TETRA TECH

October 2, 2015

James W. Bouquet P.E.
Director of Engineering
City of Key West
3140 Flagler Ave
Key West, FL 33040

Subject: Permitting / Engineering Services
Supporting the Truman Seawall Replacement (TR1503)

Dear Mr. Bouquet,

Please find attached our statement of work for the permitting and engineering services supporting the proposed replacement of the Truman seawall. This proposal is being issued in accordance with the executed General Environmental Engineering Services agreement between the City of Key West and Tetra Tech, Inc., dated January 13, 2015.

The scope of services include coordination with a local surveyor, preparation of permit applications and supporting exhibits, and preparation of construction documentation needed to support the City's Invitation to Bid for this work. We have attached copies of the quotes from the surveyor (AVIROM) and the ground detection service (GHD) for your convenience.

Please review the attached scope of work and contact me if you have any questions or need any additional information.

Sincerely,

Shauna Stotler-Hardy

Shauna Stotler-Hardy
Project Manager

cc: Terrence Justice, City of Key West
Stuart E. McGahee, Tetra Tech

759 South Federal Highway, Suite 314 Stuart, FL 34994
Tel 772.781.3400 Fax 772.781.3411 www.tetratech.com

PROPOSAL
STATEMENT OF WORK

PROJECT: TR1503
ENGINEERING SERVICES TO SUPPORT SEAWALL REPLACEMENT

Key West, FL

This proposal has been prepared in accordance with executed General Environmental Engineering Services Agreement between the City of Key West and Tetra Tech, Inc. dated January 13, 2015. The work described herein will be performed on a Lump Sum basis in accordance with the General Services agreement between Tetra Tech Inc. and the City of Key West, authorized by Resolution 14-359 executed February 23, 2015.

Prepared by: TETRA TECH, Inc.
October 2, 2015

TETRA TECH, INC.

759 South Federal Highway, Suite 314 Stuart, FL 34994
Tel 772.781.3400 Fax 772.781.3411 www.tetratech.com

PROPOSAL / STATEMENT OF WORK

Tetra Tech will work with the City of Key West (City) to assemble the construction documentation needed to facilitate the upgrade of the existing (350 FT) seawall located adjacent to the boat ramp behind the Florida Keys National Marine Sanctuary (FKNMS) Key West Office, Key West, Florida.

ENGINEERING SERVICES TO SUPPORT DESIGN BUILD OF TRUMAN SEWALL REPLACEMENT

Insert: Limits of Survey

1. Bathymetric and Riparian Survey

Tetra Tech has contacted a local surveyor (Avirom & Associates, Inc.) and has been provided a proposal to collect the riparian and bathymetric survey data necessary for the preparation of the final permit-ready plans and project construction documents. The survey will be used as the base for permit plans. A digital version can also be provided to the contractor so they can use it to prepare any necessary design shop drawing submittals. The survey is expected to take **3-4 weeks from notice to proceed** (NTP) to complete and will include the following:

1. Horizontal and vertical control data from the seawall into the basin (100-feet)
2. Horizontal and vertical control data for upland facilities within (30-feet) landward of the seawall
3. The location of utilities within (30-feet) of the seawall
4. The location of all of the support piles and existing dock structures along the wall
5. The location of the seawall repair footers at the toe of the wall
6. The riparian boundaries – to identify the required setbacks on the permit applications
7. Surveyor shall collect enough data to produce an accurate cross section from 30-feet upland to 100-feet water-ward anywhere along the wall

The surveyor has also included in their bid a proposal from *Ground Hound Detection Services* who will use Ground Penetrating Radar (GPR) in an attempt to locate the tie-back systems supporting the existing wall. If they are successful locating the tie-backs they will mark the locations on the ground and will coordinate with Avirom to collect these locations and add them to the survey.

Survey and GPR Subtotal: $ 15,682

2. Permit Drawings

Once the bathymetric and riparian survey has been completed and the exact configuration of the existing seawall, dock structures, and toe repairs is known, a determination can be made for how far water ward to place the proposed seawall. Tetra Tech will create plans that show the proposed location of the new seawall and the wall-returns that will be presented to the permitting agencies (see Task 3 below) for their review and consideration.

Using these plans Tetra Tech will also show the proposed modifications to the orientation of the wall nearest the boat ramp. Presently the intention is to remove the triangular point altogether and replace it with a perpendicular tie-in to the existing boat ramp wall. The permit drawings are expected to be completed approximately 2-weeks after the receipt of the survey, or **6-weeks after the NTP**.

