



**The Water Research Foundation  
Request for Qualifications  
(RFQ)**

**Understanding the Factors that Affect the Detection and Variability of  
SARS-CoV-2 in Wastewater  
(WRF 5093)**

**RFQ Due Date: 08/10/2020, 4:00pm MDT**

**Maximum Funding: \$300,000**

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**PURPOSE**

The purpose of this RFQ is to identify a Research Team to assist The Water Research Foundation (WRF) in understanding how to optimize sample design for the quantification of SARS-CoV-2 genes in sewage and wastewater. The selected Research Team will develop an approach to understand the sample design factors that affect detection, variability, and the dynamic range of SARS-CoV-2 genes in wastewater. The research will encompass a range of scales by conducting a sampling and analytical program in multiple locations within well characterized community sewersheds of varying size.

**BACKGROUND**

This project was identified as a high priority research need from WRF's International Water Research Summit on Environmental Surveillance of COVID-19 Indicators held on April 27<sup>th</sup> and April 30<sup>th</sup>, 2020. The other research needs stemming from the summit include:

1. Interlaboratory Methods assessment helping to establish a standard for detection of the SARS-CoV-2 signal in wastewater (Project 5089).
2. Impact of Storage and Pre-Treatment Methods on Signal Strength of SARS-CoV-2 Genetic Signal in Wastewater (Upcoming WRF Project).

Understanding the implications of sample design is critical for the interpretation of results from wastewater surveillance. Clinical studies are beginning to provide an indication of the concentration of the virus shed in feces (Zheng et al, 2020), and analysis of wastewater has shown that it is possible to detect and quantify SARS-CoV-2 RNA in wastewater before clinical infections are widely reported in the community (Medema, Peccia, Wu et al.). However, less

is known about the appropriate sampling strategy for routine wastewater monitoring of SARS-CoV-2. Wastewater monitoring should account for experimental factors that affect the viral RNA from the time fecal material enters the collection system until it reaches the sample collection location. Potential factors that may impact the detection, variability, and dynamic range of the signal include but are not limited to:

- Dilution of the viral RNA as fecal material enters the sewage system;
- Loss of detectable viral RNA while in transit in collection systems, primarily due to adsorption, degradation of the virus, and/or RNA (e.g., as a function of distance/travel time);
- Interference from other wastewater constituents (i.e., matrix effects and inhibition);
- Representativeness of the sample, which might be impacted by the following;
  - Centralized vs decentralized systems
  - Sample location within the system or facility (excluding effects of treatment)
  - Solids vs liquids sample analysis
  - Composite vs grab sampling
  - Time-dependence of SARS-CoV-2 loading and overall wastewater quality.

### **SUMMARY OF PROJECT**

The Research Team will develop an approach to understand the detection, variability, and dynamic range of SARS-CoV-2 genes in sewage and wastewater at three scales:

1. A large urban sewershed;
2. A medium sized regional sewershed with small bore sewers; and
3. A small regional system (e.g., Rural township in the U.S. serviced by decentralized onsite systems with unmanaged surface or subsurface drainage overflows, analogous to disposal in low to middle income countries, etc.).

The Research Team will conduct a sampling and analytical program in multiple locations of these well characterized community sewersheds to characterize factors that impact the detection, variability, and dynamic range of the genetic signal. Factors to be evaluated in the project will include:

1. Size of the service area (geographical and population served).
2. Impact of spatial variation in various collection systems.
3. Temporal variation (e.g., diurnal variability and impact of sampling frequency)
4. Sample types (e.g., composite vs grab samples, solids vs liquids, and location).

The Research Team will be responsible for identifying the sewershed(s) for this study as well as designing and performing research that highlights the factors that impact the SARS-CoV-2 RNA signal in wastewater from source to collection point. Ultimately, this research should highlight the implications of sample design on quantifying the SARS-CoV-2 genetic signal to

better inform use of wastewater surveillance data for decision-making efforts. This research is *not* intended to focus on development of prevalence calculations or models, but instead, this research is intended to characterize the factors influencing wastewater surveillance data and provide a framework for the design of data monitoring programs that might ultimately be used for this purpose.

### **DELIVERABLES**

The first deliverable will be a sample design and project plan, including an outline of the design framework, which will be developed in collaboration with WRF and the Project Advisory Committee (PAC). This deliverable will be pre-requisite to the full project and subject to PAC approval. The research team will also coordinate with WRF on other research efforts underway with relevance to this subject.

The product from this project will be a report (draft and final) that identifies and characterizes the sampling design parameters that impact the detection, variability, and dynamic range of SARS-CoV-2 genes in wastewater at three scales of community sewersheds. The final report will provide a framework with specific recommendations for sample design to enable implementation of wastewater surveillance at these scales. The project outcomes will be made available publicly and shared via a global portal and webcast.

