

- A.1 Draft Literature Review Report

**Task Description:**

The literature review of nitrogen reducing technologies completed as part of the Passive Nitrogen Removal Study commissioned by FDOH in 2007 will be updated with information which has emerged since the original study. The scope of the review will be expanded from the Passive Nitrogen Removal Study to include source separation, active systems, modifications to conventional onsite treatment systems, including modified soil treatment units, in addition to passive systems. The provider shall produce a searchable literature reference database, compatible with Endnote X or other department approved software format. The literature reference database shall not infringe on any copyrights. The provider shall also produce a technology database, in tabular or other department approved format, that will facilitate establishment of categories for summary and comparison, assessment of individual citations within the context of organizational categories, and analysis of trends and differences among systems. The categories shall include items such as treatment classification, media type, wastewater source, treatment configuration, documented effectiveness, documented and theoretical longevity, cost, nutrient recovery, and effect of water chemistry. The provider shall summarize the updated literature review in a report.

**Deliverables from contract:** Draft updated literature reference database; draft updated technology database; [draft updated literature review report - pdf](#).

**Status:** Task Complete

- A.2 Final Literature Review Report

**Task Description:** The department will gather comments on the draft documents of sub-task A1 from RRAC and any other interested parties and transmit such comments to the provider within one month of receiving the draft. The provider will address these comments in preparing final deliverables for the literature review within one month of receiving comments.

**Deliverables from contract:** Updated literature reference database; updated technology database; [updated literature review report - pdf](#).

**Status:** Task Complete

- A.3 Draft Classification of Technologies Report

**Task Description:** The provider will develop a scheme to classify and group identified nitrogen reduction technologies and practices to summarize the literature and facilitate comparisons between similar technologies. Four classifications are envisioned: waste stream alteration (such as blackwater systems, and urine separation); conventional OSTDS alteration (such as dosed vs. gravity systems, operational strategies, installation depth); passive nitrogen removal (OSTDS systems using no more than one pump and excluding aerators); active nitrogen removal (mechanical systems utilizing more than one pump or aerators). The preliminary classification scheme will be presented to the RRAC at a workshop, which will provide a forum for full vetting and discussion.

**Deliverables from Contract:** [Draft classification scheme of technologies report - pdf](#).

**Status:** Task Complete

- A.4 Draft Technology Ranking Criteria Report

**Task Description:** The provider will develop evaluation criteria to rank technologies and practices to determine which best meet the goals of the project and shall have priority for further development or field evaluation.

Criteria will build on and may lead to revisions to the categories developed in the literature review and include characterizations of nitrogen removal effectiveness, maturity of technology including status in Florida, costs (energy, maintenance, monitoring, replacement of parts and media), critical knowledge gaps, likelihood of success, need to field test, and the feasibility of obtaining data from existing installations in Florida. The provider will evaluate the technologies classified in sub-task A3 relative to each criterion. The provider will propose draft sets of weights to characterize the relative importance of each criterion for a) work during the initial funding period; b) work during future funding periods. The provider will prepare a working document, such as a calculation table, that shows the ranking of technologies given the evaluations relative to the criteria and the relative weights of each criterion. The provider will summarize criteria and weights in a report.

**Deliverables from Contract:** [Draft summary of criteria and proposed weights for short-term and long-term testing, working document for obtaining technology ranks from evaluations to criteria and criteria weights - pdf.](#)

**Status:** Task Complete

- A.5 Draft Priority List for Testing Report

**Task Description:** The provider will propose additional criteria to consider in establishing priorities for testing from the top ranked technologies and practices. Such criteria may address representation of several technology classifications (sub-task A3), similarity of technologies or several maturity levels in the study. The purpose of prioritization is to select the more promising technologies that may not have sufficient prior testing or that may be differently configured to improve performance, and to avoid duplicating testing where substantial experience already exists. The provider will also list technologies to be considered for sub task A10 and A11 (innovative system application assistance).

