

February 27, 2017

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  
2017 ORLAND PARK STRATEGIC FLOW MONITORING**

Dear Mr. Ingram:

RJN Group, Inc. (RJN) is pleased to submit this proposal to the Village of Orland Park (Village) for a strategic sanitary sewer flow monitoring project.

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 system evaluation & repair program." This proposal is for flow monitoring services for Year-2 of the Village's Sanitary Sewer Inflow and Infiltration (I/I) Capital Improvement Program (CIP).

RJN, founded and headquartered in Wheaton, Illinois has completed numerous flow and rainfall monitoring and analysis projects of various sizes throughout the country, including dozens of projects within the greater Chicagoland area. We own and maintain an inventory of over 450 flow meters, have a data group dedicated data analysts, and provide all of the field and office services required to complete flow monitoring work in-house.

### **PROJECT UNDERSTANDING**

Following the results of last year's flow monitoring program and discussions with Village staff, it has been determined that a strategic flow monitoring program will be beneficial to break up basins identified with severe I/I and to help guide the Village's Sanitary Sewer Inflow and Infiltration (I/I) Capital Improvement Program (CIP). We recommend 6 locations for flow monitoring to further analyze some of the worst basins identified in 2016 as well a location to further investigate evidence of downstream control near the MWRD interceptor. These locations are shown on the attached map.

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Flow monitoring is a valuable tool that can be used to study a variety of problem areas and to gather data for a number of reasons. Because of this, the Village has decided that it is in their best interests to begin purchasing meters to build a Village fleet of meters. This proposal will include an allowance for the assistance with and purchase of three additional flow meters for the Village. This purchase, in addition to the three that were purchased in 2016 will put the Village's meter fleet at 6 Village-owned meters, to be used in this project.

Using five flow meters to monitor the MWRD basin just south of 151st street will split up and provide baseline flow assessment of the Village's entire sewer system in the Short-Term Priority Area identified and submitted to the Metropolitan Water Reclamation District of Greater Chicago (MWRD) for the new Inflow and Infiltration Control Program (IICP). Having baseline data for this area will be beneficial so that future inspections required under the MWRD IICP can be quantitatively analyzed for flow reduction, and flow reduction efforts can be quantified following sewer rehabilitation activities in the area. This data will also be another method to check the accuracy of the 151st street lift station meter. The details of these meter locations are shown on the attached exhibit.

Using another meter near last year's meter site ORL-01-16 will help to assess the surcharging and severe downstream control exhibited due to the proximity to the MWRD interceptor. Continuing flow metering here can provide more accurate data in assessing the problem at this location. Data from these meters will be useful in determining capacity of sewers at MWRD connection points and could be used in the future to calibrate a hydraulic model.

RJN will be responsible for completing all flow metering and data analysis for the project. Key components of the project are:

- Assist with the selection and purchasing of three flow meters for the Village.
- Begin metering as soon as practical. Leave Village-owned meters in for six months.
- Analyze meter data develop a summary report and action items for follow-up inspections, studies, and rehabilitation.

## **PROJECT APPROACH**

We have determined that 6 flow meters will be required to properly subdivide the focus areas for the 2017 study. A map showing the recommended flow meter locations and basin boundaries is attached.

### **Meter Purchase**

RJN will coordinate the purchase of three additional Hach meters as part of this contract to bring the Village's fleet up to 6 Village-owned flowmeters. RJN will procure the meters on behalf of the Village and prepare them for installation.

### **Installation and Calibration**

RJN field technicians will make an initial site evaluation visit to the targeted meter locations. Meter site investigations are necessary to evaluate hydraulic flow characteristics and sensor application to ensure that conditions are suitable for measuring flow rates accurately. The field crew will also review each site for access, traffic control, and overall site safety considerations. Site investigation results can then be used to determine the optimal location and appropriate flow metering technology for each meter site.

Site investigation reports containing the site information and digital photographs will be prepared for Village's approval prior to the installation of the metering equipment.

RJN's field crews are certified in confined space entry procedures and will complete confined space entry reports before each site visit through the duration of the project.

At the time of installation, manual depth and velocity readings are taken by the field technicians to confirm that the meter is reading accurately and to the manufacturer's operating standards. In addition to the initial calibration, RJN will return within two weeks of installation and at least once more during the flow-monitoring period to obtain a sufficient number of manual level and velocity readings for calibrations and for comparison to the meter collected data. A final set of measurements for calibration will be taken prior to meter removal.

