DD2

STATE OF TEXAS §
§
DISTRICT OF FORT BEND §

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT is made and entered into by and between Fort Bend County Drainage District, (hereinafter "District"), a body corporate and politic under the laws of the State of Texas, and Wetland Technologies Corporation (hereinafter "Contractor"), a company authorized to conduct business in the State of Texas.

WITNESSETH

WHEREAS, District desires that Contractor provide Stream Design and Construction Consulting services related to the Big Creek Project (hereinafter "Services"); and

WHEREAS, District has determined that this Agreement is for personal or professional services and therefore exempt from competitive bidding under Chapter 262 of the Texas Local Government Code; and

WHEREAS, Contractor represents that it is qualified and desires to perform such services.

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth below, the parties agree as follows:

AGREEMENT

Section 1. Scope of Services

Contractor shall render Services to District as defined in the Scope of Services (attached hereto as Exhibit A).

Section 2. Personnel

2.1 Contractor represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for the timely performance of the Scope of Services required under this Agreement and that Contractor shall furnish and maintain, at its own expense, adequate and sufficient personnel, in the opinion of District, to perform the Scope of Services when and as required and without delays.

2.2 All employees of Contractor shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of Contractor who, in the opinion of District, is incompetent or by his conduct becomes detrimental to the project shall, upon request of District, immediately be removed from association with the project.

Section 3. Compensation and Payment

3.1 Contractor's fees shall be calculated at the rates set forth in the attached exhibits. The Maximum Compensation for the performance of Services within the Scope of Services described in Exhibit A is three hundred ten thousand dollars and no/100 ($310,000.00). In no case shall the amount paid by District under this Agreement exceed the Maximum Compensation without an approved change order. The Maximum Compensation shall be allocated as follows:

3.1.1.	Section 1: Five Years-Design Work	$79,000.00
3.1.2.	Section 2: Five Years-Constr. Supervision	$70,000.00
3.1.3.	Section 3: Five years-Maintenance Work	$46,000.00
3.1.4.	Section 4: Three Years-After Constr. Inspection/Reports	$30,000.00
3.1.5.	Section 5: One Year-Permit Re-Authorization Application	$35,000.00
3.1.6.	Contingency Items	$50,000.00

3.2 All performance of the Scope of Services by Contractor including any changes in the Scope of Services and revision of work satisfactorily performed will be performed only when approved in advance and authorized by District.

3.3 Contingency Items are defined as those Permit requirements to be fulfilled that are unknown as of the Effective Date of the Agreement, or the actual requirements for performance are not clearly defined on the Effective Date. The amount of funds and additional services to be provided as a Contingency Item shall be agreed upon in advance between District and Contractor prior to Contractor undertaking such Contingency Items. The maximum amount to be spent on Contingency Items for the entire effective Term of Agreement (hereinafter defined) shall not exceed fifty thousand dollars and no/100 ($50,000.00) for any purpose. Any amount needed in excess of such during the effective Term of Agreement shall require negotiation and agreement between the parties on an approved change order.

3.4 District will pay Contractor based on the following procedures: Upon completion of the tasks identified in the Scope of Services, Contractor shall submit to District two (2) original copies of invoices showing the amounts due for services performed in a form acceptable to District. District shall review such invoices and approve them within 30 calendar days with such modifications as are consistent with this Agreement and forward same to the Auditor for processing. District shall pay each such approved invoice within thirty (30) calendar days. District reserves the right to withhold payment pending verification of satisfactory work performed.

Section 4. Limit of Appropriation

4.1 Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence of this Agreement, that District shall have available the total maximum sum of three hundred ten thousand dollars and no/100 ($310,000.00), specifically allocated to fully discharge any and all liabilities District may incur.

4.2 Contractor does further understand and agree, said understanding and agreement also being of the absolute essence of this Agreement, that the total maximum compensation that Contractor may become entitled to and the total maximum sum that District may become liable to pay to Contractor shall not under any conditions, circumstances, or interpretations thereof exceed three hundred ten thousand dollars and no/100 ($310,000.00).

Section 5. Term of Agreement

5.1 The time for performance of the Scope of Services by Contractor shall begin with receipt of the Notice to Proceed from District based on receipt of a verbal notification from the United States Army Corp of Engineers ("Corps") that the 404 Permit Application has been approved.

5.2 This Agreement shall remain in effect during periods of Corps Permit ("Permit") authorization and written Permit approval and extend throughout the effective period of the Permit, estimated to be five (5) years.

5.3 Upon conclusion of Permit effective period, Contractor and District may negotiate for extension for performance of services related to Permit re-authorization application, if necessary.

Section 6. Modifications and Waivers

6.1 The parties may not amend or waive this Agreement, except by a written agreement executed by both parties.

6.2 No failure or delay in exercising any right or remedy or requiring the satisfaction of any condition under this Agreement, and no course of dealing between the parties, operates as a waiver or estoppel of any right, remedy, or condition.

6.3 The rights and remedies of the parties set forth in this Agreement are not exclusive of, but are cumulative to, any rights or remedies now or subsequently existing at law, in equity, or by statute.

Section 7. Termination

7.1 Termination for Convenience

7.1.1 District may terminate this Agreement at any time upon thirty (30) days written notice.

7.2 Termination for Default

7.2.1 District may terminate the whole or any part of this Agreement for cause in the following circumstances:

7.2.1.1 If Contractor fails to perform services within the time specified in the Scope of Services or any extension thereof granted by the District in writing;

7.2.1.2 If Contractor materially breaches any of the covenants or terms and conditions set forth in this Agreement or fails to perform any of the other provisions of this Agreement or so fails to make progress as to endanger performance of this Agreement in accordance with its terms, and in any of these circumstances does not cure such breach or failure to District's reasonable satisfaction within a period of ten (10) calendar days after receipt of notice from District specifying such breach or failure.

7.2.2 If, after termination, it is determined for any reason whatsoever that Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the District in accordance with Section 7.1 above.

7.3 Upon termination of this Agreement, District shall compensate Contractor in accordance with Section 3, above, for those services which were provided under this Agreement prior to its termination and which have not been previously invoiced to District. Contractor's final invoice for said services will be presented to and paid by District in the same manner set forth in Section 3 above.

7.4 If District terminates this Agreement as provided in this Section, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to Contractor.

Section 8. Ownership and Reuse of Documents

All documents, data, reports, research, graphic presentation materials, etc., developed by Contractor as a part of its work under this Agreement, shall become the property of District upon completion of this Agreement, or in the event of termination or cancellation thereof, at the time of payment under Section 3 for work performed. Contractor shall promptly furnish all such data and material to District on request.

Section 9. Inspection of Books and Records

Contractor will permit District, or any duly authorized agent of District, to inspect and examine the books and records of Contractor for the purpose of verifying the amount of work performed under the Scope of Services. District's right to inspect survives the termination of this Agreement for a period of four years.

Section 10. Insurance

10.1 Prior to commencement of the Services, Contractor shall furnish District with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days' prior written notice to District. Contractor shall provide certified copies of insurance endorsements and/or policies if

requested by District. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

10.1.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed. Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

10.1.2 Commercial general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

10.1.3 Business Automobile Liability insurance with a combined Bodily Injury/Property Damage limit of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

10.1.4 Professional Liability insurance with limits not less than $1,000,000.

10.2 District and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation. All Liability policies including Workers' Compensation written on behalf of Contractor shall contain a waiver of subrogation in favor of District and members of Commissioners Court.

10.3 If required coverage is written on a claims-made basis, Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 2 years beginning from the time that work under the Agreement is completed.

Section 11. Indemnity

CONTRACTOR SHALL INDEMNIFY AND DEFEND DISTRICT AGAINST ALL LOSSES, LIABILITIES, CLAIMS, CAUSES OF ACTION, AND OTHER EXPENSES, INCLUDING REASONABLE ATTORNEYS FEES, ARISING FROM ACTIVITIES OF CONTRACTOR, ITS AGENTS, SERVANTS OR EMPLOYEES, PERFORMED UNDER THIS AGREEMENT THAT RESULT FROM THE NEGLIGENT ACT, ERROR, OR OMISSION OF CONTRACTOR OR ANY OF CONTRACTOR'S AGENTS, SERVANTS OR EMPLOYEES.

Section 12. Confidential and Proprietary Information

12.1 Contractor acknowledges that it and its employees or agents may, in the course of performing their responsibilities under this Agreement, be exposed to or acquire information that is confidential to District. Any and all information of any form obtained by Contractor or its employees or agents from District in the performance of this Agreement shall be deemed to be confidential information of District ("Confidential Information"). Any reports or other documents or items (including software) that result from the use of the Confidential Information by Contractor shall be treated with respect to confidentiality in the same manner as the Confidential Information. Confidential Information shall be deemed not to include information that (a) is or becomes (other than by disclosure by Contractor) publicly known or is contained in a publicly available document; (b) is rightfully in Contractor's possession without the obligation of nondisclosure prior to the time of its disclosure under this Agreement; or (c) is independently developed by employees or agents of Contractor who can be shown to have had no access to the Confidential Information.

12.2 Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purposes whatsoever other than the provision of Services to District hereunder, and to advise each of its employees and agents of their obligations to keep Confidential Information confidential. Contractor shall use its best efforts to assist District in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limitation of the foregoing, Contractor shall advise District immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Agreement and Contractor will at its expense cooperate with District in seeking injunctive or other equitable relief in the name of District or Contractor against any such person. Contractor agrees that, except as directed by District, Contractor will not at any time during or after the term of this Agreement disclose, directly or indirectly, any Confidential Information to any person, and that upon termination of this Agreement or at District's request, Contractor will promptly turn over to District all documents, papers, and other matter in Contractor's possession which embody Confidential Information.

