

AECOM/URS

July 11, 2017

Ms. Thuy Patton
Floodplain Mapping Coordinator
Colorado Water Conservation Board
1313 Sherman St., Rm. 718
Denver, CO 80203

RE: Beaver Creek Alternatives Analysis in the City of Brush, CO – Scope of Work and Cost

URS Corporation (URS)¹ (referred to hereafter as AECOM/URS) is pleased to submit this proposal to the Colorado Water Conservation Board (CWCB) to conduct an alternatives analysis in Brush, Colorado for the Beaver Creek floodplain. The proposed scope, anticipated deliverables, and associated costs for this flood hazard project are detailed below.

Period of Performance: 6/30/2017 – 11/19/2019

Total Cost: \$122,052.20

Background

CWCB requested that AECOM/URS provide an estimate to analyze four alternatives to mitigate potential flooding in the City of Brush, CO (City). The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs) identify significant flood potential in the City. Historic flooding confirms flood potential in the City. Damaging floods occurred in both 1935 and 1965. Historic newspaper accounts from the Brush News Tribune indicate floodwaters reached downtown in 1935 due to floodwaters spilling over the top of the BNSF Railway, with floodwater north of the tracks inundating businesses at an average depth of two feet. In 1965, residents successfully stopped runoff from reaching downtown by constructing a five-foot dike around the southeast portion of town.

AECOM/URS performed the analysis currently shown on the FIRMs in the city of Brush on behalf of the Colorado Department of Transportation (CDOT) and CWCB in July of 2012 and will leverage these models for this study.

¹ AECOM and URS have joined together as one company providing fully integrated infrastructure and support services. URS is a wholly owned subsidiary of AECOM as of October 17, 2014. More information on AECOM can be found at www.aecom.com.

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Scope of Work

AECOM/URS will perform the following analysis of the Beaver Creek Floodplain in the City of Brush, CO. The intent of the analysis will be to reduce anticipated flooding from the 1% annual chance flood.

1. Conduct Alternatives Analysis

Scope: AECOM/URS will test four alternative structural improvements to minimize regulatory flood risk to insurable structures in the City of Brush. The models will include the following, with estimates of probable construction cost provided for each option. AECOM/URS will estimate costs for permitting, field investigations and survey, and design as a percentage of construction cost. AECOM/URS will conduct benefit cost analysis for the alternatives by estimating losses from the 1% and 10% annual chance floods using HAZUS for the existing condition and for the four proposed alternatives. These options will be conceptual in nature, and will need further design to determine feasibility.

- 1) Detention alternative. At a location approximately three miles north of the Morgan County Line and east of SH 71 just south of County Road D, AECOM/URS will use USGS 10-foot contours and the effective Beaver Creek HEC-HMS model to size a reservoir. This location was chosen after a brief investigation of nearby topographic data. AECOM/URS will calculate ability to detain the 100-year event, and will comment on the reservoirs classification per the Office of the State Engineer's requirements and additional design requirements.
- 2) Channelization Alternative without Levees. Channelization will be analyzed without embankment modifications. The channelization alternative without embankment modification will require bridge replacement analyses at County Road S, two BNSF Bridges, at SH 34, and at I-76.
- 3) Levee alternative. Approximately 2.8 miles of levee will be modeled to prevent inundation of downtown Brush north of Burlington Northern Santa Fe Railroad (BNSF) Rail Bridge. AECOM/URS will comment on the probability of certifying the levees to meet 44 Code of Federal Regulations Part 65.10 (44 CFR 65.10) given the railroad tie-ins and construction costs.
- 4) Combination Alternative. Based on preliminary findings of effectiveness of alternatives 1 to 3, AECOM/URS will prepare a fourth alternative combining the more cost effective elements of options 1 to 3.

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The table below discusses some of the impacts with each suggestion.

#	Description	Benefits	Impacts	Cost Elements
1	Locate Reservoir South of County Road D	Reduces flooding in Brush. Possible storage of water for agricultural or recreational uses.	Reservoir inundation limits would cover six or more square miles of existing active farmland and insurable structures on eleven properties.	4 mile dam, with minimum dam height 34 feet at highest point. Spillway must carry the Probable Maximum Flood. Substantial property acquisition and resident relocation from 11 properties.
2	Channel Improvements	Reduces flooding in Brush	Substantial excavation and widening of Beaver Creek and Bridges over Beaver Creek.	Construct 1.8 miles of channel improvements and expand capacity of crossing of County Road 29 Bridge, 2 BNSF Bridges, and the SH 71 Bridge. Right of way takes to allow substantial bridge widenings and channel widenings.
3	Brush Levee Trail	Prevents flooding in Brush, provides Beaver Creek Trail	Raised water surface elevations for commercial properties east of the BNSF Rail alignment.	Construct 2.8 mile levee. Raise County Road S, BNSF, County Road R, and SH 34 to Cross over Levee.
4	Combined	TBD	TBD	TBD

Assumptions:

