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DEPARTMENT OF PUBLIC WORKS - Engineering Division
MEMO

TO: Members of the Utilities Committee

FROM: Ross Buetow, Deputy Director of Public Works

SUBJECT: Award of Phase III Sanitary Sewer Flow Monitoring Contract

DATE: February 4, 2014

In 2012, the Common Council approved a five-year agreement between the City and R.A. Smith National, Inc. for Sanitary Sewer Flow Monitoring services, with specific scopes of service and their related contracts to be approved on an annual basis.

The overall goal of this project is to evaluate the flow characteristics within our public sewer system and identify potential sources of clear water inflow/infiltration (I&I). The planned scope of services for the 2014 contract includes more detailed investigations in those areas studied in previous years where significant levels of I&I were observed as well as measuring flows at additional manhole locations in other areas of the City. The field work portion of the project will take place during the spring and early summer months, when sewer flows are typically at their highest levels. This work will include flow volume measurements as well as dye-water flooding of the storm sewer system in targeted local areas where exfiltration from the storm sewer system is suspected. A final written report will be provided as part of the scope of services to document the consultant's findings and will include the consultant's conclusions and recommendations for possible corrective action.

We are hereby requesting approval of the award of contract for 2014 Sanitary Sewer Flow Monitoring services to R.A. Smith National, Inc. in an amount not to exceed \$100,000.00, which is our approved budget for this project.

With satisfactory performance by the consultant, DPW staff anticipates contracting with R.A. Smith National for the remaining phases of this flow monitoring project, subject to Utilities Committee and Common Council approval at the appropriate times.

Thank you for your consideration.

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In accordance with paragraph 1.01 of the **Master Agreement for Professional Services between the City of Appleton, WI ("City") and R.A. Smith National, Inc., ("RASN")**, dated March 7, 2012 ("**Agreement**"), RASN and City agree as follows:

I. **Specific Project Information**

A. **Task Order Title: Appleton 2014 Sewer Investigation Services**

- B. **Description of Services to be Performed:** The purpose of this project is to continue investigation and analysis of infiltration and inflow to the sanitary sewer system. The project will include two primary components in 2014 with a continuation of flow monitoring at selected locations to identify sections of the sewer system subject to excessive Inflow/Infiltration (I/I) of clear water and to conduct dyed water flooding tests to identify specific sources of I/I in such sewers as identified in past year flow analysis. This project again builds upon the results of past analyses in 2012 and 2013 and extends the program into new sections of the sewer system that are believed to contribute excessive I/I.

Flow monitoring services will begin with monitoring in up to fifteen locations selected by RASN and City staff for a period of up to 90 calendar days. Analysis of data collected during that period will be used to define the characteristics of the monitored sub-basins and to identify the value and need for additional I/I investigative steps. Specific monitoring locations will be identified by City and RASN staff based on existing sewer system information and new areas identified for investigation.

II. **Scope of Services:** The primary role and responsibilities of RASN are:

- A. **Project Kickoff Meeting** – Schedule and conduct a project team meeting to confirm proposed meter locations and dyed water flooding areas, review the project schedule, confirm communications protocols for field work and establish a project progress meeting schedule. Arrangements to transfer additional or updated GIS data and other necessary information to the RASN project team will also be completed as part of this meeting.
- B. **Traffic Control Plans** – Prepare traffic control plans for RASN crews working in City streets to install the flow meters and conduct dyed water flooding, and resolve any issues or concerns regarding those plans with City traffic engineering staff. Secure permission for work in the streets in accordance with the requirements of the City of Appleton Temporary Traffic Control Manual and Work Zone Safety guidelines. These plans will apply to each flow meter installation, meter maintenance visit and all dyed water flooding activity in the roadway.
- C. **Flow Monitoring**
1. **Install Equipment** – RASN crews will install ISCO Model 2150 Area Velocity Flow Modules (flow meters) in sewer system locations identified by the City of Appleton and will follow permit-required confined space entry procedures and approved traffic control plans for all field activity. The flow meters will be set to record data on 15-minute intervals during normal flow conditions and will automatically increase sampling frequency to 5-minute intervals when flow depths increase due to wet weather conditions. ISCO Model 2103ci CDMA Cellular Phone Modems (modems) will be installed on select flow meters to allow remote access to the collected data. Additional modems will be installed on other meter locations as the project progresses.
 2. **Maintain Equipment** – RASN staff will remotely monitor meters equipped with cellular modem equipment or conduct a field visit to flow meters not remotely accessible within two weeks of installation to confirm proper operation and to complete an initial download