12.3 Contractor acknowledges that a breach of this Section, including disclosure of any Confidential Information, or disclosure of other information that, at law or in equity, ought to remain confidential, will give rise to irreparable injury to District that is inadequately compensable in damages. Accordingly, District may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies that may be available. Contractor acknowledges and agrees that the covenants contained herein are necessary for the protection of the legitimate business interest of District and are reasonable in scope and content.

12.4 Contractor in providing all services hereunder agrees to abide by the provisions of any applicable Federal or State Data Privacy Act.

12.5 Contractor expressly acknowledges that District is subject to the Texas Public Information Act, TEX. GOV'T CODE ANN. §§ 552.001 *et seq.*, as amended, and notwithstanding any provision in the Agreement to the contrary, District will make any information related to the Agreement, or otherwise, available to third parties in accordance with the Texas Public Information Act. Any proprietary or confidential information marked as such provided to District by Consultant shall not be disclosed to any third party, except as directed by the Texas Attorney General in response to a request for such under the Texas Public Information Act, which provides for notice to the owner of such marked information and the opportunity for the owner of such information to notify the Attorney General of the reasons why such information should not be disclosed. The terms and conditions of the Agreement are not proprietary or confidential information.

Section 13. Independent Contractor

13.1 In the performance of work or services hereunder, Contractor shall be deemed an independent contractor, and any of its agents, employees, officers, or volunteers performing work required hereunder shall be deemed solely as employees of contractor or, where permitted, of its subcontractors.

13.2 Contractor and its agents, employees, officers, or volunteers shall not, by performing work pursuant to this Agreement, be deemed to be employees, agents, or servants of District and shall not be entitled to any of the privileges or benefits of District employment.

Section 14. Notices

14.1 Each party giving any notice or making any request, demand, or other communication (each, a "Notice") pursuant to this Agreement shall do so in writing and shall use one of the following methods of delivery, each of which, for purposes of this Agreement, is a writing: personal delivery, registered or certified mail (in each case, return receipt requested and postage prepaid), or nationally recognized overnight courier (with all fees prepaid).

14.2 Each party giving a Notice shall address the Notice to the receiving party at the address listed below or to another address designated by a party in a Notice pursuant to this Section:

District: Fort Bend County Drainage District
Attn: Mark Vogler, P.E.
301 Jackson Street
Richmond, Texas 77469

With a copy to: Fort Bend County Drainage District
Attn: District Judge
401 Jackson Street, 1st Floor
Richmond, Texas 77469

Contractor: Wetland Technologies Corporation
Attn: GLENN JARRETT
1831 Pinewood Court
Sugar Land, Texas 77498

14.3 A Notice is effective only if the party giving or making the Notice has complied with subsections 14.1 and 14.2 and if the addressee has received the Notice. A Notice is deemed received as follows:

14.3.1 If the Notice is delivered in person, or sent by registered or certified mail or a nationally recognized overnight courier, upon receipt as indicated by the date on the signed receipt.

14.3.2 If the addressee rejects or otherwise refuses to accept the Notice, or if the Notice cannot be delivered because of a change in address for which no Notice was given, then upon the rejection, refusal, or inability to deliver.

Section 15. Compliance with Laws

Contractor shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required by District, Contractor shall furnish District with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

Section 16. Performance Warranty

16.1 Contractor warrants to District that Contractor has the skill and knowledge ordinarily possessed by well-informed members of its trade or profession practicing in the greater Houston metropolitan area and Contractor will apply that skill and knowledge with care and diligence to ensure that the Services provided hereunder will be performed and delivered in accordance with the highest professional standards.

16.2 Contractor warrants to District that the Services will be free from material errors and will materially conform to all requirements and specifications contained in the attached Exhibit A.

Section 17. Assignment and Delegation

17.1 Neither party may assign any of its rights under this Agreement, except with the prior written consent of the other party. That party shall not unreasonably withhold its consent. All assignments of rights are prohibited under this subsection, whether they are voluntarily or involuntarily, by merger, consolidation, dissolution, operation of law, or any other manner.

17.2 Neither party may delegate any performance under this Agreement.

17.3 Any purported assignment of rights or delegation of performance in violation of this Section is void.

Section 18. Applicable Law

The laws of the State of Texas govern all disputes arising out of or relating to this Agreement. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to this Agreement and waive the right to sue or be sued elsewhere. Nothing in the Agreement shall be construed to waive the District's sovereign immunity.

Section 19. Successors and Assigns

District and Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Agreement and to the successors, executors, administrators and assigns of the other party, in respect to all covenants of this Agreement.

Section 20. Third Party Beneficiaries

This Agreement does not confer any enforceable rights or remedies upon any person other than the parties.

Section 21. Severability

If any provision of this Agreement is determined to be invalid, illegal, or unenforceable, the remaining provisions remain in full force, if the essential terms and conditions of this Agreement for each party remain valid, binding, and enforceable.

Section 22. Publicity

Contact with citizens of Fort Bend County, media outlets, or governmental agencies shall be the sole responsibility of District. Under no circumstances whatsoever, shall Contractor release any material or information developed or received in the performance of the Services hereunder without the express written permission of District, except where required to do so by law.

Section 23. Captions

The section captions used in this Agreement are for convenience of reference only and do not affect the interpretation or construction of this Agreement.

Section 24. Conflict

In the event there is a conflict between this Agreement and the attached exhibit, this Agreement controls.

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the _____ day of _____, 2014.

FORT BEND COUNTY DRAINAGE DISTRICT

Robert E. Hebert, Fort Bend County Judge

9-23-14
Date

ATTEST:

Dianne Wilson, County Clerk

WETLAND TECHNOLOGIES CORPORATION

Authorized Agent- Signature

GLENN JARRETT
Authorized Agent- Printed Name

President
Title

September 8, 2014
Date

APPROVED:

Mark Vogler, General Manager/Chief Engineer

COMMISSIONERS COURT FORT BEND COUNTY, TEXAS

AUDITOR'S CERTIFICATE

I hereby certify that funds are available in the amount of **$310,000.00** to accomplish and pay the obligation of Fort Bend County Drainage District under this contract.

Robert Edward Sturdivant, District Auditor

WETLA-1 OP ID: LG

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 09/05/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER HARCO Insurance Services 10777 Northwest Frwy., #800 Houston, TX 77092-7339 Jill Foreman Phone: 713-681-2500 Fax: 713-684-1600	CONTACT NAME: Linda Terry, CIC PHONE (A/C, No, Ext): 713-681-2500 FAX (A/C, No): 713-684-1600 E-MAIL ADDRESS: lterry@harco-ins.com
INSURED Wetland Technologies Corporation 1831 Pinewood Court Sugar Land, TX 77498	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A: Rockhill Insurance Company INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC			ENVP00096402	03/05/2014	03/05/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Prof Liab	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 1,000,000 $ 1,000,000
A	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS			ENVP00096402	03/05/2014	03/05/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

See Attached Holder Notes

CERTIFICATE HOLDER

FORTBCO

Fort Bend County Drainage District
Attn: Debbie Kaminski
301 Jackson Street
Richmond, TX 77469

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Willis J. Hargrave III

We have issued an industry-standard ACORD certificate of insurance on behalf for our customer. A law passed by the Texas Legislature effective January 1, 2012 (Senate Bill 425) requires certificate forms (as well as questionnaires and related documents) to be filed with and approved by the Texas Department of Insurance.

We are prohibited by law from issuing a certificate that alters or modifies a certificate form unless it has been approved by TDI. For more information regarding the law, please go to the Texas Department of Insurance website at: http://www.tdi.texas.gov/index.html

The General Liability and Auto Policy Includes A Blanket Automatic Additional Insured Endorsement That Provides Additional Insured Status To The Certificate Holder Only When There Is A Written Contract Between The Named Insured And The Certificate Holder That Requires Such Status

The General Liability and Auto Policy Includes A Blanket Automatic Waiver of Subrogation Endorsement That Provides This Feature Only When There Is A Written Contract Between The Named Insured And The Certificate Holder That Requires It.

The policy includes an endorsement providing that 30 days notice of cancellation (or coverage change) will be furnished to the certificate holder.

Client#: 165068 WETLATEC

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 09/05/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER USI Southwest Three Memorial City 840 Gessner, Suite 600 Houston, TX 77024	CONTACT NAME: PHONE (A/C, No, Ext): 713 490-4600 FAX (A/C, No): 713-490-4700 E-MAIL ADDRESS:
INSURED Wetland Technologies Corp 1831 Pinewood Court Sugar Land, TX 77498	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Texas Mutual Insurance Company — 22945 INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ ☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N: N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		SBP0001036056	10/29/2013	10/29/2014	X WC STATU-TORY LIMITS ☐ OTH-ER	
							E.L. EACH ACCIDENT	$1,000,000
							E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

The Workers Compensation policy provides a Blanket Waiver of Subrogation when required by written contract, except as prohibited by law.

CERTIFICATE HOLDER

Fort Bend County Drainage District
Attn: Debbie Kaminski
301 Jackson St.
Richmond, TX 77469

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

PILHA

EXHIBIT A

Wet Tech[sm]

Proposal for Professional Services

Proposed Contract Between Wetland Technologies Corporation and the Fort Bend County Drainage District for the:

Construction Phase of the Big Creek Project

Proposed Agreement Between the Parties Regarding Stream Design and Construction Consulting Work to be attached to:

Addendum One:	***Wet Tech Scope of Work***
Addendum Two:	***SOW Controlling Document***
Addendum Three:	***Wet Tech Fee Schedule***

Upon execution of the attached **Contract for Professional Services**, the **Parties** have agreed to enter into a contractual relationship between them for the purpose of performing consulting work related to the construction phase of the Big Creek Project; as follows:

Parties: The parties to this **Agreement** are:

Consultant: Wetland Technologies Corporation (**Wet Tech**);
Owner: Fort Bend County Drainage District (the **District**).