- AECOM/URS will utilize the effective FEMA HEC-RAS model to model effectiveness of alternatives 1 to 4. AECOM/URS will model detention using the effective FEMA hydrologic model developed in the Beaver Creek Technical Support Data Notebook (TSDN).
 - For Option 1, AECOM/URS will map floodplain using the “No Breach” plan from the TSDN.
 - For the submission of Option 2, AECOM/URS will target bridge hydraulic opening sizes based on HY-8 analysis with tailwater conditions set assuming successful depth reduction accomplished with the channelization. The second submission of Option 2 will refine the bridge sizes if appropriate.
 - For Option 3, AECOM/URS will accomplish this analysis by modifying the “No Breach” plan from the TSDN to eliminate the spill reach, widening the cross sections from the main channel reach to include the spill reach geometry and accommodate the presence of the levee in the widened cross sections.
- The analysis will not require survey. The project will utilize the contour/survey data used in the 2012 Beaver Creek TSDN for the hydraulic analysis and will utilize available USGS 10-foot contours for the detention analysis. The Beaver Creek TSDN includes
 - 2005 aerial survey with one foot contours in the Brush urban areas (North American Mapping, 2005).
 - 2011 survey of the SH-71 Bridge and I-76 over Beaver Creek Bridges (Western States Survey, 2011).

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- As-built bridge plans for I-76 (Ken R. White Consulting, date not listed), County Road 29 (Ken R. White Consulting, 1956), and SH-34 over Beaver Creek (Colorado Division of Highways, 1995).
- Two foot contours with surveyed cross sections from a 1964 study for the agricultural floodplain area south of Brush (Gingery and Associates, 1964).
- The alternatives analysis project will not include FEMA Letters of Map Revision or Conditional Letters of Map Revision.
- The analysis will not include development of a Probable Maximum Flood Event. Costs developed for the reservoir alternative will be focused to detain the peaks of the 100-year event only and will not include design elements associated with a high hazard dam.

Standards:

- FEMA Data Capture Technical Reference
- 44 CFR 65.10

Deliverables:

- Hydraulic models for each scenario
- Report delivered following the second community engagement meeting, documenting the approach to each alternative, limitations and benefits to each, and conceptual cost.
- Exhibits showing the proposed changes and resulting floodplains.

2. Community Engagement

Scope: This task includes activities for AECOM/URS to support CWCB with community engagement and outreach in support of this study. For this analysis, AECOM/URS assumes two meetings with the CWCB and two additional meetings with CWCB, the City of Brush, and Morgan County.

Stakeholder meetings at the beginning and end of the alternatives cost development process will direct the analysis toward a preferred alternative. Table one (above) provides draft benefits, impacts, and cost elements of various alternatives for discussion with the stakeholders. Following the two stakeholder meetings, AECOM/URS will prepare a comment response spreadsheet for sharing with the stakeholders.

Assumptions: One community meeting will be scoped for this task. The additional community meeting will be paired with other CHAMP efforts and are not scoped under this effort. No additional meeting will be required for this task.

Standards: All Community Engagement work will be performed in accordance with applicable FEMA standards.

Deliverables: Comment response spreadsheet.

3. Project Management

Scope: A Project Management Team (PMT) will be established consisting of representatives from CWCB and AECOM/URS. The PMT will be responsible for coordinating project activities and stakeholder engagement. Project manager will:

- Manage Schedule and Budget which will include monitoring of Schedule Performance Index (SPI) and Cost Performance Index (CPI).
- Maintain and report overall project QA/QC maintenance information, such as maintaining a QA/QC log and applying and documenting an approved QA/QC approach
- Manage adherence to scope of work and quality of work for an organization.

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Assumptions: Project management activities will cover data development tasks associated with this project. If additional project management activities are requested, AECOM/URS will discuss them with CWCB and submit a change request as necessary.

Standards: Monthly invoices and progress reports.

Deliverables: N/A

Schedule

AECOM/URS anticipates beginning this SOW in June 2017, following CWCB approval of this proposal. The estimated schedule for this SOW is outlined below.

ACTIVITIES	RESPONSIBLE PARTNER(S)	Estimated START DATE	Estimated END DATE
Conduct Alternatives Analysis	AECOM/URS	07/01/2017	11/19/2019
Community Engagement	CWCB AECOM/URS	07/01/2017	11/19/2019
Project Management	AECOM/URS	07/01/2017	11/19/2019

Rate Schedule

See attached

Cost Estimate

The estimated baseline cost for AECOM/URS to perform the SOW is \$122,052.20. The terms and conditions to be used for the work are provided in the Master Task Order Contract for Professional Services between CWCB and AECOM/URS, entered into on November 21, 2014. AECOM/URS can initiate work upon receipt of written authorization referencing this proposal.

AECOM/URS assumes that the work described in this scope of work can be completed within the level of effort described, which is based on AECOM/URS' experience in completing similar work and on best professional judgment of the technical staff supporting this project.

Please contact Remmet deGroot at 303-796-4633 or remmet.degroot@aecom.com, or Rigel Rucker at 575-545-1107 or rigel.rucker@aecom.com if you have any questions regarding this proposal. AECOM/URS appreciates the opportunity to assist CWCB on this project.