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of recorded data. Subsequent field maintenance visits to download data and service the field equipment will be conducted as necessary to maintain operation of the equipment and collect data following significant wet weather events. Remote observation of flow meter performance in locations with modems will be used to evaluate remaining battery life and optimize service intervals.

RASN crews will also support City staff maintenance and data collection from four City-owned ISCO Model 676 Rainfall Logging System rain gages installed on City properties. The rain gage data will be incorporated in the flow analysis to correlate wet weather conditions with recorded sewer system flows. The rainfall data will also be uploaded for City and RASN staff access through a website portal.

3. **Interim Reporting and Adjustments** – RASN will confirm City staff access to the uploaded flow data through the RASN Internet-accessible data site following initial data uploads and will meet with City staff periodically through the duration of the project to review and discuss accumulated data. This information will be used to consider and determine adjustment of flow monitor placement and duration based on wet weather occurrences and evaluation of collected data.
4. **Data Analysis and Reporting** – The collected data will be analyzed to identify and quantify sources of infiltration / inflow (I/I) in each monitored sub-basin, with summaries of each rain event of $\frac{3}{4}$ " or greater in a 24-hour period. The data analysis will identify peak-hour flows, rank the monitored sub-basins by the magnitude of infiltration, and quantify the amount of I/I. The analysis will also determine sanitary flow, dry weather infiltration, base flow wet season infiltration, rainfall derived I/I, max day flow, max hourly flow and max day-to-base flow ratios. In addition to imported rainfall data, RASN will also import City of Appleton Wastewater Treatment Plant inflow data, if available and provided by the City, in a compatible format to be used as a flow monitoring program baseline throughout the project.

RASN and City agree that collection of sewer system flow data is weather dependent and that the results of the analysis effort will be dependent upon the quantity and quality of data collected in the monitoring period. If sufficient wet weather occurs to provide areas of significant I/I, RASN will provide preliminary results, conclusions and program recommendations by June 15, 2014 for inclusion in 2015 municipal budget development.

Final reporting will be completed no later than 45 days following final flow monitoring, and presented in both electronic and paper (three copies) reports. Final reporting will include data analysis and comparison using EPA-derived performance metrics, color coded map representation of performance in the monitored sub-basins, flow graphics and tabular data. RASN will review a pre-final version of the report with City staff and update the report for final publication following that meeting. RASN will also provide support and participate with City staff in presentation of the final report to the City of Appleton Utilities Committee.

D. Dyed Water Flooding

1. **Define Investigation Areas** – RASN and City staff will review sewer system sub-basin flow monitoring analyses, topography, sanitary and storm sewer infrastructure, land use and building types to identify target areas for dyed water flooding investigation. The local sanitary sewer systems in these areas will also be evaluated to determine the effort and related cost required to conduct dyed water flooding based on sewer size, length and flow

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sequences. Specific sanitary sewer sub-basins will be identified for dyed water flooding investigation.

2. **Conduct Dyed Water Flooding** – RASN will procure subconsultant services to support the dyed water flooding investigations and will coordinate those services in the field with City staff. The dyed water flooding technique consists of surcharging a limited section of the City storm sewer system with dyed water and monitoring the underlying sanitary sewer system for dyed water to identify and quantify specific sources of infiltration or inflow.

The RASN field team will be comprised of experienced subconsultant field staff with an experienced RASN field engineer. The crew will distribute informational flyers to notify local residents of the process and will coordinate the field activity with City and regulatory staff in advance of testing.

