

Agenda Item: 7.

Memorandum

To: Programs, Projects and Operations Subcommittee
From: Brian L. Henkel, Groundwater Management Engineer
Date: March 6, 2012
Re: Contract Revision with Tetra Tech for Levee Certification

The District entered into the second phase of the Missouri River Levee Accreditation Project (Project) in December of 2010. The scope of Phase II of the Project dealt primarily with developing alternatives for the certification of the levee system components for accreditation on the upcoming Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (DFIRMS). The flooding events of the summer of 2011 along with other factors necessitated numerous adjustments to the individual task items of the current scope and additions of new tasks. Those adjustments to the individual task items have become substantial enough that management and staff feel it is warranted to provide the Subcommittee and the Board with an update on the Project and to revise the scope of the contract. The task items with the most significant changes are Platte River Hydrology, Papillion Creek Hydraulics, and the additional tasks related to the Missouri River flooding of summer 2011 (see attached Tetra Tech memorandum).

The proposed revision to the scope of services in Phase II of the contract with Tetra Tech is necessary to complete the Alternatives Analysis Phase of the levee accreditation. The amount needed to complete Phase II is \$497,807 with \$290,240 remaining under the current contract making this contract revision an additional \$207,567. The professional services agreement included a Phase I contract amount of \$330,878 and a Phase II contract amount of \$696,376 revised to include the additional \$207,567, bringing the total not to exceed contract amount to \$1,234,821. This Phase II of the professional services agreement is anticipated to be completed by August 2012.

Management recommends that the Programs, Projects and Operations Subcommittee recommend to the Board of Directors that the General Manager be authorized to execute this proposed contract amendment to the professional services agreement with Tetra Tech, Inc. for the Missouri River Levee System Units R-613 and R-616 Certification Project bringing the total not to exceed amount of the contract to \$1,234,821, subject to changes deemed necessary by the General Manager and approval as to form by District legal counsel.



MEMORANDUM

TO: John Winkler, General Manager

FROM: Mike Sotak, P.E. Project Manager

DATE: 02 March 2012

SUBJECT: **Missouri River Federal Levee Certification Project Contract Revision**

Tetra Tech entered into the Phase II of the Missouri River Levee Accreditation Project (Project) with the Papio-Missouri River NRD (District) in December of 2010. The scope developed for Phase II of the Project anticipated the development of alternatives for the certification of the levee system components for accreditation on the upcoming Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (DFIRMs). Alternatives development is dependent upon an understanding of the hydraulic, topographic and geotechnical conditions of the levees. The tasks outlined within the original Phase II scope were developed with the then current understanding of procedures and permitting. Numerous changes to the procedures and permitting, over the course of Phase II of the contract, have necessitated adjustments to the individual task items to ensure the success of the project. Tetra Tech has been working with the District staff and management to make revisions to the specific tasks items in response to those changes. The following items describe the most important changes that have occurred over the course of this contract.

Platte River Hydrology:

The flow rate on the Platte River for the 1% chance flood is based on hydrologic information that does not include the most recent flow records. Approximately 17 years of additional flow rate data is available. Incorporation of this flow rate data will provide a more realistic understanding of the probability and magnitude of flooding on the Platte River. Tetra Tech, directed by District personnel, have provided the District with an updated analysis of the flows of the Platte River and created a supporting technical memorandum outlining the methods used for that analysis. The documented analysis is intended to be used to revise the "best available" hydrology with the US Army Corps of Engineers (Corps) and FEMA. The revised hydrology will provide the District with a better understanding of the true flood risk to the levee and surrounding community and could potentially reduce the amount of redesign needed to meet FEMA accreditation.

