

EXHIBIT “B”

ADDITIONAL SCOPE OF SERVICES

FOR SANITARY SEWER FLOW MONITORING

This additional scope of services describes the additional 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 of services includes additional tasks that are anticipated for the work originally outlined in Exhibit B in the agreement dated April 14, 2016. The details of each task reflect a reasonable level of effort anticipated.

Task 1: Flow Monitoring

Six additional flow meters will be installed and monitored as part of the project. One meter is owned by the ENGINEER. Five meters are owned by the OWNER. All meters will be installed and maintained by the OWNER during the duration of the Flow Monitoring period.

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. Flow data from the additional meters shall be incorporated into one final report as outlined in the original scope of services and following. 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 & 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.

Fee Estimate
For Additional Sanitary Sewer Flow Monitoring

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

Additional Flow Monitoring	50-Day Metering Costs			
	Quant	Units	Unit Cost	Total
1 Project Admin/Management		Hourly	\$4,000	\$4,000
2a Installation of Flow Meters	0	Site	\$500	\$0
2b Installation of Rain Gauges	0	Site	\$300	\$0
3a Maintenance and Monitoring of Flow Meters	0	Meter-days	\$56	\$0
3b Maintenance and Monitoring of Rain Gauges	0	Gauge-days	\$10	\$0
4 Flow Data Analysis		Hourly	\$7,600	\$7,600
5 Reporting		Hourly	\$4,200	\$4,200
Total Additional Flow Monitoring				\$15,800