**Deliverables from Contract:** [Draft summary of additional criteria - pdf;](#) [Draft priority list for testing - pdf.](#)

**Status:** Task Complete

- A.6 Technology Classification, Ranking and Prioritization Workshop

**Task Description:** The provider will present the preliminary technology classification, rankings and priority lists developed in sub-task A3, A4 and A5 to the RRAC at a public workshop, which will provide a forum for full vetting and discussion of evaluation criteria and their assigned weights. This one day roundtable workshop with the Research Review and Advisory Committee (RRAC) will present the results and recommendations contained in the draft reports of technology classification, ranking and prioritization. The provider will facilitate RRAC's development of guidance on modifications to the draft classification, ranking and prioritization. Unless this guidance results in a need for further information collection by the provider, RRAC will provide comments on the priority lists for the initial and future funding periods. The comments and concerns of the RRAC will be documented and incorporated into the three final reports.

**Deliverables from Contract:** Public RRAC-Workshop, [Summary of the workshop - pdf.](#)

**Status:** Task Complete

- A.7 Final Classification of Technologies Report

**Task Description:** The provider will incorporate RRAC comments and concerns and comments provided by the department within two weeks of the workshop into the final classification scheme.

**Deliverables from Contract:** [Final Report - pdf](#)

**Status:** Task Complete

- A.8 Final Technology Ranking Criteria Report

**Task Description:** The provider will incorporate RRAC comments and concerns and comments provided by the department within two weeks of the workshop into the final technology ranking scheme.

**Deliverables from Contract:** [Final Report - pdf](#)

**Status:** Task Complete

- A.9 Final Priority List for Testing Report

**Task Description:** The provider will incorporate RRAC comments and concerns and comments provided by the department within two weeks of the workshop into the draft priority list.

**Deliverables from Contract:** [Final Report - pdf](#)

**Status:** Task Complete

- A.10 Draft Innovative Systems Applications Report

**Task Description:** Based on the technology evaluation in sub-task A5, the provider will identify emerging and innovative technologies that have not matured or are not currently permitted by FDOH but rank high for consideration for testing. For up to five technologies, the provider will complete or assist the manufacturer if appropriate, in completing an innovative system application for acceptance by FDOH, for which field testing of Task B will be part of the proposed innovative system monitoring protocol.

**Deliverables from Contract:** Innovative system application

**Status:** Task Eliminated

- A.11 Final Innovative Systems Applications Report

**Task Description:** The provider will respond or assist the manufacturer in responding to any requests for additional information by the department in regard to the innovative system applications.

**Deliverables from Contract:** Additional information resulting in an innovative permit by the department (per technology if additional information is requested by the department).

**Status:** Task Eliminated

- A.12 Identification of Test Facility Sites

**Task Description:** The provider will identify and evaluate potential sites for their suitability for establishing test centers. Among these potential sites will be the Gulf Coast Research and Education Center and the University of South Florida (USF) Lysimeter Station. Test facility site evaluations will include the feasibility of multiple treatment technology testing as well as the ability to monitor non-comingled subsurface plumes and the assessment of subsurface nitrogen fate and transport. Salient issues include space availability, site access, wastewater source of sufficient quantity and availability, subsurface hydrology, power supply, and security. The provider will obtain a letter of authorization from the respective property owners for establishing and operating test centers on their property, and for ownership and continued use after project is completed. If a potential site is deemed unsuitable for use in this project, a brief evaluation memo shall be prepared documenting the evaluation of the site and reasons for not recommending the site as a test facility location.

**Deliverables from Contract:** Site evaluation memo, or letter of authorization: [UCF site evaluation memo - pdf](#), [UF GCREC site evaluation memo - pdf](#), [Decision presentation - pdf](#)

**Status:** Task Complete

- A.13 Draft PNRS II QAPP

**Task Description:** The provider will develop a draft QAPP that documents the objectives, experimental design, system operation, analytical methods, and sampling frequencies to be used in PNRS II. The objectives are to 1) directly address denitrification, which the provider proposes as the highest priority onsite nitrogen removal knowledge gap; 2) expand the performance envelope for the innovative unsaturated filter media filters demonstrated in the PNRS I; 3) delineate TN removal capability of PNRS I media using pre-denitrification; 4) establish test systems that are close to full scale; 5) enable critical testing of a large number of systems to be completed within the first project year; 5) produce key data which can then be used directly for design of denitrification filters for subsequent full scale testing at home sites; 6) develop data for preliminary life cycle cost analysis and resource needs.