### **RESEARCH TEAM QUALIFICATION REQUIREMENTS**

The following is a list of the minimum requirements that the Research Team must demonstrate to be considered for selection. If one of these items is not included or missing from the submittal, the submittal will be rejected:

- Identification of a minimum of three well characterized sewersheds at the specified scales, from which samples will be collected, tested, and data reported.
- Nomination and confirmation of participation of appropriate water utility/s, analytical testing, and public health (if applicable) partners for each of the sewersheds evaluated in the study.
- Demonstrated experience in the successful and timely completion of similar projects:
  - Project scope
  - Budget
  - Duration (planned and actual)
  - Reference and contact information (note that WRF staff may interview references)
- Extensive and demonstrated knowledge of wastewater surveillance and experience in the design of field monitoring projects and interpretation of complex water

datasets. The proposal should also detail the analysis method (e.g., sample concentration, sample processing, and RNA analysis) the team intends to employ for this project, including relevant QA/QC considerations (e.g., standards, replication, recovery).

- Proof of capability to safely perform the work in accordance with recommended CDC guidelines.

### **PROJECT SCHEDULE**

Project duration is anticipated to be 12 months.

### **SUBMITTAL AND AWARD STEPS**

1. **RFQ Submittal:** Statement of Qualifications must be received via email by **4:00 PM MDT on August 10, 2020. Please send RFQ submittals to Ashwin Dhanasekar**  
**Email:** [RFQ5093@waterrf.org](mailto:RFQ5093@waterrf.org) Phone: (303) 734-3423.

Statement of Qualifications must be submitted as one PDF file and include the following items and detail how the respondent(s) meets the Evaluation Criteria:

- 1.1. Research Team qualifications as outlined on page 3 (max 5 pages).
- 1.2. Resumes or CVs outlining the Research Team's experience and experience of key team members. (2 pages/ each resume/CV)
- 1.3. Research approach, budget, and schedule (max 6 pages). Must include summary of:
  - Research approach summarizing of the statistical results, and presentation of the data.
  - Estimate of budget
  - Estimate of schedule of deliverables

Anticipated value with respect to proposed efforts and budget will be a selection consideration.

- 1.4. Comments or deviations to the example project funding agreement (PFA) (see below).
2. **Indirect Costs:** A maximum of 15% of project funding amount may be applied to indirect costs ([see funding provisions for definition](#)).
3. **Global Access:** Awards made under this funding opportunity will need to comply with the Bill and Melinda Gates Foundation's [Global Access commitment](#).

#### 4. **Evaluation Criteria**

- 4.1. Research Approach, Budget, Schedule, deliverables, and applicability (20%)
- 4.2. Qualifications, capabilities, and management (80%). Competitive candidates will demonstrate strong experience and qualifications in the following areas:
  - 4.2.1. Relevant Project Experience (30%)
  - 4.2.2. Research Team and Participating Lab Qualifications (20%)
  - 4.2.3. Qualifications of Personnel (20%)
  - 4.2.4. QA/QC Documentation (10%)

5. **RFQ Evaluation and Award:** WRF will evaluate RFQs and may elect to interview a short-list of candidates. Award notification is anticipated by August 21<sup>st</sup>. The selected Research Team should be available to begin work within two weeks of contract award.

6. **Submittal and Acceptance of Required Contract Elements:** After the Research Team is selected, the Research Team will develop at their own expense a Scope of Work (SOW), Budget, and Budget Narrative, and present it to WRF and the project advisory committee (PAC) for discussion and approval. The SOW must include the following elements: Project Abstract; Project Description, including Research Objective, Background/Understanding of the Problem, and Technical Approach; Quality Assurance/Quality Control; Schedule; Management Plan; and References (as required). Please visit the WRF website for [instructions on budget preparation](#), the required [budget](#) narrative, and the required [budget form](#). The maximum funding for this project is \$300,000. This project is funded by WRF and will be administered by WRF.

7. **Execution of Project Funding Agreement (PFA):** After the above materials are developed, a PFA will be executed. Our template is found on the WRF website and will require Standard Project Exhibits <https://www.waterrf.org/contract-materials>. All data will be owned by WRF. *These documents should be reviewed in advance of the RFQ submittal.* In the event the PFA cannot be executed in 15 days, the funding will be awarded to the next highest ranked Research Team.

#### 8. **Timeframe**

RFQ Release: July 27, 2020

RFQ Submissions Due: August 10, 2020

Selection and Contracting Completed: Week of August 21<sup>st</sup>, 2020

Project Start Date: Week of September 4<sup>th</sup>, 2020

Draft Deliverable Due: Week of October 19<sup>th</sup>, 2020

Final Deliverable Due: Week of September 30<sup>th</sup>, 2021

## 5093 Utility and Organization Participants

The following utilities have indicated interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending upon your settings, you may need to click refresh on your browser to load the latest file.)**

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