A.1 Title and Approval Page

Site-Specific Quality Assurance Project Plan - Addendum 2A for Brownfields Environmental Services Groundwater Sampling, Remediation and Monitoring 2401 Broadway, West Palm Beach, Florida (Northwood Anchor Site)

Conducted Under EPA Brownfields Cooperative Agreement # BF-00D12713-0

This document and work performed under this Site-Specific QAPP is prepared in accordance with the EPA Region 4 Brownfields Program and the Generic QAPP document for Palm Beach County, approved on March 27, 2014

Prepared for:

Palm Beach County
100 Australian Avenue, Suite 500
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February 23, 2016

Prepared by:

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Title	Name	Signature / Date
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Terracon Project Manager	Andrew Petric, PG	02/23/2016
Cardno Project Managers	Miles Ballogg & Terry Griffin, PG	02/23/2016
Terracon Quality Assurance/Quality Control (QA/QC) Officer	Eric Krebill, PG	/FOR 02/23/2016
Cardno QA/QC Officer and Technical Director	Richard Hagberg, PG	02/23/2016
US EPA Project Manager/Officer	Margaret Olson	
US EPA Designated Approving Official		Date:_____

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LIST OF ATTACHMENTS:

A3. DISTRIBUTION LIST

The following individuals will receive copies of the approved Site-Specific Quality Assurance Project Plan (QAPP) and any subsequent revisions:

- **Margaret Olson**, B**rownfields Project Officer and Coordinator, United States Environmental Protection Agency (EPA)** Region 4 – Sam Nunn Atlanta Federal Center, 61 Forsyth St. S.W., Atlanta, GA 30303; Phone: (404) 562-8601; Email: Olson.Margaret@epamail.epa.gov
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- **Art Torvella, PE, Brownfields Coordinator, Southeast District, Florida Department of Environmental Protection (FDEP)**, 400 N. Congress Avenue, Suite 200, West Palm Beach, FL 33401-2913; Phone: (561) 681-6676; Email: art.torvela@dep.state.fl.us
- **Pamela Shore, President/Quality Assurance Officer, Palm Beach Environmental Laboratories, Inc. (PBEL)**, 1550 Latham Road, Suite #2, West Palm Beach, FL 33409; Phone: (561) 689-6701; Fax: (561) 689-6702; Email: pams@palmbeachlabs.net
- **Eric Krebill, PG, Quality Assurance/Quality Control (QA/QC) Officer, Terracon Consulting, Inc.**, 1675 Lee Road, Winter Park, Tampa, FL 32789; Phone: (407) 618-8358; Fax: (407) 740-6112; Email: eric.krebill@terracon.com

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- **Randall Murphy, Field Team Leader, Terracon Consulting, Inc.,** 1225 Omar Road, West Palm Beach, FL 33405; Phone: (561) 494-7013; Fax: (561) 689-5955; Email: rmurphy@terracon.com

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- **Dana Kress, Field Team Leader, Cardno**, 380 Park Place Blvd, Suite 300, Clearwater, FL 33759; Phone: (727) 531-3505; Fax: (727) 431-1777; Email: Dana.Kress@Cardno.com

A4. PROJECT/TASK ORGANIZATION

A checklist of the required content and references and locations within this document is provided in **Attachment A**. The Quality Assurance Project Organization Chart is included as **Attachment B**. The individuals participating in the project and their specific roles and responsibilities are provided below:

- **Margaret Olson, EPA Region 4 Brownfields Project Officer/Manager** – The EPA Project Officer/Manager has the responsibility to oversee and monitor the grant. As part of that responsibility he must ensure the process described in the work plan is followed and the terms and conditions of the grant are met.
- **EPA Region 4 Brownfields Designated Approving Official (DAO)** – The Brownfields Region 4 Quality Assurance Manager's Designated Approving Official (DAO) provides a technical assistance role to the Region 4 Project Officer/Manager working on Brownfields sites. The DAOs role is to provide technical reviews of the Generic QAPPs, Site Specific QAPP Addendum and Addenda that are generated. This includes the approval of the Generic QAPP and Site Specific QAPP Addendum and Addenda QAPPs, respectively and any revisions.
- **Art Torvela, Brownfields Coordinator, Southeast District FDEP** – This individual will receive a copy of remedial action plan(s), operation and monitoring reports and active/post active groundwater monitoring reports and will receive a copy of the Quality Assurance documents for site/properties that are entered into the State Brownfields Program. This individual will also ensure applicable reports and plans are in compliance with current FDEP rules and regulations and approve as necessary.
- **Eric Krebill, PG, QA/QC Officer, Terracon or Richard Hagberg, PG, QA/QC Officer/Technical Director, Cardno, Inc.** – The QA/QC officer will remain independent of the groups responsible for data generation and will provide QA/QC technical assistance to the applicable Project Manager. The QA/QC officer will also be responsible for final internal review and approval of the Generic and Site-Specific QAPP documents, internal QA audits and QC implementation of the Brownfields projects. The QA/QC officer will report audit results to the Project Manager(s) and review all implemented corrective actions.
- **Andrew Petric, PG, Project Manager, Terracon or Miles Ballogg/Terry Griffin PG, Project Managers, Cardno, Inc.** – The Project Manager(s) will be the primary decision maker for the remedial/ monitoring work and primary user of the data to determine whether or not further action is required at a project site. He will also coordinate the activities for site remediation/monitoring and his specific responsibilities include the following:

1. Approving the Generic QAPP and subsequent revisions in terms of Brownfields specific requirements; distribution of the Generic QAPP document to the Field Team Leader and members of the project team.
2. Overall responsibility of the remediation/monitoring.
3. Coordinating field and laboratory activities.
4. Conducting project activities in accordance with the QAPP and work order.
5. Validating field data (with assistance from QA/QC Officers and Field Leaders).
6. Reporting to the FDEP Brownfields Coordinator and PBC's Brownfields Coordinator (County) regarding the project status per the work order and preparing interim and final reports to FDEP and the County.
7. Making final project decisions subject to approval of Greg Vaday, PBC's Project Coordinator, to commit the necessary resources to conduct the project.
8. Instituting corrective actions for problems encountered during remediation/monitoring and field sampling activities.
9. Communicating corrective actions to the Field Team Leader to remedy problems encountered in the field and coordinate with the Lab Director to correct any corresponding problems encountered in the chemical analyses.
10. Compiling documentation detailing any corrective actions and provide them to the QA/QC Officer, FDEP Brownfields Coordinator, and County's Brownfields Coordinator.

- **Randall Murphy/Dana Kress, Field Team Leaders, Terracon/Cardno** - The Field Team Leader will perform the following duties:
  1. Select the field sampling team and discuss project details with the Project Manager.
  2. Conduct the field activities per the approved QAPP documents and supervise the field sampling team.
  3. Upon receipt from the Project Manager, distribute the approved QAPP documents and subsequent revisions to the members of the field sampling team.
  4. Report problems in the field to the Project Manager.
  5. Implement corrective actions in the field as directed by the Project Manager. Corrective actions will be documented in the field logs and provided to the Project Manager.
- **Field Team Technicians; Terracon/Cardno Staff** – These individuals will perform the actual fieldwork per the QAPP documents and at the direction of the Field Team Leader. The field team typically consists of two (2) to four (4) people and will be named at a later date by the Field Team Leader.
- **Palm Beach Environmental Laboratories, Inc.'s President/QA Officer, Pamela Shore** – This individual will be responsible for coordinating the analysis of the samples and laboratory validation of the data. She will coordinate the receipt of the samples at the laboratory, select the analytical team, ensure internal laboratory audits are conducted per the Laboratory's Quality Manual (QM) and distribute the applicable sections of the Generic QAPP and subsequent revisions to members of the analytical team. She is responsible for instituting corrective actions for problems encountered in the chemical analyses and will also

report laboratory problems affecting the project data to the Project Manager and QA/QC officer. Corrective actions for chemical analyses will be detailed in a QA report that will be provided to the Project Manager via electronic and/or conventional mail.

A5. PROBLEM DEFINITION/BACKGROUND

Palm Beach County (County) has received a U.S. EPA Brownfields Revolving Loan Fund for the cleanup of eligible properties within areas that may ultimately be designated for Brownfields redevelopment.

For reporting purposes, the subject site is being identified as "2401 Broadway," the "Northwood Anchor Site," and/or the "Site" and consists of approximately 0.3 acres of land with a property use code of "municipal". The Site has a Palm Beach County Parcel ID number of 74-43-43-09-05-049-0070 and is located in an area of West Palm Beach, Florida known as "Northwood." The current owner is the West Palm Beach Community Redevelopment Agency (CRA). The site location and general boundaries are depicted in **Figures 1** and **2**, respectively; and surrounding land uses are depicted on **Figure 3** in **Attachment C**.

Recently, the Brownfields Cleanup RLF team (including representatives of Palm Beach County and their consulting team Terracon/Cardno) have determined to move forward with an updated assessment as a precursor to site remediation to encourage redevelopment of the parcel during the terms of this Cooperative Agreement.