The field crews will maintain plugs in the targeted sections of storm sewer through the duration of the test. They will flood those storm sewers with water from City of Appleton hydrants, colored with a non-toxic brightly colored dye. Flow in adjacent and downstream sanitary sewers will be monitored to observe any dyed water from the surface. CCTV cameras will be used through the targeted sanitary sewers to observe the presence of dyed water through any specific defects. The total volume of dyed water exfiltrating the flooded storm sewers will also be measured.

3. **Dyed Water Flooding Report** – RASN will document the dyed water flooding investigations completed in each basin with a summary of findings and recommendations for remediation of any identified infiltration or inflow sources. CCTV observations will be documented using NASSCO PACP code techniques to describe the structural and functional conditions of the existing sanitary sewer pipe, including estimates of the rate of infiltration or inflow at each defect location.

III. Deliverables

All deliverables shall be provided to the City, and shall be the sole and exclusive property of the City and shall not be used, distributed, shared, sold, exchanged or published by RASN without the City's consent. RASN will return to the City, at no cost to the City, any documents, plans, files, maps etc. that City provides to RASN during the term of this project. Deliverables shall further include any documents, data, and work products developed for this project.

- A. **Meetings** - Project kick-off meeting, interim project progress meetings, report review and report presentation meetings as described.
- B. **Recorded Flow Data Access** – On-going Internet-based access to all data as it is uploaded to the flow data server for City staff use through a secured web portal, including access to ISCO Flowlink Pro software for graphic data display.
- C. **Interim Reporting** – Interim, preliminary reports on sewer system performance characteristics as observed following rainfalls of $\frac{3}{4}$ " or greater and resulting from dyed water flooding investigations. Preliminary analysis and recommendations will be provided as available prior to June 15, 2014 for consideration in 2015 budget development.
- D. **Final Reporting** – One electronic and three paper copies of the reports as described above.

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IV. Additional Services

The following services are not included as part of this project and, therefore, are not reflected in our project fee. If requested, these services will be performed on an hourly, time-and-materials basis according to the Agreement, unless other arrangements are agreed upon.

- A. Additional flow monitoring services are anticipated to be authorized under this Task Order as preliminary data analysis from wet weather events is completed and can be used to guide further data collection. Such services may be authorized by subsequent amendment of this Task Order when they can be defined. Anticipated additional services may include, but are not limited to:
 - 1. Repositioning of flow meters from their initial locations to other locations within the sewer system.
 - 2. Installation of flow recording equipment in other existing facilities, such as pump stations, and analysis of recorded data.
- B. Attendance at meetings other than those identified in the Scope of Services.
- C. Additional or other extended services beyond those specifically described in the Scope of Services.

V. City's Responsibilities

City shall have the responsibilities set forth in the Agreement and shall provide access to City staff, monitoring locations, existing GIS documentation to support data analysis and project map preparation, and any other existing data pertinent to the proposed project.

VI. Times for Rendering Services

RASN will work with City staff to refine the Project Schedule as data is collected and interim analysis can be completed. Modifications of the project schedule are anticipated in accordance with anticipated adjustments in the flow monitoring program as described in the Scope of Services. The initial project tasks as described in the Scope of Services will be provided in accordance with this schedule:

- A. **Project Kick-off Meeting** – Hold in February 2014 prior to preparing meters for installation
- B. **Traffic Control Plan Review/ Approvals** – Prior to meter installation or start of dyed water flooding investigations
- C. **Equipment Installation** – By March 14, 2014
- D. **Equipment Maintenance** – Remote or physical confirmation of operation within two weeks of installation; subsequent visits dependent on weather events and monitored equipment battery life
- E. **Dyed Water Flooding Investigations** – The schedule for specific field investigations will be coordinated with City staff prior to starting
- F. **Preliminary Analysis and Recommendations** – Prior to June 15, 2014, dependent upon quality and quantity of recorded data

Time limits established for the project in the approved Project Plan shall not, except by reasonable cause, be exceeded by RASN.

- VII. **Payments to RASN** – The authorized budget limit for services under this Task Order is \$100,000, unless modified by written amendment to this task order. RASN and City staff will modify the

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number and duration of installed flow meters and the extent of dyed water flooding investigations through the duration of the project to manage those services within the available budget. Payment for authorized services will be made as follows.