The permit drawings will be formatted to 8 1/2" x 11" paper for submittal to the agencies. These permit drawings will include (but may not be limited to) the following:

1. Existing conditions
2. Existing resources with input from NOAA
3. Riparian survey limits
4. Proposed demolition
5. Proposed turbidity protection
6. Proposed storm water pollution prevention plan
7. Proposed excavation locations and volumes (if any)
8. Proposed fill locations and volumes - between existing and proposed walls
9. Special construction conditions & details

Subtotal: $ 9,779

3. Permit Applications

Tetra Tech will coordinate with the City of Key West, the National Oceanographic and Atmospheric Administration (NOAA), the Florida Department of Environmental Protection (FDEP), and the US Army Corps of Engineers (USACE), and assist with the preparation of state and federal permit applications needed for the contractor to start work. Tetra Tech will submit applications and will pay the applicable application fees to the following agencies:

- US Army Corp of Engineers / USACE Dredge & Fill Permit (There is no Application fee).
- Florida Department of Environmental Protection / FDEP ERP (Application fee: $450)

Tetra Tech will attend one pre-application meeting and coordinate with NOAA and the FKNMS during the permitting process. The proposed cost included preparing responses to two (2) RAI's per agency (FDEP and USACE). Tetra Tech will attend two (2) additional teleconferences with agency staff to facilitate the processing of permit applications and prepare meeting notes. The permit applications should be completed and filed within 1-week from the completion of the permit drawings, or **7-weeks from NTP**.

NOTE: ***This cost estimate assumes that all necessary resource surveys will be conducted directly by NOAA and does not include any additional resource surveys that may be required by FDEP, USACE or NOAA***. This proposal does not guarantee permit issuance and does not include local building permits.

Subtotal: $ 11,419

4. Bid Documents / Procurement Services

Tetra Tech will support the City of Key West's procurement department as needed. It is understood that the City will prepare the full boilerplate "Invitation to Bid" package in-house, including the bid form, general conditions, insurance and bond requirements, and etcetera. Tetra Tech will provide the complete design documents necessary for the City to compile the contract documents for that Invitation to Bid. Specifically, Tetra Tech will provide the project's Scope of Work and Design Drawings which will include the project-specific technical specifications. All drawings will be formatted for 11" x 17" paper and should be completed within **12-week from the NTP**. This timeframe may be extended depending on comments, or plan changes requested from the permitting agencies. These Complete Design Documents package will include (but may not be limited to) the following:

1. Scope of Work
2. Cover page with location and access
3. Existing conditions survey
4. Demolition plan – seawall & docks
5. Storm Water Pollution Prevention Plan (SWPPP)
6. Natural Resources Protection Plan
7. Plan views that show:
    - Limits of construction
    - Wall returns on either end of the new wall
    - New wall will tie-in to the existing walls
    - Upland utility locations & conflict locations near the five existing dock structures
    - Conflict locations of previously made wall repairs
    - Locations of tie-backs (if found using GPR)
8. Cross sections views that show:
    - New wall offset from old wall – one cross section approximately every 50-feet
    - New wall tie-ins to remaining – one cross section of existing walls on either end
    - Estimated embedment depths for new steel sheets
    - Typical – Concrete cap and tie-back placement and connections
    - Typical – Construction details
9. Timber Construction details & Performance specifications
10. Concrete Mix design guidelines & performance specifications
11. Preliminary sheet pile wall-design & performance specifications

Survey note: If the GPR survey can locate the tiebacks, and the tiebacks are uniformly spaced, the plans will include instructions to the contractor to leave the tiebacks in place (if possible) and install new tiebacks in-between. In either case, whether we are able to locate the tie-backs or not, the contractor will be instructed to carefully excavate behind the existing wall when installing the new tieback systems. The plans will include instructions for the removal of a portion of the existing wall cap and panels as necessary to facilitate the placement of this new concrete cap and tie-back system.

Engineering note: This proposal assumes the contractor will engage an engineer and will be submitting signed and sealed shop drawings for technical items of work and will be the engineer of record for the project.

