

EXHIBIT “B”

Scope of Services

For Maybrook Sanitary Sewer Flow Monitoring

This scope of services describes the work elements to be performed by Burns & McDonnell Engineering Company, Inc. (hereinafter referred to as ENGINEER) in development of sanitary sewer flow monitoring report for the system serving the City of Lee’s Summit (hereinafter referred to as OWNER). This scope includes detailed tasks that are anticipated for the work. The details of each task reflect a reasonable level of effort anticipated.

Task 1: Flow and Rainfall Monitoring

Development of a Flow Monitoring Report for the Maybrook Basin as described in Task 2 will first require data to be collected from existing data sources and/or field assessment. Flow and rainfall data monitoring activities will focus only on priority assessment areas identified by the ENGINEER in consultation with the OWNER. The flow and rainfall monitoring task comprises a period of ninety (90) days.

a. Flow Meter Site Assessment/Installation:

ENGINEER shall install eleven (11) flow monitors for up to ninety (90) days. Six (6) of the flow monitors will be owned and maintained by ENGINEER. Five (5) of the flow monitors will be owned and maintained by OWNER. Potential flow monitoring sites will be determined by evaluating the City’s GIS and choosing locations that divide the Maybrook basin’s sewer system into appropriate meter catchments. A site assessment of potential flow monitoring sites will then be made to determine, in general, the most suitable flow monitoring and rain gauge locations based on the following conditions:

1. Suitability for Accurate Metering – The accuracy of open channel flow metering will depend on numerous variables that should be controlled as much as possible. For this reason, reconnaissance inspections will be performed to identify the best sites for metering and to minimize such error-causing factors as changes in pipe alignment and size, interruption of channel flow by side inlets and turbulence caused by uneven channels.
2. Safety – It is equally important that the proposed sites conform to ENGINEER’s requirements for safe operating conditions. If the site falls outside of these requirements, alternate sites that are suitable based on safety requirements will be selected upon further consultation with the OWNER.

ENGINEER shall complete site assessment forms for each flow monitoring location. The ENGINEER shall provide six (6) electronic depth/velocity flow monitors (ISCO 2150) for the duration of the monitoring periods described above. The OWNER shall provide five (5) electronic depth/velocity flow monitors for the duration of the monitoring period.

b. Flow Monitoring (Day 0-90):

Six (6) flow monitors shall be maintained by ENGINEER on a weekly basis. Five (5) flow monitors shall be maintained by OWNER on a weekly basis. Weekly maintenance shall include the upload and interrogation of all flow data, meter calibration (as needed), weekly velocity profiling, and other diagnostic checks. Flow monitors shall remain in place for 90-days. ENGINEER shall remove six (6) monitors at the conclusion of the monitoring period.

c. Rainfall Monitoring (Day 0-90):

- a. ENGINEER shall install, service, and maintain two (2) continuous recording, electronic rain gauges within the study areas during the same 90-day monitoring period, and then removed once flow monitoring is complete. The gauges will record rainfall to one-hundredths of inch increments. The instruments will be checked and data downloaded weekly by ENGINEER. Data collected from rain gauges will be analyzed by ENGINEER to correlate peak system flows to total rainfall depth and duration as further discussed in this scope of work. ENGINEER shall complete site assessment forms for each rainfall monitoring location.

Deliverables:

1. Flow hydrographs and rainfall hyetographs for each flow monitoring location and each rain gauge in electronic copy format.

Task 2: Data Analysis and Report

The flow and rainfall data collected in Task 1 will be processed to develop a Flow Monitoring Report described in this task. Principal components of sanitary sewer system flows will be deconstructed from the flow meter hydrographs in the following general manner:

- a. Provide an analysis of flow metering data to estimate average dry weather flow (ADWF) and peak dry weather flow (PDWF).
- b. Develop and provide ADWF curves for each metering site. These curves will reflect 15-minute interval variations over time for weekdays and weekends.
- c. Identify rainfall events for evaluation, and determine wet weather flow vs. rain volumes by calculating wet flow volume (total flow, less ADWF, integrated over time during wet weather impact).
- d. Develop scatter graphs of flow depth (in feet) against velocity (in feet per second) for each flow meter.
- e. Develop normalized peak flow versus rainfall depth curves for each flow meter. Separate curves will be developed for infiltration and inflow (I&I) and will include projected peak flow for the design storm event. Indicate if the flow meter site is impacted by upstream flow split and/or downstream conveyance performance.
- f. Estimate groundwater induced infiltration and rainfall dependent inflow for each flow meter site.
- g. Review results with the OWNER to address any issues as to data validity, missing data, or other problems.

