

VIA EMAIL

February 29, 2024

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Boone County Resource Management (BCRM)
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Subject: Proposal for Hinkson Creek Surface Water Sampling

Dear Ms. Hooper:

Geosyntec Consultants (Geosyntec) has prepared the following scope of work and cost estimate for the collection and analysis of surface water samples from Hinkson Creek and its tributaries. The proposed sampling coincides with ongoing continuous water quality monitoring conducted by Geosyntec.

INTRODUCTION AND PURPOSE

In November 2023, Geosyntec installed six (6) water quality monitoring stations in Hinkson Creek and its tributaries to continuously monitor specific conductance levels. Specific conductance is a known surrogate for monitoring dissolved ions such as chloride. Previous specific conductance monitoring performed by Geosyntec in 2019 and 2020 indicated specific conductance levels in Hinkson Creek may range from 10 to 4,000 microsiemens per centimeter. Continuously monitoring specific conductance provides information critical to characterize frequency, magnitude, duration, and travel time of chloride within Hinkson Creek and its tributaries. To establish specific conductance and chloride relationships at each monitoring station, surface water samples must be collected during a variety of specific conductance levels and analyzed for chloride and other dissolved ion concentrations.

Geosyntec provides this proposal to collect ten (10) water samples at each of the six (6) Hinkson Creek and tributary monitoring stations and develop regression models per monitoring station to predict chloride concentrations from specific conductance data.

SCOPE OF WORK

The following tasks of sample collection and analysis as well as the development of regression models summarized in a memorandum are proposed.

Task 1. Sample Collection and Analysis

Objective: Geosyntec will collect surface water samples from each of the six (6) monitoring stations during a variety of specific conductance levels. Surface water samples will be analyzed using approved laboratory methods for chloride, sulfate, and magnesium and calcium (hardness) by Engineering Surveys and Services (ES&S) laboratory in Columbia, Missouri.

Activities:

- Collect ten (10) surface water samples (mid-stream, surface grab method) at each of the six (6) monitoring stations for a total of sixty (60) ambient samples.
- Six (6) additional samples will be collected for duplicate quality control analyses (10% of total ambient samples).
- Specific conductance values will be evaluated at each station prior to sample collection to determine if levels are suitable to develop chloride regressions over the range of observed or potential specific conductance values in urban freshwater ecosystems (e.g. 20; 40; 80; 160; 320; 640; 1,280; 2,560; 5,120; 10,240 microsiemens per centimeter).
- Deliver collected samples to ES&S laboratory for analysis of chloride, sulfate, and hardness.

Deliverables:

- Provide analytical data associated with each sampling event.

Assumptions

- ES&S laboratory will provide new and appropriate sample bottles.
- Geosyntec will deliver analytical samples to ES&S laboratory within required hold times.
- Analytical data from ES&S laboratory will be provided to Geosyntec within four (4) weeks of sample submission.
- This scope assumes environmental conditions will facilitate ten (10) surface water sampling events during a variety of specific conductance levels prior to the conclusion of continuous water quality monitoring in November 2026.
 - At least one (1) full year and winter season will likely be required to collect samples across a range of specific conductance values. Several events will occur during and after winter snowmelt conditions to capture potential elevated chloride and specific conductance levels.

Task 2. Chloride and Specific Conductance Regression Memorandum

Objective: Geosyntec will compile laboratory analytical data and continuous specific conductance data to develop a regression model to predict chloride concentration from continuous specific conductance data at each monitoring station. Analytical data and developed regressions will be summarized in a brief technical memorandum.

Activities:

- Compilation and evaluation of data.
- Development of a regression model for specific conductance and chloride per monitoring station.
- Development of a brief technical memorandum summarizing analytical data and developed regression model for each monitoring station.

Deliverables:

- Brief technical memorandum summarizing analytical data and developed regressions for each monitoring station.
- PowerPoint presentation to the Hinkson Creek Collaborative Adaptive Management group summarizing specific conductance and chloride relationship at each monitoring station.

Assumptions:

- Previously collected chloride and specific conductance data that are spatially similar may be used in development or refinement of regression models; however, these data must have been analyzed using approved field and laboratory methods and met quality control objectives. These data must be previously peer reviewed and compiled.
- One (1) meeting between Geosyntec and BCRM will be conducted to discuss the brief technical memorandum.

SCHEDULE

Collection of surface water quality samples for laboratory analysis will commence upon authorization and is estimated to require one (1) full year to complete during a variety of environmental conditions and specific conductance levels. Samples will be collected when field staff have confirmed that monitoring station specific conductance levels are appropriate for developing a specific conductance and chloride relationship. Geosyntec will compile laboratory

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data and develop regressions for all six (6) monitoring stations within three (3) months of completing sample collection. BCRM will be updated monthly on sample collection progress.

PROJECT SUMMARY ESTIMATE

The estimated cost to complete the proposed scope of work is **\$19,800**. This estimate was developed using projected labor rates and direct costs and includes costs associated with ES&S laboratory analyses. Task budgets are summarized in **Table 1**. The project work will be conducted on a time-and-materials basis.

Should you have any questions, please contact Josh Horne at 573-499-5445 or jhorne@geosyntec.com.

Sincerely,
Geosyntec Consultants



Josh Horne
Professional Scientist



Cody Luebbering
Senior Scientist

Table 1: Hinkson Creek Surface Water Sampling Cost Table

Task		Hours	Labor Cost	Expenses
Task 1	Sample Collection and Analysis	20	\$3,300	\$8,000
Task 2	Chloride Specific Conductance Regression Memorandum	50	\$8,500	\$0
Totals		70	\$11,800	\$8,000