Subtotal:	$ 10,075
TOTAL:	**$ 46,955**

City of Key West Seawall Analysis Report			Task 1 Surveys		Task 2 Permit Drawings		Task 3 Permit Applications		Task 4 Bid Documents		Task 5 Services During Construction		Task 6 Certification		TOTAL	
BILLING CLASS	NAME	UNIT RATE	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST	UNITS	COST
Tetra Tech Staff																
Tech Prof I	S. Stotler-Hardy	$ 95.00	4.0	$380	8.0	$760	9.0	$855	9.0	$855		$0		$0	30.0	$2,850
Tech Prof I	R. Garland	$ 95.00	-	$0	2.0	$190	4.0	$380	4.0	$380		$0	-	$0	10.0	$950
Sr. Tech Prof II	T. Malone	$ 158.00	2.0	$316	2.0	$316	2.0	$316	2.0	$316		$0	-	$0	8.0	$1,264
Sr. Tech Prof III	G. Vince	$ 179.00	-	$0	-	$0	38.0	$6,802	-	$0		$0	-	$0	38.0	$6,802
Sr. Project Manager	S. McGahee	$ 192.00	2.0	$384	16.0	$3,072	5.0	$960	23.0	$4,416		$0	-	$0	46.0	$8,832
Tech Prof I	F. Martinez-Rivera	$ 95.00	-	$0	44.0	$4,180	2.0	$190	41.0	$3,895		$0	-	$0	87.0	$8,265
Sr. Tech Prof III	A. McDonald	$ 179.00	-	$0	-	$0	2.0	$358	-	$0	-	$0	-	$0	2.0	$358
-	-	$ -	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
TOTAL LABOR COST			**8.0**	**$1,080**	**72.0**	**$8,518**	**62.0**	**$9,861**	**79.0**	**$9,862**	**-**	**$0**	**-**	**$0**	**221.0**	**$29,321**
																$0
INTERNAL SUBCONTRACTOR			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		$0
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
APPLICATION FEES (Paid by TT on behalf of the client)			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
FDEP (ERP)		$ 450.00	-	$0	-	$0	1.0	$450	-	$0	-	$0	-	$0	1.0	$450
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
TOTAL INTERNAL SUBCONTRACTOR				**$0**		**$0**		**$450**		**$0**		**$0**		**$0**		**$450**
EXTERNAL SUBCONTRACTOR			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		
SURVEYOR (Riparian & Topo)		$ 10,489.00	1.0	$10,489	-	$0	-	$0	-	$0	-	$0	-	$0	1.0	$10,489
GPR		$ 3,400.00	1.0	$3,400	-	$0	-	$0	-	$0	-	$0	-	$0	1.0	$3,400
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		
TOTAL EXTERNAL SUBCONTRACTOR				**$13,889**		**$0**		**$0**		**$0**		**$0**		**$0**		**$13,889**
TRAVEL			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		
R/T Airfare		$ 500.00	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
Mileage/Gas		$ 0.58	550.0	$316	550.0	$316	550.0	$316	-	$0	-	$0	-	$0	1,650.0	$948
Rental Car w/Fuel		$ 75.00	1.0	$75	2.0	$150	-	$0	-	$0	-	$0	-	$0	3.0	$225
Misc Travel Costs		$ 50.00	1.0	$50	2.0	$100	-	$0	-	$0	-	$0	-	$0	3.0	$150
Lodging		$ 175.00	1.0	$175	2.0	$350	1.0	$175	-	$0	-	$0	-	$0	4.0	$700
Meals & IE		$ 75.00	1.0	$75	2.0	$150	-	$0	-	$0	-	$0	-	$0	3.0	$225
			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
TOTAL TRAVEL COSTS				**$691**		**$1,066**		**$491**		**$0**		**$0**		**$0**		**$2,248**
OTHER DIRECT COSTS			-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		
Shipping/Postage		$ 5.00	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
Information Services		$ 2.70	8.0	$22	72.0	$195	62.0	$167	79.0	$213		$0		$0	221.0	$597
Reproduction - B&W		$ 0.08	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
Reproduction - Color		$ 0.42	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0
Misc. Equip & Supplies		$ 150.00	-	$0	-	$0	3.0	$450	-	$0	-	$0	-	$0	3.0	$450
		$0.00	-	$0	-	$0	-	$0	-	$0	-	$0	-	$0		
TOTAL OTHER DIRECT COSTS				**$22**		**$195**		**$617**		**$213**		**$0**		**$0**		**$1,047**
				$0		**$0**		**$0**		**$0**		**$0**		**$0**		**$0**
GRAND TOTAL				**$15,682**		**$9,779**		**$11,419**		**$10,075**		**$0**		**$0**		**$46,955**

AVIROM & ASSOCIATES, INC.
SURVEYING & MAPPING

October 1, 2015

Via E-Mail: *Shauna.Stotler-Hardy@tetratech.com*

Ms. Shauna Stotler-Hardy
Project Manager
Tetra Tech
900 Trail Ridge Road, Suite 101
Aiken, SC 29803, USA

RE: *Truman Waterfront, Truman Annex, Key West, FL*
Determination of Riparian Rights Line, Bathymetric Survey and Tree Survey – Revision 3

Dear Shauna:

In accord with your request, we are pleased to provide the following cost proposal for surveying services at the above referenced location.

Location:

At 31 East Quay Road, Truman Waterfront, Truman Annex, Key West, FL.

Scope:

Limits

The upland topographic survey limits shall be from the wet face of the existing concrete seawall, southeasterly 30 feet, to the back of the concrete dock.

The bathymetric survey limits shall be from the wet face of the existing concrete seawall, northwesterly 100 feet towards Key West Harbour.

