Appendix 4B-1: Scope of Work for Intensive Spatial Monitoring of Sediment, Vegetation, and Water Quality in the Stormwater Treatment Areas

Qore, Inc.

PROFESSIONAL SCIENCE AND ENGINEERING SERVICES	Work Order No. C-15986-WO01-06

In accordance with our Contract No. C-15986, dated January 14, 2003 the South Florida Water Management District hereby directs QORE, Inc. to perform the services for the contract as set forth in the Exhibit "C" Statement of Work and as specified in the attached mutually agreed Work Order WO01-06 hereby incorporated by reference and attached hereto, for the maximum not-to-exceed price set forth below.

Work Order Start Date: May 1, 2003 Completion Date: September 30, 2003

ALL INVOICES SHALL INDICATE THE DATE OF WHICH SERVICES WERE RENDERED

Payment shall be made as follows:

Monthly payments based on hours worked and hourly rate schedule identified in the Statement of Work, 8.0 Budget Summary, with a total not to exceed: **$ 284,295.00**

Approvals:

_____	_____
Project Manager	Contract Specialist
Date _____	Date _____
_____	_____
Division Director	Contractor
Date _____	Date _____

Science and Engineering Support Services
Environmental Science – Work Order WO01-06

Contract/WO Number: **C-15986-WO01-06** **Duration: 5 months**

Firm: **QORE, Inc.**
Craig Kidwell
5840 Corporate Way, Suite 114
West Palm Beach, FL 33407
Phone: 561.615.8833
Fax: 561.615.6678
Email: ckidwell@qore.net

Project Manager: **Martha Nungesser**
Senior Environmental Scientist, Ph. D.
3301 Gun Club Road
West Palm Beach, FL 33406
Phone: (561) 682.6614
Email: mnunges@sfwmd.gov

Position Title: **4 Environmental Scientists (Level 1)**
2 Staff Environmental Scientists (Level 2)
1 Senior Environmental Scientist
1 Lead Engineer

Required Skill Sets: **Attachments A1, A2, A3, A4**

Work Schedule: **N/A**
Location: **Off-Site**
Rate: **4 Environmental Scientists at $50.00 per hour**
2 Staff Environmental Scientists at $60.00 per hour
1 Senior Environmental Scientist at $85.00 per hour
1 Lead Engineer at $100.00 per hour
Total Hours: **3,648 Hours**
Billing Interval: **Quarterly by Fiscal Year**
The Contractor may invoice the District no later than 21 days after the end of the month in which the work was accomplished. A final fiscal year invoice is due by October 7 for all work accomplished in/or by September 30.
Hardware/Software: **None**
Transportation: **2 Airboats: See Budget Summary**
Travel: **24,000 miles, See Budget Summary**
Equipment: **Hydro Lab, See Budget Summary**
Bags and coolers, See Budget Summary
Sample Shipping, See Budget Summary
Work Order Total: **FY03 $ 284,295.00 Total $ 284,295.00**

VEGETATION AND SEDIMENT CHARACTERISTICS IN CONSTRUCTED WETLANDS STA-1W (CELLS 1-4), STA-2, STA-5, AND STA-6

STATEMENT OF WORK

1.0 INTRODUCTION

This is a 5 month work order (May 2003 - September 2003) in accordance with Contract C-15986, Science and Engineering Support Services, between the South Florida Water Management District (District) and QORE, Inc. (Contractor), to characterize vegetation and soils in constructed wetlands.

The biotic integrity of the Everglades ecosystem, the largest subtropical wetland in the United States, is endangered because of alterations in hydrologic and nutrient regimes as a result of urban and agricultural development. Reduction of total phosphorus (TP) from the Everglades Agriculture Area (EAA) runoff is a prerequisite to restoring and protecting the remaining Everglades. The 1994 Everglades Forever Act (EFA, Section 373.4592, Florida Statutes) requires that water released from the EAA into the Everglades Protection Area (EPA) meet a threshold discharge limit for TP. To achieve this objective, a series of constructed wetlands known as Stormwater Treatment Areas (STAs), totaling about 47,000 acres, have or will be built by the District. The STAs use biological processes to reduce excess nutrients from EAA runoff.

As part of the performance evaluation of the wetlands, it is important to monitor vegetation biomass and species shifts as well as sediment accretion rates within each of the STAs. Information on vegetation and sediment accretion obtained from this study will help to manage and operate the STAs and to aid with the design of future STAs. The objective of this work order is to obtain estimates of plant biomass and tissue nutrients to quantify the nutrient content of the vegetation. Additionally, an assessment of the nutrient content of the floc and soil layers will be made. The top flocculent layer will be measured to estimate accretion rates, and phosphorus fractionation analysis on this floc will assist in determining availability of stored phosphorus in the sediments. Four (4) of the STAs, STA-1W Cells 1-4, STA-2, STA-5, and STA-6, will be sampled under this contract.

STA-1W (Figure 1) is located in western Palm Beach County adjacent to the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Water Conservation Area-1), into which it discharges. Treatment Cells 1 to 4 of STA-1W total 3,740 acres and were flooded in 1993. STA-1W Cell 5 is not part of this scope of work. The dominant vegetation community in Cells 1, 2 and 3 is cattail but a variety of other emergent, floating, and submerged aquatic vegetation (SAV) is present. Cell 4 is dominated almost completely by SAV and periphyton, with a section of cattail located at the discharge. STA-1W was constructed on actively farmed sugar cane land and the soils are predominantly peat.

STA-2 (Figure 2) is located in southern Palm Beach County, adjacent to the southwestern section of Water Conservation Area 2A (WCA-2A). STA-2 is made up of three

treatment cells, Cells 1-3. This 6,430 acre wetland discharges into the western section of WCA-2A. Cell 1 was forested prior to flooding and the current predominant vegetation is a mixture of sawgrass, cattail, and SAV. Cell 2 was constructed on land both farmed and unfarmed, and cell 3 was constructed on previously farmed land. Cell 2 is now dominated by sawgrass and cattail dominate. Cell 3 is maintained as an SAV system. The soils in STA-2 are mostly peat mixed with some sand.

STA-5 (Figure 3) is located in Hendry County, situated between the L-3 canal and the Rotenberger Wildlife Management Area. STA-5 is 4,118 acres in size and is divided into four treatment cells, Cells 1A, 1B, 2A, and 2B. STA-5 discharges into the Rotenberger Wildlife Management Area. Cattails are the dominant vegetation in Cells 1A, 2A, and 2B but a variety of submerged, floating, and emergent species are also present. Cell 1B is maintained as an SAV system. The soils in STA-5 are mostly peat soils mixed with some sand.

STA-6 (Figure 4) is located south of STA-5 in southeastern Hendry County, situated between the L-3 canal and the Rotenberger Wildlife Management Area. STA-6 discharges into WCA-3A. STA-6 is divided into two treatment cells, Cells 3 and 5, totaling 870 acres in size. Cell 3 is co-dominated by sawgrass and willow, while Cell 5 is dominated by grasses such as para grass, torpedo grass, and switch grass. The soils in STA-6 are composed of sand and peat, but are more mineral than the soils found in the other STAs.