Cardno (a/k/a Cardno TBE and TBE Group during portions of previous assessments) conducted environmental assessment activities throughout the multi-block Northwood Redevelopment Area/Northwood Anchor Site property in West Palm Beach, Florida; on behalf of the Treasure Coast Regional Planning Council (TCRPC). Based on this investigation, environmental impacts were confirmed at the 2401 N. Broadway site (Site) near the southern end of this study area. As a result, a Combined Brownfields Site Assessment Report and Remedial Action Plan (BSAR/RAP) was submitted for this former retail gas facility site in February 2009 and a Remedial Action Plan Approval Order was ultimately provided by FDEP on April 12, 2011; after two requests for additional information.

Subsequent to BSAR/RAP approval, the City of West Palm Beach (City) began demolition of several derelict buildings throughout the broader Northwood study area, including the demolition of the former 2401 Broadway gas station building (note – the former petroleum storage tanks were reportedly removed from the site in April 1990). Additionally, the cleared site was used by the City for an extended period as a staging area for building materials and equipment, in support of major buried utility upgrades throughout the Northwood area. Financial arrangements and project lead responsibility for site remediation have remained under negotiation for this parcel between a group of stakeholders (TCRPC, CRA, and County). This negotiation has remained dynamic as a developer for this property has not been specifically identified and (as a result) the end development plans for the property have not been fully determined. Based on these factors, no additional site assessment or remediation work was performed at the site since RAP approval in April 2011.

Based on the amount of time that passed with no remedial actions, Cardno was retained to re-sample all existing monitor wells and to provide a supplemental Site Assessment Report that summarized the current site conditions. Additionally, Cardno was requested to refine the Analysis of Brownfield Cleanup Alternatives (ABCA)/RAP document, if required based on the

assessment results from March 2014. Petroleum impacts were notably higher in groundwater in 2014 than in 2008, presumably due to the removal of all pavement from the site and the subsequent infiltration of rainwater through the vadose zone. Based on the increases in constituent of concern (COC) concentrations, and on a directive from stakeholders to achieve site closure in the shortest time practical, the remediation strategy was shifted from in-situ bioremediation to air sparge and soil vapor extraction (AS/SVE). The Supplemental Assessment and ABCA Report (Cardno, May 2014) included a summary of the updated groundwater assessment results, as well as a modified proposal for AS/SVE remediation. The May 2014 Remedial Action Plan Addendum was subsequently approved by FDEP on September 4, 2014.

Palm Beach County received an EPA Brownfields Cleanup Revolving Loan Fund (RLF) grant in 2013. As a result, the funding of this project has been transferred from TCRPC to Palm Beach County to be funded under this Cooperative Agreement.

A6. PROJECT/TASK DESCRIPTION AND SCHEDULE

The scope of work for this project will include pre-remediation confirmatory sampling, ABCA/RAP preparation (cleanup planning) and remedial implementation which will involve Air Sparge and Soil Vapor Extraction (AS/SVE). This Site-Specific QAPP Addendum focuses on pre-remediation confirmatory sampling, active remediation monitoring sampling and analysis and post active remediation groundwater monitoring.

A6.1 Pre-Remediation Confirmatory Sampling

The objective of the pre-remediation sampling is to confirm the extent of petroleum impacts to groundwater and current concentrations of petroleum compounds in groundwater (most recently data is nearly two years old - from March 2014) so that appropriate remedial system design can be conducted.

Based on the findings of the previous assessment, contaminants of concern (COCs) within the following analytical method categories have been identified for confirmatory sampling:

- Volatile organic compounds
- Polynuclear aromatic hydrocarbons
- Total recoverable petroleum hydrocarbons

In addition to laboratory analysis of groundwater samples (critical determinations), non-critical determinations of pH temperature, conductivity, dissolved oxygen, turbidity of groundwater and general visual observations will also be collected to aid in the decision making process.

For this project, FDEP Chapter 62-777, Florida Administrative Code (FAC) Table I Groundwater Cleanup Target Levels (GCTLs) will apply.

FDEP Chapter 62-777, FAC Table V, Natural Attenuation Default Concentrations (NADCs) are provided as a reference for situations where contaminants are found above GCTLs; however, the GCTL regulatory limits will be used for comparison to laboratory analytical data to determine the extent of contaminants present. Tables I and V were provided in the Generic QAPP and can also be found here:

Table I: http://www.dep.state.fl.us/legal/Rules/waste/62-777/62-777_TableI_GroundwaterCTLs.pdf

Table V: http://www.dep.state.fl.us/waste/quick_topics/rules/documents/62-777/62-777_TableV_NaturalAttenuationDefaultConcs.pdf

The following scope of work has been developed based on previous assessments:

A6.1.1 Confirmatory Groundwater Sampling: Up to three shallow groundwater monitoring wells (approximately 18 feet deep) will be installed at the site using direct-push drilling methods. Specifically, two monitoring wells will be installed at the northern periphery and one at the south periphery of the suspected dissolved hydrocarbon plume. **Figure 4, Attachment C** depicts the general location of the dissolved-phase plume and the proposed monitor well locations.

Groundwater samples will be collected from the three newly-installed monitor wells and up to six existing monitor wells (TBE-3W, TBE-7R, TBE-4W, TBE-6DW, MW-B4 and TBE-5W) in accordance with FDEP SOP 001/01 (provided in Generic QAPP). On-site field measurements of pH, temperature, conductivity, dissolved oxygen, turbidity, color, odor, and sample collection times will be recorded on groundwater sampling logs; which will in turn be included in the project deliverable.

Water level measurements will be collected from all accessible on-site groundwater monitor wells. The depth to water elevation data will be used to complete water table elevation contour and flow diagrams (data permitting).

- Special personnel requirement: Environmental Technician
- Special equipment requirements: Survey equipment, FDOT-approved 55-gallon drum.

A6.1.2 Laboratory Analytical Program: The groundwater samples collected as part of the sampling event will be transported to the selected subcontracted FDOH-certified and NELAC-compliant analytical laboratory for standard 5 to 7-business day turnaround for the following parameters:

- Volatile organic compounds (VOC) by EPA Method 8260
- Polynuclear aromatic hydrocarbons (PAH) by EPA Method 8270
- Total recoverable petroleum hydrocarbons (TRPH) by the FL-PRO Method

A6.1.3 Investigation Derived Waste (IDW): It is not anticipated that drill cuttings will be generated during monitoring well installation. Impacted groundwater resulting from well development/purging will be stored on-site within FDOT-approved 55-gallon drums. The contents of the drums will be disposed of at such time that one or more drums are full of water. The drummed water may require sampling and analysis by an accredited laboratory and will be appropriately disposed of based on the analytical results. Specifically, the development water may be analyzed for VOC by EPA Method 8260, semi-volatiles by EPA Method 8270, TRPH by FL-PRO Method, and RCRA 8 metals by EPA Method 6010 (mercury by EPA Method 7470), if required based on initial analytical results.

- Special personnel requirements: Environmental Technician
- Special equipment requirements: none

A6.2 Remediation Implementation

Based on previous assessment data and evaluation of remedial alternatives, remedial implementation will involve AS/SVE. AS/SVE will involve the injection of air within the affected aquifer to facilitate volatilization of dissolved hydrocarbons and a transfer of the volatile compounds from the phreatic zone to the vadose zone in a gaseous form. Once in the vadose zone soils, the soil vapors will be captured using the SVE system. The captured vapors will then be treated by way of granular activated carbon (GAC) to ensure that organic vapor emissions do not exceed established emission standards.

The following tasks will be conducted in association with remediation:

A) System Design and Permitting: System design will include providing detailed, scaled, drawings of the AS/SVE remediation system that was conceptually approved by the FDEP in the ABCA. The specifications of equipment and materials to be utilized will be designed upon receipt of approval to proceed. The construction drawings will be of sufficient detail as to materials and methods of construction to serve as project construction drawings, and to provide for fair and competitive bids from contractors. Typical construction drawings will include: cover page, site vicinity map, remedial system compound layout, AS well and SVE well details, piping layout, piping trench cross-section, piping and instrumentation diagram (P&ID), electrical controls diagram and equipment pad layout. Pilot testing is not anticipated to be conducted in advance of system installation. The system will be evaluated upon installation and adjustments to the system, if necessary, will be made at that time.

B) Contractor Bids: Bid specification packages will be prepared and distributed to obtain price quotes from three pre-qualified remedial contractors for installation and start-up of the AS/SVE system. Contractor quotes will be evaluated as part of contractor selection.

C) Remediation System Construction:

- Obtain applicable permits from the City of West Palm Beach to place the equipment, and from the Florida Department of Transportation (if required) to access the right-of-way area abutting the property along the north side of Northwood Road.
- Install vertical air sparge wells AS-1 through AS-9 and 30-degree-inclined air sparge wells AS-10, AS-11 and AS-12 at locations shown within the ABCA. It is anticipated that the AS wells will be installed to a depth of approximately 25 feet below ground surface (bgs) and constructed of 1-inch diameter Schedule 40 polyvinylchloride (PVC) with a 2-feet of 0.01-inch machine slotted well screen at the deepest portion of the well, extending from approximately 23 to 25 feet bgs.
- Install vertical SVE wells SVE-1 through SVE-20 at the locations shown within the ABCA. The design in the ABCA states that the SVE wells are to be constructed of 2-inch diameter Schedule 40 PVC with a 0.02-inch machine slotted well screen from approximately 5 to 10 feet bgs, but screen lengths may be extended depending on system design.
- Fit the wells and/or piping sections with valves, gauges and sample ports, as needed, to measure, track, and control system operations. Manholes will be installed to access well heads.