### **Data Maintenance & Handling**

RJN will maintain the data link required for remotely uploading the data from the installed

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meters. Experienced data analysts will collect, consolidate, process, and perform a cursory review for data continuity and quality throughout the project. Data will be corrected and adjusted according to calibrations and flow balances among connecting sites. The data will be made available online to the Village for viewing.

RJN will utilize a host software support application program for remote wireless flow meter data collection. On a daily basis, all data recorded and stored in the meter will be collected by the host system. RJN will install, operate, and maintain the telemetry for this system. RJN Group will use a system employing client/server architecture to store all project flow data. On a daily basis, flow meter measurements, battery voltages, and other data entities will be forwarded to the server and immediately posted to the website for viewing by authorized parties.

The web module software will allow any networked computer (with appropriate authentication) access to the data stored using a common web browser (i.e. Microsoft Internet Explorer). The web module will enable the user to view the data and download the data in Microsoft Excel format. Web module users will not have access to modify the database or any operational system configurations.

### **Data Analysis**

RJN will review the flow monitoring data at least twice a week during the “settling in” period and then once per week thereafter, and rainfall data after receipt. During the “settling in” period, crews will obtain necessary calibrations and make efforts to prevent sensor failure, minimize equipment maintenance issues, avoid excessive siltation, and configure the monitoring equipment to capture hydraulic variations or anomalies. The analysis of the data includes the identification of data gaps, hydraulic anomalies, and overall meter performance.

Any equipment service needs will be conveyed to RJN field service crews from our data analysis team. The data will be processed and edited in accordance with field confirmations to produce final data sets for each site. The final data will be posted when completed.

After the flow-monitoring period is complete, the data will be evaluated and used in developing an I/I analysis for the Village. In addition to addressing the results of the flow monitoring, the report will also include recommendations for reducing excess flows. The recommended study plan will help to identify areas of high I/I and provide guidance on determining future long term planning O&M programs for the MWRD IICP.

Recommendations on scheduling and budgeting further studies, including smoke testing,

manhole inspections, dyed water flooding, and televising inspection will be included.

### **PROPOSED SCOPE OF SERVICES**

Our proposed scope of services is outlined as follows:

1. Procure three Hach FL-900 flow meters for the Village with expedited delivery.
2. Coordinate with Village for periodic data delivery from the Village's 5 rain gauges.
3. Investigate targeted sites for flow meter installation. Determine the meter sites that are hydraulically suitable for flow monitoring. Prepare Site Investigation Reports for approval by Village.
4. Prepare flow meters for installation. Install the 6 Village-owned flow meters at approved locations.
5. During installation, calibrate each flow meter by taking manual depth and velocity measurements and comparing with meter readings.
6. 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.
7. Prepare the host system for handling the flow data and posting the data for viewing and access by Village staff. 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 field crews.
8. Take calibration measurements on meters a second time within two weeks of installation. Utilize the calibrations to adjust the data and prepare final data sets.
9. Provide flow meter maintenance as necessary to keep equipment in proper operation for the duration of the monitoring period. Calibrate each meter at least one additional time within the flow monitoring period.
10. Procure spare parts and replacement equipment, such as batteries and desiccants, as needed to keep flow meters working and within operating standards.
11. Perform final calibration measurements at each site and remove the flow meters.

12. Process the collected raw data. Analyze the processed data for wet- and dry-weather flow patterns. Create hydrographs for each meter and determine wet-weather peaking factors at standard storm recurrence and durations for each basin.
13. Perform an inflow and infiltration analysis, including:
  - a. Inflow peaking factors;
  - b. Regression analysis for peaking factor prediction;
  - c. Scattergraphs and hydrographs; and
  - d. Capacity analysis including downstream control and surcharging assessment.
14. Provide the following information for the summary report:
  - a. Details on each flow meter and rain gauge location;
  - b. Summary of the flow and rainfall data collected;
  - c. Conclusions from the flow metering, including evidence of downstream control, hydraulic bottlenecks, and levels of infiltration and inflow (I/I);
  - d. Adequacy of the existing system to handle existing flows; and
  - e. Recommendations for the MWRD IICP high-priority area and other high priority areas as part of long term O&M program.
15. Consolidate information and prepare and pdf copies of a draft report to Village outlining results and recommendations.
16. Incorporate Village's comments and submit up to three copies of the final report to Village. Provide a pdf of the final report and a flash drive containing all digital documents and processed flow-monitoring data.
17. Provide project management services for the duration of the project. Attend up to two meetings with Village staff.

### **ITEMS REQUESTED FROM VILLAGE**

We request the following items from Village:

1. Access to the Village's five rain gauges for periodic data deliveries from Village for each rain gauge, at 15-minute interval data, at a minimum. Village will remain responsible for rain gauge maintenance and data collection.
2. Assistance with traffic control where needed in high traffic locations.