Papillion Creek Hydraulics:

The District had contracted with the Corps to provide the hydrologic and hydraulic analysis on the Papillion Creek as part of the FEMA mapping process. The work was being partially paid for through a Federal authorization. Federal budget considerations have impacted the Corps ability

Tetra Tech

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to utilize those federally authorized funds and the Corps is unable to complete the work at this time. The remaining work needed for the accreditation process is the finalized hydraulics for the Papillion Creek adjacent to the Districts federal levees. In order to keep the Project moving forward, District personnel directed Tetra Tech to finalize the Papillion Creek hydraulics in coordination with the Corps. The finalized hydraulics are necessary for the District to proceed with a design of the levee modifications and are fundamental to the project. The Corps has been able to find additional money in their budget to review and submit the finalized hydraulic modeling as part of the mapping process with FEMA.

Missouri River Flooding 2011:

The flooding events on the Missouri River during the summer of 2011 required numerous technical analyses to provide District personnel with an appropriate understanding of the flooding conditions and levee system. District personnel directed Tetra Tech to assist the District on multiple occasions with a variety of tasks related to the flooding event. These tasks are applicable to the certification process but were not anticipated at the time that the original Phase II scope was developed.

There are remaining questions with respect to procedures and permitting for levee accreditation. This proposed revision to the scope of services for Phase II of the Project with the District is a best attempt to provide the District with the necessary components to complete the alternatives analysis phase of the Project. The most recent project invoice included the following table, showing the status of contracted amounts and invoicing to date in each task based on the current professional services agreement;

Summary for Invoice # 22

Project Name: Missouri River R-613 & R-616 Levee Accreditation Project

Tasks	Contracted Fee	Previously Billed	This Invoice	Total To Date	% Complete
Phase 2 Project Management	\$46,865	\$61,720.98	\$7,624.58	\$69,345.56	147.97%
Levee Setback and Restoration Alternative Development	\$35,672	\$39,987.69	\$0.00	\$39,987.69	112.10%
US Hwy 75 Levee Modification	\$27,720	\$17,675.11	\$0.00	\$17,675.11	63.76%
RR Closure Alternatives	\$50,050	\$14,982.55	\$0.00	\$14,982.55	29.94%
Sediment/Scour Analysis	\$46,366	\$16,922.44	\$619.10	\$17,541.54	37.83%
Develop Final Levee Modification Plan	\$43,696	\$21,965.00	\$0.00	\$21,965.00	50.27%
Hydrology and Hydraulics (H&H)	\$5,657	\$58,023.85	\$9,236.04	\$67,259.89	1188.97%
Geotech/Geophysics	\$435,710	\$145,588.76	\$0.00	\$145,588.76	33.41%
GIS Database Management	\$4,640	\$7,352.19	\$4,437.89	\$11,790.08	254.10%
Totals:	\$696,376	\$384,218.57	\$21,917.61	\$406,136.18	58.32%

As can be seen, of the original contracted fee of \$696,376, approximately 58%, or \$406,136.18 has been invoiced, leaving \$290,239.82 remaining in the current contract.

A summary of the work completed to date and planned for the revised Phase II of the contract is provided below:

Project Management: The currently invoiced Project Management category exceeded the contracted amount due to the extended schedule from the flooding event.

Additional Project Management time is proposed for this Phase II revision.

Levee Setback and Restoration Alternative Development: This task developed alignment alternatives and opinions of probable cost for a potential levee setback to the R-613 levee unit.

The proposed Phase II contract amendment does not propose any additional work under this task.

US Hwy 75 Levee Modification: Work performed under this task assessed the potential effects of NDOR's planned project along US Hwy 75 on the levee certification effort.

The proposed contract amendment does not propose any additional work under this task. Future work may be required should NDOR submit additional plans .

RR Closure Alternatives: To date, several alternatives and opinions of probable cost have been developed to address levee modification needs at the two closure sections.

The proposed contract amendment does not propose any additional work under this task. Future work may be required once Platte River hydraulics are completed.

GIS Database Management: The current invoiced amount exceeded the contracted amount due to the additional tasks of logging all field notes, communication and survey (high water and interior ponding) information from the summer 2011 flooding.

Additional GIS Database Management tasks are proposed to log a selection of the photos from the summer 2011 flooding into the database and to conduct a hands-on training session for District staff for use and management the database.