The survey limits are delineated in red in the attached Exhibit A below, incorporated herein for reference.

1. Riparian Rights Line

Establish the common Riparian Rights Line between Parcel 00001630-000000 (per Monroe County Property Appraiser's Office), vested in the United States of America and Parcel 00001630-001000 (per Monroe County Property Appraiser's Office), vested in the City of Key West, Florida.

We shall attempt to recover sufficient boundary information between the two parcels to spatially define the upland coincident boundary line, upon which a determination of the riparian rights line will be made. This is not a boundary survey or mean high water line survey and should not be relied as such.

2. Upland Topographic Survey

Spot elevations shall be taken on a 50 foot grid within the limits of the survey stated above and delineated on Exhibit A below. Establish a minimum of two (2) North American Vertical Datum of 1988 (NAVD 88) benchmarks at the site, referenced to a published Benchmark Network by the National Geodetic Survey (NGS). The benchmarks shall also be horizontally referenced to the North American Datum of 1983 (NAD 83-2011) Epoch 2010.00, and tied to the National Geodetic Survey Geodetic Control Network.

We shall locate all above ground improvements including, but not limited to the seawall, cleats, docks, dolphin piles and above ground evidence of utility. Utility locations will include manhole, catch basins, fire hydrants, water valves, meter boxes, vaults and electrical outlets.

There is no provision for the excavation, probing or location of underground utilities, structures or improvements. Utilities shall be located to the extent that they are above ground and visible. There is no provision in this contract to enter structures to obtain information.

We shall obtain topography along the adjacent shoreline, extending into the water establishing elevation overlaps with the bathymetry. The overlaps will provide a quality check of the soundings and the near shore elevations will seamlessly integrate with the bathymetric survey.

All work shall be performed in accordance with the Standards of Practice as defined in Chapter 5J-17, Florida Administrative Code.

3. Bathymetric Survey

The bathymetric surveys shall be conducted using a fully automated, hydrographic survey system comprised of a 200 kHz Sonarmite BT survey grade fathometer, Trimble R8 GNSS Global Positioning System, and computer-based navigation/data collection system. Data will be collected along transects oriented approximately perpendicular to the shoreline and spaced at fifteen (15) foot intervals from the previous transect.

Data shall be recorded continuously along each transect at approximate intervals of five (5) feet in raw digital format along with other information such as date, time, northing/easting, latitude/ longitude and a summary of all the parameters of the navigation file. Prior to the start of the survey a tide staff will be established in close proximity to the site for use in monitoring water levels during the course of the bathymetric survey operations. Water levels will be recorded at 6 minute intervals. We will establish both horizontal and vertical controls needed for the survey. Upon completion of the data collection activities, raw digital bathymetric data files will be edited and reduced to the proper vertical datum via application of collected tide information. Charts will be prepared in ACAD 2014 format and shall encompass contours and/or plotted plan data. Contours shall be plotted at one (1) foot contour intervals. Contours will be generated via the

development of a Digital Terrain Model (DTM) of the data. Final charts will encompass a grid depicting northings (Y) and eastings (X) relative to the project datum. In addition, charts will include a complete description of horizontal and vertical control used for the survey, approximate location of the tide staff and any general notes pertinent to the survey. Charts will be provided to the client on paper media along with digital files in PDF format and AutoCAD 2014 format. In addition to the digital PDF files, the client can be provided with an ASCII file containing the final X, Y, Z data. The depths will be based on elevations relative to the North American Vertical Datum of 1988 (NAVD 88), with a conversion factor listed to reduce the data to Mean Low Water.

Footer Location:

We will locate the footer at the base of the existing seawall at 10 foot intervals. Elevations shall be taken at the top edge of the footer and at the base of the footer where it meets the sea bed.

Tree Survey:

We will locate all indigenous and protected specimen trees having a 4" and larger caliper diameter at breast height relative to the boundary, with the tree species listed to the best of knowledge and ability of the surveyor (without the benefit of a botanist or landscape architect). The location of shrubbery and landscaping is not included in this proposal. Large, bunched groups of trees shall be located as clusters with a count and diameter listed. We will not locate exotic or non-native species.

OPTION-Location of Tie-Backs:

We will locate tie-backs of the bulkhead from Ground Penetrating Radar (GPR) done by others. This work will be done during the course of our crew conducting the topographic survey. We will coordinate with the GPR crew so that the work will be accomplished in conjunction with the topographic survey. This work will be done by the consultant Ground Hound Detection Services, Inc. (see attached proposal under separate cover).

Deliverables:

We shall provide four (4) signed and sealed hard copies of the survey, a digital PDF file of the hard copy and an AutoCAD 2014 or lower, file of the survey.