- The ABCA indicates that the AS and SVE wells will have a lateral spacing of 15 feet which will be confirmed and revised, if needed, during system design. The design presented is anticipated to have an overlapping zone of influence of each well.
- Provide temporary fencing around site boundaries during construction.
- Excavate trenching approximately 24 to 30 inches wide and 24 inches deep to install individual piping from the equipment compound (or trailer) to each AS and SVE wellhead. Piping for each system will be manifolded at the equipment compound. The piping manifold will be equipped with valves to adjust flow rates, ports to collect vapor samples, and vacuum gauges to measure vacuum pressure. Provide piping and valve connections at wellheads. Native soils will be used to fill the trenches, and excess soils will be properly disposed. Cover will include an approximately 8 to 10-inch layer of limerock compacted to 95% of a modified proctor verified by density testing. A 4-inch thick layer of concrete will be placed at surface in the trenches of in the sidewalk of the Northwood Road right-of-way. Surfacing for other trenches was not specified in the ABCA but will be evaluated after the system is installed for potential short circuiting of vacuum.
- As an option, excess soils and cuttings from trenching and well installation may be placed in a roll-off type container (covered with visqueen), characterized and disposed of at a licensed landfill. For budgeting purposes we have assumed that 10 cubic yards of impacted soil may require disposal.
- The ABCA did not specify specific types of equipment or motor sizes for the remedial equipment. The remedial system will be incorporated into a treatment system that includes the following typical components:
  - Air compressor (60 acfm)
  - Vacuum blower (40 acfm)
  - Piping manifold for 20 vacuum extraction points and 12 air sparging points
  - Control panel
  - Knockout tank
  - Emissions control (method unspecified; cost unspecified- final design will be affected by flowrate of vacuum system) – Costs based on estimate to utilize 16 drums containing 250 lbs of carbon over a period of 2-months)
- Establish a new electrical service and connection for equipment in the compound (or trailer), and establish a service account with a local electric company to pay monthly bills when the system is operational.
- Establish a telephone service to pay monthly bills for the remedial equipment telemetry.
- Place equipment trailer and piping manifold on site. Secure unit (possibly via fencing).

D) Remediation System Startup: Perform one week of remedial equipment startup testing in accordance with the manufacturer's recommendations. The tasks associated with equipment startup are as follows:

- On a daily basis, measure pressure and flow rate and adjust to verify the SVE vacuum radius of influence meets or exceeds the AS radius of influence. Adjustments will be made to maximize system performance.
- Monitor the treatment compound/trailer area with an explosimeter on a daily basis.
- On a daily basis, collect SVE effluent vapor samples for analysis of Volatile Organic Compounds (VOC) by EPA Method 18.
- As-built drawings of the remediation system, certified by a registered professional engineer, will be provided within six weeks of system start-up. Copies of the manufacturer's warranty and maintenance schedule will be included with the as-built drawings. A start-up report will be provided with the as-built drawings.

E) Operation & Maintenance:

- Conduct monthly site visits to perform necessary maintenance of the treatment system components according to the manufacturer's specifications, monitor system components, make adjustments to maximize operation, and collect air emission samples for laboratory analysis for discharge from the SVE System required samples for laboratory analysis for VOC by EPA Method 18. Note, for the first three weeks of system operation, it will be necessary to conduct weekly site visits including weekly collection of air emission samples to ensure emission standards are not exceeded. Operation of the remedial system is estimated to be 18 months.
- Prepare quarterly remediation status reports providing discussion of remediation monitoring data and sampling data and site map displays. An annual report will be provided after the fourth quarter event that summarizes the site conditions and system performance.
- Telemetry will allow remote system monitoring and resolution of minor problems. In the event of an alarm or shutdown condition, Terracon or Cardno will respond within 48 hours.

A6.3 Active Remediation Monitoring Sampling and Analysis

The anticipated monitoring plan will consist of the following:

- Collection of air emission samples for laboratory analysis for discharge from the SVE System required samples for laboratory analysis for VOC by EPA Method 18. For the first several weeks of system operation, it will be necessary to conduct weekly collection of air emission samples to ensure emission standards are not exceeded. Thereafter, it is expected that monthly air emissions sampling will be conducted. During remedial system start-up, daily air emissions sampling will be conducted.
- Quarterly groundwater collection from key monitor wells (including several of the following monitoring wells: MW-B3, MW-B4, TBE-3W, TBE-4W, TBE-5W, TBE-6DW, TBE-7, TBE-8 and three new monitoring wells, specific monitoring wells to be determined at a later time) per the groundwater sampling methodology discussed in Section A6.1.2.
- Water level measurements will be collected from all site monitor wells. The depth to water elevation data will be used to complete water table elevation contour and flow diagrams (data permitting).

- Submittal of groundwater samples to an accredited laboratory for analysis of VOA, PAH, and TRPH (per EPA Methods previously identified).
- Special personnel requirement: Environmental Technician
- Special equipment requirements: Survey equipment, FDOT-approved 55-gallon drum.

A6.4 Post-Active Remediation Groundwater Monitoring

The anticipated monitoring plan will consist of the following:

- Quarterly groundwater collection from key monitor wells (including several of the following monitoring wells: MW-B3, MW-B4, TBE-3W, TBE-4W, TBE-5W, TBE-6DW, TBE-7, TBE-8 and three new monitoring wells, specific monitoring wells to be determined at a later time) per the groundwater sampling methodology discussed in Section A6.1.2.
- Water level measurements will be collected from all site monitor wells. The depth to water elevation data will be used to complete water table elevation contour and flow diagrams (data permitting).
- Submittal of groundwater samples to an accredited laboratory for analysis of VOA, PAH, and TRPH (per EPA Methods previously identified).
- Special personnel requirement: Environmental Technician
- Special equipment requirements: Survey equipment, FDOT-approved 55-gallon drum.

A6.5 Schedule

Field activities will begin shortly after approval of the Site-Specific QAPP Addendum by EPA and the County's Brownfields Coordinator. Due to the multi-phase scope presented in A6.1.1 through A6.4, a date-specific schedule would not be practical at this time.

A7. SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

Laboratory QAM and all other training requirements and certifications were provided in the Generic QAPP.

A8. DOCUMENTS AND RECORDS

All information was provided in the Generic QAPP document.

B1. SAMPLING DESIGN PROCESS

The proposed project scope will confirm/quantify prior groundwater quality findings and allow for detailed treatment planning. The sample collection design is such that a homogeneous area (decision unit) derived by professional judgment, will be tested and evaluated.

Sample design is determined from the previous assessment findings and areas of environmental concern are sampled based on constituents known or perceived to be present on the subject site.

The field staff will be provided a copy of this plan for reference in the field. The following subsections will discuss the sampling procedure to be used for water.

B1.1 Water Samples (Critical)

An area of concern or documented area of COC-impacted groundwater will be considered one decision unit, confined to the proposed sample collection location. Groundwater samples will be collected per DEP SOP 001/01; specifically sections FS-1000 and FS-2200.

Care will be taken to minimize agitation and aeration of the water samples during collection. Samples sent to the laboratory for analysis will be properly preserved, labeled, logged onto chain-of-custody forms, and placed in an iced cooler for shipment, as necessary. The analyses to be included in this study are summarized in previous sections of this document.

B1.2 Non-Critical Determinations

Several non-critical determinations will be made in the field for the groundwater samples. Non-critical determinations for groundwater samples will include water quality characteristics (pH, temperature, conductivity, dissolved oxygen, turbidity, color, and odor). This information will be used to supplement the critical data; it is not typically needed to make the decision of whether or not remediation is needed.

B2. SAMPLING AND ANALYTICAL METHODS REQUIREMENTS

Table 1.0 (**Attachment D**), Sample Containers, Preservations, & Holding Times provides analytical methods, container requirements, holding times, and sample volume requirements. All other information is provided in the Generic QAPP.

B3. SAMPLE HANDLING AND CUSTODY REQUIREMENTS

All information pertaining to sample handling and custody requirements is provided in the Generic QAPP Document.

B4. ANALYTICAL METHODS AND REQUIREMENTS

Analytical methods are provided in Table 1.0 and are presented in Section A6 of this document. All other analytical information is provided in the Generic QAPP document.

B5. FIELD QUALITY CONTROL REQUIREMENTS

This information is provided in the Generic QAPP document.

B6. LABORATORY QUALITY CONTROL REQUIREMENTS

This information is provided in the Generic QAPP document.

B7. FIELD EQUIPMENT AND CORRECTIVE ACTION

This information is provided in the Generic QAPP document.

B8. LAB EQUIPMENT AND CORRECTIVE ACTION

This information is provided in the Generic QAPP document.

B9. ANALYTICAL SENSITIVITY AND PROJECT CRITERIA

Method detection limits, sensitivity criteria, and reporting limits for each analytical method are provided in Table 2.0, included in **Attachment D**.

B10. DATA MANAGEMENT AND DOCUMENTS

All records and reports, including any review comments and checklist from the USEPA Region 4 Designated Approving Official can be found in the electronic or physical project file located at Terracon, 1225 Omar Road, West Palm Beach, FL 33405. The project file will eventually be archived for a period up to five years. Any deviations from these procedures will be documented in the project file and approved by the QA/QC Officer before implementation.

