



August 29, 2016

Mr. Jason Farnsworth
Platte River Recovery and Implementation Program
4111 4th Avenue, Suite 6
Kearney, Nebraska 68845

Re: Proposal for Platte River Sediment-transport Modeling for Breached Berm Conditions, Modification No. 1 to CONTRACT dated November 10, 2014 (Tetra Tech Project No. 100-SWW-T33518).

Dear Mr. Farnsworth:

Tetra Tech, Inc. is pleased to submit the attached letter proposal (Attachment 1) for Modification No. 01 to the contract dated November 10, 2014 (Tetra Tech Project No. 100-SWW-T33518). We propose to perform this additional work on a time-and-materials basis with total cost not to exceed \$30,238, which will increase the total contract cost from \$20,000 to \$50,238. A detailed breakdown of our anticipated costs is provided in Attachment 1. The technical memorandum will be completed within 75 days of notice to proceed. We propose that this contract modification extend the end date to December 31, 2016.

Thank you for the opportunity to provide this proposal. This proposal has an acceptance period of at least 90 calendar days. If you have any questions regarding this proposal, or should you require additional information, I may be reached at 970-223-9600 or by email at stu.trabant@tetrattech.com. You may also reach our Program Manager, Dr. Robert Mussetter, at 970-223-9600 or by email at bob.mussetter@tetrattech.com.

Please review our proposal and if you are in agreement, please sign, date and return a copy for our files.

Sincerely,

TETRA TECH, INC.

A handwritten signature in black ink, appearing to read 'Stu Trabant', is written over the company name.

Stuart C Trabant, P.E.
Project Manager

ACCEPTED:
PRRIP – Executive Directors Office

By _____ Date _____

ATTACHMENT 1

August 16, 2016

Mr. Jason Farnsworth
Platte River Recovery Implementation Program
Headwaters Corporation
4111 4th Avenue, Suite 6
Kearney, Nebraska 68845

Re: Platte River Sediment-transport Modeling for Breached Berm Conditions

Dear Jason,

The existing berm along the main channel near the upstream end of Jeffreys Island blocks flow from the historical channel that previously connected with the South Channel. Tetra Tech, Inc. understands that the PRRIP is interested in evaluating the effects of removing the existing protection along the berm, allowing high flows to periodically breach the berm and pass water and sediment to the South Channel. We are pleased to submit the following proposal to perform sediment-transport modeling to quantify the effects of a breached berm. The initial analysis will be carried out to quantify the effects of the breached berm in the immediate vicinity of the berm, with specific focus on the potential degradation that could occur along the mainstem reach upstream from the berm, the likely amount of incision along the historical connector channel downstream from the berm and the associated sediment loading to the South Channel (Farnsworth, 2016 pers. comm., 09 August). We propose to perform the analysis using the existing 1-D HEC-RAS model that was developed and calibrated for the Sediment Augmentation Feasibility Study (Flatwater, HDR and Tetra Tech, 2010). The following tasks will be carried out as part of the analysis:

1. Truncate the existing model to only include the portion of the model that extends from Lexington to Overton, and update the model geometry to reflect existing conditions based on the 2015 LiDAR data and 2016 Geomorphic and Vegetation Monitoring survey data. The bathymetry at non-survey model cross sections where water obscures the channel bed in the LiDAR data will be updated using differences between the model geometry and survey data at the anchor points as a guide. The current stage-discharge relationship at the Overton gage will be used to define the downstream boundary condition for this model.
2. Convert the HEC-RAS model that was initially prepared in HEC-RAS Version 4.1 into Version 5.0. This is an important task because the previous Version 4.1 model did not allow for sediment splits around bars or at the berm, while Version 5.0 allows for the sediment splits. As part of this conversion, the junctions at the upstream limit of the flow-sediment splits will be incorporated into the model, and the lateral sediment outflow rating curves that were used to model the sediment splits in the previous Version 4.1 modeling will be removed.
3. Prepare the hydrologic input (mainstem discharge and J2 release) for the 2015 and 2016 events and incorporate into the updated model. Results from these two simulations will serve as the baseline condition.
4. Revise the model geometry to reflect with-breach conditions by either removing the berm from the model geometry or cutting a suitably-sized breach into the existing berm geometry. This task will require definition of model cross sections along a separate reach of the model domain that represents the historical connector channel, which will in turn require truncating a number



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of sections in the North Channel reach of the model. Tetra Tech will coordinate with PRRIP to define the geometry of the breached berm.