Proposal: The body of this **Proposal** constitutes a summary of the duties to be performed by **Consultant** on behalf of, and according to the authority of the **Owner**. Additional detail regarding the work to be performed is provided in:

ADDENDUM ONE: SCOPE of WORK (SOW), and

ADDENDUM TWO: SOW CONTROLLING DOCUMENT, and

ADDENDUM THREE: WET TECH FEE SCHEDULE

Contract Length: This **Agreement** is to begin in force and effect from the date of verbal notification by the **Corps of Engineers** that the **404 Permit Application** has been approved; and that the **District** will be granted a written authority to begin construction work at a later date, most likely following at about six (6) to eight (8) weeks. The signed written **Corps Permit** (the **Permit**) will have an effective period of five (5) years from it's issuance date; and this **Agreement** will end on the same date; except for work remaining on the permit re-authorization application, if any.

Total **Contract** length is to be that undetermined period (about eight weeks) between verbal **Permit** authorization and written **Permit** approval; and the life of the **Permit** in force and effect (about five years); and work remaining on the permit re-authorization application, if any. All as are described more fully within the attached documents.

Based on our most recent experiences at that time (the end-of-permit and contract), **Wet Tech** will negotiate with the **District** a follow-on contract extension for performance of these or similar contract items until the project is complete (about an additional five years).

Purpose of Work: The **District** desires to meet all requirements of the **Permit** as are more fully described in the section on **Duties** below. The **District** also desires to meet all requirements described as standard requirements in the **Stream SOP** released by the **Corps** in **May of 2013**.

Duties of Wet Tech: Reference is made to the **SOW Controlling Document** comprised of the text description of the work to be performed by **District** as will be required by **Permit,** as well as other requirements to condition the **Permit** as yet unknown. The controlling document/permit requirement states in a number of locations that Consultant **(Wet Tech)** will stake certain design features for heavy equipment operators to work from, and that **Wet Tech** will observe operators working to ensure that all requirements are met. While not widely known, the new **Corps** rules hold the Applicant's Consultant to be liable for project failure (of required environmental aspects of project); ensuring that Consultant facilitates actual designs and observes construction work in a manner that leads to project success. By extension, **Wet Tech** is to fulfill this mandated role.

Certificates of Insurance: On execution of this **Agreement** between the **Parties, Wet Tech** is to provide to the **District** certificates of insurance for professional services of (a combined policy of) General Liability, Professional Liability, and Hired/Not Owned Vehicles Liability; as well as a certificate for a policy of Workmen's Compensation. All are to be in the amounts as required by the **District.**

Change Orders (if any), and Contingency Amounts: To prevent or lessen need for future change orders, this **Wet Tech** contract proposal contains contingency amounts within each section. Additional casual labor such as field staking or data input are to be at the cost of **Wet Tech.** However, should a professional be needed that is not currently known to be required – such as a Biologist for delineation, or an endangered species Biologist, or an Archeologist – identification of such costs would generate a proposal by **Wet Tech** to activate certain contingency amounts, which would become effective on approval by **District.** Should available contingency amounts be insufficient to pay for work needed, **Wet Tech** would prepare a proposal for a Change Order for **District's** approval.

Cost Controls: Wet Tech will utilize the **District's** surveyors whenever possible to lower or eliminate outside surveyor costs. **Wet Tech** will provide channel location and cross section details to eliminate or reduce outside engineering costs. These efforts are to be provided within the **District's** casual "field-fit" design format. **Wet Tech** will also utilize the **District's** capability to provide color GIS maps for meetings and reports when a specific CAD drawing is not required.

CAD Drawings and Construction Specifications: Wet Tech will utilize previously developed materials – with only minor revisions for local site conditions – to aid in preparation of a suitable Construction Specification document. **Wet Tech** CAD drawings will be the simplest that **Wet Tech** and the **District** can agree on; that will meet the needs of construction documentation for **Permit** compliance records.

Reports and Inspections: Are to be done on a continuous basis when appropriate; and structured to submit to the **Corps** on a yearly basis as is described more fully in the **Permit**.

Beginning Work: As **District** management desires to begin construction work on the date written permit approval is received, **Wet Tech** is to begin preliminary design work on receipt of verbal approval from the **Corps** that the written permit will follow when signed. Usually the waiting period for the signed permit is about six (6) weeks after notification. During that time a sufficient amount of preliminary design work will be completed to allow sitework to begin upon written approval to begin work.

Project Timeline: The project duration described above in the **Contract Length** section is focused primarily on the **District's** construction progress achieved per day, month, and year. As **Wet Tech** serves the purpose of facilitating **District's** success in meeting **Permit** and **Stream SOP 2013** requirements, **Wet Tech's** project completion amounts are defined as to be the same as completing it's **SOW** requirements for that period of time that **District** is completing it's construction of the Big Creek project.

Specifically, for a period of slightly more than five years, **Wet Tech** is to complete all (100%) of it's **Preliminary Office Work, Field Work,** and it's normal **Office Work** for **Section One: Design** each month (for each month) that **District's** surveyors are performing their project staking work. Additionally, **Wet Tech** staff are to achieve the same completion of professional services per month to match the work of **District** on-site construction crews as apply to **Section Two, Section Three, and Section Four.**

During the last (5^{th}) year of the contract, in addition to continuing to perform the duties of **Section's One, Two, Three and Four** concurrently - **Wet Tech** staff will also concurrently perform the duties of **Section Five.** Should **Section Five** not be complete (defined as project **Permit** re-authorization being received) at the end of the 5^{th} year, **Wet Tech** will continue to perform those duties until it is complete. **Wet Tech** will invoice **District** each month for work completed that month concurrently on **Section's One, Two, Three, Four and Five** as is defined above.

Wet Tech Proposal: The work is proposed to be performed over a slightly longer period than five years by **Wet Tech** on behalf of, and at the direction of **District,** as is more fully described within **Addendum's One, Two, and Three;** and as is summarized (without unknown contingency amounts) below:

Section One: Design $ 79,000.00

Preliminary Office Work: Prior to beginning fieldwork, coordination with **District's** staff, with **District's** survey crew, and with **District's** construction crew.

Fieldwork: Wet Tech staff will work with the **District's** survey crew until they have sufficient guidance to operate independently, and **Wet Tech** staff will utilize their information marked on stakes when observed later. Record field data of staked-in site design for in-office drawings, and photo-document the process well for future reports to the Corps.

Office Design Work: About two (2) days of every week will be scheduled for recording of field information in sitework files and preparing construction drawings; as well as construction specifications site-specific to the Big Creek project. At all times keep a log book of big trees marked to be taken, and the number and species of new trees to be planted.

Section Two: Construction Supervision 70,000.00

Fieldwork: Coordinate with **District's** construction management, meet crew as they move onsite, and photo-document that the process was done appropriately. Observe each operator and his equipment sufficient to determine their capabilities. Work with supervisor to ensure that operators understand how to accomplish working wet carefully. Adjust design stakes to accommodate **District's** field-fit needs during construction process. Continue field design work described in **Section One** above during quiet periods of construction work.

Observe tree and herbaceous planting activities, keep a running tally of tree and herbaceous species nursery stock planted, and stock needed to be ordered for delivery. If an on-site grow-out nursery is operated, maintain a constant observation of site activities.

Office Work: Begin keeping detailed log records of observations of site work including the log book of big trees that are removed up to date. Set up a separate photo library in computer to hold and organize all site photographs for the approximate ten (10) year construction period. Continue office design work described in **Section One** above and prepare the next set of drawings.

Section Three: Maintenance 46,000.00

Fieldwork: Perform continual inspections during year to ascertain maintenance needs that arise, and inspect maintenance work being completed as appropriate.

Office Work: Utilize inspection photographs to prepare reports of maintenance needed, and to document work performed.

Section Four: After Construction Inspections and Reports 30,000.00

Fieldwork: Yearly inspections as required by permit, both of construction work completed to-date and regular maintenance work in progress. Photo-document all aspects of completed work well for use in yearly reports to Corps.

Office Work: Prepare and submit yearly reports as required by permit. Prepare sufficient CAD drawings to indicate as-built conditions during previous year. Utilize aerials to show construction progress.

Section Five: Preparation and Submittal of Permit Re-Authorization Application 35,000.00

Fieldwork: All fieldwork necessary to support preparation of new permit application. Utilize CAD drawings and aerials generated during previous reports where possible.

Office Work: Meetings with Corps and resource agency representatives when appropriate. Preparation and submission of new permit application. Preparation and submission of new TCEQ 401 WQ permit application.

New Contract Extension: Negotiation with the **District** of the final construction contract extension, most likely very similar to this contract language and scope of work, provided that the re-authorized permit language is not appreciably different from the original.

Total Contract Amount $260,000.00

(without unknown contingency amounts)

Addendum One:

Wet Tech[sm] Scope of Work

Contract Between Wet Tech and the District for:

Construction Phase of the Big Creek Project

To be Attached to the:

Wet Tech Proposal for Professional Services:

Section One: Design

Preliminary Office Work: Coordination with the **District's** staff to determine where it desires to begin construction work, and whether there should be a plant nursery onsite. And, with **District's** survey crew to arrange where to begin design work; and with **District's** construction crew to determine the types of equipment and the number of them that will be available to start on permit date.

Fieldwork: Wet Tech staff will work with the **District's** survey crew for several days to develop a suitable method to stake the necessary measurements prior to beginning design work. When the survey crew has sufficient guidance to operate independently, they will proceed at their own pace, and **Wet Tech** staff will utilize their information marked on stakes when observed later. Record field data of staked-in site design for in-office drawings, and photo-document the process well for future reports to the Corps.