### SCHEDULE

Flow meters are typically installed in March/April. It is our goal to have all meters installed within three weeks of project approval.

The key schedule parameters for this project are as follows:

- Order meters within one week of a notice to proceed.
- The site investigations will begin within two weeks of a notice to proceed.
- Flow meters will be installed within two weeks of site investigations, based on purchased meter delivery.
- The flow monitoring period will begin after the last meter is successfully installed.
- The flow monitoring periods is 6 months. The draft report will be submitted to Village within three months of the end of the flow-monitoring period.
- The final report will be submitted within two weeks of receipt of Village comments on the draft report.

### PROPOSED FEE

This scope of services will be invoiced on a unit price basis per the following fee schedule. The total cost for the recommended program is **\$82,300**.

Task #	Task	Quantity	Unit	\$/Unit	Total
1001	Site Investigations (6 meters)	6	meter	\$ 350	\$ 2,100
1002	Meter Preparation and Installation	6	meter	\$ 900	\$ 5,400
1003	Long-Term Meter Maint., Cals, & Review (6 met., 6 mos)	36	meter-mo.	\$ 925	\$ 33,300
1004	I/I Analysis, Draft/Final Report	1	LS	\$ 8,500	\$ 8,500
1005	Project Management and Meetings	1	LS	\$ 3,500	\$ 3,500
1006	Meter Purchase*	1	Cost+5%	\$ 29,500	\$ 29,500
<b>TOTAL :</b>					<b>\$ 82,300</b>

\* For purchase of 3 meters including 5% markup for purchase coordination

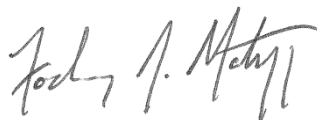
It is our pleasure to submit this proposal to the Village of Orland Park. Please feel free to contact Joe at (630) 682-4700 x337 if you would like to discuss this proposal in detail. We are looking forward to the opportunity to continue working with Village on this important program.

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Sincerely,  
RJN Group, Inc.