Sincerely,

AECOM/URS



Remmet deGroot, CFM, GISP
Program Manager



Ed Toms, PE
Vice President



Labor Category		Rate	Project Management	Hydraulics	Community Engagement	Total
Graduate Scientist	Asst/Support 3	\$ 69.00				0
Staff Scientist	Staff 2	\$ 96.00		230		230
Senior Scientist	Project 1	\$ 128.00				0
Graduate Engineer	Staff 1	\$ 84.00				0
Staff Engineer	Staff 3	\$ 106.00		220	17	237
Project Engineer	Project 1	\$ 128.00		274.5		274.5
Senior Engineer	Consultant 1	\$ 165.00		144.9	8	152.9
Surveyor	Staff 2	\$ 96.00				0
Survey Lead	Staff 3	\$ 106.00				0
Project Controls	Ass/Support 4	\$ 79.00	12			12
Admin Support	Ass/Support 2	\$ 58.00				0
Project Manager	Consultant 1	\$ 165.00	72		8	80
Project Principal	Principal 4	\$ 220.00				0
Total Hours			84	869.4	33	986.4
Labor Cost		\$	12,828.00	\$ 104,444.50	\$	\$ 121,714.50
ODCs		Unit Cost				Cost
Per Diem		\$64.00		2		\$ 128.00
Airfare		\$0.00				\$ -
Lodging		\$100.00		0		\$ -
Mileage		\$0.535		200		\$ 107.00
Large Color Prints		\$12.00		6		\$ 72.00
11x17 Prints		\$0.12		0		\$ -
8.5x11 Prints		\$0.07		0		\$ -
Auto Rental		\$500.35		0		\$ -
Miscellaneous (Meeting Materials)		\$2.00		0		\$ -
Express Mail		\$100.00		0		\$ -
Web Hosting		\$150.00		0		\$ -
					ODC Costs	\$ 307.00
					10% G&A	\$ 30.70

10% Subcontract	\$	-
Total Labor	\$	121,714.50
3% Communication	\$	-
Total ODCs	\$	337.70
Grand Total	\$	122,052.20

URS COLORADO FEE SCHEDULE – COLORADO RISK MAPPING CONTRACT

The following describes the basis for compensation for services performed for the term of the agreement. Staff will be billed at their appropriate billing rates through the term of the agreement.

PERSONNEL CHARGES

The charge for all time required in performing the Scope of Services, including office, field, and travel time, will be at the Unit Price Hourly Rates set forth below for the labor classifications indicated.

<u>Labor Classification</u>	<u>Hourly Rate</u>
Assistant/Support Staff 1	47
Assistant/Support Staff 2	58
Assistant/Support Staff 3	69
Assistant/Support Staff 4	79
Assistant/Support Staff 5	91
Assistant/Support Staff 6	101
Assistant/Support Staff 7	111
Assistant/Support Staff 8	122
Assistant/Support Staff 9	133
Assistant/Support Staff 10	143
Staff 1	84
Staff 2	96
Staff 3	106
Staff 4	116
Project 1	128
Project 2	138
Project 3	148
Project 4	160
Consultant 1	165
Consultant 2	175
Consultant 3	185
Consultant 4	195
Principal 1	200
Principal 2	205
Principal 3	210
Principal 4	220

Charges for temporary personnel under Company supervision and using Company facilities will be invoiced according to the hourly rate corresponding to their classification, if not billed as subcontractors.

Overtime (hours worked in excess of eight (8) hours per day) by exempt personnel will be charged at the above straight time hourly rate. Overtime by non-exempt personnel will be charged at time and a half.

Project accounting reporting and financial services, including submission of invoice support documentation will be charged at the appropriate rate of the staff performing the work.

FIELD EQUIPMENT

Leased or rented field equipment will be charged as other direct cost.

OTHER PROJECT CHARGES

Subcontracts

The cost of services subcontracted by the Company to others will be charged at cost plus 10%.

Travel and Other Direct Costs

The cost of travel (airfares, lodging, meals, rental vehicles, parking fees, baggage handling cost, etc.) or other direct cost (field supplies, report binding supplies, film and processing, etc.) will be charged at cost plus 10%. A per diem may be used for lodging and meals.

Communications

A flat rate of 3% of the total labor charges will be invoiced for charges for normal domestic telephone, long-distance telephone, cellular telephone, facsimiles, email, and correspondence mailing. All other communication fees (e.g., Express Mail, other shipping, etc.) will be charged as Other Direct Costs.

Document Reproduction

In-house labor for document reproduction will be charged directly to projects. External reproduction will be charged at cost plus 10%.

Vehicles and Mileage

Company owned or leased field vehicles (pick-ups, vans, trucks, etc.) used on project assignments will be charged at the rates noted in the Schedule of Equipment Charges. The mileage charge for personal autos will be the current mileage rate established by the Internal Revenue Service.

This fee schedule contains URS confidential business information. Do not disclose, copy, or distribute without written permission from URS.