Hydrology and Hydraulics: The current contract did not include some of the items performed in this task. Changes to the Corps' available funds and an assessment of the existing Platte River hydrology necessitated adjustments to the scope. The currently invoiced amount reflects those adjustments.

Additional Hydrology and Hydraulics task are proposed to complete the hydraulic modeling on the Papillion Creek system and to complete the assessment of the probable discharge rates and water surface elevations along the Platte River. The two tasks have been separated within the H&H work required on the proposed Phase II contract amendment.

Sediment/Scour Analysis: The current contract's scope has not been completed due to Project delays from the summer 2011 flood event.

Tasks for completion of this portion of the certification are included in the proposed Phase II contract amendment.

Develop Final Levee Modification Plan: The current contract's scope has not been completed due to incomplete hydraulic information and project delays due to the summer 2011 flood event.

Tasks for completion of this portion of the certification are included in the proposed Phase II contract amendment.

Geotech/Geophysics: To date, the geophysical investigation has been completed on the pre-flood system as well as some additional post-flood geophysical work on four areas that showed some stress during the flood events.

Tasks for completion of this portion of the certification are included in the proposed Phase II contract amendment.

Annual Inspections: This task is not a part of the current Phase II scope.

This new task is for one Tetra Tech employee to accompany District personnel on the Corps' periodic inspection of the R-616 levee system unit.

This memo accompanies a proposed Exhibit K for a revision to the effective professional services agreement for the project. The modification addresses changes in the contract scope, a revised contract amount, and an updated schedule as needed to complete the Alternatives Analysis Phase of the Project.

P-MRNRD R-613 & R-616 Levee Certification Task Descriptions – March 2012 Contract Amendment

Project Management

Project Management – Client Meeting – Prepare agenda and pertinent information and attend up to three meetings with NRD and Consultant Team to review responsibilities, communication expectations and project scope and schedule.

Project Management – Monthly Invoice/Schedule Update – Monthly preparation of consultant invoice including incorporation of internal and subconsultant invoices, description of services rendered and update of Project schedule.

Stakeholder Meetings – Prepare for and attend two (2) meetings with project stakeholders defined by NRD and consultant team to relay the intended project path and identify any input needed from stakeholder agencies. The NRD may also choose to receive input from stakeholder groups.

USACE Coordination Meetings – Prepare for and attend three (3) meetings with the U.S. Army Corps of Engineers to discuss progress on the levee certification project and how it meshes with the Corps' 408 and PL 84-99 programs.

GIS Database Management

Webinar/Meeting with NRD Staff – Prepare for and conduct meeting with NRD staff to display how flood-related and other information pertinent to the levee systems is stored in the GIS database created for the project.

Database Refinement – Compile all information in GIS database to make it as functional as possible.

Logging Photos – Incorporate flood-related photos into the GIS database.

Papillion Creek Hydraulic Modeling

Coordination Meetings with NRD/USACE – Prepare for and attend two meetings with the NRD and/or U.S. Army Corps of Engineers to discuss modifications made to hydraulic model.

Incorporate/Document All Updated Field Survey Information – Modify and document all changes to hydraulic model related to entering current survey information from NRD surveys.

Incorporate/Document Updated LiDAR Survey Information – Modify and document all changes to hydraulic model related to entering current survey information from most recent LiDAR information.

Run Model / Document Changes and Levee Freeboard Analysis – Run and document results of hydraulic model that has been updated with most recent hydrologic information provided by USACE and updated survey information.

Platte River Hydrologic/Hydraulic Modeling

Coordination Meetings with NRD/USACE/FEMA – Prepare for and attend three meetings with the NRD and/or U.S. Army Corps of Engineers and FEMA to discuss proposed modifications made to area hydrology and hydraulic model.

Update Information In Hydrology Technical Memorandum – Update previously prepared TM on Platte River Hydrology with 2011 Flood information and updated hydraulic information obtained from newly available LiDAR.

Incorporate/Document Updated LiDAR Information – Update hydraulic model cross sectional information with newly available LiDAR information.

Analyze Extents of Mapping Changes Needed for Reduced Design Discharge – Based on results of hydraulic modeling, analyze how far upstream changes in the hydraulic model needs to be carried to meet FEMA criteria.