2.0 OBJECTIVES

This study involves field collection of vegetation, sediment, and surface water in STA-1 Cells 1-4, STA-2, STA-5, and STA-6. The objectives of this study are to:

(1) Characterize the vegetation biomass and coverage in STA-1 Cells 1-4, STA-2, STA-5, and STA-6 through collection of vegetation samples at preselected sites;
(2) Determine the sediment's physical and chemical characteristics at these same sites through the collection of sediment samples;
(3) Determine the surface water physical and chemical characteristics at these same sites through collection of surface water quality samples.

These objectives of the project will be accomplished by completing the tasks and deliverables as identified in Section 4.0 and 5.0 of this statement of work.

3.0 SCOPE OF WORK

The District seeks the services of the Contractor to conduct a single collection of vegetation, sediments, and surface water samples in STA-1W Cells 1-4, STA-2, STA-5, and STA-6 toward the end of the rainy season (June through August), and to submit the samples to a District specified laboratory for analysis. The Contractor will submit copies of the field notes and chain-of-custody sheets to the District for all laboratory shipping and analysis.

4.0 WORK BREAKDOWN STRUCTURE

All laboratory shipping and analytical costs associated with this statement of work will be paid directly to the specified laboratory by the District. This project shall be accomplished by completion of the following tasks:

Task 1 Kick-Off Meeting

The Contractor will attend and conduct an STA Vegetation and Sediment Characterization Kick-Off Meeting.

Within the first week after work order execution, the Contractor and District staff shall meet in a Kick-off Meeting at the District's West Palm Beach Headquarters. The Contractor will receive templates for use in developing the data reports, required plans, field observation notes, and the specific sampling plan and protocols for each STA. The District will also communicate to the Contractor any method requirements to be used when performing the sampling and reporting tasks as outlined below. The Kick-Off Meeting will provide the opportunity for the Contractor and District staff to coordinate project implementation.

At the Kick-off meeting, the Contractor shall meet the District project manager and other key project staff, present a sampling schedule for District approval and introduce the Contractor sampling and management staff. If the Contractor chooses to subcontract any portion of the work, a representative from each of the subcontractors shall be present for this portion of the meeting.

Estimated Hours: 116 hours not to exceed $6,970.00
Due Date: Within one week of work order execution

4 Environmental Scientists 16 hours each
2 Staff Environmental Scientists 16 hours each
1 Senior Environmental Scientist 10 hours
1 Lead Engineer 10 hours

Task 2 Project Orientation

With District staff, the Contractor will attend a series of pre-sampling orientation and field visits to STA-1W, STA-2, STA-5, and STA-6.

Estimated Hours: 222 hours not to exceed $12,790.00
Due Date: Within three weeks of work order execution

4 Environmental Scientists 32 hours each
2 Staff Environmental Scientists 32 hours each

1 Senior Environmental Scientist 30 hours

Task 3 Project Documentation

The Contractor will prepare a Project Work Plan that includes a Site Safety Plan, Field QA/QC (quality assurance/quality control) Plan and Field Observation Notes prior to the start of the vegetation, sediment and water quality collection.

A) The Contractor shall prepare and submit a draft Site Safety Plan. At a minimum, the Site Safety Plan will consist of a table of contents, emergency phone numbers, locations of the nearest emergency facilities, material safety data sheets (MSDSs) for any and all chemicals used on-site and for sample preservation storage, and sampling safety protocols focused on sampling in remote wetland locations in hot weather with potentially dangerous wildlife.

B) The Contractor shall prepare and submit a draft Field QA/QC Plan. At a minimum, the Field QA/QC Plan shall consist of protocols to collect, prepare, store, and ship samples.

The District will review the draft Site Safety Plan and draft Field QA/QC Plan and will return one marked copy of each draft for revision within two (2) weeks to the Contractor. The Contractor shall revise and make the final adjustments within one (1) week after receipt of the marked copy, including tables detailing the requested changes and the action taken by the Contractor.

To ensure that the Contractor is aware of and follows site safety protocols, all personnel working on this project shall be required to read and sign the final Site Safety plan and the final Field QA/QC Plan.

The draft Project Work Plan that includes a Site Safety Plan, Field QA/QC (quality assurance/quality control) Plan and Field Observation Notes is due no later than 5 weeks after work order execution. The final Project Work Plan is due no later than 8 weeks after work order execution.

C) The Contractor will maintain chains of custody and Field Observation Notes for all sample collections. The Field Observation Notes shall include, but are not limited to, the weather conditions, names of the field sampling crews, site names, dates and times of collection, vegetation coverage, sediment characteristics, water column physical parameters, digital photographs of the sites, and any other general observations.

After collection of the vegetation, sediment, and surface water quality samples in each STA, the Contractor shall submit a copy of all relevant chains of custody and Field Observation Notes and any other pertinent information, in both hard copy and on CD, on the first business day of the following month (July, August, and September). Data for each STA shall be submitted separately. All disks shall be clearly labeled and shall be submitted to the District. The Contractor will use Microsoft Word, Access, or Excel® for all electronic data submittal

Estimated Hours: 600 hours not to exceed $36,700.00

4 Environmental Scientists 80 hours each
2 Staff Environmental Scientists 80 hours each
1 Senior Environmental Scientist 60 hours
1 Lead Engineer 60 hours

Task 4 Vegetation Collection and Analysis

The Contractor will collect vegetation in STA-1W, STA-2, STA-5, and STA-6, complete the necessary chain of custody and field observation sheets, and submit the samples to the District for processing and transport for analysis.

One (1) set of vegetation harvests at different locations in each of the STA's will be performed. The sampling locations in each STA are based on a stratified random design format and station coordinates will be supplied by the District. While the final number of sampling locations will be specific to each STA, the current estimate is 600 total sites. The vegetation harvest sampling will be accomplished using airboats provided by the Contractor. All supplies such as rice bags, zip top bags, and coolers; and field transportation related to the vegetation harvest sampling will be provided by the Contractor. The collection of vegetation shall be conducted as established by the District in each of the STAs to ensure sampling consistency. All vegetation harvest, sediment, and water quality sampling shall be conducted simultaneously, as identified in Tasks 5 and 6, between June 1 and September 1, 2003.

Vegetation Collection Protocol for Each Site

The predetermined sampling sites shall be located using a global positioning system (GPS). At each site, a quadrat shall be randomly tossed into the marsh. A digital photo will be taken of each sample plot prior to collection of the vegetation. The percent coverage of vegetation in the quadrat shall be estimated using defined methodology supplied by the District. The dominant and co-dominant species in each quadrat will be identified by percent coverage and/or biomass and shall be hand-gathered. Cattail and other large emergent vegetation shall be collected from a 0.25

m^2 quadrat area, while grasses, floating vegetation, and submerged aquatic vegetation (SAV) shall be collected from a 0.50 m^2 quadrat area. A flat-edged shovel shall be used to cut around the quadrat to aid in removing the rooted plant species. Both the above-ground and below-ground vegetation tissues shall be collected. Emergent plant species, such as cattail and sawgrass, shall be divided into above-ground and below-ground tissues, as well as above-ground dead tissues, and each component shall be analyzed separately. SAV shall be collected carefully to assure collection of the plant throughout the water column. The Contractor may use a box corer and a rake to assure complete collection within the quadrat area. The SAV, grasses, pickerel weed, duck potato, and other miscellaneous species shall be analyzed as whole plants. If mats of periphyton are present, the periphyton shall also be collected, placed in a zip top bag, and stored in a cooler on ice.

The plant material will be delivered to the District for processing. A copy of the chain-of-custody sheet shall be submitted along with the samples.