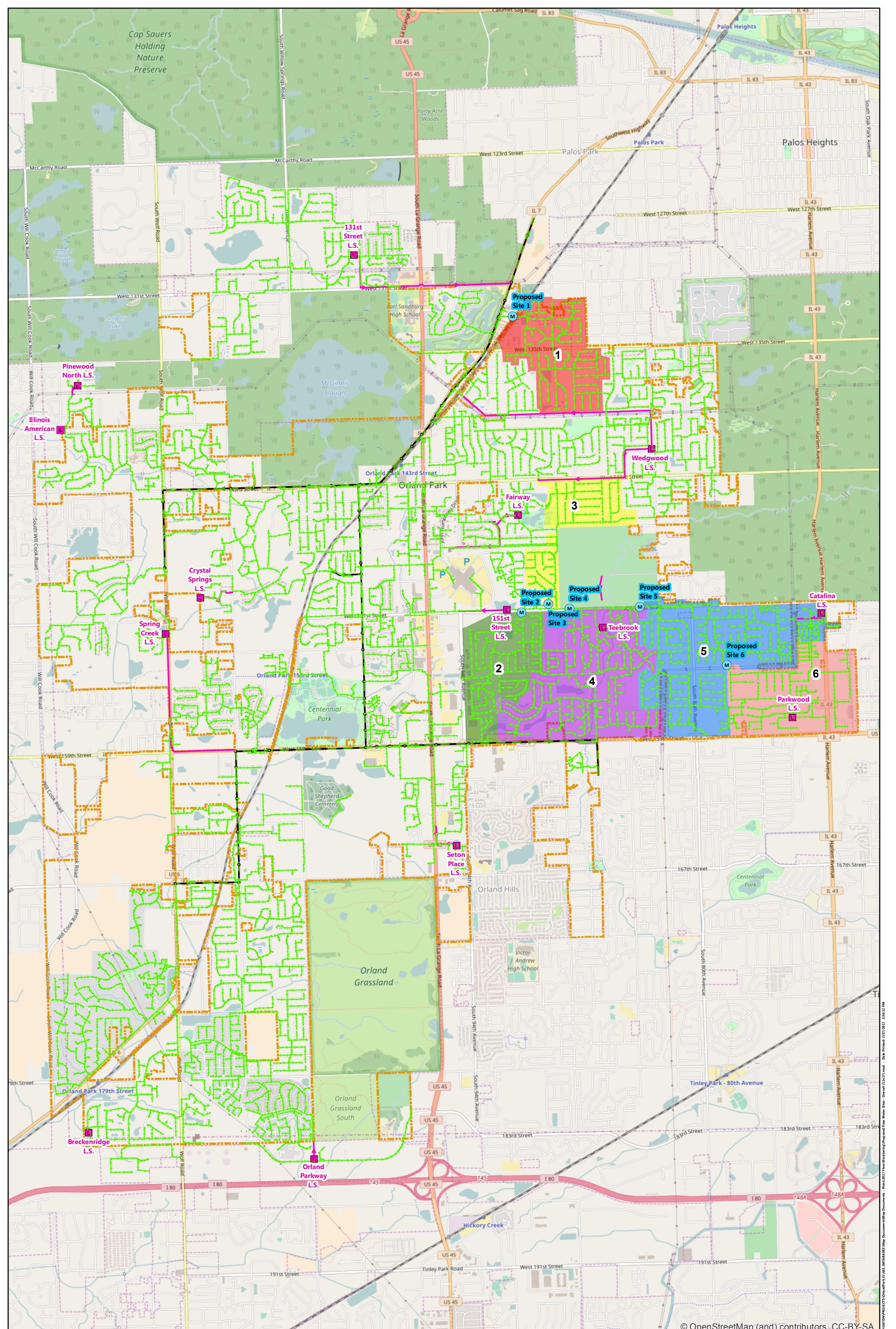
Joseph M. Sullivan  
Project Manager



Zachary J. Matyja, P.E.  
Client Manager

Enclosure