Run Model / Document Changes and Levee Freeboard Analysis – Document changes to model and analyze effects on levee freeboard, flood mapping and closure section needs for affected reaches.

Sediment/Scour Analysis

Review existing and historical information – Obtain and review available bathymetric/topographic data, historical aerial photographs, as-built plans for the Papillion Creek channelization and other infrastructure, and other relevant information to assess aggradation/degradation and lateral stability trends in the Missouri and Platte Rivers and Papillion Creek within the R-613 and R-616 project areas.

Assess potential sediment transport impacts on BFE's and Levee Stability¹ – Perform a qualitative assessment of potential sediment transport and scour impacts on the Missouri and Platte River levees based on the available information. Develop and apply a sediment routing model (either HEC-RAS v4.1 or HEC-6T) of the downstream approximately 6.3 miles of Papillion Creek to

¹ Based on the presently available information, it is assumed that sediment transport and scour will not have a significant impact on BFE's and levee stability along the Missouri and Platte Rivers within the R-613 and R-616 project areas, but are a potential issue in Papillion Creek.

quantify aggradation/degradation potential and likely impacts to BFE's and levee stability. This reach includes the 5.3-mile reach between the mouth and Capehart Road that is within the R-613 project area and approximately 1-mile upstream reach that will serve as the sediment supply reach.

Prepare Analysis Report and Certification Report Text – Prepare a report summarizing the information review and methods, assumptions and results of the sediment transport analysis. Prepare relevant text for the levee certification report, including text that specifically addresses questions posed on the FEMA MT-2 form.

Develop Final Levee Modification Plan

Prepare Final Levee Raise Map - Determine areas of insufficient levee freeboard along Papillion Creek and the Platte River. Prepare a final levee raise map for the R-613 and R-616 project areas.

Assess Previously Developed Alternatives – Expand upon previous alternatives assessment and potential changes due to updated hydraulics.

Assess Interior Channel Modifications for Papillion Creek – Compare existing channel profile to design channel profile where available. Use Design Memorandum typical sections and invert profiles to recreate design bench elevations. Compare these to existing cross sections provided by the USACE with additional survey as needed (provided by the NRD). Assess ability to improve channel hydraulics by restoring original channel design geometry (remove sediment.)

Develop Costs for Alternatives – Develop opinion of project costs for alternatives prepared within this task group for the purpose of screening alternatives and selecting preferred alternative.

Compile Survey Information and Assess Final Design Deficiencies – assess all available survey information as compiled by NRD and identify any missing information that will be needed for final design phase.

Present Information to NRD - Meet with NRD representatives to review information prepared within this task group.

Refine Design Memorandum - Prepare and present design memorandum outlining overall modification plan. This will include discussions and alternatives for all levee modifications to obtain required freeboard including levee raises, structural modifications and possible channel modifications. Concept cost estimates will be included with each alternative.

Interior Drainage Analysis

Complete Analysis for Current Conditions – Based upon final Papillion Creek and Platte River hydraulics, complete interior drainage model prepared to date.

Complete Analysis for Two Setback Conditions – Document changes to interior drainage model as affected by the two R-613 setback alignments being considered.

Prepare Draft Maps for New FEMA Floodplain Zoning – Based on interior drainage analysis, delineate extents of interior ponding and probably FEMA zoning boundaries related to proposed changes in FEMA floodplain zoning.

Geotechnical Analysis

Geotechnical Analysis – Conduct planning tasks and field work (Drilling and sampling) of geotechnical analysis.

Annual Inspections

Annual Inspections – Accompany NRD and USACE on periodic levee inspections for R-613 and R-616 units.

SUGGESTED FORMAT
(for use with E-500, 2002 Edition)

This is **EXHIBIT K**, consisting of 2 pages, referred to in
and part of the **Agreement between Owner and Engineer**
for Professional Services dated 9 Sep, 2010.