Table 1- Vegetation harvest plant tissue (laboratory) and in-situ field parameters

Plant Tissue Parameters – Laboratory	**In-situ Field-Measured Parameters**
Total Phosphorus	Water Depth
Total Nitrogen	Species Composition
Total Carbon	Vegetation % Coverage
Dry Weight	

Estimated Hours: 1,005 hours not to exceed $55,325.00

4 Environmental Scientists 160 hours each
2 Staff Environmental Scientists 160 hours each
1 Senior Environmental Scientist 25 hours
1 Lead Engineer 20 hours

Task 5 Sediment Collection and Analysis

The Contractor will collect sediment samples in STA-1W, STA-2, STA-5, and STA-6, complete the necessary chain of custody and field observation sheets, and submit the samples to the District .

One (1) set of sediment sampling at different locations in each of the STA's shall be performed. The sampling locations in each STA are based on a stratified random design format and station coordinates will be supplied by the District. While the final number of sampling locations will be specific to each STA, the current estimate is 600 total sites. The sediment sampling will be accomplished using airboats provided by the

Contractor. All supplies and field transportation related to the sediment sampling will be provided by the Contractor. Supplies include, at minimum, zip top bags or their equivalents. The collection of sediment samples shall be conducted as established by the District in each of the STAs to ensure sampling consistency. All vegetation harvest, sediment, and water quality sampling shall be conducted simultaneously, as identified in Tasks 4 and 6, between June 1 and September 1, 2003.

Sediment Collection Protocol for Each Site

The soils shall be collected at the same locations as the vegetation collection, directly adjacent to the quadrat site, using a 4 inch internal diameter corer, 30-cm in length, and processed according to District methodology. The depth of the top flocculent layer, defined as the large, unconsolidated particles found on top of the sediment, shall be measured and recorded on the Field Observation Notes sheet. The floc layer shall then be separated from the sediments in the field, placed into a zip top bag, and stored on ice for delivery to the District. The remaining sediment section of the core shall be sectioned in the field into a 0–10 cm section, placed into a zip top bag, and delivered to the District. A copy of the chain-of-custody sheet shall be submitted along with the samples.

Table 2- Sediment/soil parameters to be measured.

Floc Layer Parameters (laboratory)	**0-10 cm Sediment Sections Parameters (laboratory)**
Total Phosphorus	Total Phosphorus
Total Nitrogen	Total Nitrogen
Total Carbon	Total Carbon
Ash Content	Ash Content
Bulk Density	Bulk Density
Sulfur	Sulfur
Iron	Iron
Total Calcium	
Inorganic Phosphorus Fractionation	
Organic Phosphorus Fractionation	

Estimated Hours: 1,005 hours not to exceed $55,325.00

4 Environmental Scientists 160 hours each
2 Staff Environmental Scientists 160 hours each
1 Senior Environmental Scientist 25 hours
1 Lead Engineer 20 hours

Task 6 Water Quality Collection and Analysis

The Contractor will collect water quality samples in STA-1W, STA-2, STA-5, and STA-6, complete the necessary chain of custody and field observation sheets, and submit the samples to a laboratory specified by the District.

One (1) set of water quality sampling in each of the STA's shall be performed. The sampling locations in each STA are based on a stratified random design format and station coordinates will be supplied by the District. While the final number of sampling locations will be specific to each STA, the current estimate is 600 total sites. The water quality sampling will be accomplished using airboats provided by the Contractor. Field transportation related to the water quality sampling will be provided by the Contractor. The Contractor shall provide the coolers for shipping Bottles, labels, and preservative media (such as acid) will be provided by the District for sample collection. The collection of water quality samples shall be conducted as established by the District in each of the STAs to ensure sampling consistency. The Contractor is responsible for calibrating the field equipment to assure accurate measurements. All vegetation harvest, sediment, and water quality sampling shall be conducted simultaneously, as identified in Tasks 4 and 5, between June 1 and September 1, 2003.

Surface Water Quality Sampling Protocol for Each Site

The surface water shall be collected at each vegetation and sediment site, prior to vegetation and sediment collection, from the water column at a depth of10 cm (or mid-water column depth), using a peristaltic pump. Immediately after collection, the samples shall be processed and preserved according to the APHA Standard Methods, 1989, 17th Edition. The samples shall be stored on ice in a cooler and transported overnight to a District specified laboratory for analysis. A chain-of-custody sheet shall be completed and submitted along with the samples. In addition to collecting samples for water quality analysis, the physical parameters at the site shall also be measured using a YSI or Hydrolab multiprobe instrument and recorded on the chain-of-custody sheet. The parameters to be measured are listed in Table 3.

Table 3- Water Column parameters measured during the vegetation and sediment collection.

Water Physical Parameters	**Chemical Parameters**
Specific Conductance	Total Phosphorus
Temperature	Soluble Reactive Phosphorus
Dissolved Oxygen	Total Dissolved Phosphorus
pH	Total Kjeldahl Nitrogen
	Ammonia
	NO_2NO_3

	Sulfur
	Iron
	Calcium
	Alkalinity
	Chloride

Estimated Hours: 1,005 hours not to exceed $55,325.00

4 Environmental Scientists 160 hours each
2 Staff Environmental Scientists 160 hours each
1 Senior Environmental Scientist 25 hours
1 Lead Engineer 20 hours

5.0 DELIVERABLES

Deliverable 1 - Kick-Off Meeting Summary

The Contractor will prepare and deliver a summary of the Kick-Off meeting to the District for review and approval, no later than 1 week after the meeting is held. The summary shall acknowledge receipt and understanding of any and all material, including sampling protocols and methodology provided to the Consultant by the District at the Kick-Off Meeting.

Estimated Hours: Included in 4.0 Work Breakdown Structure Task 1

Deliverable 2- Field Visit Summary

The Contractor will prepare and deliver a memorandum to the District for review and approval. The memorandum shall summarize the field visit and the Contractors understanding of how the field orientation will assist them in performing the work identified in 4.0 Work Breakdown Structure. The memorandum shall also include written protocols on how the contractor proposes to successfully perform all vegetation, sediment and water quality sampling activities.

Estimated Hours: Included in 4.0 Work Breakdown Structure Task 2

Deliverable 3 - Draft Project Work Plan

The Contractor will prepare and deliver to the District a Draft Project Work Plan for review and approval.

Estimated Hours: Included in 4.0 Work Breakdown Structure Task 3

Deliverable 4- Final Project Work Plan

The Contractor will finalize the Final Project Work Plan, based upon District comments and deliver to the District a Final Project Work Plan for District approval. The Final Project Work Plan will be signed by all contractual individuals partaking in the implementation of this work order.

Estimated Hours: Included in 4.0 Work Breakdown Structure Task 3

Deliverable 5 - Project Supporting Documentation

The Contractor will submit a copy of all project notes, field observation notes, chain of custody sheets, digital photographs, field audits or reports and any other pertinent information gathered for all site sampling within all the STAs. Documentation will be submitted in hard copy and on CD to the District. Supporting documentation is due on the first business day of the month following collection of the vegetation, sediment, and water samples and their transfer to the laboratory for analysis.

Estimated Hours: Included in 4.0 Work Breakdown Structure Task 4, Task 5 and Task 6.

6.0 PERFORMANCE

The minimum requirements of the staff assigned to this project are listed in Attachments A1 and A2. The Contractor shall provide a list of the staff who will be assigned to this project and documentation of the qualifications of each to the District Project Manager.