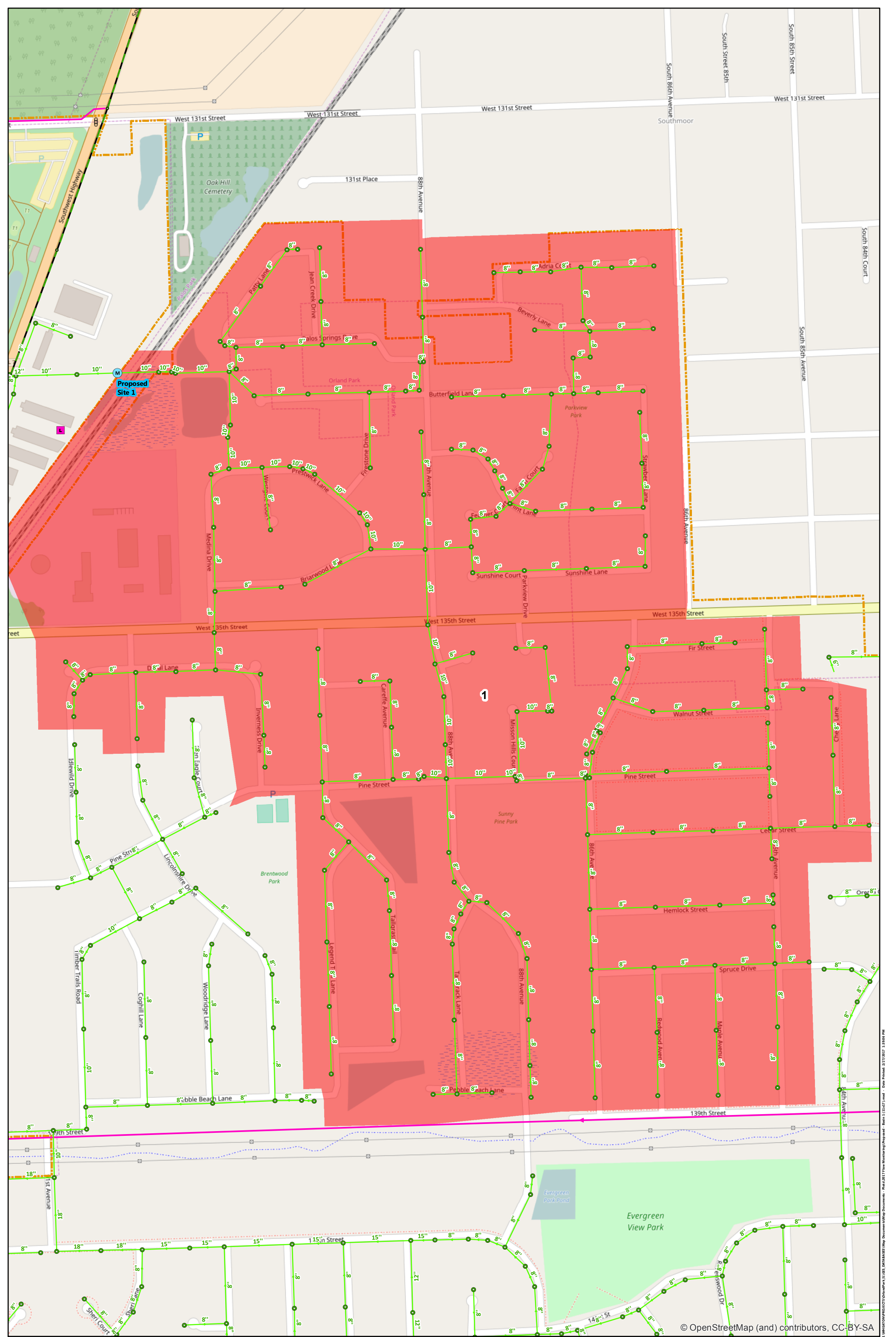


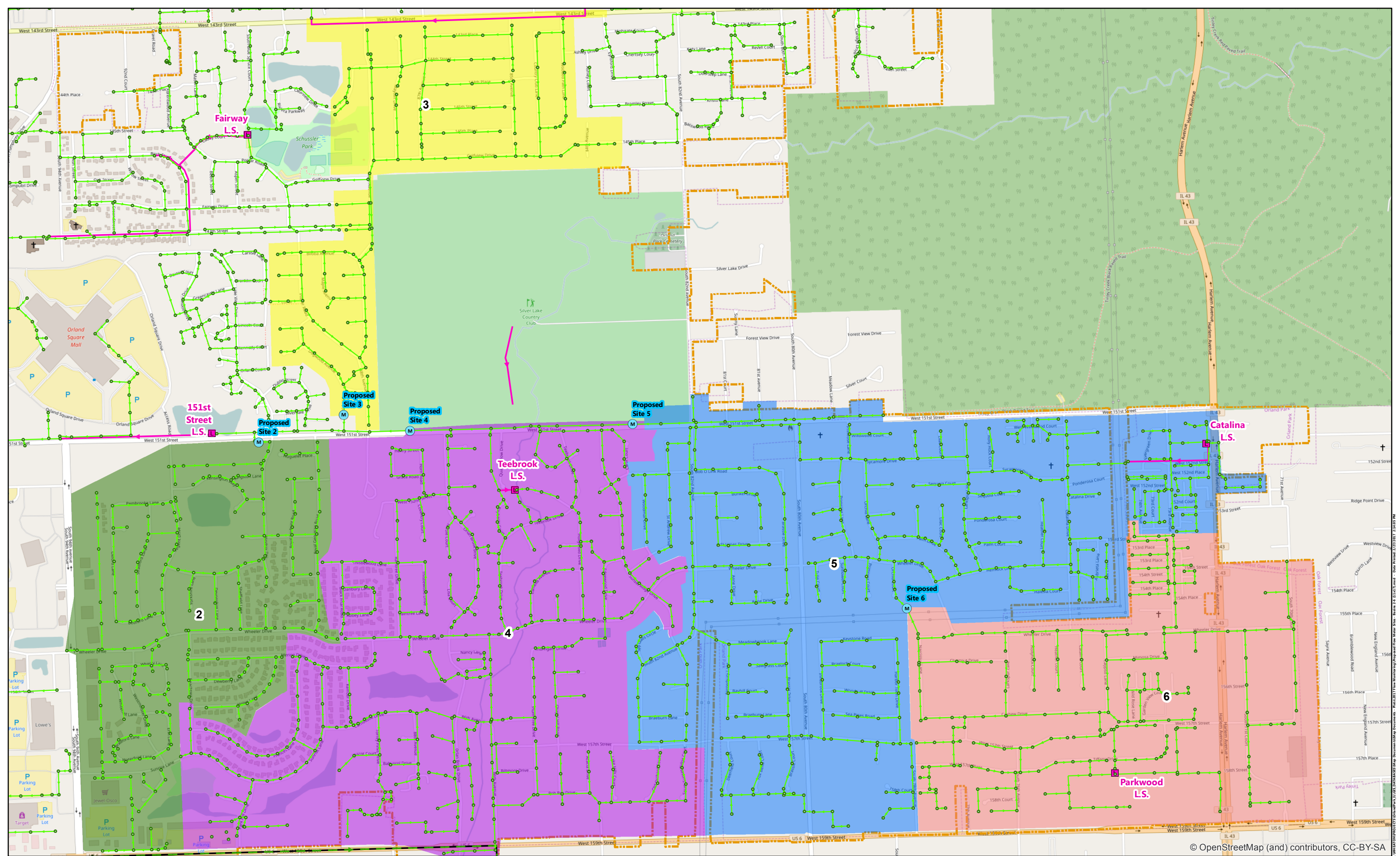


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