In particular, review all site design detail staking requirements committed to in permit application, and ensure that all are met sufficiently. If possible, determine additional site details that can be staked in advance. And, focus every day on recording every large tree to be taken as described in the permit application. Ensure that each overbank drain wetland design is appropriate for the local situation; as well as meets permit commitments. Take time to design and record the planned tree planting sites, along with suitable photographs.

If a grow-out nursery is to be constructed, select the site and stake the proposed grow-out areas for recording by the survey crew. Coordinate with **District's** staff during the decision phase, and construction manager regarding proposed work details for laborers installing the initial plantings. Also consider utilizing the first area to be planted within the main project as a plant nursery.

Office Design Work: About two (2) days of every week will be scheduled for recording of field information in sitework files. At about the third week these office work days will begin to be utilized to prepare construction drawings, in order to aid in beginning construction work. Also at about the third week begin to develop construction specifications site-specific to the Big Creek project. At all times keep a log book of big trees marked to be taken, and the number and species of new trees to be planted.

Draw up the tree planting areas in detail, where all concerned can see the proper locations, tree species to be planted, and proper planting methodologies. Contact nurseries of tree saplings for sale and aid the **District** in selection of the suppliers.

Also aid the district in selection of nurseries for supply of herbaceous plant species, and calculate quantities needed if a grow-out nursery is decided on, or much larger quantities if one is not. If desired by **District,** calculate cost differences between additional labor required to operate grow-out nursery vs. cost savings of purchasing large amounts of nursery stock.

At about six (6) weeks begin to coordinate with **District** staff drawings and specifications prepared to-date in order to be ready to start construction at any time.

Section Two: Construction Supervision

Fieldwork: Coordinate with **District's** construction management the appropriate start date and time, the equipment and personnel to be delivered to the site, and fueling station environmental requirements. Inspect staking to determine than none of the controlling stakes are missing, or have been moved.

Meet crew as they move onsite and photo-document that the process was done appropriately. Explain the drawings and specifications as are related to site staking. Ensure that site roadways and spoil disposal areas do not impact delineated wetlands that are not located within the permitted project impact footprint. Ensure that dump truck drivers (if any) remain on designated roadways and within designated spoil areas.

Observe each operator and his equipment sufficient to determine their capabilities. Work with supervisor to ensure that operators understand how to accomplish working wet carefully. Provide operator training on specialty topics if desired. Ensure that trackhoes and draglines do not excavate beyond staked existing channel as described in permit. Constantly replace design stakes that are removed in rainfall events, or by cattle. Adjust design stakes to accommodate **District's** field-fit needs during construction process.

Observe tree planting and herbaceous planting activities, and provide training if appropriate. Keep a running tally of tree and herbaceous species nursery stock planted, and stock needed to be ordered for delivery. If an on-site grow-out nursery is operated, maintain a constant observation of site activities.

Continue field design work described in Section One above during quiet periods of construction work. Coordinate with survey crew to ensure adequate staking is available for current needs, and record all necessary information to prepare the next set of drawings.

Office Work: Arrange with construction supervisor to have at least one day per week available for **Wet Tech** staff to perform in-office work. Begin keeping detailed log records of observations of site work. In particular keep the log book of big trees that are removed up to date, with sufficient photographs for subsequent Corps reports. Set up a separate photo library in computer to hold and organize all site photographs for the approximate ten (10) year construction period.

Continue office design work as is described more fully in Section One above, and prepare the next set of drawings.

Section Three: Maintenance

Fieldwork: Year One work begins part way through the year. Perform "informal" inspections continually during entire five (5) year construction period in order to observe problem issues early on. Work with construction supervisor to schedule regular maintenance activities at the convenience of work crew. Focus on maintaining healthy tree plantings as well as other species plantings. Try to determine cause of mortality for each tree sapling that dies, and rectify the observed issues involved with the new planted sapling. Photograph a representative sample of all maintenance issues that arise, as well as of corrective measures taken.

Office Work: Year One work begins part way through the year. Maintain separate maintenance files of informal reports of results of various site activities. Focus primarily on photographic documentation. Utilize as basis to support yearly inspections and reports to the Corps.

Section Four: After Construction Inspections and Reports

Fieldwork: Yearly "formal" inspections for report to the Corps as called for in the permit, all beginning in the Second Year. Note in the report success of construction work during the year, and performance of regular maintenance activities on-site. Focus on success achieved of maintaining healthy tree plantings as well as other species plantings. Review records of cause of mortality for each tree sapling that dies, and report observed success of new planted saplings.

Photograph all other construction related issues for the previous year, and review file photographs of all maintenance issues that occurred, as well as of the corrective measures taken. Year Five work is included as a part of the preparation of new permit application and not invoiced separately for this section.

Office Work: Prepare and submit yearly "formal" report to the Corps as called for in the permit, all beginning in the Second Year. Setup and maintain separate computer files for photographs selected for potential inclusion in formal Corps reports. Focus all formal reports on a photographic format while including all text information required to meet permit rules. Produce sufficient CAD drawings suitable for formal reports. In particular overlay new aerials flown after construction in the manner required by the PJD format to produce "as-built" drawings for the project permanent file. These drawings are to reduce or eliminate the need to have a biologist delineate any part of the newly constructed project. Year Five work is included as a part of the preparation of new permit application and not invoiced separately for this section.

Section Five: Preparation and Submittal of Permit Re-Authorization Application

Fieldwork: Similar to current **Wet Tech** work, utilize yearly as-built drawings as a guide to make site observations regarding completion of project to-date. Calculate the remaining work to be re-permitted. Overlay current Google Earth aerials to determine that previous PJD mapping is sufficient without need for a new delineation. Check with Corps Enforcement Section to ensure that their re-approval is not required.

Office Work: Similar to current **Wet Tech** work, utilize fieldwork observations and photographs to prepare a new application to re-authorize the original permit. Attempt to retain existing Corps requirements without generating additional mandated items. Make field trips to site with resource agency reps and meet with them in their offices when appropriate. Attempt to maintain the current approval to not require mitigation for project impacts. Submit for publication, and maintain contact with the Corps to provide any additional information required. Prepare and submit new TCEQ 401 WQ Certificate and AA Q&A.

New Contract Extension: Negotiation with the **District** of the final construction contract extension for **Wet Tech.** Most likely to be similar to this contract language and scope of work, provided that the re-authorized permit language is not appreciably different from the original.

Addendum Two: SOW Controlling Document '014

Description of Big Creek Avoidance and Minimization Plan

Proposed to be located on the Upper and Middle Reaches of Big Creek, Fort Bend County, Texas

Submitted to: **Corps of Engineers, Galveston District, Regulatory Branch**
Prepared for: **Fort Bend County Drainage District (Applicant)**
Prepared by: **Wet Tech[sm] (Consultant)**
Date: **June 9, 2014**

Introduction: This Avoidance and Minimization Plan (the Plan) was prepared according to requirements of the Stream SOP issued by the Corps in 2013. There are many aspects of the Stream SOP that affect design of proposed stream projects; however the most critical issue stated within it requires Applicant to select a design alternative that impacts stream stability the least (Least Environmentally Damaging Alternative). Applicant has selected an alternative that impacts stream stability minimally; such that very minor impacts are all that will remain after construction and maintenance periods are complete. As further described on following pages, ALL impacts proposed for the Big Creek project are for the purpose of increasing stream stability. NO negative long-term impacts are proposed to be included in project design. An alternative design that proposed straightening the channel with 7 bypasses (which would shorten stream length by about 5,000', lower bed height, and speed storm-flow downstream) was rejected by Applicant as detrimental to stream stability.

Background: Historically Big Creek consisted of a slow moving, coastal plain stream that flooded out of its banks frequently. Its original streambed exhibited many meanders and loops, which slowed drainage of adjacent agricultural properties during wet years. In the 1950's Big Creek was partially channelized by excavating a number of bypass channels between meanders, thereby shortening the streambed and lowering bed elevation. Bypassed remnant channels mostly became oxbow lakes; while a few old channels were allowed to remain open-ended into the new, lower flood-way. Additionally, side-slopes were widened at the same time in order to increase conveyance capacity. In the 1990's to early 2000's, larger sections of the Lower Reach of Big Creek were widened and deepened again to increase conveyance capacity as authorized by previous Corps Galveston District Permits.

Background continued: A Hydrologist firm subsequently studied Middle and Upper Reaches of Big Creek and recommended in 2003 a matching capacity-increasing project to be constructed that would increase their storm-flow capacity in order to utilize recently constructed downstream reach improvements.

Purpose: The alternative that was selected would again widen the existing channel and add conveyance capacity. It would retain existing meanders and slower speed of flow, while creating a small floodplain alongside the new streambed that does not currently exist. Additionally, the entire project construction footprint would utilize the least Jurisdictional impact location. All to be for the purpose of increasing existing conveyance capacity from a 5 year rainfall event up to a 10 year event. No additional capacity for future development is proposed. Big Creek would still flood out of its banks in a 10 year or greater event.

The project objective can now be stated as: to construct a suitable design within Middle and Upper Reaches of Big Creek, in a manner that impacts from the proposed floodplain creation project are sufficiently minimal such that no long-term negative effects remain after completion.