Schedule:

Upon notice to proceed, we will mobilize within 72 hours and have the work completed within three (3) weeks after mobilization.

Clarification:

- Client shall arrange all access and permission with the U.S. Navy to have our crew perform the survey within the Truman Annex. Delays encountered due to access at no fault of

Avirom & Associates may incur additional costs, which will be billed at our current hourly rates (see below).

- The Mean High Water Line will be displayed for informational purposes only. This is not a Mean High Water Line survey according to Chapter 177, Part II Florida Statutes.
- If obstructions are encountered (moored vessels), we shall make a note on our survey.

Cost:

The itemized cost to provide the above services shall be:

1. Establish Riparian Rights Line ……..…… $2,162.00 lump sum
2. Upland topographic survey & bathymetric survey …… $7,827.00 lump sum
3. Location of Footer …….. $ 500.00 lump sum
4. Tree Survey …… No Charge
5. *OPTION – Location of GPR marks for tie-back Locations* …….. $ 700.00 lump sum
6. *OPTION – GPR Services (see attached consultant proposal)* ……... $2,700.00 (at cost)

TOTAL ……. $10,489.00 lump sum

TOTAL (WITH OPTION) .. $13,889.00

Current Hourly Rates

P.L.S. Technical Coordination ……	$150.00/Hour
Survey Crew ……	$135.00/Hour
Computer Computations & Drafting ……..	$ 90.00/Hour
1 Hydrographic Survey Crew with Sounder, GPS & Boat …..…..	$3,000.00/Day*

* *Minimum of one day required*

We thank you for the opportunity to submit this proposal and look forward to working with you on this project. Should you have any questions or comments, please do not hesitate to contact me.

Respectfully,

Keith M. Chee-A-Tow, P.L.S.
For the Firm

If this proposal is acceptable, please execute the signature below and return one (1) copy for our files.

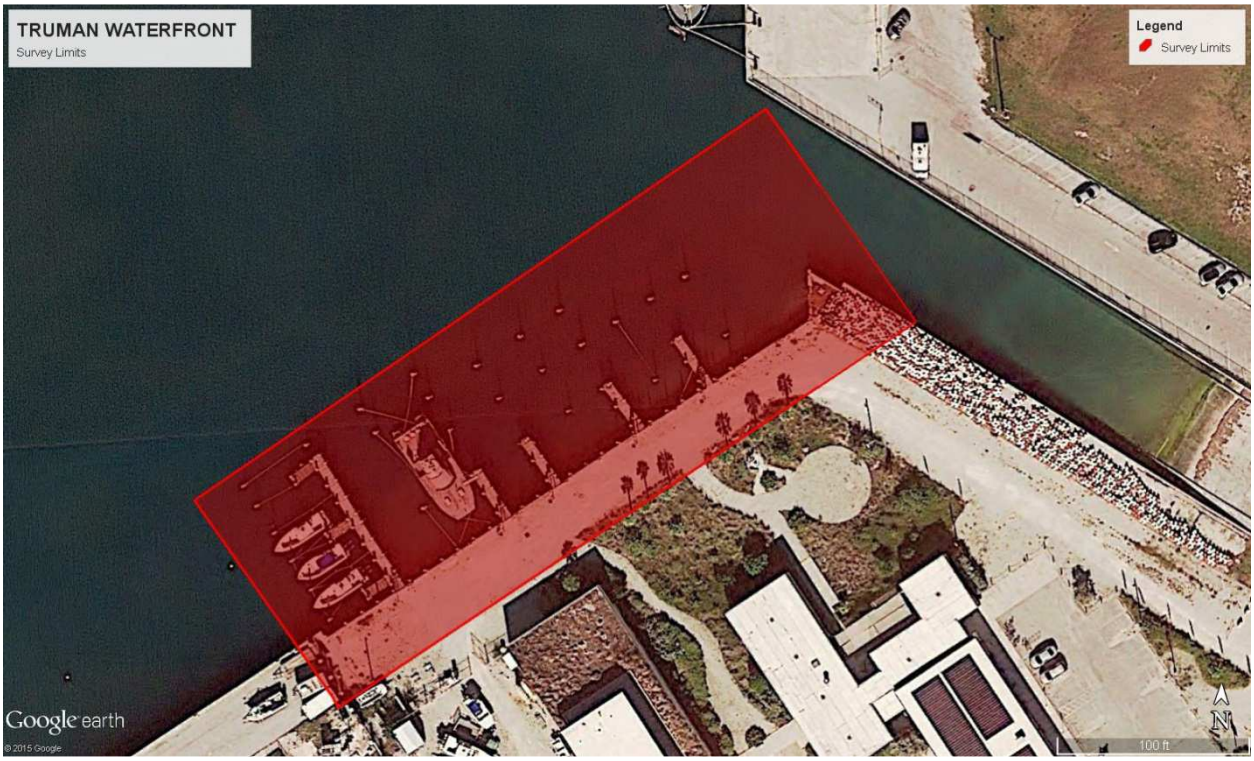
THESE CONDITIONS ARE ACCEPTABLE, AND I HEREBY AUTHORIZE YOU TO PROCEED.