AMENDMENT TO OWNER-ENGINEER AGREEMENT

1. Background Data:

- a. Effective Date of Owner-Engineer Agreement: 9 September, 2010
- b. Owner: Papio-Missouri River Natural Resources District
- c. Engineer: Tetra Tech, Inc.
- d. Project: Missouri River R-613/616 Federal Levee Certification

2. Nature of Amendment

- ☒ Additional Services to be performed by Engineer
- ☒ Modifications to Services of Engineer
- ☐ Modifications to Responsibilities of Owner
- ☒ Modifications to Payment to Engineer
- ☒ Modifications to Time(s) for rendering Services
- ☐ Modifications to other terms and conditions of the Agreement

3. Description of Modifications

Due to delays caused by the 2011 flooding event and some minor scope revisions of the originally executed contract, the original project scope and schedule has changed. Some additional hydrology and hydraulics work and revisions to previously scoped items was proposed by Tetra Tech and agreed upon by the P-MRNRD. Attachment 1 to Exhibit K replaces the existing Attachment 3 to Exhibit A and details the revised scope item tasks to be completed and Attachment 2 and 2b to Exhibit K replaces Attachment 1 to Exhibit A and details the professional fees negotiated to complete the tasks.

During February of 2012, at the time of the change in scope, there was approximately \$290,000 in professional services remaining on on the effective contract. This contract modification adds \$207,567 to the total value of the contract, and therefore, the total contract amount is amended to \$903,943.

Regarding the project schedule, a large portion of the work is field work associated with the geotechnical sub-surface investigation. Some weather delays have been factored in, and therefore these services are anticipated to be completed by the end of summer, 2012.

Replace Paragraph C2.01 of Exhibit C of the original contract with:

C2.01 Compensation For Basic Services (other than Resident Project Representative and Post-Construction) – Direct Labor Costs Times a Factor Method of Payment

A. Owner shall pay Engineer for Basic Services set forth in Addendum Exhibit A, as follows:

1. An amount equal to Engineer's Direct Labor Costs times a factor of 3.02 for the services of Engineer's employees engaged on the Project, plus Reimbursable Expenses, provided however, and notwithstanding anything to the contrary contained in this Addendum, the total amount of money due to ENGINEER for such services and for Reimbursable Expenses and Engineer's Consultant's charges shall not exceed the amount of \$903,943 unless an additional payment for the services, expenses or charges resulting in such excess is authorized in writing by OWNER in advance of such services, expenses or charges being furnished, expended, or incurred, the amount of \$903,943 being intended by parties as the maximum amount of money to be due to Engineer under this Addendum.
2. Engineer's Reimbursable Expenses Schedule is attached to this Exhibit C as Appendix 1 and incorporated herein by reference.
3. The total compensation for services under Paragraph C2.01 is estimated to be \$903,943 based on the following assumed distribution of compensation:
 - a. Investigative Phase \$330,878 (See Attachment 1 to Agreement Exhibit C)
 - b. Alternatives Development Phase \$903,943
 - c. Final Design and Bidding Phase \$ (To be negotiated at a later date)
 - d. Construction Observation Phase \$ (To be negotiated at a later date)

Owner and Engineer hereby agree to modify the above-referenced Agreement as set forth in this Amendment. All provisions of the Agreement not modified by this or previous Amendments remain in effect. The Effective Date of this Amendment is 2 March, 2012.

OWNER:

Papio-Missouri River NRD

By: John Winkler

Title: General Manager

Date

Signed: _____

ENGINEER:

Tetra Tech, Inc.

By: Michael K. Sotak, P.E.