Several years ago Applicant installed this double weir at the beginning of the proposed floodplain creation project in order to stop a major head cut that was working upstream. The pool-weir-pool combination did stop head cut expansion as expected. Upon receiving authority to begin work, and then stabilizing the upstream channel of Big Creek, first weir shown to right above will be removed and only the lower weir to left will remain. Lower weir height promotes biological organism connectivity. Following pages present other examples of Applicant's existing stream stability work.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Description Summary of Proposed Enhancements: The Middle Reach of Big Creek would be widened from an average of 19' at the toe-of-slope up to 40' width in straight sections, and wider at side channel entrances. The Upper Reach of Big Creek would be widened from an average of 15' at the toe-of-slope up to 30' in straight sections, and wider at side channel entrances.

1.) A sinuous streambed is to be shaped into the newly excavated floor that would utilize new width to create bankfull benches and/or layback benches according to currently available stream design publications. **2.)** Emergent pool-weir-pool(s) are to be included that stabilize stream-flow and step down streambed elevation. **3.)** Upper Terrace on each side of overbank swale system is to have occasional wetland pools ponded against main berm for water quality improvement and associated habitat. **4.)** Old remnant channels of Big Creek are to have their hydrology restored from the overbank swale system; either to restore a previous oxbow lake, or to run storm-flow through an existing dry bottom. **5.)** Some trees are to be planted on Upper Terrace (overbank swale) side-slope. **6.)** Existing benthic organisms are to be conserved and returned to newly constructed streambed (along with wetland vegetation growing within current streambed for seedbank material).

Small Weir-And-Pool: Previously installed by Applicant on Fulshear Creek some years ago to control head cut traveling upstream (out of sight behind camera position). Note long, gradual tailrace behind weir that moderates hydraulic jump and prevents scouring a pool below. Rather than scouring a pool below the weir, another pool would be dug in below weir to accept remaining energy flowing downstream.

Four small weirs are proposed to be installed at mouths of infalling tributaries to Big Creek. They are to moderate flood energy specifically within tributaries, and stabilize them in order to prevent head cutting.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Design Data Collection and Related Design: In previous years, existing condition cross section profiles of Big Creek Upper and Middle Reaches were prepared during the original Hydrologist's design study. The Hydrologist firm also prepared their selected design elevation for the new streambed. In this past year, Applicant has performed a more detailed cross section study; a sample page of which is included in the Project Plans and Drawings. The resulting proposed design streambed profile incorporates hydrological information from those various studies, as well as stream gauge data accumulated over a number of years. Based on available data, Consultant has modified Hydrologist's original design somewhat to accommodate desired goals and objectives of the Stream SOP.

Specifically, the original design of a centerline pilot channel has been modified into a proposed sinuous streambed that curves from side-to-side within the new floodplain bottom. Its width is to be about 1/3rd the available bottom width, and avoids the toe-of-slope on each side. A representative plan view is shown in the Plans and Drawings. This particular shape results in desired bankfull benches being constructed on each side of the streambed, as well as riffles and backwater pools. As a consequence of greatly increasing the amount of shallow water edge, vegetated wetland fringe area will also be increased.

The Stream SOP suggested design docs recommend new streambeds be designed calculated to flood (out of the new streambed) at no more than the 1.5 year flood event. While many calculations provided in various docs related to the Stream SOP seem to address this issue; they are almost entirely focused on streams with slope and rocky ground, neither of which exist in the Gulf Coastal Plain. Big Creek winds through a silty/clay/sandy alluvial coastal plain whose slope only falls about a foot every 3,000'. Their local environment tends to be dry or moderate, where the Gulf Coast is a very humid weather location. Additionally, rarely do they experience extreme events from hurricanes and tropical storms, the major causes of extreme floods locally. Consultant is of the opinion that the new streambed will flood over the benches at considerably less than the 1.5 year event.

Based on historical data available, local erodible soil types and lack of slope, and Applicant's experience with Big Creek during major flood events over the past 50 years; Consultant has observed that stability within Big Creek most likely would benefit from additional measures other than the planned new floodplain creation project. Consequently, Applicant proposes to install step-pool weirs at several locations along the new streambed to drop out excess flood energy at appropriate intervals along its length. As shown in photographs here, Applicant has considerable experience in design, construction and maintenance of small and large weirs.

Section One: Emergent Pool – Weir – Deep Pool Specification

Description: A primary method selected by Applicant to enhance stream stability within the Big Creek streambed is to install a series of pools and weirs within the newly excavated floodplain; as well as a somewhat smaller, similar series to be installed at the mouths of 4 tributaries emptying into Big Creek. Applicant also proposes to install 8 larger new pool-weir-pools within the new Big Creek floodplain, in addition to an existing weir located at downstream end of project, and proposed tributary weirs.

Closeup of tailrace below weir-and-pool on Fulshear Creek. Note sparse wintertime vegetation, and regular mowing of sideslopes. Clearly shown is that weir's backslope tailrace promotes connectivity of finfish and other biological organism(s) movement up and/or downstream with very little rainfall. Reducing scour from hydraulic jump over weir enhances stream stability. It is important to note that this type of weir design usually works over a very long timescale. Poured concrete structures tend to fail 10 to 30 years after construction.

Looking downstream from same weir at head cut that was stopped by weir installation. Applicant has succeeded in controlling large-scale stream bank erosion with each weir it has installed.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Pool-Weir-Pool(s) continued: To-date Applicant has constructed pool-weir-pool(s) on streams within Ft. Bend County, typical examples of which are shown on previous pages. In most cases, a smooth concrete cap is shaped over the top and backslope of weir in order to moderate hydraulic jump energy. Rip-rap energy dissipators are placed at end of tailrace where remaining jump lands. Consequently, the plunge-pool that normally forms below a new weir is not being scoured out of stream bottom as deeply. In almost every case, the head cut downstream (the weir was installed to control) has already scoured a suitable pool below it. Weir itself backs up standing water about a foot deep, creating a pool that moderates stormwater energy as it flows into the pool. Resulting pool-weir-pool segment of stream required only building of the weir itself. Small tributary weirs to be located along edges of Big Creek may (or may not) be of this type.

However, there are minor stream habitat, water quality, and stability issues resulting from this particular specification that can be rectified with a one-time investment in additional earthwork. When a weir is installed in a stream segment as a future preventative measure that has no pre-existing downstream scour pool, moderating hydraulic jump energy prevents the desired deep pool from forming. Lack of a downstream deep pool eliminates habitat, sediment dropout for water quality, as well as stormwater storage and stilling.

Additional Earthwork- To enhance many benefits provided by a deep pool structure, Applicant proposes to perform additional earthwork for that purpose. As Applicant's main work crew excavates back one (or both) sideslopes to widen the bottom, crew will also excavate and haul away sufficient substrate below streambed's designed elevation to create a large pool downstream of a planned new weir location. Each deep pool will be "field-fit" (designed to fit) into a particular stream segment as is appropriate.

Deep Pool Specifications- Each deep pool will be no more than 500' long, in order to leave room for streambed construction; and no less than 100' long to provide sufficient sedimentation and water quality treatment capacity. Each deep pool will be constructed with 5' wide shallow shelves along their edges to support emergent wetland vegetation (fringe wetland areas). Pool interior sideslopes are to be excavated from shallow side shelves downward at a 3-to-1 slope until both sides meet at the pool bottom. Due to an additional 10' bottom width in the Middle Reach, its pools will be deeper than Upper Reach (pools).

Shallow Emergent Pool Specifications- Shallow pools are NOT limited by the specification that they will be no more than 500' long; but weirs and pools will be no more than 11,000' in total of Big Creek's 53,950' stream length, also in order to leave room for streambed construction. And, no less than 100' long to provide sufficient sedimentation and water quality treatment capacity. A 1' height weir or less in a particular location is to be constructed such that the height backs water up the distance desired in that particular location. In a very long flat area weir may be dug into existing stream elevation, and a shallow pool dug in behind it. Weir creates a marshland emergent depth of the desired length that is 30' to 40' in width.

Stream Enhancement- Emergent pool-weir-deep pool(s) stabilize stream bottom and act as a sump to drop out gradually building erosive energy. They also resist head cutting and bottom scour. Stream geomorphology is enhanced by increasing stream size to fit amount of stormflow, and reducing erosion. Biochemical enhancements occur from locating emergent depths (aerobic) next to open water depths (anaerobic) that will treat runoff from adjacent agriculture operations. Biological enhancements are due to providing a diversity of in-stream/pool habitats. Connectivity for finfish and biological organism movement in ephemeral stream bottom is enhanced during dry periods by providing a deep refuge to await next rainfall event. When streambed starts flowing, each pool is immediately connected with all others.

Water Quality Treatment- These marsh zones and deep pools are very large. They provide a major part of dissipating flood energy in-stream, in combination with energy dissipators (rip-rap) in tailrace catching plunge from weir. Sedimentation processes are allowed to occur by stilling flow energy. Heavy sands will drop out easily, but our local clays will only drop out from flocculation of fine clay particles to detritus. This requires large pools and emergent vegetation to promote stillness. First emergent pool before weir will provide most water clarification. Second pool removes most sediment generated by plunge/scour after weir. When water clarity improves greatly, then stormwater passing through vegetated aerobic-anaerobic depth zones (emergent depths to open water depths) begins a nitrification-denitrification BOD treatment cycle of nutrients (that are contributed to receiving stream by adjacent agricultural operations). Large pool/marshland size contributes to effective water treatment due to their volumes providing extended detention times. Stormwater clarification of fine clays is difficult to achieve, and BOD reduction will not begin to occur without it.

Increased Biological Diversity- As a pool opens out from shallow streambed into deeper habitat, aquatic species provide shade and cover for finfish and other organisms. About 5 individuals each of *Nymphaea odorata* (white water-lily) and *Nymphaea mexicana* (banana water-lily) will be planted per 150' of pool length.