_____ _____

Ms. Shauna Stotler-Hardy Date
Tetra Tech

Keith's Documents\Proposal\Keys\Bathymetric\Truman Annex Rev 2.docx

EXHIBIT A



GROUND HOUND DETECTION SERVICES, INC.™ A Professional Utility Locating Service

September 29, 2015

Mr. Keith Chee-A-Tow
Avirom & Associates, Inc.
50 SW 2nd Street
Suite 102
Boca Raton, FL 33432

Re: "GPR Investigation for Seawall Tie-backs – CoCW Seawall Replacement"

Mr. Chee-A-Tow,

Ground Hound Detection Services, Inc. (GHD) is pleased to provide the following proposal for Subsurface Investigation services. Based on the information contained in the emails received on September 29, 2015 and phone conversation with Stuart McGahee of Tetra Tech, Ground Penetrating Radar (GPR) and Electromagnetic (EM) methods will be used to identify any detectable objects of substantial size consistent with tie-back structures for the sea wall. The provided drawings and depictions of limits of the area to be investigated will be considered a part of this proposal.

DESCRIPTION OF SERVICES:
Multiple tools involving differing technologies are proposed for this investigation.

Ground Penetrating Radar (GPR) method transmits electromagnetic waves, which are pulsed at discrete distance/time intervals. The transmitted pulse radiates through the earth whereby a portion of the energy is reflected from interfaces of contrasting electrical properties (e.g. pavement and soil interface, soil stratigraphic changes and buried metallic and nonmetallic objects) while the remaining energy continues until reaching additional reflectors where the process is repeated. Reflected energy is received by the antennae and recorded for later processing and interpretation. Factors such as soil moisture, clay content, and variations in the dielectric constants of materials control the effectiveness of the GPR method. Wet conductive soils severely attenuate GPR signals and thus the effective depth of exploration. The presence of foreign product leeched into the soil can eschew the data collected. GPR energy cannot transmit through ferrous objects since metal acts as a pure reflector. GPR energy cannot transmit through ferrous objects since metal acts as a pure reflector. Freshly-poured concrete (less than 60 days), concrete containing metal fibers, fine-mesh screenings beneath tile, Styrofoam between floor or roof slabs can inhibit the effective permeability and accuracy of GPR. In order to accurately conduct a radar survey, orthogonal scans must be made across the target area. Confined or obstructed areas that restrict an even scanning pattern can impede the data collected and reduce the accuracy of the final results. GPR does not measure diameter of objects, just their location(s). EM and GPR discovery may be limited up to 24inches within any vertical impediment, structure or otherwise.

EM-Magnetic Detection method is a LF (30 to 300 KHz) or VLF (below 30 KHz) receiver for detecting electromagnetic fields which radiate off of metallic objects. Magnetic locators/magnetometers operate on a simple principal. An electronic transmitter and receiving antennae are mounted on a support structure. The two antennae are mounted a fixed distance apart aligned opposing so that the magnetic field measured by one sensor is negative of the magnetic field measured by the other. Each measures the average magnetic field component along their axis i.e. the magnetic field component along the longitudinal axis between the antennae. This is calibrated at the survey site to a position (setting) which is neutral to the earth's natural magnetic field (and average mineralization component of the geology). When a metallic object is introduced within this field (or a differing mineral concentration within the geology- for voids and non-metallic structures), it is detected as a differing field. This differing magnetic/mineralized field is the field of interest.

DESCRIPTION OF SERVICES (cont.):

Locating underground objects is not an exact science. Therefore, Ground Hound Detection Services, Inc. (GHD) expresses no guarantees that using one or any of the available technologies for identifying objects/structures will identify all objects /structures and/or meet the objective of this or any individual project. Avirom & Associates, Inc. understands that limitations within the available technology, the complexity of site conditions and circumstances beyond the control of GHD may limit the performance/results of the GHD's services. Project Owners, Avirom & Associates, Inc. and any of its Subcontractors shall hold harmless and indemnify GHD against any and all losses as a result of inability to locate or mislocate due to limitations within the available technology, the complexity of site conditions and circumstances beyond its control, but not against negligence on the part of GHD or its employees. The services provided by GHD shall be performed in accordance with generally accepted professional practices as related to the nature of services performed and in accordance to the Standard Guide for Using the Surface Ground Penetrating Radar Method for Subsurface Investigation as set forth by the American Society for Testing and Materials: **D 6432 – 99 (Reapproved 2005)**. Payment to GHD shall not be contingent upon its performance or results due to any limiting condition as described.