- A. **Flow Monitor Services/ Reporting – Base Locations:** City shall pay RASN a lump sum fee of \$2,250.00 for each of up to fifteen meter locations selected for monitoring and including all labor, use of equipment, materials and confined space entry required to install the equipment, provide on-going equipment maintenance and service visits, interim project progress meetings and reporting per the Scope of Services. This cost item also includes preparation of traffic control plans and primary traffic control for meter installation and visits. The time period for these services is 90 days from the date of initial installation. Extended flow monitoring services in these locations will be charged at the same rate as the base period charges of \$750 per meter-month.
- B. **Flow Monitoring Services and Reporting – Supplemental Locations:** City shall pay RASN a monthly fee of \$950.00 per meter-month for additional flow meters installed in locations determined by RASN and City staff through the course of the project. The monthly meter cost will include all equipment and services as defined for the Flow Monitor Services/ Reporting in Base Locations above. The basis of this monthly cost per meter is up to 10 sets of metering equipment installed for two-month periods.
- C. **Temporary Traffic Control:** City shall pay RASN up to \$5,000.00 for reimbursement of expenses related to temporary traffic control for the project. RASN has arranged for Warning Lites of Appleton, Inc. to provide temporary traffic control support as needed beyond RASN field crew primary traffic control capability.
- D. **Dyed Water Flooding Investigation –** City shall pay RASN for RASN staff time to coordinate, document and report dyed water flooding investigations on an hourly basis and payment for subconsultant support services to conduct the field investigations on a per foot basis.
- E. **Program Consulting Services:** RASN will provide program consulting services as requested by the City to support the City's flow monitoring and I/I reduction program. These services may include program level planning support for extended flow monitoring services, development of project parameters for other investigative techniques designed to identify and quantify specific sources of I/I, support of rain gage maintenance and data collection activities and efforts to develop updated City programs and policies related to the City's sewer system performance. Time for services of RASN personnel performing consultation services and attending meetings not included in the lump sum cost items above will be provided at the following hourly rates:
- | | |
|---|--------|
| 1. Jeff Mazanec, PE (Project Principal) | \$ 133 |
| 2. Chris Stamborski, PE (Project Manager) | \$ 115 |
| 3. Ben High, PE (Field Engineer) | \$ 99 |
| 4. Charles Pape, PE (Field Engineer) | \$ 90 |
| 5. Staff Engineer | \$ 70 |
| 6. Field Technician | \$ 58 |
- Hourly billing rates for other RASN personnel providing support for additional services will be offered in accordance with the RASN Standard Hourly Rate Schedule in effect at the time the services are authorized.
- F. **Additional Service Authorization:** As the project progresses, additional services beyond the scope of Task Order 3 will be provided upon written authorization(s) amending this Task Order.

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VIII. Consultants

RASN will procure subconsultant services to support dyed water flooding investigations as defined above. We will also continue to engage Warning Lites of Appleton, Inc. for traffic control support as needed for this project within the scope of this Task Order.

IX. Other Modifications to Agreement

None.

X. Attachments/Exhibits

None.

XI. Documents Incorporated By Reference

None.

XII. Terms and Conditions: Execution of this Task Order by RASN and City shall make it subject to the terms and conditions of the Agreement (as modified above), which Agreement is incorporated by this reference. RASN is authorized to begin performance upon the earlier of its receipt of a copy of this Task Order signed by City or the authorized Effective Date. The Effective Date of this Task Order is February __, 2014.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement.

R.A. Smith National, Inc. (RASN):

By: Jeff Mazanec
Jeff Mazanec, PE
Project Principal

By: Chris Stamborski
Chris Stamborski, PE
Project Manager

City of Appleton (City):

Attest: _____

By: _____
Timothy M. Hanna, Mayor

Printed Name: _____

Attest: _____

By: _____
Charlene Peterson, City Clerk

Printed Name: _____

Provision has been made to pay the liability that will accrue under this contract.

Approved as to form:

Tony Saucerman, Interim Finance Director

James P. Walsh, City Attorney