Field data worksheets, the laboratory QAM, and other information were provided in the Generic QAPP.

C1. ASSESSMENT AND RESPONSE ACTIONS

This information was provided in the Generic QAPP document.

C2. PROJECT REPORTS

This information was provided in the Generic QAPP document.

D1. FIELD DATA EVALUATION

This information was provided in the Generic QAPP document.

D2. LABORATORY DATA EVALUATION

J	Estimated value may not be accurate. Use of this code requires justification for its use and is used in the following situations: 1. Exceedance of surrogate recovery limits. 2. Existence of no quality control criteria for a component 3. Failure to meet established precision and accuracy criteria. 4. Matrix interference. 5. Questionable data due to improper field or lab protocols. "J" values are exclusive and are not used in conjunction with other codes.

U	Indicates that a specific compound was analyzed for but not detected. The reported value shall be the laboratory method detection limit.
L	Off scale high and the actual value is known to be greater than the reported value. Used when the sample concentration of the analyte exceeds the linear range or highest calibration standard and the calibration curve is known to exhibit a negative deflection.
A	Value reported is the mean (average) of 2 or more determinations. This code is utilized if the results of 2 or more discrete and separate samples are averaged.
B	Results based upon colony counts outside the acceptable range. This code applies to microbiological tests, specifically to membrane filter colony counts, and is used only if the colony count is generated from a plate in which the total number of coliform colonies exceeds the method indicated ideal ranges.
H	Value is based on field kit determination and may be inaccurate. Used when field screening tests which are not recognized by DEP are employed to generate the reported value.
K	Indicates off scale low and the actual value is known to be less than the value listed. Used if the value is less than the lowest calibration curve and is known to be non-linear. Can also be used if the actual value is known to be less than the reported value based on the sample size or dilution.
M	To be used for chemical analysis: the presence of the analyte is verified but not quantified and the actual value is less than the value reported.
N	Presumptive evidence of presence of a compound. To be used when the compound has been determined by TIC (mass spectral library search) of if presence of the compound cannot be confirmed using alternate procedures.
Q	Indicates that the sample was prepared or analyzed after the holding time had expired.
T	Reported value is less than the laboratory method detection limit. The value is reported for informational purposes only and is not used in statistical analysis.
V	Indicates blank contamination (i.e. the compound was detected in the sample and the associated method blanks.)
Y	Laboratory analysis was performed on sample that was unpreserved or improperly preserved; therefore, the data may be inaccurate
Z	Too many colonies were present (TNTC)
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
?	Indicates that the data should not be used since some or all of the quality control data for the analyte fall outside the limits and the presence or absence of the analyte cannot be determined from the data.
*	Analysis was not performed due to interference.

D3. DATA USABILITY AND PROJECT VERIFICATION

The Laboratory Director will review and verify the laboratory data generated under their corrective action system for accuracy according to their applicable certifications and QAMP. Any problems identified during this process will be reported to the Project Manager in the analytical data report. The QA/QC Officer, along with the Project Manager, will validate laboratory data upon receipt of the analytical results.

References

1. U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*. EPA QA/G-4 240/B-06/001. February.
2. U.S. Environmental Protection Agency. 2002. *Guidance for Quality Assurance Project Plans*. EPA QA/G-5. EPA 240/R-02/009. December.
3. U.S. Environmental Protection Agency. 2006. *EPA Requirements for Quality Assurance Project Plans*. EPA QA/R-5. EPA 240/B/01/003. Reissued May.
4. U.S. Environmental Protection Agency. 2006. *Data Quality Assessment: Statistical Methods for Practitioners*. EPA QA/G-9S. EPA 240-B-06-003. February.
5. U.S. Environmental Protection Agency Region 4, Science and Ecosystem Support Division (SESD), Field Branches Quality System and Technical Procedures, http://www.epa.gov/region4/sesd/fbqstp/index.html.
6. USEPA Region 4, Brownfields Quality Assurance Project Plans (QAPPs) Interim Instructions, Generic QAPP and Site-Specific QAPP Addendum for Brownfield Site Assessments and/or Cleanup, Revision No. 3, July 2010.
7. Florida Department of Environmental Protection. Chapter 62-160 FAC. *Quality Assurance*. Effective February 23, 2012.
8. Florida Department of Environmental Protection. *Standard Operating Procedures of Field Activities*. DEP-SOP-001/01, March 31, 2008 (effective 12/3/08).
9. Florida Department of Environmental Protection. Chapter 62-777 F.A.C., Tables I, II, and V.

List of Abbreviations

ASTM:	American Society for Testing and Materials
BLS:	Below Land Surface
BSA:	Brownfields Site Assessment
BSRA:	Brownfields Site Rehabilitation Agreement
BTEX:	Benzene, Toluene, Ethylbenzene, and Total Xylenes
CD:	Compact Disc
COC:	Contaminants of Concern
CTL:	Cleanup Target Levels
DAO:	Designated Approving Official
DPT:	Direct Push Technology
DQO:	Data Quality Objective
EDB:	1,2- Dibromoethane
ESA:	Environnemental Site Assessment
FDEP:	Florida Department of Environmental Protection
FID:	Flame Ionization Detector
GCTLs:	Groundwater Cleanup Target Levels
GIS:	Geographic Information Systems
HAZWOPER:	Hazardous Waste Operations
ID:	Identification
KAG:	Kerosene Analytical Group
L:	Liter
LL PAHs:	Low Level Polycyclic Aromatic Hydrocarbons
MDLs:	Method Detection Limits
mL:	Milliliter
MTBE:	Methyl tert-butyl ether
MW:	Monitor Well
NELAC:	National Environmental Laboratory Accreditation Conference
OSHA:	Occupational Safety and Health Administration
OVA:	Organic Vapor Analyzer
PAHs:	Polynuclear Aromatic Hydrocarbons
PQLs:	Practical Quantification Limits
QA:	Quality Assurance
QAM:	Quality Assurance Manual
QAPP:	Quality Assurance Project Plan
QC:	Quality Control
RCRA:	Resource and Conservation Recovery Act
SCTLs:	Soil Cleanup Target Levels
SPLP:	Synthetic Precipitate Leaching Procedures
SVOC:	Semi-volatile Organic Compounds
SOP:	Standard Operating Procedure
TCLP:	Toxicity Characteristics Leaching Procedure
TRPH:	Total Recoverable Petroleum Hydrocarbons
USC:	Unified Soil Classification
UST:	Underground Storage Tank
VOC:	Volatile Organic Compounds

Attachment A

Checklist

APPENDIX B

USEPA REGION 4 BROWNFIELDS SITE-SPECIFIC QAPP ADDENDUM

Note: Appendix B explains in detail the actual information that goes into each of the elements to create the Site-Specific QAPP Addendum. To ensure all elements have been properly addressed the QAPP developer/writer's organization must fill out Appendix B and send in with the Site-Specific QAPP Addendum to the EPA Region 4 Project Officer. You must indicate the page number, paragraph and line where each of the elements can be found. This process also helps EPA Region 4's Designated Approving Official (DAO) speed up the review and approval of the Generic QAPP. It also helps the QAPP developer/writer ensure accuracy and the necessary content is in the Generic QAPP.

Site-Specific Quality Assurance Project Plan - Addendum 2A
for Brownfields Environmental Services
Groundwater Sampling, Remediation and Monitoring
2401 Broadway, West Palm Beach, Florida
(Northwood Anchor Site)
Conducted Under EPA Brownfields Cooperative Agreement # BF-00D12713

Signature and Date: Palm Beach County, Terracon and Cardno: February 2016

Brownfields Site-Specific QAPP Elements and information/template for writer	Page and Line if applicable
A-1. Title and Approval Page Title of Site Specific QAPP (Including Project Title, Brownfields Grant #, date, and Revision #)	Page 1
Addenda (Plural of Addendum) sequence Number – see guidance	Page 1
Indicate the Addendum is prepared in accordance with EPA's Region 4 Brownfields Program; Identify the Addendum's Association with the approved Generic QAPP (including a complete reference to the Generic QAPP; Provide a statement that the work described will be performed in accordance with the processes described in the Generic QAPP.	Page 1
Organization's Name: Both the name of the organization preparing the QAPP and the organization conducting the project or the grantee's name.	Page 1
Dated Signature of Approving Officials (Names, Titles). Example: Project Manager (Both the originating organization's PM and EPA's corresponding PM and/or PO).	Page 1
Date and Signature of Quality Assurance Manager's approval for the originating entity and EPA Region 4's Designated Approving Official (DAO).	Page 1
Other Key Signatures as needed and/or requested on the project. Example: State	N/A