The experimental design is expected to consist of a battery of passive nitrogen removal treatment systems fabricated to evaluate salient design features of passive nitrogen removal systems including filter media, media stratification, surface loading rates, filter length, geometry, and aspect ratios, and unsaturated filter recycle for pre-denitrification and alkalinity recovery. The test configuration is anticipated to consist of a common wastewater feedstream, a suite of vertical unsaturated filters supplied by a common septic tank effluent (STE) feedstream, mixing of the unsaturated filter effluents to provide a common influent to the denitrification filters, a suite of horizontal saturated filters using lignocellulosic and sulfur reactive media and liquid carbon dosing as well as other system designs, and a means of final effluent disposal. The draft QAPP will address additives issues per Florida Administrative Code (FAC) Chapter 64E-6. The draft QAPP will propose where the test facility will be located and operated to determine nitrogen removal performance and optimize design variables.

**Deliverables from Contract:** [Draft QAPP - pdf](#)

**Status:** Task Complete

- A.14 Recommendation for Process Forward

**Task Description:** Based on the details agreed upon in the draft QAPP, the provider will develop a recommendation whether or not to proceed with the remainder of Task A as outlined below, or recommend an amendment to this contract, and present a revised cost estimate. This will include a recommendation on whether the USF Lysimeter Station should be renovated and utilized as a test facility for this project. Both the provider and FDOH shall reach a written agreement prior to moving forward with the remaining parts of Task A.

**Deliverables from Contract:** [Meeting summary and recommended scope and budget revisions - pdf](#).

**Status:** Task Complete

- A.15 Final PNRS II QAPP

**Task Description:** The department will gather comments on the draft QAPP from RRAC and any other interested parties and transmit such comments to the provider within one month of receiving the draft. The provider will address these comments in preparing final deliverables within one month of receiving comments. If the provider subsequently recommends modifying or adding procedures to address conditions encountered in the field, the QAPP may be revised or appended upon mutual agreement between provider and the department.

**Deliverables from Contract:** [Final QAPP - pdf](#) - to be approved by FDOH

**Status:** Task Completed

- A.16 Materials Testing for FDOH Additives Rule

**Task Description:** The engineered media for the biofilters proposed in the PNRSII QAPP will be tested as required to meet 64E-6.0151 F.A.C. for additives. Effluent from the tank based pilot systems will be used as the effluent source for this testing. A brief technical memo describing the results of this testing will be prepared and presented to FDOH prior to constructing biofilter systems at the GCREC test facility or elsewhere in the field. The department may authorize the provider in writing to perform such testing for additional materials.

**Deliverables from Contract:** [Technical memo - pdf](#) - describing the results of additives rule testing per 64E-6.0151, per additive tested.

**Status:** Task Completed

- A.17 PNRS Specification Reports

**Task Description:** The provider will specify, order and purchase specialty materials for test facility construction and experimental monitoring. The provider will oversee preparation of materials to meet specifications, and prepare procurement and assembly reports that document design and fabrication of the test systems, procurement of treatment system construction materials as well as the media for the filters, site preparation, monitoring instrumentation and equipment, and start-up testing of the PNRS II systems. Actual cost for materials and supplies will be documented as part of this subtask and be included in the construction budget for PNRSII construction.

**Deliverables from Contract:** [Specification reports, materials list and cost and as-built diagrams - pdf](#) - of the treatment systems to be tested as part of PNRS II, one for the in-tank PNRS II testing and one for the in-situ testing.

**Status:** Task Complete

- A.18 PNRS II Test Facility Design 50%

**Task Description:** The provider will design the test facility. Since the GCREC was chosen as the only test facility, the design will include both PNRSII pilot testing facilities and Task C groundwater fate and transport monitoring facilities. However these components will be separated into two construction phases on the design drawings to the extent possible. The PNRSII test facility 50% design submittal under this subtask will include preliminary layout sketches and design concepts and criteria. Provisions for supporting the installation and operation of in-tank treatment systems and in-situ biofilters monitoring systems, including supply of power, a common wastewater source at controllable flowrates, provision for wastewater source routing to pilot facilities and effluent routing to soil treatment units, sampling collection and monitoring appurtenances, and a preliminary flow diagram will be included. The 50% design documents will be submitted to FDOH for review and comment. The department will provide comments within two weeks of receipt