5. Simulate the 2015 and 2016 events using the with-breach models, compare the results to those from the baseline conditions models, and evaluate the amount of erosion in the historical connector channel and the resulting sediment load delivered to the South Channel. The comparison will focus on the approximately 2-mile reach upstream from the berm in the North Channel, including both the mainstem channel and side channel in the vicinity of the berm.
6. Prepare a brief technical memorandum summarizing the methods, assumptions and results from the analysis.

We propose to perform the above work on a time-and-materials basis with total cost not to exceed \$30,238 without your prior written approval. A detailed breakdown of our anticipated costs is provided in Enclosure 1. The technical memorandum will be completed within 75 days of notice to proceed.

Please call if you have questions or would like to discuss the proposed approach for updating the model.

Sincerely,

TETRA TECH, INC.

Robert A. Mussetter, PhD, PE
Project Manager

ENCLOSURE 1

COST ESTIMATE FOR Platte River Sediment-transport Modeling, Breached Berm Analysis

Task	Task Description	Principal Engineer/ Geomorphologist	QA/QC	Senior Engineer	Hydraulic Engineer	Clerical	Labor Cost with Overhead	Direct Costs*	Total by Task
	Billing Rate	\$258.00	\$182.00	\$138.00	\$120.00	\$88.00			
1	Truncate and update model, Lexington to Overton	1		8	32		\$ 5,202	\$ 148	\$ 5,350
2	Convert model to RAS v5.0	1	1	4	24		\$ 3,872	\$ 138	\$ 4,010
3	Model 2015 and 2016 events (baseline conditions)	1	2	4	16		\$ 3,094	\$ 100	\$ 3,194
4	Prepare with-breach conditions model	2	1	8	24		\$ 4,682	\$ 129	\$ 4,811
5	Model 2015 and 2016 events (with-breach conditions) and compare to baseline conditions	1	2	16	32		\$ 6,670	\$ 175	\$ 6,845
6	Prepare technical memorandum	4	2	16	16	4	\$ 5,876	\$ 152	\$ 6,028
	Total Hours	10	8	56	144	4			
	TOTAL COST	\$2,580	\$1,456	\$7,728	\$17,280	\$352	\$ 29,396	\$ 842	\$ 30,238

*Includes G&A Overhead on Other Direct Costs = 14.79%

OTHER DIRECT COSTS:

Item	Unit Cost	Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		Total (Tasks 1-6)
		Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost	
Computer	\$1.75 /hour	41	\$ 71.75	30	\$ 52.50	23	\$ 40.25	35	\$ 61.25	51	\$ 89.25	42	\$ 73.50	\$ 388.50
Expendable Field Supplies	LS		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ -
Xerox (8 1/2 x 11 & 11x17)	\$0.10 /page	20	\$ 2.00	30	\$ 3.00	20	\$ 2.00	10	\$ 1.00	30	\$ 3.00	40	\$ 4.00	\$ 15.00
Color laser prints	\$0.50 /sheet	30	\$ 15.00	50	\$ 25.00	10	\$ 5.00	20	\$ 10.00	40	\$ 20.00	20	\$ 10.00	\$ 85.00
Misc. Office Supplies	LS		\$ 15.00		\$ 15.00		\$ 15.00		\$ 15.00		\$ 15.00		\$ 20.00	\$ 95.00
Misc. Communications (Telephone, fax, shipping)	LS		\$ 25.00		\$ 25.00		\$ 25.00		\$ 25.00		\$ 25.00		\$ 25.00	\$ 150.00
TOTAL DIRECT COSTS			\$ 128.75		\$ 120.50		\$ 87.25		\$ 112.25		\$ 152.25		\$ 132.50	\$ 733.50