The Contractor's performance for the terms and conditions of C-15986-W01 will be evaluated at the following frequencies:

1. 90 Day
2. Final Performance Review
3. Additional evaluations as determined by the Project Manager

A Running Average Score 3.0 is required to maintain active contract status in the SESS – Environmental Science discipline.

7.0 HARDWARE AND SOFTWARE

The Contractor will provide any and all necessary hardware and software for the completion of this statement of work

8.0 BUDGET SUMMARY

Task	Deliverable	Skill Set	Rate	Duration	Cost*
Task 1	Deliverable 1	4 @ Level 1	$50.00/hr	16 hours	$ 3,200.00
Task 1	Deliverable 1	2 @ Level 2	$60.00/hr	16 hours	$ 1,920.00

Task 1	Deliverable 1	1 @ Level 3	$85.00/hr	10 hours	$ 850.00
Task 1	Deliverable 1	1 @ Level 4	$100.00/hr	10 hours	$ 1,000.00
Task 2	Deliverable 2	4 @ Level 1	$50.00/hr	32 hours	$ 6,400.00
Task 2	Deliverable 2	2 @ Level 2	$60.00/hr	32 hours	$ 3,840.00
Task 2	Deliverable 2	1 @ Level 3	$85.00/hr	30 hours	$ 2,550.00
Task 3	Deliverable 3 and 4	4 @ Level 1	$50.00/hr	80 hours	$ 16,000.00
Task 3	Deliverable 3 and 4	2 @ Level 2	$60.00/hr	80 hours	$ 9,600.00
Task 3	Deliverable 3 and 4	1 @ Level 3	$85.00/hr	60 hours	$ 5,100.00
Task 3	Deliverable 3 and 4	1 @ Level 4	$100.00/hr	60 hours	$ 6,000.00
Task 4	Deliverable 5	4 @ Level 1	$50.00/hr	160 hours	$ 32,000.00
Task 4	Deliverable 5	2 @ Level 2	$60.00/hr	160 hours	$ 19,200.00
Task 4	Deliverable 5	1 @ Level 3	$85.00/hr	25 hours	$ 2,125.00
Task 4	Deliverable 5	1 @ Level 4	$100.00/hr	20 hours	$ 2,000.00
Task 5	Deliverable 5	4 @ Level 1	$50.00/hr	160 hours	$ 32,000.00
Task 5	Deliverable 5	2 @ Level 2	$60.00/hr	160 hours	$ 19,200.00
Task 5	Deliverable 5	1 @ Level 3	$85.00/hr	25 hours	$ 2,125.00
Task 5	Deliverable 5	1 @ Level 4	$100.00/hr	20 hours	$ 2,000.00
Task 6	Deliverable 5	4 @ Level 1	$50.00/hr	160 hours	$ 32,000.00
Task 6	Deliverable 5	2 @ Level 2	$60.00/hr	160 hours	$ 19,200.00
Task 6	Deliverable 5	1 @ Level 3	$85.00/hr	25 hours	$ 2,125.00
Task 6	Deliverable 5	1 @ Level 4	$100.00/hr	20 hours	$ 2,000.00
Task 6	Deliverable 5	HydroLab	$25.00/day	60 days	$ 3,000.00
Task 4, 5, 6	Deliverable 5	Coolers and bags	Cost + 10%		$3,300.00
Task 4, 5, 6	Deliverable 5	Airboat	Cost+10%	60 days	$ 39,600.00
All Tasks	All Deliverables	Travel	$0.29/mile	12,000 miles	$ 6,960.00
Task 6	Deliverable 5	Shipping samples	Cost + 10%	60 days	$ 9,000.00
Total					**$ 284,295.00**

*** not to exceed amounts**

9.0 PAYMENT AND DELIVERABLE SCHEDULE

The Contractor may invoice the District no later than 21 days after the end of the month in which the work was accomplished, with a final fiscal year invoice due by October 7 for all work accomplished in September, and/or all previously unbilled work completed through the fiscal year ending September 30. All invoices shall indicate the number of hours worked per task, times the hourly rate within the not-to-exceed amounts shown below per Fiscal Year (FY).

Task	**Deliverable**	**Due Date***	**Cost****
Task 1	Deliverable 1	1 week	$ 6,970.00
Task 2	Deliverable 2	3 weeks	$ 12,790.00
Task 3	Deliverable 3	5 weeks	$ 18,350.00
Task 3	Deliverable 4	8 weeks	$ 18,350.00
Task 4	Deliverable 5	August 15, 2003	$ 55,325.00
Task 5	Deliverable 5	August 15, 2003	$ 55,325.00

Task 6	Deliverable 5	August 15, 2003	$ 55,325.00
Task 6	Deliverable 5 – 2 HydroLabs	N/A	$ 3,000.00
Task 4, 5, 6	Deliverable 5 – 2 Airboats	N/A	$ 39,600.00
Task 4, 5, 6	Deliverable 5 – Bags and Coolers	N/A	$ 3,300.00
Task 4, 5, 6	Deliverable 5 - Shipping	N/A	$ 9,000.00
All Tasks	All Deliverables -Travel	N/A	$ 6,960.00
Total			**$ 284,295.00**

*** weeks from work order execution unless otherwise noted**
**** not to exceed amounts**

10.0 REFERENCES

The following references are available for review and download from the District's Website: http://www.sfwmd.gov/org/erd/ecp/etweb/main_template/attrep_a.htm or at the District Reference Center.

Chimney, Michael J., Martha Nungesser, Jana Newman, Kathy Pietro, Guy Germain, Tammy Lynch, Gary Goforth and M. Zaki Moustafa. 2000. Chapter 6: Stormwater Treatment Areas—Status of research and monitoring to optimize effectiveness of nutrient removal and annual report on operational compliance. 2000 Everglades Consolidated Report, South Florida Water Management District, West Palm Beach, FL.

Chimney M.J. and Moustafa M.Z. 1999. Chapter 6: Effectiveness and optimization of stormwater treatment areas for phosphorus removal. In: Everglades Interim Report, South Florida Water Management District, West Palm Beach, FL, USA, pp. 6-1 to 6-45.

Ivanoff, D.B., K.R. Reddy, S. Robinson. 1998. Chemical Fractionation of Organic Phosphorus in Selected Histosols. Soil Science 163:36-45.

Reddy, K.R., Y. Wang, W.F. DeBusk, M.M. Fisher, S. Newman, 1998. Forms of Soil Phosphorus in Selected Hydrologic Units of the Florida Everglades. Soil Science Society of America Journal 62:1134-1147.

Figure 1. STA-1W, Palm Beach County.