This proposal constitutes the entire agreement between the parties. The agreement may not be altered, modified or conditioned in any respect without the prior written consent of all parties. Documents such as but not limited to "change orders", "purchase orders", sub-contract agreements, and statements of terms and conditions of work shall require prior written acceptance by GHD to be binding. Payment to GHD for work performed pursuant to this proposal shall not be contingent upon GHD's consent to any proposed alteration, modification or condition to the agreement.

CONDITIONS – Locating of anomalies for pre-excavation/design purposes:

- Anomalies/Objects locations are being provided in an attempt to aid in additional investigation of the site.
- Areas to be surveyed must be level and free of obstructions.
- GHD's inability to complete the project due to conditions outside of GHD's control does not void this contract.
- If GHD is to produce a map (additional fee), client is responsible for providing an electronic AutoCAD file or other graphical file for GHD to map its discoveries.
- Maps produced by GHD (additional fee) are *not* considered to be "survey grade" drawings. GHD will include dimensions from a fixed feature (referenced to the staked targeted areas provided by the client) in the field to the horizontal position of the discovered target being depicted. Drawings are not prepared by a licensed Engineer, Surveyor or Draftsman. Drawings are not prepared to any State survey or drafting standard.
- If GHD reviews its discoveries with others responsible for data collection/mapping, a copy of the finished drawing must be supplied to GHD for review.
- GHD is not responsible for moved, altered, and obliterated marks or maintaining marks. GHD will impose an additional fee to relocate/remark facilities.
- GHD is not a substitute for Chapter 556 of the FL State Statute (Underground Facility Damage Prevention and Safety Act). Prior to project construction, excavating contractor is responsible for securing locations of public utilities through Sunshine State One Call of Florida (phone: 811).
- The performance of GHD's services is limited to full and unobstructed access to include but not limited to: mechanical rooms, manholes, hand holes, vaults, meter rooms, telecom rooms, fixtures (plumbing, electrical, communication), dispensers, fenced compounds, tanks and structures (if applicable). Full cooperation from the on-site personnel is necessary to perform a complete survey.

COST ESTIMATE:

Electromagnetic, GPR Investigation

- *Conduct a subsurface investigation to determine the presence of any detectable anomalies consistent with seawall tie backs using EM and GPR techniques.*
- *Mark selected targets on the ground surface as necessary with marking paint and/or flags*
- *Review discoveries with data collection personnel*

Electromagnetic & GPR Field Investigation	1 day @ $1,700/ day	$1,700.00
Mobilization	10hrs @ $75/hour	$ 750.00
Overnight	1 night @ $250*****	$ 250.00*****
Total Cost Estimate:		**$2,700.00**

****An overnight charge of $250 applies should data collection be deemed successful resulting in a full day on-site. If data quality is deemed inconclusive after one-half day sampling, overnight rate not applied.***

The above cost is effective for 30 days from the date of this proposal. Costs are subject to change upon unforeseen condition, any changes will be negotiated accordingly. ***Provided, in no event shall payment to GHD be made later than 45 days from submission of its invoice, irrespective of Contractor's receipt of payment from Owner.***

Mr. Chee-A-Tow, thank you for allowing us to present this proposal. Should you have any questions, do not hesitate to contact me at: 561-737-9800. If you wish to schedule this project to be worked, please sign and return via fax or email this last page.

Sincerely,

Adam Smith, Dir of Ops
Ground Hound Detection Services, Inc.