Planted white water-lily against shoreline, several years old. Note spread canopy of floating leaves from single bulb. At this time, nutria were controlling *Typha sp.* (cattail), nutria have since moved elsewhere. As stormflow rolls into pool, floating leaved aquatic species moderate scour impacts to stored sediments.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Pool Planting Specifications- Each pool is to have shallow water planting shelves at toe of each side-slope, that will colonize in transitional species such as *Cyperus sp.* (flatsedge), *Eleocharis sp.* (spikerush), and *Carex sp.* (sedge). All of which are observed along the existing bank, and will be returned as seedbank material to be a vegetative erosion control BMP. Water-lily bulbs are to be planted 10' apart at break-over edge from shallow planting shelf to deeper water zone. Bulbs are to be planted in small groups of about 5 of the same species, and at least 50' from a different species (of water-lily). Cattails have not colonized Big Creek yet, even though many are adjacent upslope in neighboring ponds. Mowing sideslopes for maintenance seems to control any that invade. Emergent marsh shallow pools are to be planted in some species of *Sagittaria sp.* (arrowhead) on a 10' x 10' grid. Some time in the past, *Equisetum hyemale* (horsetail) has invaded the entire Big Creek shoreline. It is expected to re-sprout when deposited as seedbank material. Seedbank re-establishment, emergent marshes, and water-lily plantings are expected to mature about 10 to 15 years after construction.

Mowed flatsedge colonizing open streambank – completely re-sprouting with no evidence of mortality. Other sedges and spikerush species are adapted to Applicant's mowing schedule. Where being grazed, same vigorous re-sprouting is observed.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Section Two: Big Creek New Floodplain Creation Plan

Applicant proposes to create a small floodplain alongside streambed where none currently exists in order to curve stream in a sinuous fashion, and construct bankfull benches into new floodplain at new stream edge, as is more fully described below:

In-stream and Streamside Habitat Diversity- Currently existing streamside habitat is of very low diversity. Flow is captured in a narrow channel between two mowed sideslopes, resulting in a narrow incised bed in most cases. Very little area of actual streambed and streamside habitat is in place. Where there is an incised trench-like bed, little or no bankfull bench is present. Between the previously described pools, **1.)** bottom area between sideslopes are to be widened, **2.)** a streambed is to be shaped in a sinuous manner, and **3.)** bankfull benches are to be constructed; all of which are to be grouped together under the term "new floodplain creation". Natural stream building processes have shaped a similar configuration onto the previously constructed segment directly downstream in less than 10 years; as is shown below:

Reference Stream Segment: Note previously completed segment of new floodplain creation on Big Creek building a point bar (as a bench), with hydrophytic species colonizing it providing erosion resistance. Shown is creation – by stream building processes - of sinuous streambed by widening and curving into small floodplain. Also note a small backwater pool is forming in center foreground.

Wintertime vegetation shown here is sparse, but shoreline is solidly covered in late summer with floating leaved aquatic plant species such as *Ludwigia peploides* (floating seedbox). Resource agency biologists have been on-site and inspected completed segments of previous project near this location.

New Floodplain Construction Specifications: Applicant proposes to utilize dragline, trackhoe, scraper, or other suitable heavy equipment to excavate sideslopes back from existing locations in order to widen the distance between toes of side-slopes.

Note currently existing narrow channel in photo above, with no available floodplain adjacent to it. Also note extensive summertime vegetative cover along the channel bottom.

Either of the side-slopes (or both side-slopes) may be excavated, depending on avoidance of Jurisdictional Areas abutting the top-of-bank. Particular local area design is to be field-fit into area according to existing site constraints. Consultant is to stake existing bottom channel edge shown above for heavy equipment operator to avoid when lowering bucket and beginning to excavate sideslope.

Main Project Excavation- Designated sideslope is to be pulled back from avoided bottom channel, creating a new flat bottom area that will usually be somewhat lower than the avoided channel. Consultant will place additional stakes in bottom for operator to locate where to excavate desired deep pools. Deep pools are to be excavated at same time as adjacent side-slopes; that is, operator will pull bucket deeper than flat bottom (to be constructed upstream and downstream of a deep pool). Spoil materials are to be spread on top-of bank and outward to edge of project boundary. Where overbank drains are to be installed into new bank, a small wetland elevation area is to be created in front of each outlet. If adjacent landowners agree to accept additional spoils, they may be placed in areas previously delineated as uplands.

Shaping of New Streambed and Adjacent Benches- Consultant is to stake designed streambed onto the new flat floor for operators to reference. Scrapers, trackhoes, bulldozers, motor graders or other suitable equipment are to shape a streambed into flat bottom about 1' deep, that is about one-third the width of total bottom width. The designated shape is to curve from bank-to-bank with a sinuosity of about 1.2-to-1. About 5'of width at both toe-of-slopes are to be left as-is to protect the toe. Bottom material removed from streambed to be placed directly adjacent on both sides (of streambed) in order to create bankfull benches, and backwater pools.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Conservation of Benthic Organisms: Existing streambed that is to be avoided during new floodplain creation work contains living benthic organisms. A trackhoe is to follow along behind the streambed construction crew, excavate out existing channel and place wet materials into the new streambed. Consequently, conserved benthic organisms are installed into new flow zone directly adjacent; as well as all of the hydrophytic plant species living in old channel. Typical riffle shown below:

Benthic Organisms Alternative- As an alternative to the above described work, Applicant may chose to perform a more detailed effort to conserve benthic organisms as follows: In any location along existing channel where deemed desirable, a small pool may be constructed upslope – outside the work footprint – and filled to about 1' deep with water from the channel. A trackhoe and dump truck, scraper, or other suitable equipment would excavate the existing channel, haul it to and then dump into the pool. On completion of the new streambed work, it would be excavated and hauled back to the new streambed and dumped within it.

Ft. Bend Cty. Drainage Dist. **SWG-2007-00913** **Big Creek New Floodplain Creation** **Application Date:** **Description Page:**	**For: Ft. Bend County Drainage District** **P. O. Box 1028** **Rosenberg, TX 77471**	**By: Wet Tech[sm]** **1831 Pinewood Ct.** **Sugar Land, TX 77498** **Ph: 281-242-8734** ***glenn@wet-tech.net***

Section Three: Additional Specifications

The bulk of planned work proposed for Big Creek Upper and Middle Reaches has been described above, regarding **1.)** pool-weir-pool(s) to be built, as well as **2.)** creation of a small floodplain alongside the streambed where none currently exists. Planting specifications were proposed in the above descriptions for both of those aspects of the work. Following are additional details that are also important to Applicant's proposal for minimization of impacts during work on the Creek.

Avoidance and Minimization of Jurisdictional Impacts: Prior to selecting adjacent areas to widen the proposed project corridor, the existing stream and adjacent banks were delineated for several hundred feet on both sides of existing streambed. Proposed widening corridor was then selected to avoid greatest amount of Jurisdictional areas, thereby impacting the least possible amount of them. In addition, where possible stands of large trees were also avoided. Most Jurisdictional areas not down in the channel bottom were created by stormwater ponding against the upper spoil berms before exiting through overbank swales leading to installed and maintained drains. The number and size of these small wet areas will be greatly increased by the new specification to create a similar wetland elevation in front of ALL overbank drains. These are more fully described below in the section Water Quality Constructed Wetlands.

Independent Pools: Several pages have been presented above regarding emergent marsh-weir-pool(s) describing marshes and pools in some detail. In locations where it is apparent that additional flood energy needs to be abated, but no step-down in streambed elevation is required, marshes and/or pools will be installed independent of weirs individually. Construction specifications described previously are to be utilized for these in-stream designs. Planting specifications described previously will also be followed.

Water Quality Constructed Wetlands:

Typical existing overbank swale "Jurisdictional area", note very little hydrophytic plant species observed in front of/below drain in left foreground, and all are subject to regular mowing.

Water Quality Constructed Wetlands continued: While existing small swale wetlands ponded against main berm provide a minimal amount of habitat and water quality improvement; they are very few in number, small in area, and are regularly mowed. In the context of stream assessment these are buffer zone wetlands, not directly adjacent to the bottom channel. In contrast, ALL of the new constructed overbank swales will lead to a new Jurisdictional (low) area below outfall elevation of outfall drain. These swales and constructed wetlands will greatly increase buffer zone Jurisdictional area, water quality improvement; and considerably raise stream assessment buffer rating due to new buffer zone wetlands. New constructed swale wetlands will only be mowed once per year, in either October or November, during a dry weather period. Regular maintenance mowing during the balance of the year will avoid a 50' transitional zone around wetland, except on top of berm above it, and where it may cross the property line **(if any)**. This will prevent trees and shrubs from growing, but allow all non-shrub species to produce seed and establish. If on selected mowing day, wetland is holding water or the soil surface is soft, it is to be avoided until the next year. It is not to be rutted.

Exception to this specification will be tree planting areas. Tree planting areas are to be permanently avoided by all future mowing activities; as is more fully described on several pages following below.

Adjacent Landowner Habitat Wetlands:

Several landowners adjacent to previously completed project downstream cooperated with Applicant to construct large new Jurisdictional areas (some of which are wetlands) ponded against new main berm, as is shown above. Most are open water ponds, however this one shows potential for wetland plant growth and habitat. Directly upslope in background are pastured cattle, whose runoff is well treated by flowing through this constructed wetland. Size and nature of these constructed adjacent wetlands are set by elevation that Applicant installs overbank drain pipe at.

Applicant will encourage each landowner adjacent to project to install a ponded area against main berm, and Consultant will aid any landowner with advice about wetland plantings if they so desire. Where these are to be located, no additional water quality constructed wetland will be required.