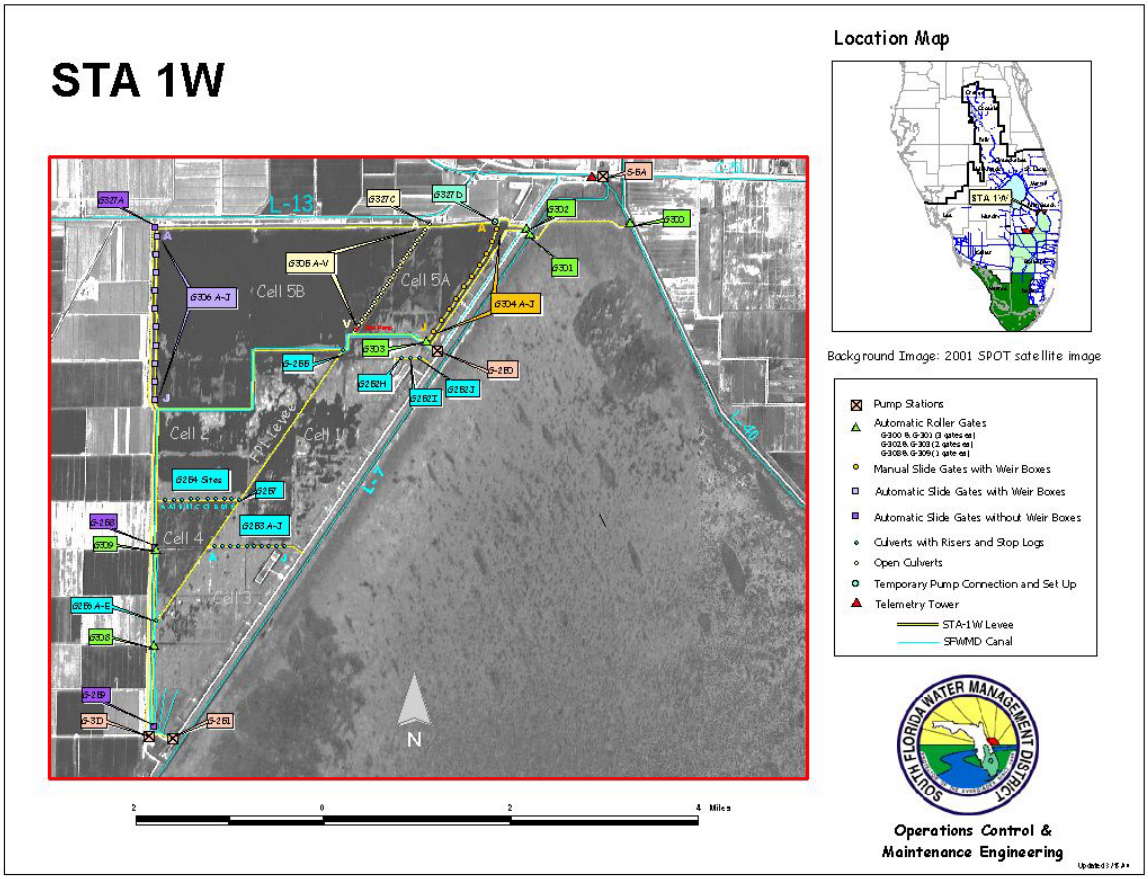

STA 1W
Location Map
Background Image: 2001 SPOT satellite image
Pump Stations
Automatic Roller Gates
Manual Slide Gates with Weir Boxes
Automatic Slide Gates with Weir Boxes
Automatic Slide Gates without Weir Boxes
Culverts with Risers and Stop Logs
Open Culverts
Temporary Pump Connection and Set Up
Telemetry Tower
STA-1W Levee
SFWMD Canal
L-13
Cell 5B
Cell 5A
Cell 2
Cell 1
Cell 4
Cell 3
N
Miles
Operations Control &
Maintenance Engineering

Figure 2. STA-2, Palm Beach County.

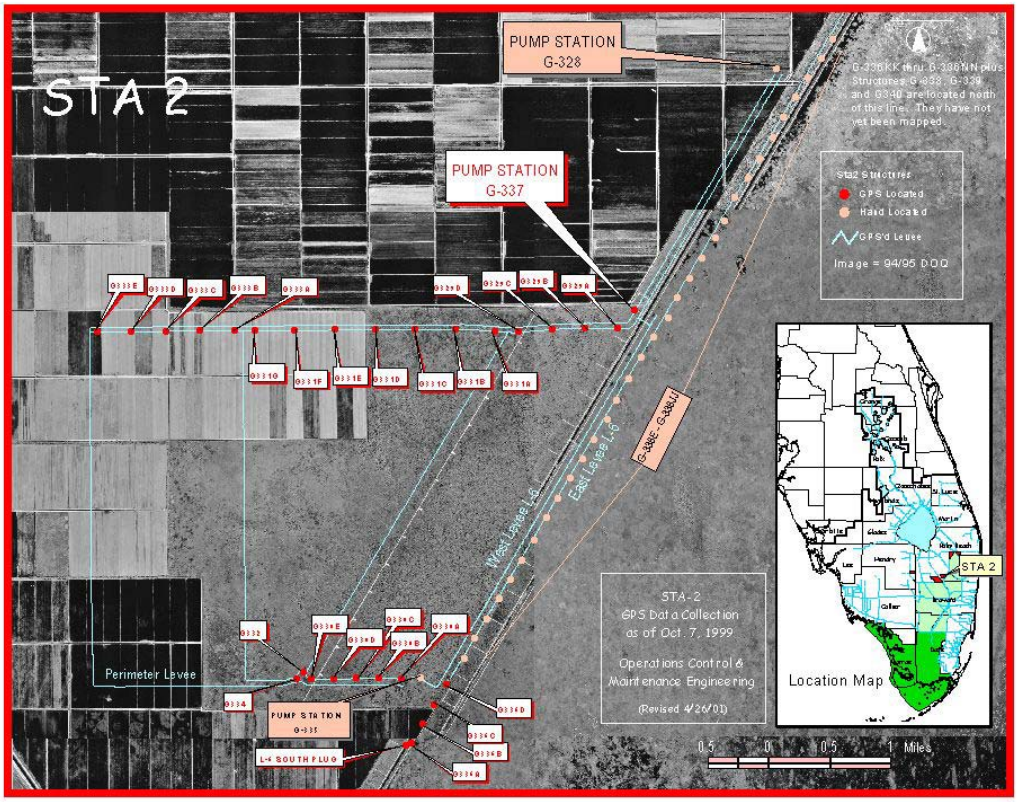


Figure 3. STA-5, Hendry County.