A-2. Table of Contents: Including Tables, Figures and Appendices Please provide a table of contents outlining all appropriate sections and appendices.	Page 2 and 3
A-3. Distribution List: Name, title/position, organization, and contact information (telephone & email), of all entities or agencies requiring copies of the Site Specific QAPP Should include all major individuals mentioned in the document – important for "controlled" document requirements.	Page 4
A-4. Project - Task Organization Please provide any modifications or additions. These modifications and additions should be tracked and incorporated into the Generic QAPP at the yearly update. NOTE: See Appendix A, Guidance for Generic QAPP for information on the concepts to be covered in this section.	Pages 5 and Page 6 (up to A5) No modifications
A-5. Problem Definition/Background. Provide sufficient background information from a historic, scientific, and/or regulatory perspective to establish the current understanding of the site. Identify the current property owner and the proposed future reuse/development plans for the property;	Pages 6-7 Page 6, 2nd Paragraph of A5 Page 6, 3rd Paragraph of A5 (redevelopment is being encouraged)
Describe pertinent historical and current uses of the property, as well as any uses of adjacent properties, that may be impacting the site;	Pages 6 and 7, Paragraphs 4 – 6 of A5
Discuss known or likely chemicals/contaminants of concern. Whenever possible identify specific primary contaminants of concern (i.e., lead as opposed to just metals), and if historical data is available, indicate where known contamination is present and its magnitude relative to criteria/standards (i.e., just above, just below, 5-times above, etc.);	Included in A6.1 (Page 7)
Describe the findings of previous investigations and how/whether data will be used in this assessment or cleanup (this is particularly relevant for a cleanup QAPP);	Pages 6 and 7, Paragraphs 4 – 6 of A5

Present the current understanding of the conceptual site model (C SM) for the project, and indicate how contamination may be acting in the environment. Identify the size of the property, pertinent understanding of site hydrology and geology (include known or presumed groundwater flow direction, depth to groundwater, soil/overburden characteristics and depth to bedrock). Reference any important documents/reports used in development of the CSM;	n/a – Site lithology and hydrology data was presented in previous assessments and will be collected as part of the proposed confirmatory sampling (discussed in A6.1)
Provide a topographic map of area around the site, and a site map showing significant structures, terrain, previous sampling locations and relevant summary data, as appropriate to illustrate problem	See Figure 1 for topography map, Figure 2 for property boundaries, Figure 3 for surrounding land use and Figure 4 with summary data and proposed sampling locations (Attachment C)
Clearly state the problem(s) to be solved, decision(s) to be made, and outcome(s) to be achieved.	Page 7, Paragraph 1 of A6
A-6 Project/Task Description/timeline Provide an outline for the tasks to be performed and the principle use of the data obtained from each task;	Pages 7-12
Identify the media and parameters being sampled;	Pages 7 - 12
Identify the field measurements (PID, low flow parameters), field analytical testing [Immunoassy (IA) test kits, x-ray fluorescence (XFR) for metals, field GC, etc.], and off-site laboratory testing being performed;	Pages 7 – 12
Distinguish between the critical data which will drive decisions (i.e., specific analytes or compounds of concern), and non-critical data used for supporting purposes;	Page 13, Sections B1.1 and B1.2
Cite the specific regulatory standards or criteria that data will be compared against;	Page 13, Sections B1.1 and B1.2

Define important conditions under which data should be collected (e.g., storm event, seasonal, flow conditions, etc.).	N/A
Provide clear discussion on how project tasks relate to resolving problems/issues stated in background section (i.e., what is the task attempting to determine).	Page 12, 1st sentence of B1
Provide the projected timeline for key tasks in the project, including QAPP review and approval, field activities and sampling, laboratory results turnaround, and reporting activities to be completed. (Please allow 30 days for QAPP review and approval in your planning.)	n/a – see A6.5
A-7. Special Training Requirements and Special Certifications	Included in the Generic QAPP.
A-8. Documentation and Records	Included in the Generic QAPP
B-1. Sampling Process Design & Site Figures Provide the details and design elements behind the various sampling tasks to be performed. This section describes the logic and rationale (the "why") behind the design of the sampling program. Note, a thorough site reconnaissance should always be performed to conceptualize and nail down the design elements of the plan.	Pages 12-13, B1
Be specific as to the locations, numbers of samples, and analytical parameters for each task, including test pits, soil borings/monitoring wells, groundwater and surface water sampling, surface soil sampling, sediment sampling, soil vapor sampling, etc. Indicate the minimum sample quantities and/or analytical data points needed to meet completeness goals for the project;	Pages 7 - 12

Explain the thought process behind the layout of the sample locations. Discuss the design in terms of the purpose behind individual locations, as well as more globally in terms of 1) the purpose behind a set or series of samples in a particular area or location, and 2) how the sampling design addresses the whole site;	The sampling plan addresses documented impacts.
Discuss any out of the ordinary communication/instructions that needs to take place between the field contractor and the laboratory to address special methods, matrices, particular samples, etc.;	N/A
When the sampling locations, sampling depths and/or choice of analytical parameters can not be predetermined, document the decision logic or input that will be used in the field to make those determinations (i.e., describe the dynamic sampling strategies) and explain how the process will be documented and reported.	N/A
B-2. Sampling & Analytical Method Requirements Include a detailed sample summary table that clarifies and reflects the sampling design in the text. Note, if a defined field analytical program is part of the sampling design, please include that information in the summary table. The table (or tables) can be of your own design, but they need to include: Sample matrix (e.g., soil, sediment, groundwater, etc.); Parameter (e.g., VOCs, PCBs, 13 priority pollutant metals, etc.); The number of field samples to be collected for that matrix/parameter, and number of each type of field QC sample to be collected with that matrix/parameter (e.g., 10 field samples, 1 field duplicate, 1 trip blank). 3540C/8270C, 5010A/6020, etc.); and analysis methods (e.g., SW846 5035A/8260B, Sampling Method reference number; Sample containers (number per sample, size, and type); Sample preservation (temperature, light, chemical, etc.); Maximum holding time requirements (preparation and analysis).	Pages 7 - 11
B-3. Sample Handling and Custody Requirements	Page 13, B3 & Included in the Generic QAPP

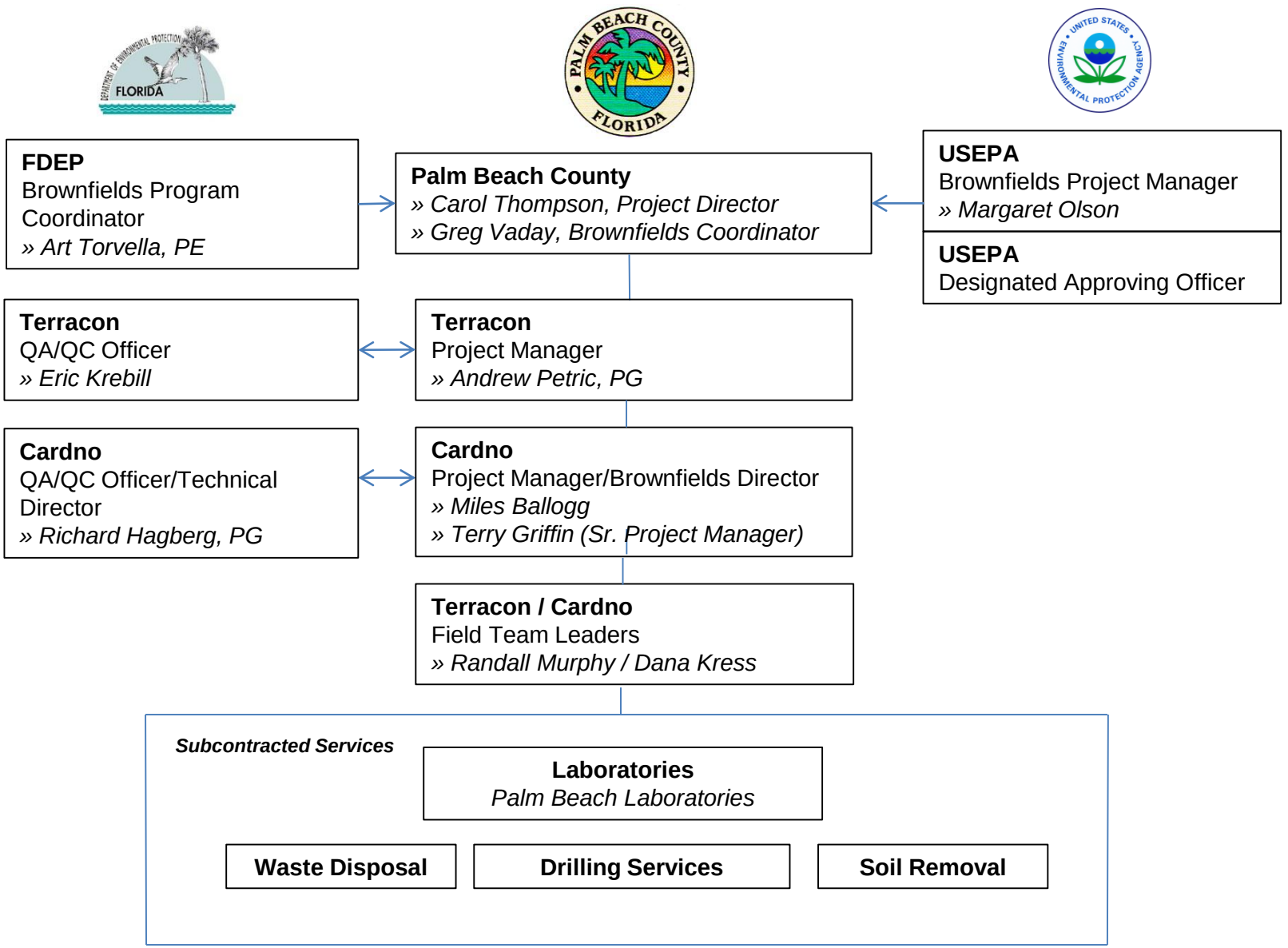
B-4. Analytical Methods and Requirements unless specific analytical methods are prescribed.	Page 13, Included in the Generic QAPP
B-5. Field Quality Control Requirements	Page 13, Included in the Generic QAPP
B-6. Laboratory Quality Control Requirements	Page 13, Included in the Generic QAPP
B7. Field Equipment & Corrective Action	Page 14, Included in the Generic QAPP
B8. Lab Equipment & Corrective Action	Page 14, Included in the Generic QAPP
B-9. Analytical Sensitivity & Project Criteria	Page 14, Included in the Generic QAPP
B-10.Data Management and Documents Should a specific project require any modifications or additions to the above sections, please provide those changes with the associated site-specific QAPP Addendum. NOTE: When adding a new SOP to the Generic QAPP, several of the sections above will be affected. Only the pertinent information from those sections, related to that new SOP, needs to be provided in the site- specific QAPP Addendum. These modifications and additions should be tracked and incorporated into the Generic QAPP at the yearly update.	Page 14, No other modifications
C-1. Assessments and Response Actions	Page 14, Included in the Generic QAPP
C-2. Project Reports Should a specific project require any modifications or additions to these sections, please provide those changes with the associated site-specific QAPP Addendum. NOTE: In the site-specific QAPP addendum whether the additional assessment or report information is a single occurrence or whether the modifications and additions should be tracked and incorporated into the Generic QAPP at the yearly update.	Page 14, No other modifications
D-1. Field Data Evaluation	Page 14, Included in the Generic QAPP
D-2. Laboratory Data Evaluation	Page 14-15, Included in the Generic QAPP

