**PROJECT TITLE:** Field Testing of a New Phosphorus Removal Technology

**I. PROJECT STATEMENT**

The Comfort Lake-Forest Lake Watershed District will pilot a new pollutant-removal nanotechnology by installing innovative adsorption pellets in various configurations at multiple sites in order to analyze optimization of this new material so as to reduce loading to impaired and/or near-impaired waterbodies in the most cost-effective manner possible.

Clarosorb is a new proprietary technology that can capture and retain the pollutant of choice. For these trials, the focus will be on dissolved phosphorus (orthophosphate). The new sorbent media; which is available in foam, granule and pellet form; can adsorb over 99% of dissolved phosphorus from water within 1 minute. Furthermore, the amount of phosphorus that can be captured per gram of the material (i.e. the loading capacity) is over 6-10 times higher than other technologies, enabling a small footprint for installation. For example, capturing 40 lbs. of phosphorus requires 55 lbs. of the sorbent material with a footprint less than 0.5 cubic yard. Finally, the bound phosphorus can be efficiently recovered, and the sorbent reused. This is likely to be a game-changer for the field of watershed management moving forward as it may be able to both capture pollutants efficiently and then turn unwanted nutrient pollutants, such as phosphorus and nitrogen, into commodities that can be sold to further reduce the cost of improving water resources.

The main objective of this new technology is to achieve superior removal of dissolved phosphorus with a smaller footprint and lower cost than the currently-used technologies, resulting in improved water quality and less frequent/severe algae blooms. The shared objective of Claros Technologies and the Comfort Lake-Forest Lake Watershed District is to obtain data and demonstrate the effectiveness of the new material in the field. To date, the material has only been tested in the lab. To achieve these objectives, the District proposes to install field-test pilot projects that utilize Claros media at multiple sites in the watershed. Project effectiveness (i.e. actual amount of phosphorus removed) will then be measured. This will result in phosphorus reductions, and subsequently improved water quality, to impaired and/or near-impaired waterbodies such as Forest Lake, Comfort Lake, Bone Lake, Moody Lake, and others. It will mitigate impacts resulting from artificial hydrological modifications in urban and agricultural areas. Moreover, this pilot project will ultimately aim to prove the in-field capacity of this new technology and pave the way for future projects to utilize it, therefore increasing the cost-effectiveness of water quality improvement efforts across the state and beyond.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1 Title:** Construction and Sorbent Installation

**Description:** On the ground implementation of sorbent material projects. Multiple sites will be considered for implementation. Prior to the grant period, the District will use its own funds to implement small-scale test sites and identify potential sites to implement larger-scale projects during the grant period. Outcomes of this activity will be evaluated through project effectiveness monitoring, as described in grant Activity 3. This Activity will be carried out by a contractor hired through the appropriate bidding/quotation process, as determined by the final estimated contract price.

**ENRTF GRANT BUDGET**: $56,000

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| **Outcome** | **Completion Date** |
| *1. Implementation of Claros media at one or more project sites resulting in a measurable reduction in phosphorus, nitrogen, and/or other pollutants* | *July 2022* |

**Activity 2 Title:** Development and Engineering of Sorbent Material Project**Description:** This activity will include project development, prioritization, feasibility, design, construction contracting assistance, and construction oversight. At the project sites, various design configurations will be considered specific to each site to minimize clogging while maximizing contact time with the sorbent material. System sizing will be dependent on flows and expected phosphorus loads. Prior to the grant period, the District will use its own funds to perform site identification, feasibility, landowner outreach and landowner agreement execution, so that project implementation during the grant period can begin smoothly. This Activity will be carried out by District staff, District legal counsel (Smith Partners), the District engineer (Emmons and Olivier Resources), and Claros Technologies.**ENRTF GRANT BUDGET:** $46,000**In-Kind:** $15,000 |  |
| **Outcome** | **Completion Date** |
| *1. Project prioritization list* | *December 2020* |
| *2. Project feasibility and design* | *December 2021* |
| *3. Construction contract execution* | *February 2022* |

**Activity 3 Title:** Monitoring of Sorbent Effectiveness

**Description:** Project effectiveness monitoring to quantify actual load reductions. Monitoring for results will be performed in two different ways. The first would be to do traditional monitoring at both the inlet and outlet of the treatment system over the course of the season to determine reductions through the system. The second method would be to have Claros Technologies bring the media back to the lab after the season is over and analyze the material to determine the total pounds of phosphorous captured. This Activity will be carried out by Emmons & Olivier Resources and Claros Technologies.

**ENRTF GRANT BUDGET:** $48,000

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| **Outcome** | **Completion Date** |
| *1. Project effectiveness monitoring report* | *July 2022* |

**III. PROJECT PARTNERS AND COLLABORATORS (TEAM MEMBERS):**

* Claros Technologies – proprietor of new sorbent material
* Emmons & Olivier Resources – contracted engineer for the District
* Smith Partners LLP – contracted legal counsel for the District
* Contractor (TBD)

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

Results of this project will be used for future implementation of similar projects at other sites throughout the District and ultimately throughout the region and state. This project aims to test and successfully (i.e. cost-effectively) implement this technology in a field setting. Its success will go toward refining and popularizing this new technology so that it is a reliable and cost-effective solution for watershed management organizations statewide. More specifically, the District plans to continue to implement this technology in similar (i.e. phosphorus-reducing) instances in future years, as well as exploring additional uses such as nitrogen-reducing projects which may also help with managing the invasive species, Eurasian watermilfoil. Additional implementation within the District will be funded by the District’s tax levy and/or future grants or local partner contributions.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**Proposal Budget Spreadsheet –** Attached

**Visual Component –** Attached

**Project Manager Qualifications and Organization Description –** Attached

**Resolution –** Attached

**Financial Capacity –** Most Recent (2017) Approved Audit Attached