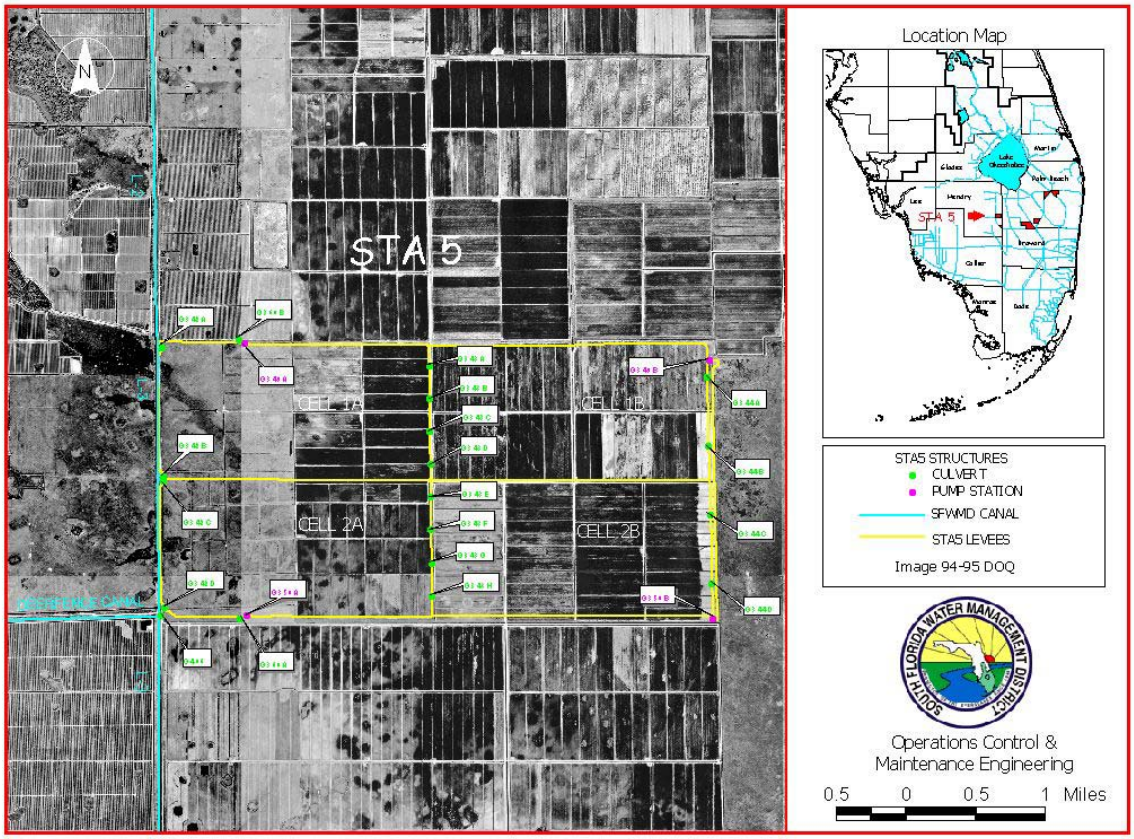
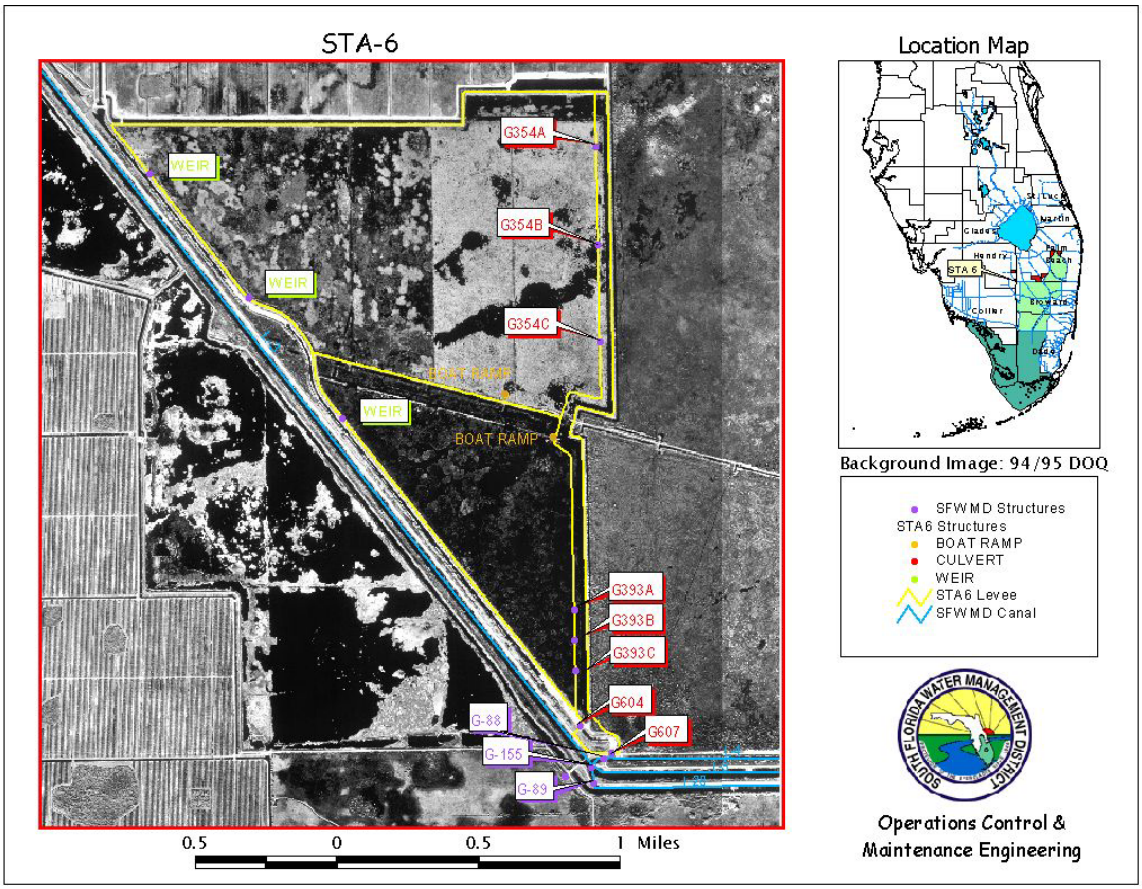


Figure 4. STA-6, Hendry County.



11.0 GENERAL SKILL SETS

GENERAL SKILLS:

Ability to work independently and efficiently
Excellent communication skills with contracting agency (District)
Experienced airboat driver
Ability to lift 40 pounds over side of airboat
Excellent record-keeping skills
Ability to work in hostile, hot weather at sites with biting insects and alligators

TECHNICAL COMPETENCE

Staff must have the following technical skills with educational/experience level commensurate to a college B.S. degree or equivalent plus the minimum experience noted.

Experience working in shallow subtropical wetlands	2 years
Knowledge of and ability to identify dominant wetland species occurring in the STAs	2 to 3 years
Expertise in visual cover estimates and harvesting of STA wetland plants	2 years
Expertise in wetlands sediment sampling	2 years
Competent in collecting water quality samples	2 years
Familiarity with GPS in locating and recording sites	1 year

Attachment A1
Environmental Scientist
Professional Level 1 –$50.00 per hour

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ENVIRONMENTAL SCIENTIST

JOB SUMMARY

Conducts applied ecological research to provide a sound scientific basis for evaluation of alternatives related to selection of alternative stormwater treatment technologies and environmental enhancement and protection of the Everglades in cooperation with District senior scientists and engineers. Manages contracts for limited research and sampling services. Provides occasional consultation on scientific issues relevant to the District's mission.

EMPLOYMENT GUIDELINES

EDUCATION: B.S. or B.A. degree in environmental science, ecology, biology, zoology, botany or related area.

EXPERIENCE: Zero (0) to four (4) years related experience is required.

OTHER: Valid Florida driver's license.

KNOWLEDGE, SKILLS AND ABILITIES

Knowledge of theoretical and applied aspects of aquatic ecology with emphasis in wetland, river, lake, or estuarine ecology.

Knowledge acquired through academic concentration or experience in at least one of the following areas: wetland ecology; wetland restoration; nutrient dynamics; aquatic invertebrates; wetland and aquatic plant communities; fish communities; biological chemistry.

Skill in the use of state-of-the-art computer hardware and software for word processing, data analysis, and publication of biological information.

Understanding of project management and basic personnel supervision.

Knowledge of contract management principles.

Ability to work collaboratively with District employees and externally with representatives of consulting firms, environmental groups, and other government agencies.

Knowledge of ecological sampling methods.

Ability to synthesize and present technical findings concisely and logically.

Skill to assist in training of colleagues in field of expertise.

Skill in scientific writing for technical publications.

Ability to build and maintain effective interpersonal relationships and to build research teams.