D-3. Data Usability and Project Evaluation Should a specific project require any modifications or additions to these sections, please provide those changes with the associated site-specific QAPP Addendum. NOTE: In the site-specific QAPP addendum indicate whether the additional data evaluation information is a single occurrence or whether the modifications and additions should be tracked and incorporated into the Generic QAPP at the yearly update.	Page 15, Included in the Generic QAPP
Other Key Signatures as needed/and or requested on the project. Example: State	N/A

Attachment B

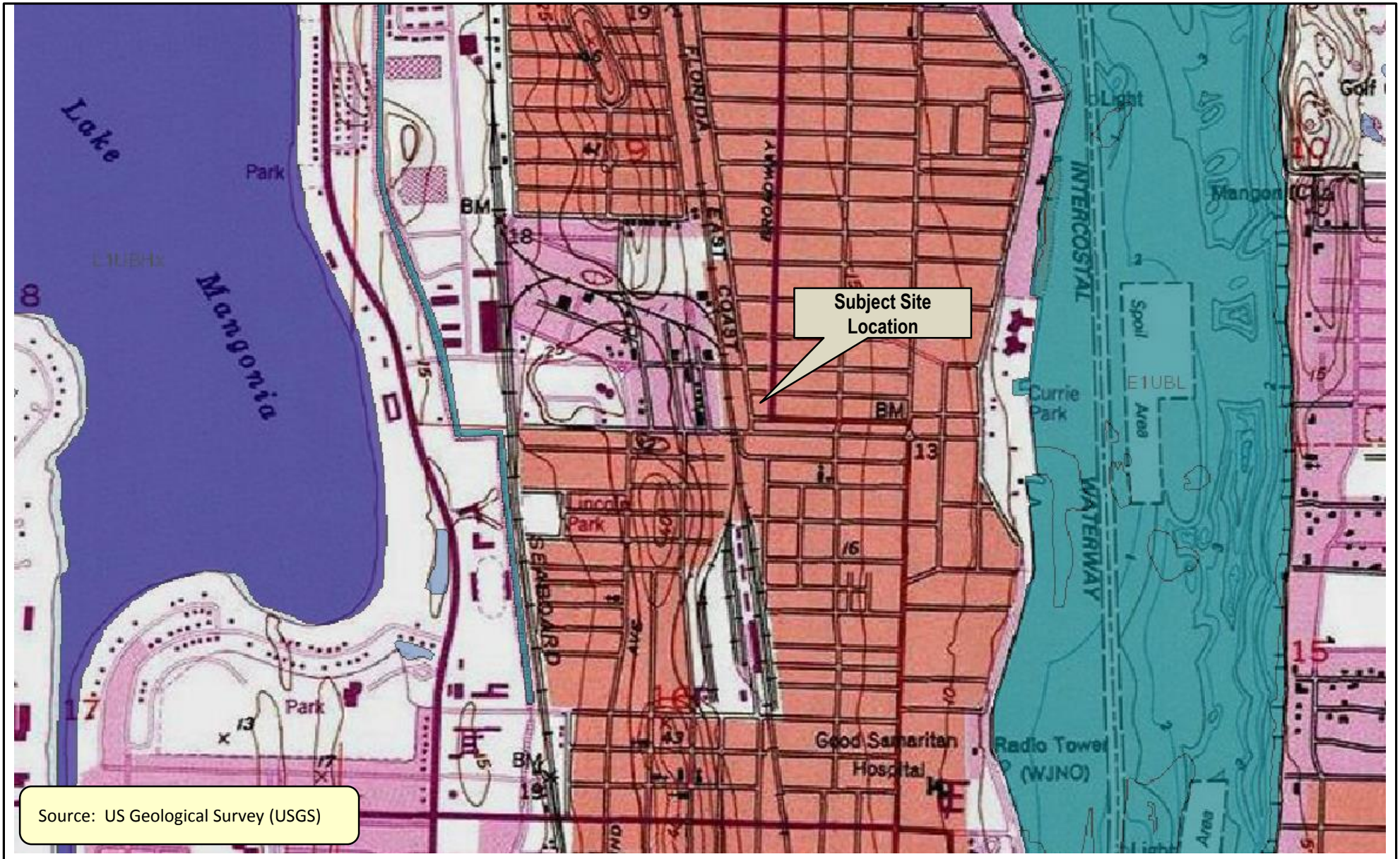
Project Organization Chart

Attachment B – Organizational Chart



Attachment C
Figures

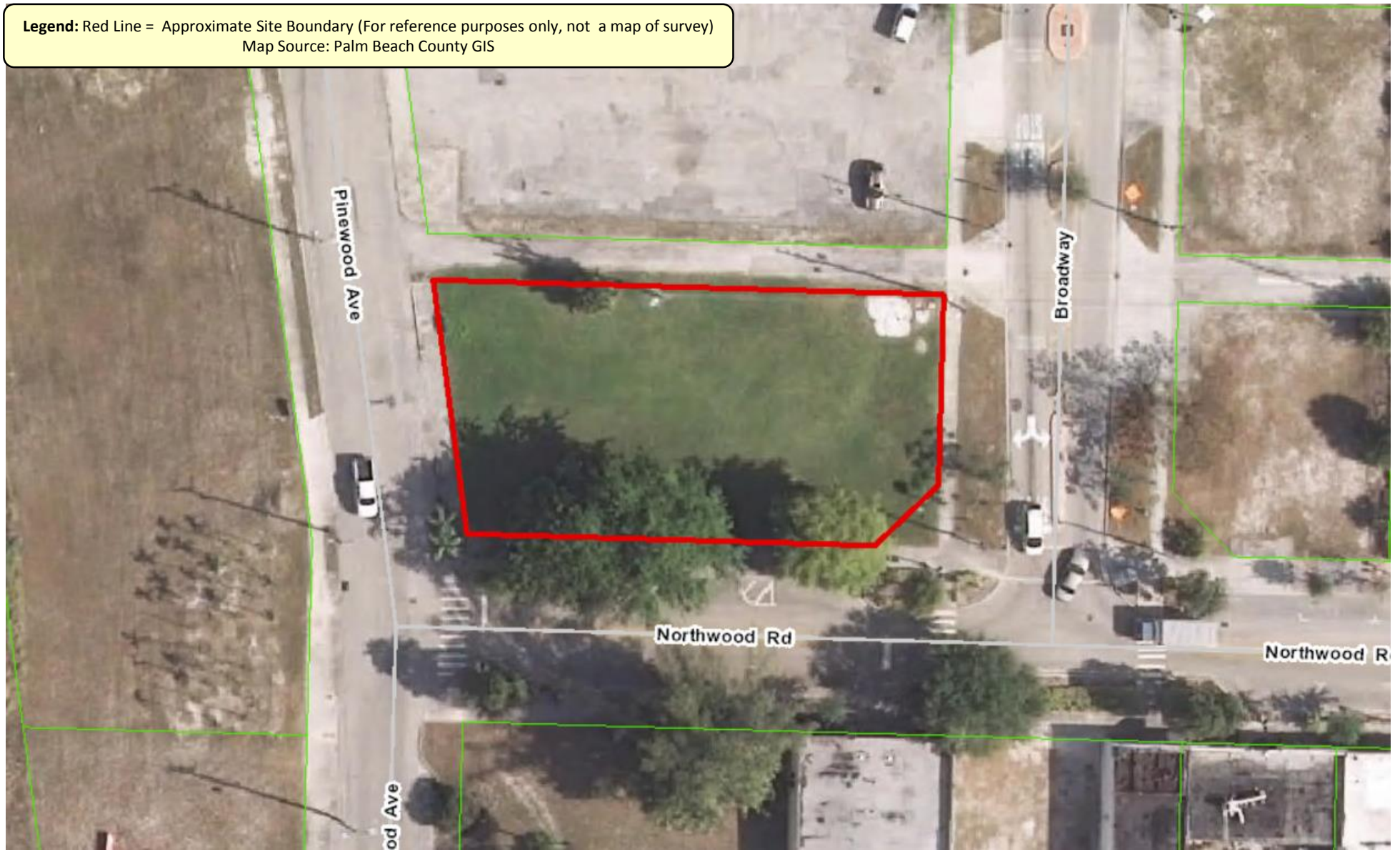
Figure 1 – USGS/Site Vicinity Map
Figure 2 – Site Boundary Map
Figure 3 – Surrounding Land Use Map
Figure 4 – Proposed Sampling Locations Map



