR
OAKWOOD DR
S BUSSE RD
ROBERT DR
BEECHWOOD DR
GRACE DR
CYPRESS DR
ASH DR
CHURCH RD
WILLOW LN
W CATALPA LN
MAGNOLIA LN
EVA LN
PHEASANT TRL
NORTH LN
FERN DR
BIRCH DR
CHESTNUT DR
S HICKORY DR
CIRCLE DR
COTTONWOOD LN
SOUTH LN
KNIGHTS BRIDGE DR
REDWOOD DR
UNKNOWN
LINNEMAN RD
W DEMPSTER ST
E FALCON DR
E SHADY WAY
TAMARACK DR
VAH-2
E KIMBER LN
E ALGONQUIN RD
VAH-1
S CLEARBROOK DR
S EMBERS LN
CEDAR GLEN DR W
BRIARWOOD DR W
BRIARWOOD DR E
FOREST COVE DR
CRYSTAL LN
VAH-5
NORTHWEST HWY
RAMP
I90WB
I90EB
N ELK GROVE RD
NORTHWEST POINT BLVD
0
400
800
1,600 Feet
Proposed Meter Basins
VAH-1
VAH-2
VAH-3
VAH-4
VAH-5
Proposed Meter Sites
VAH Sanitary Manholes
MWRD Manholes
Private Manholes
Pressurized Main
VAH Sanitary Sewers
MWRD Sewers
Private Sewers
Model Route
Redevelopment Areas
Village of Arlington Heights Boundary
rjngroup
Engineering infrastructure for tomorrow
Village of Arlington Heights, IL
Exhibit 6
Proposed Meter Basins
January 2021
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