- h. Prioritize basins from most severe to least severe I&I, taking into consideration inflow and infiltration separately, total I&I, and I&I per inch-diameter mile of sewer.
- i. Submit rough draft of Flow Monitoring Report to OWNER for discussion, review, and comments.
- j. Submit final draft of Flow Monitoring Report to OWNER.

Deliverables:

- 1. Raw Flow Monitoring Data, Final Flow Monitoring Data, Site Sheets and Photos – one (1) electronic format copy
- 2. Flow Monitoring Report Rough Draft – four (4) hardcopies and one (1) electronic format copy.
- 3. Flow Monitoring Report Final Draft – four (4) hardcopies and one (1) electronic format copy.

Method of Payment:

The above services are to be compensated in accordance with the attached Schedule of Hourly Professional Service Billing rates. The rates presented in this Schedule are effective for services through December 31, 2018 and are subject to revision thereafter.

City of Lee's Summit, MO
 Sanitary Sewer Flow Monitoring -Maybrook
 Burns & McDonnell

WORK TASK DESCRIPTION	Unit Costs				Hourly + Expenses								Technology Charge	Total Costs
	Units	Quant	Rate	Subtotal	PM	QA/QC	PE	EIT	FTI	FM	Total Hours	Subtotal		
90-Day Metering														
1 Project Admin/Management					4		30			14	48	9,070	478	\$9,548
2a Installation of Flow Meters	Each	6	\$500	3,000					10		10	945	100	\$4,045
2b Installation of Rain Gauges	Each	2	\$300	600							0	0	0	\$600
3a Maintenance and Monitoring of Flow Meters	Meter-days	540	\$60	32,400							0	0	0	\$32,400
3b Maintenance and Monitoring of Rain Gauges	Gauge-Days	180	\$12	2,160							0	0	0	\$2,160
4 Flow Data Analysis					2	10	107	93			212	34,437	2,109	\$36,546
5 Reporting					2	8	42	40			92	15,206	915	\$16,122
Total Sanitary Sewer Flow Monitoring														\$101,420

Assumptions:

- 2a: 11 Meters will be installed, 5 Owned by City 6 Owned by BMcD. Unit costs account for installation of BMcD meters. Hourly costs account for installation of City owned meters.
- 2b: 2 rain gauges will be owned and installed by BMcD.
- 3a: Assume 6 meters will be maintained by BMcD, 5 meters will be maintained by the City.
- 3b: Assume 2 rain gauges will be maintained by BMcD.

Exhibit A
 Schedule of Professional Service Billing Rates
 Hourly Professional Service Billing Rates

<u>Position Classification</u>	<u>Classification Level</u>	<u>Hourly Billing Rate</u>
General Office *	5	\$62.00
Technician *	6	\$78.00
Assistant *	7	\$90.00
	8	\$119.00
	9	\$144.00
Staff *	10	\$163.00
	11	\$178.00
Senior	12	\$197.00
	13	\$219.00
Associate	14	\$227.00
	15	\$239.00
	16	\$244.00
	17	\$247.00

Unit Cost Rates

<u>Description</u>	<u>Unit Cost</u>
Flow Meter Installation	\$500.00/each
Rain Gauge Installation	\$300.00/each
Flow Monitoring (minimum 5 meters)	\$60.00/meter-day (90-day base)
	\$65.00/meter-day (60-day base)
Rain Gauge Monitoring	\$12.00/gauge-day

NOTES:

1. Position classifications listed above refer to the firm's internal classification system for employee compensation. For example, "Associate", "Senior", etc., refer to such positions as "Associate Engineer", "Senior Architect", etc.
2. For any nonexempt personnel in positions marked with an asterisk (*), overtime will be billed at 1.5 times the hourly labor billing rates shown.
3. Project time spent by corporate officers will be billed at the Level 17 rate plus 25 percent.
4. A technology charge of \$9.95 per labor hour will be billed for normal computer usage, computer aided drafting (CAD) long distance telephone, fax, photocopy and mail services. Specialty items (such as web and video conferencing) are not included in the technology charge.
5. Monthly invoices will be submitted for payment covering services and expenses during the preceding month. Invoices are due upon receipt. A late payment charge of 1.5% per month will be added to all amounts not paid within 30 days of the invoice date.
6. The services of contract/agency personnel shall be billed to Owner according to the rate sheet as if such contract/agency personnel is a direct employee of Burns & McDonnell.
7. The rates shown above are effective for services through December 31, 2017, and are subject to revision thereafter.