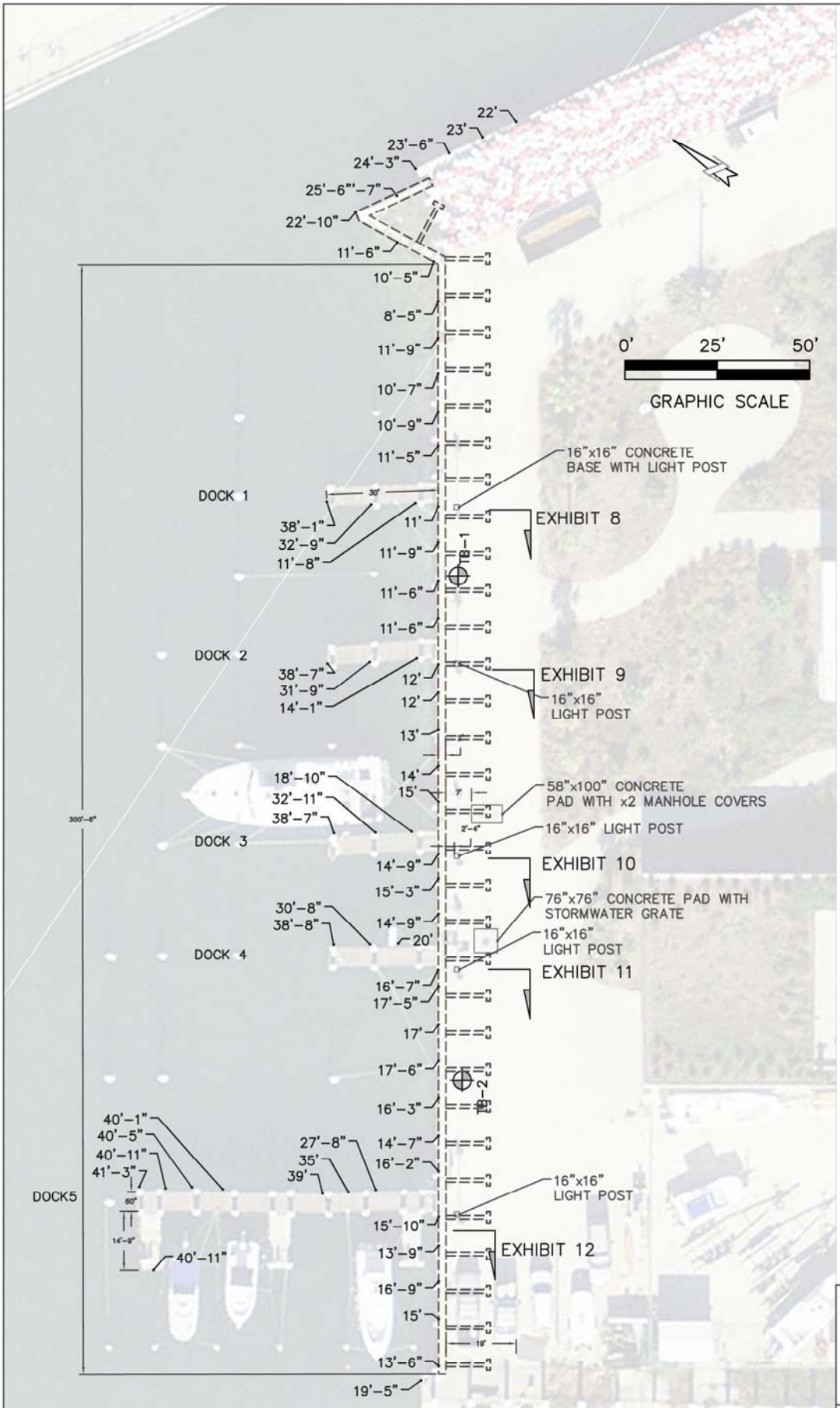
_____ _____

Accepted by Title/Company

_____ _____

Print Name of Signer Date

Re: Avirom "GPR Investigation for Seawall Tie-backs – CoCW Seawall Replacement"



LEGEND:

60" — DIMENSIONS (FIELD-MEASURED)

15' — HEIGHT (MEASURED FROM TOP OF SEAWALL TO TOE of SEAWALL)

DEPTH — AVERAGE DISTANCE FROM TOP OF WALL TO WATER WAS: 7-FEET

SO, IF HEIGHT WAS MEASURED AT 15', WATER DEPTH AT THAT POINT IS:
15' - 7' = 8'

BORING LOCATION

EXISTING WALL

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS SHOWN WERE FIELD-MEASURED USING 25' AND 100' TAPE MEASURES. THE SEAWALL LENGTH WAS MEASURED USING A WHEEL MEASURE.
2. DATA COLLECTED ON 6/23/15. ELEVATION DATA AND WATER DATA COLLECTED BETWEEN 11:30AM TO 12:30PM.
3. ALL ELEVATIONS SHOWN ARE MEASURED COMPARED TO THE ELEVATION OF THE SEAWALL AT EACH LOCATION. ELEVATIONS AT DOCKS WERE COMPARED TO THE RELATIVE ELEVATION AT THE SEAWALL IN FRONT OF THE DOCK.
4. THE SEAWALL CAP IS 2' WIDE BY 1' TALL. THE SEAWALL APPEARS TO BE MADE OF REINFORCED CONCRETE.
5. MEASUREMENTS ARE ROUNDED TO THE NEAREST INCH.
6. DISTANCE TO WATER IS MEASURED FROM THE TOP OF THE EXISTING WALL TO THE TOP OF WATER AT THE TIME TAKEN.

TRUMAN SEAWALL
KEY WEST, FL
EXHIBIT 1 – DEPTHS

TETRA TECH, INC.

SCALE: AS SHOWN	PREPARED: FM	CAD FILE NO. Site Visit 062315
DATE:	CHECKED:	DRAWING NO. E1_DEPTH
	APPROVED:	