DUTIES AND RESPONSIBILITIES

APPLIED ECOLOGICAL RESEARCH AND MONITORING PROGRAMS:

Assists in program planning by identifying environmental problems, developing scope of research, setting goals and objectives, and selecting scientific parameters and sampling techniques to provide definitive data.

Collects and analyzes biological samples and data, makes scientific observations in the field, collects relevant data from previous programs and/or contractual sources. Coordinates with District divisions, outside consultants, government agencies, and environmental groups.

Compiles and evaluates biological data using best available publications, memoranda, and articles in open literature, either individually or in collaboration with senior staff or contractor; occasionally presents findings via conferences and symposia.

ECOLOGICAL RESEARCH AND MONITORING CONTRACTS:

Identifies, examines, and determines research objectives.

Determines scope of ecological research/monitoring/biological sampling to be undertaken.

Monitors field work and reviews reports or other deliverables; ensures appropriate payment for services.

Evaluates contract compliance and fulfillment, and quality of work.

Assists staff in evaluating proposals.

Provides basic interpretation of contract findings.

PERFORMANCE MANAGEMENT FACTORS

Accountability: Shares accountability with senior scientist for integrity of District's research and monitoring programs so that work products hold up under scrutiny of outside interests. Demonstrates vision in identification of ecological problems, needs, impacts, and tradeoffs. Demonstrates commitment to environmental research and ability to bring projects to closure.

Ecological Knowledge: Demonstrates basic knowledge of wetland, river, estuarine, and lake ecosystems. Maintains knowledge of the Kissimmee, Okeechobee, and Everglades Ecosystems as applied to District research and monitoring programs.

Scientific Analysis: Efficiently and effectively analyzes scientific data using simple to advanced statistical analysis and other mathematical means, and current information from scientific literature. Uses state-of-the-art computer software and hardware.

Planning: Demonstrates effective planning skills and makes allowances for contingencies. Does not overlook variables affecting project, including funding, equipment, and human resources.

Technical Papers: Assists in the production of technical memoranda and publications.

Coordination: Effectively coordinates project work both internally and externally. Requests input, respects judgement of others, solicits involvement, and builds teamwork.

Scientific Objectivity: Defines problems fully, accurately, and in an unbiased manner. Objectively compiles, interprets, and reports data.

Contract Management: Handles routine contract management, and displays initiative in dealing with contractors.

Interpersonal Relations: Is tactful, cooperative, and open minded. Develops rapport with others. Promotes interpersonal trust and respect. Willing participant and successful as a team worker. Encourages organization-wide cooperation. Respects the opinions, abilities, and contribution of others. Deals effectively with the organizational climate.

PHYSICAL DIMENSIONS

Extended independent work in the field, under hot, humid, wet conditions and in areas occupied by animals such as alligators and snakes, and stinging/biting insects.

PHYSICAL ATTRIBUTES

Lifting and carrying up to 20 pounds of field equipment.
Stooping, kneeling, crawling, crouching, digging, and reaching to conduct field research.
Handling to mobilize and use field equipment.
Fingering computer keyboard and mouse.
Sitting at desk to prepare reports, technical publications, and in meetings.
Walking throughout undeveloped sites; particularly in wetlands/shallow water conditions.
Talking via telephone and in meetings to contractors, Department Staff, and others.
Hearing normal conversation for meetings and telephone conversations.
Near vision for reading computer screens, reports and technical documents.
Mid-range and Far vision for conducting field research and analysis.
Driving to and from research sites, meetings and training.

Attachment A2
Staff Environmental Scientist
Professional Level 1 –$60.00 per hour

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ECOLOGICAL TECHNOLOGIES DEPARTMENT
STAFF ENVIRONMENTAL SCIENTIST

JOB SUMMARY

A mid-level professional position responsible for independently conducting applied ecological research and/or managing District research facilities under the general supervision of senior District scientists and engineers to provide a sound scientific basis for evaluation of alternatives related to optimizing performance of the stormwater treatment areas, selection of alternative stormwater treatment technologies, and environmental enhancement and protection of the Everglades. Initiates and manages contracts for research and monitoring services. Has internal District and external customer contacts and represents the District to these groups. Provides consultation on environmental issues relevant to the District's mission and contributes to the development of practical solutions to these problems. Supervises Environmental Scientist (P1) level and scientific support personnel.

EMPLOYMENT GUIDELINES

EDUCATION: B.S. or B.A. degree in environmental or ecological science, biology, zoology, botany, or other related areas.

EXPERIENCE: Four (4) to seven (7) years of progressively responsible research experience in aquatic ecology.

OTHER: Valid Florida driver's license.

KNOWLEDGE, SKILLS AND ABILITIES

Knowledge of theoretical and applied aspects of aquatic ecology with emphasis in wetland, river, lake, or estuarine ecology. This knowledge can be acquired through formal academic training or experience in at least one of the following areas: limnology; wetland/lake ecology, hydrology or restoration; wetland/lake nutrient cycling dynamics; aquatic invertebrate communities; wetland/aquatic plant communities; fish communities; or aquatic biogeochemistry.

Skill in the use of state-of-the-art computer hardware and software for word processing, data analysis, and the presentation/publication of scientific information.

Knowledge of principles of project management, including contract management, and basic personnel supervision techniques. Demonstrable leadership capabilities required for supervision of District staff.

Ability to work collaboratively with District employees and externally with representatives of consulting and engineering firms, environmental advocacy and citizen groups, and government agencies.

Skill to assist in training colleagues in field of expertise

Knowledge of ecological sampling methods.

Ability to synthesize and present technical findings concisely and logically.

Skill in scientific writing for technical publications.

Ability to build and maintain effective interpersonal relationships with District staff and outside members of the scientific community and to contribute to the building of research teams.

DUTIES AND RESPONSIBILITIES

APPLIED ECOLOGICAL RESEARCH AND MONITORING PROGRAMS:

Assists senior District scientists and engineers in program planning by identifying environmental problems, developing scope of research, setting goals and objectives, and selecting scientific parameters and sampling techniques to provide definitive data.

Collects and analyzes biological and chemical samples and data using best available statistical and scientific techniques, makes scientific observations in the field, assesses relevant data from previous District programs and/or contractual sources. Maintains a current knowledge of relevant environmental issues. Coordinates work efforts with other District groups, outside consultants, government agencies, and industry, environmental or citizen advocacy groups.

Summarizes and reports research findings through technical publications, memoranda, and articles in the open scientific literature, either individually or in collaboration with other District staff and/or contractors.

Makes oral presentations to District staff and management, professional organizations, and governmental agencies to share information regarding water resources management and District research and monitoring programs.

RESEARCH AND MONITORING CONTRACTS:

In cooperation with senior District scientists and engineers, determines objectives for research and monitoring programs that are consistent with District mission and goals.

Assists senior District scientists and engineers in generating scopes of work for research and monitoring contracts.

Assists senior District scientists and engineers in evaluating research and contract proposals.

Monitors quality of work and compliance with scope-of-work requirements for District research and monitoring contracts; reviews reports or other deliverables; may authorize payment for services rendered.

Assists senior District scientists and engineers in integrating results of research and monitoring projects into action plans that meet District mission and goals.

PERFORMANCE MANAGEMENT FACTORS

Accountability: Shares accountability with senior District scientist and engineers for integrity of District's research and monitoring programs so that work products hold up under scrutiny of outside interests. Demonstrates vision in identification of ecological problems, needs, impacts, and tradeoffs. Demonstrates commitment to environmental research and ability to bring assigned projects to closure.