Terracon Cardno

2401 Broadway (Northwood Anchor Site)
West Palm Beach, Palm Beach County, Florida
Parcel ID No. 74-43-43-09-05-049-0070

Figure 1
USGS/Site Vicinity Map



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2401 Broadway (Northwood Anchor Site)
West Palm Beach, Palm Beach County, Florida
Parcel ID No. 74-43-43-09-05-049-0070

Figure 2
Site Boundary Map

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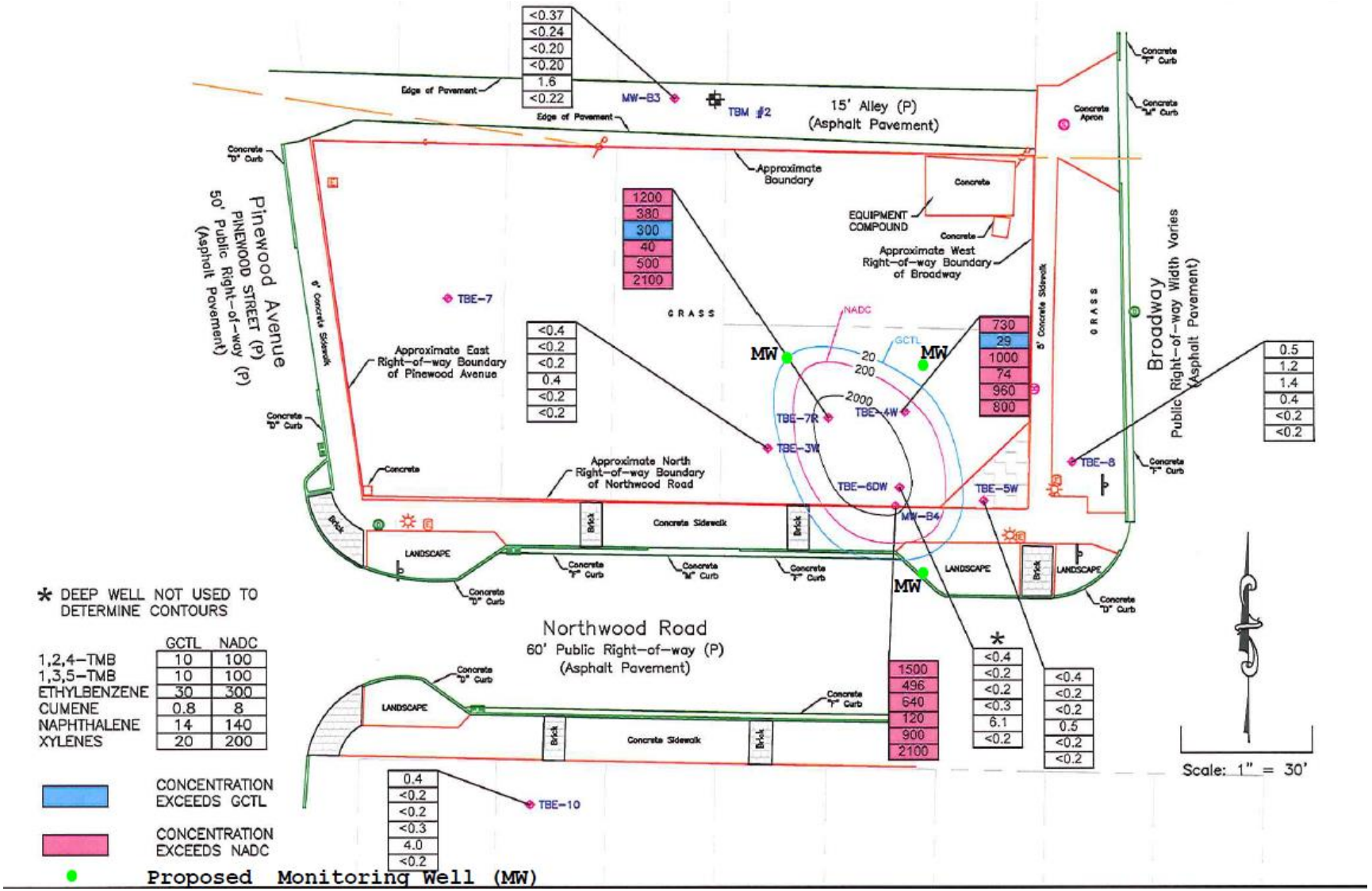
2401 Broadway (Northwood Anchor Site)
West Palm Beach, Palm Beach County, Florida
Parcel ID No. 74-43-43-09-05-049-0070

Figure 3
Surrounding Land Use Map



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2401 Broadway (Northwood Anchor Site)
West Palm Beach, Palm Beach County, Florida
Parcel ID No. 74-43-43-09-05-049-0070

Figure 4
Proposed Sampling Location Map

Attachment D
Tables

Table 1.0 – Sample Containers, Preservatives, & Holding Times
Table 2.0 – Data Quality Objectives for Proposed Analysis

Table 1: Sample Containers, Preservatives, and Hold Times

Matrix	# of Samples	Parameter	Method	Container	Preservative	Hold Time	Min. Volume
Water	TBD	VOCs	8260	Glass	.3mL 1:1 HCl	14 days	120mL
Water	TBD	PAHs	8270	Amber Glass	none	7 days/40 days	1L
Water	TBD	TRPH	FL-PRO	Amber Glass	8mL 1:1 HCl	7 days/40 days	1L
Water	TBD	MS-LL PAHs	8270	Amber Glass	none	7 days/40 days	1L
Water	TBD	MSD-LL PAHs	8270	Amber Glass	none	7 days/40 days	1L
Water	TBD	MS-TRPH	FL-PRO	Amber Glass	8mL 1:1 HCl	7 days/40 days	1L
Water	TBD	MSD-TRPH	FL-PRO	Amber Glass	8mL 1:1 HCl	7 days/40 days	1L
Water	1 (per cooler)	Trip Blank with 8260 samples	8260	Glass	.3mL 1:1 HCl	14 days	80mL

Samples will include equipment blanks and duplicates, where applicable.
# of Samples includes the total number of potential samples

Table 2
Data Quality Objectives for Proposed Analysis
EPA Method 8260
(full list)

Constituent of Concern		Soil					Groundwater				
		QA/QC Acceptance Limits					QA/QC Acceptance Limits				
Analytes	CAS No.	Detection Limits	Units	LCL	UCL	RPD	Detection Limits	Units	LCL	UCL	RPD
Benzene	71-43-2	0.0005	mg/kg	75	136	20	0.1	ug/L	68	132	20
Bromobenzene	108-86-1	0.0009	mg/kg	69	133	20	0.25	ug/L	77	130	20
Bromochloromethane	74-97-5	0.0007	mg/kg	70	130	20	0.2	ug/L	80	120	20
Bromodichloromethane	75-27-4	0.0005	mg/kg	70	130	20	0.1	ug/L	67	141	20
Bromoform	75-25-2	0.0007	mg/kg	74	129	20	0.3	ug/L	80	124	20
Bromomethane	74-83-9	0.011	mg/kg	56	159	20	0.4	ug/L	62	130	20
MTBE	1634-04-4	0.0007	mg/kg	60	139	20	0.05	ug/L	80	120	20
tert-Butylbenzene	98-06-6	0.0007	mg/kg	65	134	20	0.1	ug/L	71	134	20
Sec-Butylbenzene	135-98-8	0.0008	mg/kg	65	132	20	0.3	ug/L	79	132	20
n-Butylbenzene	104-51-8	0.001	mg/kg	71	136	20	0.6	ug/L	71	136	20
Carbon Tetrachloride	56-23-5	0.001	mg/kg	80	124	20	0.2	ug/L	79	126	20
Chlorobenzene	108-90-7	0.0006	mg/kg	80	122	20	0.2	ug/L	79	122	20
Chloroethane	75-00-3	0.001	mg/kg	67	138	20	0.3	ug/L	50	154	20
Chloroform	67-66-3	0.0006	mg/kg	80	120	20	0.1	ug/L	80	120	20
Chloromethane	74-87-3	0.001	mg/kg	77	122	20	0.1	ug/L	63	138	20
2-Chlorotoluene	95-49-8	0.0008	mg/kg	52	158	20	0.2	ug/L	68	145	20
4-Chlorotoluene	106-43-4	0.001	mg/kg	67	149	20	0.3	ug/L	80	139	20
p-Cymene (p-Isopropyltoluene)	99-87-6	0.0008	mg/kg	72	133	20	0.4	ug/L	72	133	20
1,2-Dibromo-3-Chloropropane	96-12-8	0.004	mg/kg	75	135	20	0.9	ug/L	80	136	20
Dibromochloromethane	124-48-1	0.001	mg/kg	80	124	20	0.15	ug/L	80	120	20
Dibromomethane	74-95-3	0.001	mg/kg	79	122	20	0.1	ug/L	80	122	20
1,2-Dichlorobenzene	95-50-1	0.0008	mg/kg	74	130	20	0.2	ug/L	80	122	20
1,3-Dichlorobenzene	541-73-1	0.0009	mg/kg	65	140	20	0.3	ug/L	76	133	20
1,4-Dichlorobenzene	106-46-7	0.0009	mg/kg	63	142	20	0.4	ug/L	80	127	20
Dichlorodifluoromethane	75-71-8	0.001	mg/kg	65	137	20	0.3	ug/L	80	133	20
1,2-Dichloroethane	107-06-2	0.0004	mg/kg	76	122	20	0.2	ug/L	80	120	20
1,1-Dichloroethane	75-34-3	0.0009	mg/kg	80	120	20	0.1	ug/L	80	120	20
trans-1,2-dichloroethene	156-60-5	0.0007	mg/kg	80	122	20	0.2	ug/L	80	120	20
cis-1,2-Dichloroethene	156-59-2	0.0006	mg/kg	80	120	20	0.2	ug/L	76	124	20
1,1-Dichloroethene	75-35-4	0.001	mg/kg	77	128	20	0.15	ug/L	63	131	20
2,2-Dichloropropane	594-20-7	0.0009	mg/kg	76	129	20	0.5	ug/L	76	129	20
1,3-Dichloropropane	142-28-9	0.0008	mg/kg	72	125	20	0.1	ug/L	80	120	20
1,2-Dichloropropane	78-87-5	0.0007	mg/kg	80	120	20	0.1	ug/L	80	120	20
trans-1,3-dichloropropene	10061-02-6	0.001	mg/kg	76	120	20	0.2	ug/L	80	122	20