**Deliverables from Contract:** [50% design documents - pdf \(25mb\)](#).

**Status:** Task Complete

- A.19 PNRS II Test Facility Design 100%

**Task Description:** The provider and the department will agree on the design concepts based on review of the 50% design submittal. The provider will prepare a test facility 100% design submittal based on these concepts. The 100% design submittal will include the design details and technical specifications for the workplan described in the PNRS II QAPP, and include the stage 1 unsaturated biofilters, stage 2 denitrification

filters, and in-situ engineered media biofilter systems. These documents will provide the level of detail necessary to estimate construction cost. These documents will be submitted to FDOH for review and comment. The department will provide comments within two weeks of receipt.

**Deliverables from Contract:** [100% design documents - pdf.](#)

**Status:** Task Complete

- A.20 PNRS II Test Facility Construction Support and Administration (2 deliverables, 50% at start, 50% at completion)

**Task Description:** The provider will work with a construction contractor for facility construction using a design-build methodology within the amount budgeted for construction in this attachment or its amendments. Construction will be completed in two phases, with Phase 1 relating mostly to PNRSII pilot test facilities while Phase 2 will primarily involve construction of facilities related to Task C fate and transport studies. This subtask will cover the Phase 1 construction. There will be some overlap between PNRSII and Task C facilities, for example power supply for the test facility will be constructed in this task but will also serve the Task C facilities. The in-situ biofilter systems for PNRSII will be constructed in Phase II along with the mini-mounds for Task C.

Provider will be onsite during construction to review materials and equipment being used to determine if work is conducted in accordance with the construction plans and will assist with installation of monitoring equipment. Construction will be reviewed for completeness by the provider and for conformance with the design intent. As necessary, the provider will propose a contract amendment to increase funds or test facility design changes to decrease costs as feasible.

**Deliverables from Contract:** Compensation for this subtask will be in two phases: 50% upon start of facility construction and the remaining 50% at [construction completion - pdf.](#)

**Status:** Task Complete

- A.21 PNRS II Test Facility Construction 50% (2 deliverables, start and 50% complete)

**Task Description:** The provider will monitor facility construction as needed to monitor progress and conformance with design documents. For budgeting purposes, the provider and the department have assumed a construction cost value in this scope and budget. At the time the contractor is onsite and construction is started, invoices for materials and mobilization will be submitted to the Department by the Provider for payment. When the provider determines that approximately 50% of the facility construction is complete, a construction progress report will be provided for documentation and this subtask will be deemed complete, and the remaining amount in the Section C. cost schedule for this subtask will be paid to provider.

**Deliverables from Contract:** Construction Progress Report: [Report 1 pdf](#); [Report 2 - pdf.](#)

**Status:** Task Complete

- A.22 PNRS II Test Facility Construction 100% (cost reimbursable)

**Task Description:** Provider will monitor facility construction as needed to monitor progress and conformance with design documents. This task will include the construction cost of the facility based on the construction estimate and any approved additional costs. For budgeting purpose the provider and the department have assumed a construction cost value in this scope and budget. This subtask will be based on this amount as a cost reimbursable item not to exceed the estimated total construction cost value, and will be documented by contractor invoices, material and equipment bills, and other provider incurred expenses. The amount paid will be the total documented construction cost less the amount paid to provider in subtask A-21 above.

**Deliverables from Contract:** [Construction Progress Report - pdf.](#)

**Status:** Task Complete

- A.23 PNRS II Test Facility Construction Substantial Completion

**Task Description:** Provider will conduct a site inspection to determine if the project is substantially complete. The inspection will result in the preparation of a punch list to be delivered to the contractor in writing for final completion.

**Deliverables from Contract:** [Construction punch list - pdf](#).

**Status:** Task Complete

- A.24 PNRS II Test Facility Accept Construction

**Task Description:** The provider will conduct one final inspection for the project to determine if the work has been completed in accordance with the contract documents and the punch list. Subsequent to this final inspection, the provider will make final payment to the subcontractor. The provider shall give written notice to FDOH that the work is complete. As-built drawings will then be developed by the provider for the facility. .