Tree Planting: Almost all existing large individual trees (defined as 18" DBH or larger) are to be avoided by development project footprint, due to the lengthy Alternative Analysis performed previously. The few that may be impacted **(if any)** are to be offset with five (5) gallon sized, minimum 1" DBH saplings (or larger) at a ratio of two-to-one (2:1). Establishment success of planted tree saplings will be inspected by Consultant and reported on in his Report.

Tree planting areas are to be flooded, and then after subsiding, trees are to be planted during the months of November and December. A planting hole twice the size of tree rootball is to be excavated, and a suitable planting medium placed in bottom half of hole. Tree rootball is to be combed out, set onto the medium and then backfilled to the surface with medium. Two (2) bags of hardwood bark mulch per tree are to be spread over rootball surface, and a watering ring built-up around (outside of) the rootball. The trunk of large trees are to be staked with four metal fence poles and guy-wired to tree four (4) places. Small saplings will require three (3) smaller sized metal fence poles and guy-wires.

A planted tree is to be deep watered immediately (full to the top of the watering ring) and once per week (that it does not rain) between March and November of first year after planting. All trees are to be fertilized with: one cup of bone meal, one cup of cottonseed meal, one cup of dry Medina, one cup of dry *Mycorrhizal* fungi and one cup of blood meal at planting - and also same amount the following winter. During first year after completion only, all trees are to be inspected within one week after a high wind event for blow-downs. Any trees found to be blown over are to be righted and roots replanted according to original planting specifications described above.

Large saplings described above are defined as container grown trees in good health grown in at least 5 gallon pots, and measuring at least one inch (1") DBH. All other trees to be planted may be no smaller than one half inch (1/2") DBH, and grown in three (3) gallon pots; again, all to be in good health at the time of planting. Suitable tree species for planting are as follows:

Obligate species (OBL) - at least two (2) species of - *Taxodium distichum* (bald cypress), *Quercus lyrata* (overcup oak), *Magnolia virginiana* (sweetbay magnolia), *Nyssa aquatica* (water-tupelo), or *Carya aquatica* (water hickory); *Fraxinus pennsylvanica* (green ash) will invade from nearby.

Facultative Wet species (FACW) - at least four (4) species of - *Acer negundo* (box-elder), *Quercus bicolor* (swamp white oak), *Quercus laurifolia* (laurel oak), *Quercus michauxii* (swamp chestnut oak), *Quercus nuttallii* (nuttall oak), *Quercus phellos* (willow oak), *Betula nigra* (river birch) and *Sabal minor* (dwarf palmetto).

Facultative species (FAC) - at least four (4) species of - *Ulmus americana* (American elm), *Nyssa sylvatica* (black gum), *Carya laciniosa* (big shellbark hickory), *Carya cordiformis* (bitter-nut hickory), *Carya illinoensis* (native pecan), *Carpinus caroliniana* (American hornbeam), *Acer rubrum* (red maple), *Quercus macrocarpa* (bur oak), *Quercus muhlenbergii* (chinkapin oak), *Quercus palustris* (pin oak), *Quercus nigra* (water oak), *Ilex vomitoria* (yaupon holly) and *Juglans microcarpa* (river walnut).

Facultative Up species (FACU) - at least two (2) species of - *Fraxinus americana* (white ash), *Ulmus alata* (winged elm), *Carya ovata* (shag-bark hickory), *Ilex opaca* (American holly), *Quercus virginiana* (live oak), *Quercus falcata* (southern red oak), *Quercus alba* (white oak), and *Juglans nigra* (black walnut).

Tree Planting continued: Obligate species are to be planted at/from the water's edge down to -12" in depth. Facultative Wet species are to be planted from/at the water's edge up to an elevation of +12". Facultative species are to be planted from an elevation of +6" up to an elevation of +18". Facultative Up species are to be planted at the highest elevation, and always above the +12" elevation. For this reason, there will be no more than fifty (50) (whether large or small trees) Facultative Up individuals planted within this project.

It is expected that each tree planting location will naturally colonize with *Juniperus virginiana* (eastern red cedar), *Quercus virginiana* (live oak), *Fraxinus pennsylvanica* (green ash), *Salix nigra* (black willow) and *Populus deltoides* (eastern cottonwood) species. It is also expected that these species will provide the majority of individual new trees on-site. Consequently, these species will not be controlled or managed. And, these species will not be counted in yearly tree mortality inspection.

The number of large trees to be planted **(if any)** is to be determined by the formula stated above. Six hundred **(600)** smaller trees also described above are to be planted in roughly equal amounts per acre across all tree planting locations.

Tree planting locations are to be located within the main project footprint on the outside of the main spoils berm and within the protected overbank swale and associated outfall wetland area. They are to be on the north bank starting at F.M. 2977 and proceeding southeastward (downstream). They are to be specifically located at gaps where adjacent small woodlots are broken by plowed agricultural land of the George Ranch. A completely forested corridor is to be established in this location that is protected from future development.

The trees are to be planted in mixed species groupings of 10 to 15 individuals on a spacing of about 10'by 10', but never exactly the same amount. The majority of them are to be located within the overbank swale and the associated constructed wetlands, with a small number planted on adjacent spoil berms. Somewhat larger sapling (2" DBH) shown below:

Tree Planting continued: Tree planting areas are not to be mowed inside them, and are not to be mowed within 10' of any new tree once they are planted; except for berm-tops, and where the tree planting area extends to the property line. Consultant will stake mowing line for operator after planting is complete. Small wet depressions – about 10' X 50' – are to be dug in with a natural curving shape at lowest elevations to locate plantings of obligate species.

Old Remnant Channel:

Opportunity for Stream Restoration Sub-Project – In this one location both ends of old meander that was cut-off from the original Big Creek channel 50 years ago are open and do not form an oxbow lake; all others that were cut-off are established oxbow lakes, some of which are dry.

Stormflow from adjacent overbank swale will be directed into this abandoned channel bottom in a manner to flow completely around it before falling into Big Creek. Appropriate herbaceous, shrub and tree species are already well established, as Big Creek floods up and through it in a 2 year flood event. It will now flow during every rainfall that flows to overbank swales.

It will continue to flood from Big Creek as it always has. No water quality wetland is needed or proposed. No construction impacts are proposed, streambed is to be created by natural stream-building processes. Additionally, several dry oxbow lakes are proposed to be repaired and re-flooded.

Section Four: Implementation- Adaptive Design, Adaptive Implementation, Site Inspection, Reports and Maintenance

The focus of Applicant's efforts is to minimize impacts to Big Creek's streambed to the extent that no permanent negative impacts remain after construction. Proposed new stream will continue to be operated by Applicant as a designated floodway, and will be maintained accordingly. As advised by staff of the Corps Galveston District, Applicant is proposing a one to two year Monitoring and Maintenance Period after construction on a per-year completed section basis; more fully described below:

Adaptive Design: Upon rejecting the shorter stream length, faster stormwater flow alternative design; Applicant shifted it's focus to a stream stability based design. It's various stream sections are to be individually designed according to the general criteria described in previous pages above; as are applied in the field to fit the particular conditions at that location. Applicant is comfortable with it's 50+ year history of adapting to requirements of individual stream conditions across the county, including at Big Creek. It has many stream gage records for Big Creek accumulated over time, as well as experience arising from major floods during tropical storms and other significant rainfall events.

As an example, Applicant has observed stream stability issues (including at Big Creek) and resolved them with construction of step-pool weirs at appropriate locations, as well as other erosion control measures. Applicant terms selection of particular site construction activities at individual locations as "field-fit". According to the Corps desire to perform Adaptive Management in Jurisdictional areas, Applicant's proposal to perform Adaptive Design at each location meets the test of such adaptation.

These criteria being implemented are to be focused separately on **1.)** widening the bottom and constructing the new streambed, and **2.)** pulling back side-slopes, and constructing water quality swales and wetlands in buffer zones. This activity is further broken down into whether construction equipment is to be pulling back one bank, or both banks from each side. Consequently, these detailed decisions will be made on-site during the construction phase in order to incorporate best available stream design characteristics from currently available publications. That is, site locations shown on accompanying drawings of weir and pool locations - and other site design details – most likely will be shifted somewhat during actual construction. Actual locations of constructed site details are to be reported on after-construction drawings upon completion.

Adaptive Implementation: Prior to beginning work, Consultant will utilize streamside coordinate location staking provided by Applicant's surveyors to inspect large trees located within staked impact areas. Such trees will be measured with a DBH tape and those registering 18" DBH or larger will be recorded. Applicant will be given the choice to avoid it's rootzone entirely, or to take the tree down. The tree is to be then marked with an indication to either avoid it, or to remove it. If it is to be avoided, the rootzone is to be clearly marked by Consultant at the dripline where the equipment operator will have no issue with recognizing the avoid zone. During construction phase, Consultant will observe operators working around leave trees to determine that their rootzones are being avoided.

If it is to be removed, it is to be recorded for calculating of future required tree replacement plantings. Consultant will keep a running total of size and species removed. All *Sapium sebiferum* (Chinese tallow) trees of any size will be removed, but will not be counted for replacement.

Adaptive Implementation continued: If either bank side is determined to be left as-is, and all necessary widening is to occur on opposite bank; then Consultant will inspect existing swale and overbank drain pipe. If no water quality wetland exists at pipe outfall, Consultant will stake one to be constructed.

Additionally, Applicant's surveyor is to stake adjacent edges of previously delineated wetlands outside of permitted work area. Consultant is to observe that no excavated spoil materials are deposited in adjacent delineated wetlands. Upon completion of rough shaping of spoils into the upper bank profile, Consultant will stake in a water quality wetland at the end of each swale, to be constructed in front of each overbank drain. Consultant will observe that water quality wetland is shaped and at a depth to meet requirements of Permit. Where designated by Consultant, some of the new constructed wetlands are to shaped and at a depth suitable to meet requirements for tree planting areas.