Ecological Knowledge: Demonstrates knowledge of wetland, river, estuarine, and lake ecosystems in general, and the Kissimmee, Okeechobee, and Everglades ecosystems in particular, as they relate to District research and monitoring programs. Communicates this knowledge in a manner that evokes trust and confidence of peers and lay persons.

Scientific Analysis: Efficiently and effectively analyzes scientific data using simple to advanced statistical analysis and other mathematical means, and current information from scientific literature. Uses state-of-the-art computer software and hardware. Demonstrates ability to integrate information obtained from the scientific literature and other District research and monitoring projects into analysis of current data.

Planning: Demonstrates effective planning skills and makes allowances for contingencies. Does not overlook variables affecting project, including funding, equipment, and human resources.

Technical Papers: Assists senior District scientists and engineers in the production of technical memoranda and publications. Supports District staff by critically reviewing manuscripts, scopes of work, and other documents and providing constructive criticism.

Coordination: Effectively coordinates project work efforts, both internally and externally. Requests constructive criticism, respects judgement of others, solicits involvement, and takes initiative in team building.

Scientific Objectivity: Defines problems fully, accurately, and in an unbiased manner. Objectively compiles, interprets, and reports data.

Contract Management: Handles routine contract management, and displays initiative in dealing with contractors.

Interpersonal Relations: Is tactful, cooperative, and open minded. Develops rapport with others. Promotes interpersonal trust and respect. Willing participant and successful as a team worker. Encourages District-wide cooperation with research and monitoring programs. Respects the opinions, abilities, and contribution of others. Deals effectively with the organizational climate.

PHYSICAL DIMENSIONS

Extended independent work in the field, under hot, humid, wet conditions and in areas occupied by animals such as alligators and snakes, and stinging/biting insects.

Attachment A3
Senior Environmental Scientist
Professional Level 3 –$85.00 per hour

I. JOB SUMMARY

An advanced level professional position, responsible for all aspects of water quality and scientific environmental issues. The Senior Environmental Scientist (level 3) will assist the Lead person in all aspects of project management. The Senior person will make certain all of the District's desires are understood and to pose and discuss sampling nuances, project approach, schedule, and other project related matters.

II. EMPLOYMENT GUIDELINES

EDUCATION

Ph.D. or MS Degree in Environmental Science, Environmental Engineering or a related field is required.

EXPERIENCE

Four (4) to ten (10) years of qualifying experience in environmental science or engineering programs involving one or more of the requisite fields is required. Demonstrated leadership capabilities are also required.

LICENSES

State of Florida Drivers License.

KNOWLEDGE, SKILLS AND ABILITIES

(1) Knowledge of environmental science and engineering, including hydrology, water chemistry, soil and sediment characteristics, best management practices, and environmental engineering principles and practices. Comprehensive understanding of water quality, environmental chemistry, biology, environmental engineering, urban and agricultural Best Management Practices as they affect water quality, and environmental remediation technologies. Ability to independently assess site specific physical factors to predict how the alteration of these factors by proposed management and public works programs may affect and impact the Everglades Protection Area. Ability to effectively work within the limits of the District's regulatory programs while protecting the water resources of the District.

(2) Knowledge of program specific laws and regulations. Thorough understanding of environmental rule making and permitting criteria, statutory requirements of the Everglades Forever Act, the Non-ECP Permit, the Everglades Stormwater Program Regulatory Action Strategy, Rule 40e-63, and other District, State, and Federal rules, regulations, and permits that may impact the mission of the Everglades Stormwater Program. Ability to independently analyze plans, management practices, and public works and apply criteria on a project specific basis and discuss relevant aspects with regulated interests.

(3) Communication. Ability to communicate effectively and with credibility to subordinates, superiors, engineers, attorneys, and the regulated public. Ability to clearly and concisely convey District rules, criteria, and procedural issues. Ability to prepare written communications without need for corrections or editing. Ability to represent the District's environmental regulatory program in high profile situations and public speaking opportunities.

(4) Ability to exercise independent judgment and accept responsibility for decisions. Demonstrated ability to make effective decisions on regulatory matters. Ability to accept responsibility for decisions. Ability to represent the Department in a variety of environmental regulatory issues in both public and legal forum.

(5) Ability to schedule work activities and manage time to meet deadlines. Demonstrated ability to manage multiple priorities/projects and deadlines. Skill in planning, delegating and implementing work activities to achieve organizational goals and objectives as well as project deadlines.

Attachment A4
Lead Engineer
Professional Level 4 –$100.00 per hour

I. JOB SUMMARY

A highly advanced level professional position, responsible for all aspects of water quality and scientific environmental issues. The Lead Engineer (level 4) is the person within QORE who is ultimately responsible for the project. He or she has the authority to commit the resources, both inside and outside QORE, to ensure that the project is completed within the authorized budget and schedule. The Lead person will make certain all of the District's desires are understood and to pose and discuss sampling nuances, project approach, schedule, and other project related matters.

II. EMPLOYMENT GUIDELINES

EDUCATION

M.S. / M.A. degree in Chemistry, Biology, Environmental Science, Environmental Engineering or a related field is required. A Ph. D. degree in one of those fields and/or registration as a Professional Engineer in Environmental or Civil Engineering or a related engineering discipline is preferred.

EXPERIENCE

At least 10 years of qualifying experience in environmental science or engineering programs involving one or more of the requisite fields is required. Demonstrated leadership capabilities are also required.

LICENSES

State of Florida Drivers License.

KNOWLEDGE, SKILLS AND ABILITIES

(1) Knowledge of environmental science and engineering, including hydrology, water chemistry, soil and sediment characteristics, best management practices, and environmental engineering principles and practices. Comprehensive understanding of water quality, environmental chemistry, biology, environmental engineering, urban and agricultural Best Management Practices as they affect water quality, and environmental remediation technologies. Ability to independently assess site specific physical factors to predict how the alteration of these factors by proposed management and public works programs may affect and impact the Everglades Protection Area. Ability to effectively work within the limits of the District's regulatory programs while protecting the water resources of the District.

(2) Knowledge of program specific laws and regulations. Thorough understanding of environmental rule making and permitting criteria, statutory requirements of the Everglades Forever Act, the Non-ECP Permit, the Everglades Stormwater Program Regulatory Action Strategy, Rule 40e-63, and other District, State, and Federal rules, regulations, and permits that may impact the mission of the Everglades Stormwater Program. Ability to independently analyze plans,

management practices, and public works and apply criteria on a project specific basis and discuss relevant aspects with regulated interests.

(3) Communication. Ability to communicate effectively and with credibility to subordinates, superiors, engineers, attorneys, and the regulated public. Ability to clearly and concisely convey District rules, criteria, and procedural issues. Ability to prepare written communications without need for corrections or editing. Ability to represent the District's environmental regulatory program in high profile situations and public speaking opportunities.

(4) Ability to exercise independent judgment and accept responsibility for decisions. Demonstrated ability to make effective decisions on regulatory matters. Ability to accept responsibility for decisions. Ability to represent the Department in a variety of environmental regulatory issues in both public and legal forum.

(5) Ability to schedule work activities and manage time to meet deadlines. Demonstrated ability to manage multiple priorities/projects and deadlines. Skill in planning, delegating and implementing work activities to achieve organizational goals and objectives as well as project deadlines.