**Deliverables from Contract:** [As-built drawings of the test facility - pdf \(10 mb\)](#)

**Status:** Task Complete

- A.25 Monitoring and Sample Event Reports (per sample event)

**Task Description:** After each sampling event, the provider will provide sample event reports verifying operation of the test systems, flowrate monitoring, field parameter results, and chain of custody forms that document sample collection and delivery to the analytical laboratory. The number of events and the parameters to be analyzed shall be as provided in the PNRSII QAPP at a minimum. Sampling events subsequent to the number in the budget for Phase 2 of this task are subject to available funding and the department shall authorize the provider in writing to perform each additional sampling event.

**Deliverables from Contract:** Sampling event report. (per sampling event) - all are pdfs - [Sample event 1](#), [Sample event 2](#), [Sample event 3](#), [Sample event 4](#), [Sample event 5](#), [Sample event 6](#), [Sample event 7](#)

**Status:** Task Complete

- A.26 Data Summary Report (per sample event)

**Task Description:** The provider will provide data reports that verify completion of analyses by an analytical laboratory and that include compiled data from field and analytical laboratory analyses in electronic and paper form. This task is contingent on the previous task.

**Deliverables from Contract:** Data Summary Reports (per sampling event). [Sample event 1](#), [Sample event 2](#), [Sample event 3 \(10mb\)](#), [Sample event 4](#), [Sample event 5](#), [Sample event 6 \(6mb\)](#) , [Sample event 7](#)

**Status:** Task Complete

- A.27 Draft PNRS II Report

**Task Description:** The provider will prepare a PNRS II report that includes PNRS II objectives, experimental methods, results, discussion, conclusions and recommendations. For each nitrogen reduction technology tested at the GCREC pilot facility a technical description will be prepared that includes name, supplier, operating

principles, salient physical description, flow sequence, pertinent design details, manufacturer or designer claims of treatment goals, and operating recommendations. The draft report will be provided to the department for comments from the department and the RRAC prior to submitting a final report.

**Deliverables from Contract:** [Draft Report pdf \(8mb\)](#)

**Status:** Task Complete

- A.28 Final PNRS II Report

**Task Description:** The department will gather comments on the draft report from RRAC and FDOH review and transmit such comments to the provider within one month of receiving the draft. The provider will address these comments in preparing final deliverables within one month of receiving comments.

**Deliverables from Contract:** [Final Report pdf \(27mb\)](#)

**Status:** Task Complete

- A.29 Draft Task A Final Report

**Task Description:** The provider will submit a draft final report summarizing the results of the technology classification, ranking and prioritization efforts in Task A and the conclusions from PNRSII and provide recommendations for onsite nitrogen reduction technologies for Florida. If warranted, this report will also recommend a revised priority list for testing of future systems.

**Deliverables from Contract:** Draft Report

**Status:** Task Eliminated

- A.30 Task A Final Report

**Task Description:** The department will gather comments on the draft report from RRAC and FDOH review and transmit such comments to the provider within one month of receiving the draft. The provider will address these comments in preparing final deliverables within one month of receiving comments.

**Deliverables from Contract:** Final Report

**Status:** Task Eliminated

- A.31 Change-order Allowance

**Task Description:** From time to time the Department may find it necessary to make minor changes or adjustments to activities under this task based on results that indicate a potential improvement to the project by making a change. Examples of such changes include additional or revised sample locations and parameters, minor modifications to test systems or field activities based on problems encountered, or conditions that develop requiring expedient actions to correct a potentially serious problem. Up to \$ 40,000 will be allocated from the contract budget for such minor changes to research activities under this task. Upon determination by the Department that changes should be made, all or a portion of these funds may be authorized by written notification from the Department to the Provider directing specific changes to research activities be made, and the amount budgeted for the changes specified.

**Deliverables from Contract: (unless indicated, all are pdfs)** Deliverables outlined in authorization letters. [Authorization to make design improvements on test facility](#), [Authorization to analyze additives](#), [Authorization to develop design tool for bioreactor filtration treatment](#), [Bioreactor treatment tool](#)

[literature review and data set specification](#), [Bioreactor tool process forward minutes](#), [Biotool model xls](#), [Biotool user guide](#)

**Status:** Task Complete