Consultant will stake out both sides of existing streambed sufficient to be visible to excavation equipment operator. Existing streambed is to be left as-is during major excavation activities for conservation of benthic organisms. Consultant will stake out locations of deep and emergent pools to be additionally excavated concurrent with side-slopes. Consultant is to instruct operator to pull away existing side-slope and deposit spoils outside of streambed. Consultant will observe that operator is depositing spoils outside of streambed, and that designated pools are being excavated according to design criteria.

When a consistent bottom has been excavated to design depth elevation, Consultant will stake out new streambed between pool areas, that is to be constructed with a sinuosity of an approximate ratio of 1.2 to 1. Consultant will instruct operator of bulldozer, scraper or other suitable equipment to remove bottom materials from staked streambed location to design profile and deposit them directly adjacent to construct bankfull benches or layback banks.

When a suitable length of new streambed as designated by Consultant is complete, operator is to excavate a short ditch to connect upstream existing channel with the new streambed, thereby draining the bypassed channel downstream. When old channel is sufficiently dry to work with tracked equipment, a trackhoe or other suitable equipment is to excavate old channel, and turn and deposit it's contents into the currently flowing new streambed. Consultant is to observe that appropriate streambed materials containing benthic organisms are being properly deposited into new streambed. Spoils on-hand from excavating streambed are to be deposited into old channel to bring it up to design bottom profile.

After excavation of a downstream deep pool and upstream shallow emergent pool is complete, a flat bottom area is to be left between them of a width sufficient to construct a suitable weir and it's tailrace. Applicant will design, construct and maintain the weir structure. As shown in project drawings, 8 large weirs are proposed for the main Big Creek streambed, and 4 smaller weirs are proposed at mouths of tributaries. It is envisioned that the lower existing weir will remain as the 9th main stream weir. Note that each pool-weir-pool complex is situated within a lengthy straight stream section.

Generally, most of these locations are where Big Creek was channelized 50+ years ago, which dropped the streambed in elevation and increased speed of stormflow. Specifying pool-weir-pool complexes in these locations will cause generated excess flow energy to be dampened by acting as a sump. Also note that designated locations left available for new streambed to be constructed are mostly within remaining meanders not previously straightened and abandoned. Each of these specifications work together to moderate erosive potential of the bankfull – 1.5 year – rainfall event.

Site Inspections: Site inspections are to be performed by Consultant of constructed features of the project, as well as plantings installed within it. The day of beginning construction will be recorded and the first day of the month following will be designated as the project anniversary date. During the next year, casual observation of constructed features and plantings will be made by Consultant and recorded. Obvious issues found with the project are to be rectified by Applicant at the time. Trees of 18" DBH or larger to be removed are to be recorded to calculate necessary tree planting requirements. Within 90 days after anniversary date, an inspection will be performed of the entire length of Big Creek previously constructed. Each following year an inspection will be made by Consultant of that year's completed work. Additionally, the previous year's work will be re-inspected.

Reports: Concurrent with construction work in progress, while observing the work being done, Consultant will prepare simple as-built drawings as each section of the stream is complete. Coordinate staking will be provided by Applicant's surveyor on the ground, and utilized on all drawings for accurate locations. Consultant will stake locations of weirs, pools and other important locations to be recorded by surveyor. A log book will be kept containing a running total of all large trees removed to-date.

A Yearly Project Completion Report will be prepared from observations made during the yearly inspection. It will present the as-built drawings for the previous year as well as a photographic report of observations made by Consultant. Findings will be presented that include future maintenance to be done, as well as observations of maintenance that is already completed. Findings will also be presented for observations of the portion of stream completed and maintained the year before. Each completed Report will be provided to the Corps office, Galveston District.

Maintenance: The idealized constructed streambed will be immediately adjusted by natural stream building process as are observed in completed reaches of Big Creek downstream. This process is expected and desired. No maintenance will be performed for the purpose of attempting to restrain the new stream into the constructed streambed. However, if any excess erosion occurs indicating an un-stable stream; erosion will be repaired for the first two years. If any damage occurs to any concrete structures, they will be repaired.

Planted trees will be watered up to the top of their tree rings every day for the first month after planting; and once per week for the balance of the first year. All planted trees that suffer mortality during the first year are to be replanted; in the second year, 50% of those that expire will be replanted. All *Sapium sebiferum* (Chinese tallow) trees that are observed by Consultant will continue to be removed.

Planted herbaceous species will not be replanted, unless they suffer more than 50% losses in any one pool. Should nutria focus on *Sagittaria sp.* to the extent of consuming 50% or more of the individual stems, a different native species will be selected for replantings, and for future new plantings.

Similar adaptive management adjustments to the original proposed design will occur as necessary throughout the life of the project's construction and maintenance phase.

Applicant will continue to mow the side-slopes as is currently done, and plant any new side-slopes with *Cynodon dactylon* (Bermuda grass) and similar commercial grass species. Applicant will not mow the tree planting or water quality wetlands areas as is more fully described above.

Addendum Three:
Wet Tech[sm] Fee Schedule

Contract Between Wet Tech and the District for:

Construction Phase of the Big Creek Project

To be Attached to Wet Tech Proposal for Professional Services:

As is described more fully in the attached Proposal, all fees stated below are formatted as "flat-fee" amounts rather than "not-to-exceed" amounts. That is, all fee amounts will be completely invoiced by the end of each year.

Section One: Design

Preliminary Office Work:	Preliminary quarter		**$ 5,000.00**
Fieldwork:	Five quarters – 1.25 years (yr. #1 only)	Year One-	**10,000.00**
		Year Two-	**8,000.00**
		Year Three-	**8,000.00**
		Year Four-	**8,000.00**
		Year Five-	**8,000.00**
Office Design Work:	Five quarters – 1.25 years (")	Year One-	**8,000.00**
		Year Two-	**6,000.00**
		Year Three-	**6,000.00**
		Year Four-	**6,000.00**
		Year Five-	**6,000.00**
		5.25 Year Design Sub-Total-	**$ 79,000.00**

Section Two: Construction Supervision

Fieldwork:	Year One-	**$ 10,000.00**
	Year Two-	**8,000.00**
	Year Three-	**8,000.00**
	Year Four-	**8,000.00**
	Year Five-	**8,000.00**
Office Work:	Year One-	**8,000.00**
	Year Two-	**5,000.00**
	Year Three-	**5,000.00**
	Year Four-	**5,000.00**
	Year Five-	**5,000.00**
	Five Year Construction Supervision Sub-Total-	**$ 70,000.00**

Section Three: Maintenance

Fieldwork:	Year One-	**$ 3,000.00**
	Year Two-	**5,000.00**
	Year Three-	**5,000.00**
	Year Four-	**5,000.00**
	Year Five-	**5,000.00**
Office Work:	Year One-	**3,000.00**
	Year Two-	**5,000.00**
	Year Three-	**5,000.00**
	Year Four-	**5,000.00**
	Year Five-	**5,000.00**
	Five Year Maintenance Sub-Total-	**$ 46,000.00**

Section Four: After Construction Inspections and Reports

Fieldwork:	Year One-	**$ 0,000.00**
	Year Two-	**5,000.00**
	Year Three-	**5,000.00**
	Year Four-	**5,000.00**
	Year Five-	**0,000.00**
Office Work:	Year One-	**0,000.00**
	Year Two-	**5,000.00**
	Year Three-	**5,000.00**
	Year Four-	**5,000.00**
	Year Five-	**0,000.00**
	Five Year After Construction Inspections / Reports Sub-Total-	**$ 30,000.00**

Section Five: Preparation and Submittal of Permit Re-Authorization Application

Fieldwork:	Year Five (only)-	**$ 15,000.00**
Office Work:	Year Five (only)-	**20,000.00**
	Permit Application Sub-Total-	**$ 35,000.00**

Wet Tech[sm] Fee Schedule Section Summary

Section One: Five Years- Design Work	**$ 79,000.00**
Section Two: Five Years- Construction Supervision	**70,000.00**
Section Three: Five Years- Maintenance Work	**46,000.00**
Section Four: Three Years- After Construction Inspections/Reports	**30,000.00**
Section Five: One Year- Permit Re-Authorization Application	**35,000.00**
Total Five Years of Consulting Work	**$260,000.00**

Notes:

1.) Year One (only) consists of five (5) quarters (1.25 years) or possibly six (6) quarters.

2.) Section Four: After Construction Inspections and Reports does not begin until after completion of Year One.

3.) Section Five: Permit Re-Authorization Application is to be performed in the last year only. Should the Permit not be re-authorized before the end of the fifth year, this Contract section will not be complete until receipt of Permit re-authorization.

Wet Tech[sm] Contingency Section Summary

Contingency amounts are to be agreed on in advance between the District and Wet Tech prior to activation of this contingency section of the Contract. All contingency amounts for the entire Contract period are to be no more than $50,000.00 total for any purpose. Any amount in excess of $50,000.00 during the life of the Contract would require negotiation and agreement between the parties on a Contract Change Order. Contingency items are defined as those requirements to be fulfilled that are unknown on Contract Date, or the actual requirements for performance are not clearly defined on Contract Date. An example is provided as follows:

Currently the District has proposed to perform an additional study of benthic organisms and also a study of water quality; both to be completed in the fifth (5^{th}) year of the construction project. The actual requirements of those studies are as yet unknown, and may be unknown until that time. A student might be available to do the work and subsequent report as a thesis project for very low cost, or a professional study might be required at a correspondingly higher cost. Similarly, threatened and endangered species studies, or additional delineations of the site, or additional historical studies may all be required; but are as yet unknown, and they (or any other currently unknown Contract item) are not included within this Contract.