Title: Office Lead

Date Signed:

P-MRNRD MO River R-613/616 Federal Levee Certification - Alternatives Development Phase

TASKS

[illegible]

R-613/R-616 Levee Geotechnical Cost Estimate

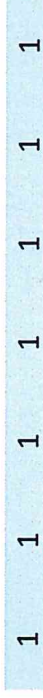
TASKS	Title: Name(s): Rate:	Sr	Sr. QC	Sr.	Project Engr.	Staff	Field Staff	Staff	CAD	Project	Sub/Lab Cost	Expenses	Sub-Total	Total
		Engineer/ Geologist Chapel \$210	Review Johnson/Gard \$250	Geophysicist Laymon \$190	Tranham \$125	Engineer Stock \$115	Klein \$90	Geologist DeTienne \$105	Johnson \$95	Asst. several \$70	(\$) several 1			
Project Development/Scoping/Review														
Review existing Data		30	2		8	8			4				\$0	
Locates and Access		8					50	12				250	\$9,100	
Scoping		20				8		8					\$7,690	
Site visit		20					8					750	\$5,960	
Coordination with Geophysicist		10		10				10	4				\$5,670	
Field Investigation-Drilling		30	2									\$750	\$5,430	33,850
Mobilization-drill rig	(1)						10		30			\$800	\$11,300	
Mobilization-drill rig support truck	(1)											\$600	\$800	
Mobilization-Location to location												\$3,500	\$600	
Auger drilling/Wash rotary/Sampling (assume 35 borings, 1430 feet)	(2)											\$17,160	\$3,500	
per diem (crew of 2)												\$350	\$17,510	
borehole plugging (assumes 35 locations)												\$2,760	\$2,760	
Thin Wall Tube Samples												\$6,078	\$6,078	
Utility Locates												\$2,450	\$2,800	
Project Management (drilling sub)												\$350	\$875	
Tt Field Oversight												\$875	\$875	
Sampling Expenses								160				\$570	\$570	
Field Investigation-CPT		30	2				10		20			\$1,500	\$18,300	66,093
Mobilization-CPT Unit	(1)											\$1,000	\$1,000	
Mobilization-CPT support truck	(1)											\$750	\$10,350	
Mobilization-Location to location												\$800	\$800	
CPTu soundings (assume 35 locations, 1715 feet)												\$600	\$600	
CPTu soundings (assume 35 locations, 1715 feet)												\$3,500	\$3,500	
Pore Pressure Dissipation tests (assume 8 locations)												\$18,008	\$18,008	
CPTu Sounding Hole Grout Closure (assume 35 locations)												\$2,000	\$2,000	
per diem (crew of 2)												\$5,145	\$5,145	
Data Reduction and Reporting												\$2,760	\$2,760	
Utility Locates												\$3,500	\$3,500	
Project Management (CPT sub)												\$875	\$875	
Tt Field oversight	(1)							160				\$575	\$575	
misc Expenses												\$1,500	\$18,300	
Laboratory Testing and Analysis		10			8	8		40				\$500	\$18,300	66,913
Gradation (#4 to -200; assume 36)													\$8,220	
Atterberg Limits (assume 36)													\$2,772	
Moisture & Density													\$3,168	
Specific Gravity													\$2,503	
Direct Shear (3 point test; assume 12)													\$1,760	
Unconfined Compression													\$5,148	
Triaxial Testing (CU; assume 12)													\$1,980	
Triaxial Testing (CD; assume 6)													\$16,247	
Standard Compaction													\$11,979	
Consolidation / Swell													\$1,650	
Permeability (flexible wall; assume 6)													\$2,035	
Hydrometer Analysis													\$2,640	
Organic Content													\$1,320	
Geotechnical Analysis													\$770	
Report		40	2		360	120		40	20				\$73,800	
Conceptual Plans for Mitigation Alternatives		40	4		40	40		40	30	12			\$26,890	
		20	2	4	20	20		20	32				\$15,400	15,400

Notes: (1) Costs Assume that field activities can be completed in one 2 week period for drilling and one 2 week period for CPT
(2) Rig Standby Rate is \$180 per hour

Total : 345,137

	Fiscal Year:			2012			2013						
	Calendar Year:			2011			2012						
<u>Task</u>	<u>Month:</u>	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb

Project Management



GIS Database Management



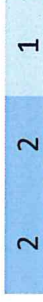
Papillion Creek Hydraulic Modeling



Platte River Hydraulic Modeling



Sediment/Scour Analysis



Develop Final Levee Modification Plan



Interior Drainage Analysis



Geotechnical Investigation



Levee Inspections