Table 2
Data Quality Objectives for Proposed Analysis
EPA Method 8260
(full list)

Constituent of Concern		Soil					Groundwater				
		QA/QC Acceptance Limits					QA/QC Acceptance Limits				
Analytes	CAS No.	Detection Limits	Units	LCL	UCL	RPD	Detection Limits	Units	LCL	UCL	RPD
1,1-Dichloropropene	563-58-6	0.0006	mg/kg	79	127	20	0.1	ug/L	79	127	20
cis-1,3-Dichloropropene	10061-01-5	0.0006	mg/kg	69	126	20	0.2	ug/L	80	122	20
Ethylbenzene	100-41-4	0.0008	mg/kg	89	142	20	0.2	ug/L	79	124	20
Hexachlorobutadiene	87-68-3	0.001	mg/kg	60	140	20	1.6	ug/L	60	140	20
isopropylbenzene	98-82-8	0.0004	mg/kg	65	145	20	0.2	ug/L	78	137	20
Methylene Chloride	75-09-2	0.002	mg/kg	37	173	20	1.7	ug/L	77	137	20
Naphthalene	91-20-3	0.001	mg/kg	80	128	20	1.9	ug/L	67	149	20
n-Propylbenzene	103-65-1	0.0006	mg/kg	70	131	20	0.2	ug/L	70	131	20
Styrene	100-42-5	0.0007	mg/kg	79	125	20	0.1	ug/L	80	121	20
1,1,1,2-Tetrachloroethane	630-20-6	0.0008	mg/kg	73	124	20	0.2	ug/L	80	120	20
1,1,2,2-Tetrachloroethane	79-34-5	0.0008	mg/kg	65	135	20	0.2	ug/L	80	121	20
Tetrachloroethylene	127-18-4	0.0005	mg/kg	73	128	20	0.25	ug/L	61	138	20
Toluene	108-88-3	0.003	mg/kg	70	129	20	0.3	ug/L	67	133	20
1,2,4-Trichlorobenzene	120-82-1	0.001	mg/kg	70	148	20	1.4	ug/L	70	130	20
1,2,3-Trichlorobenzene	87-61-6	0.001	mg/kg	70	130	20	2.4	ug/L	70	130	20
1,1,2-Trichloroethane	79-00-5	0.0008	mg/kg	76	125	20	0.7	ug/L	80	120	20
1,1,1-Trichloroethane	71-55-6	0.0008	mg/kg	80	122	20	0.1	ug/L	80	123	20
Trichloroethene	79-01-6	0.0008	mg/kg	80	124	20	0.2	ug/L	68	133	20
Trichlorofluoromethane	75-69-4	0.0008	mg/kg	70	130	20	0.2	ug/L	76	133	20
1,2,3-Trichloropropane	96-18-4	0.001	mg/kg	70	130	20	0.2	ug/L	70	130	20
1,2,4-Trimethylbenzene	95-63-6	0.001	mg/kg	52	151	20	0.2	ug/L	80	135	20
1,3,5-Trimethylbenzene	108-67-8	0.0007	mg/kg	56	148	20	0.2	ug/L	80	137	20
Vinyl Chloride	75-01-4	0.0008	mg/kg	68	138	20	0.09	ug/L	80	120	20
o-Xylene	95-47-6	0.001	mg/kg	79	124	20	0.4	ug/L	79	124	20
m,p-Xylenes	108-38-3	0.001	mg/kg	80	125	20	0.4	ug/L	80	125	20

Notes:

* = Starting RL. Actual RL depends on moisture content of sample or amount of sample received

** = Normal spiking compounds

Extraction/Digestion Method Soils:	SW 5035
Extraction/Digestion Method Water:	SW 5030

Holding Time = 14 days (Soils) when frozen
Holding Time = 14 Days (Groundwater)

Table 2
Data Quality Objectives for Proposed Analysis
EPA Method 8270
(PAHs)

Constituent of Concern		Soil					Groundwater					
		QA/QC Acceptance Limits					QA/QC Acceptance Limits					
Analytes	CAS No.	Detection Limits	Units	LCL	UCL	RPD	Detection Limits	Units	LCL	UCL	RPD	
Acenaphthylene	208-96-8	0.0022	mg/kg	38	97	20	0.022	ug/L	56	121	20	
Anthracene	120-12-7	0.0017	mg/kg	48	96	20	0.02	ug/L	56	119	20	
Benzo(a)anthracene	56-55-3	0.0015	mg/kg	56	101	20	0.011	ug/L	60	109	20	
Benzo(a)pyrene	50-32-8	0.002	mg/kg	28	103	25	0.009	ug/L	30	124	20	
Benzo(b)fluoranthene	205-99-2	0.0027	mg/kg	33	109	21	0.007	ug/L	33	119	20	
Benzo(g,h,i)perylene	191-24-2	0.0069	mg/kg	35	121	21	0.012	ug/L	40	127	20	
Benzo(k)fluoranthene	207-08-9	0.0019	mg/kg	41	106	22	0.017	ug/L	42	130	29	
Chrysene	218-01-9	0.0012	mg/kg	58	103	20	0.01	ug/L	52	124	20	
1-Methylnaphthalene	90-12-0	0.0033	mg/kg	43	97	20	0.028	ug/L	55	117	20	
Dibenz(a,h)anthracene	53-70-3	0.0073	mg/kg	50	106	20	0.011	ug/L	40	128	20	
Fluoranthene	206-44-0	0.0023	mg/kg	50	114	20	0.02	ug/L	63	117	20	
Fluorene	86-73-7	0.0018	mg/kg	40	100	20	0.03	ug/L	57	122	20	
Indeno(1,2,3-c,d)Pyrene	193-39-5	0.0072	mg/kg	43	112	20	0.011	ug/L	33	133	21	
2-Methylnaphthalene	91-57-6	0.0028	mg/kg	33	95	20	0.025	ug/L	49	110	20	
Naphthalene	91-20-3	0.0055	mg/kg	40	90	20	0.031	ug/L	51	127	20	
Phenanthrene	85-01-8	0.0028	mg/kg	48	100	20	0.026	ug/L	57	115	20	
Pyrene	129-00-0	0.0069	mg/kg	43	116	20	0.022	ug/L	59	116	20	

Notes:

* = Starting RL. Actual RL depends on moisture content of sample or amount of sample received

** = Normal spiking compounds

Extraction/Digestion Method Soils: SW 3545
Extraction/Digestion Method Water: SW 3510

Holding Time = 14 days extraction 40 days for analysis (Soils)
Holding Time = 7 days extraction 40 days for analysis (Groundwater)

Table 2
Data Quality Objectives for Proposed Analysis
FLorida PRO Method
(TRPH)

Constituent of Concern		Soil					Groundwater				
		QA/QC Acceptance Limits					QA/QC Acceptance Limits				
Analytes	CAS No.	Detection Limits	Units	LCL	UCL	RPD	Detection Limits	Units	LCL	UCL	RPD
FLPRO	NA	4.8	mg/kg	63	143	25	46.000	ug/L	55	118	20

Notes:

* = Starting RL. Actual RL depends on moisture content of sample or amount of sample received

** = Normal spiking compounds

Extraction/Digestion Method Soils: SW 3545
Extraction/Digestion Method Water: SW 3510

Holding Time = 14 days extraction 40 days for analysis (Soils)
Holding Time = 7 days extraction 40 days for analysis (Groundwater)