



**COLORADO**

**Colorado Water  
Conservation Board**

Department of Natural Resources

1313 Sherman Street, Room 718  
Denver, CO 80203

October 14, 2015

Upper Platte and Beaver Canal Company  
Attn: Mr. Steve Griffiths, President  
P.O. Box 69  
Fort Morgan, CO 80701

RE: Official Notice to Proceed - WSRA Grant – POGG1 2016-429 UP&BCC Feasibility  
Study in the South Platte River Basin

Dear Steve,

This letter is to inform you that the purchase order to assist in the above WSRA grant project was approved on October 14, 2015. This email serves as the original documentation for your records.

With the executed purchase order, you are now able to proceed with the project and invoice the State of Colorado for costs incurred through October 31, 2016 according to the schedule in Exhibit A. Please provide the project name, purchase order number, and basin when corresponding with or invoicing the State of Colorado for your project. Upon receipt of your invoice(s), the State of Colorado will provide payment no later than 30 days after review and signed approval by the project manager. I wish you much success in your project.

If you have any questions or concerns regarding the project, please contact me. You can contact Dori Vigil at 303-866-3441 ext. 3250 for invoicing and payment disbursement questions.

Sincerely,

//s//

***Brent Newman***  
***Program Manager***  
***Colorado Water Conservation Board***  
***Water Supply Planning Section***  
1313 Sherman Street, Suite 718  
Denver CO 80203  
 [\(303\) 866-3441, ext 3222 \(office\)](tel:3038663441)  
[brent.newman@state.co.us](mailto:brent.newman@state.co.us)

cc: Heather Kalous, Secretary  
Attachments





STATE OF COLORADO  
Department of Natural Resources

<b>ORDER</b>		<b>** IMPORTANT **</b>				
Number: POGG1 PDAA 20160000000000000429		The order number and line number must appear on all invoices, packing slips, cartons and correspondence				
Date: 10/14/15						
Description: PDAA 2500 WSRA UPBCC Feasibility Study		<b>BILL TO</b>				
Effective Date: 10/14/15      Expiration Date: 10/31/16		COLORADO WATER BOARD CONSERVATION				
<b>BUYER</b>		1313 SHERMAN STREET, ROOM 718				
Buyer:		DENVER, CO 80203				
Email:		<b>SHIP TO</b>				
<b>VENDOR</b>		COLORADO WATER BOARD CONSERVATION				
UPPER PLATTE AND BEAVER CANAL COMPANY		1313 SHERMAN STREET, ROOM 718				
PO BOX 69		DENVER, CO 80203				
FORT MORGAN, CO 80701		<b>SHIPPING INSTRUCTIONS</b>				
Contact: HEATHER KALOUS		Delivery/Install Date:				
Phone: 970-842-2552		F.O.B:				
		<b>VENDOR INSTRUCTIONS:</b>				
<b>Line Item</b>	<b>Commodity/Item Code</b>	<b>UOM</b>	<b>QTY</b>	<b>Unit Cost</b>	<b>Total Cost</b>	<b>MSDS Req.</b>
1	G1000		0	0.00	\$46,875.00	<input type="checkbox"/>
Description: PDAA 2500 WSRA UPBCC Feasibility Study						
Service From: 10/14/15      Service To: 10/31/16						
<b>Line Item</b>	<b>Commodity/Item Code</b>	<b>UOM</b>	<b>QTY</b>	<b>Unit Cost</b>	<b>Total Cost</b>	<b>MSDS Req.</b>
2	G1000		0	0.00	\$46,875.00	<input type="checkbox"/>
Description: PDAA 2500 WSRA UPBCC Feasibility Study						
Service From: 10/14/15      Service To: 10/31/16						
<b>TERMS AND CONDITIONS</b>						
<a href="https://www.colorado.gov/osc/purchase-order-terms-conditions">https://www.colorado.gov/osc/purchase-order-terms-conditions</a>						
<b>DOCUMENT TOTAL = \$93,750.00</b>						

**Exhibit A**  
**Statement of Work**  
**Date: September 11, 2015**

**WATER ACTIVITY NAME – Upper Platte & Beaver / Deuel & Snyder Feasibility Study**

**GRANT RECIPIENT – Upper Platte and Beaver Canal Company (UP&B)**

**FUNDING SOURCE – Water Supply Reserve Account**

**INTRODUCTION AND BACKGROUND**

The existing diversion dam spans the South Platte River and allows UP&B and Deuel & Snyder (D&S) to divert water into their intake structures. The original structure was constructed over 80 years ago and UP& B and D&S have modified and repaired the structure throughout its history to make it useable for both companies. Recent investigations have found problem areas where the shale bedrock has been undermined resulting in structural damage that must be addressed so that the diversion structure does not catastrophically fail, and so that UP&B and D&S can insure efficient operation of their irrigation systems. The work to be performed in this feasibility study will consist of a thorough evaluation of the existing diversion structure and associated diversion components that are owned and operated by both UP&B and D&S. The feasibility study will be designed to evaluate options to repair and/or upgrade the existing structures as well as provide options to replace the existing structure with a new diversion dam across the South Platte River.

**OBJECTIVES**

The goal of this feasibility study is to evaluate the existing structures and determine if it is best to repair/modify the existing structure or if it is best to replace the dam. The design and construction phase that will follow will be designed to provide an efficient, safe, diversion structure that will provide benefits for the next 80 plus years. Additional benefits that have been identified for evaluation at this time include, but are not limited to the following:

- Fish passage structure(s) designed to provide a detour route for migrating native Colorado fish including the Brassy Minnow and Sucker Mouth Minnow
- Channelization of the South Platte River to minimize flood impacts and ongoing erosion on the north and south banks of the South Platte River at and near the diversion structure
- Bank stabilization
- Protection of existing downstream infrastructure (Morgan County Quality Water, Morgan Heights, etc...)
- Safe operations

**TASKS**

## **TASK 1 – Site Survey**

### Description of Task

A topographical survey will be conducted of the project site including the existing diversion dam and extending 200 feet upstream and downstream of the structure. The survey will include the dam abutments, dam crest, upstream toe, downstream toe, location, size and crest elevation of gates, and adequate spot elevations to define the structure. The dam will be stationed from the left abutment to the right abutment looking downstream and marked at intervals of 50 feet. The site survey will include up to five cross-sections of the river channel upstream of the dam and three cross-sections downstream of the dam structure. The location of the cross-sections will be selected as required for the hydraulic model of the river.

### Method/Procedure

The survey will be conducted using horizontal control based on NAD 83 (State Plane) and vertical control based on NGVD 88. Field methods will include the use of a watercraft as necessary to access points in the river.

### Deliverable

The survey will be used to develop a base map suitable for preparing conceptual plans of the proposed alternatives. The base map will be plotted using a screened aerial photo, with one foot contours adjacent to the existing dam and spot elevations shown at the location of the cross-sections. Deliverables will include an electronic copy of the ACAD DWG file, PDF of the base map, ASCII file listing points, and field notes including control ties.

## **TASK 2 – Visual Inspection**

### Description of Task

The visual inspection will document the exiting structural and mechanical condition of the dam and appurtenances. The visual inspection will be conducted by team consisting of a senior civil engineer, structural engineer and geotechnical engineer licensed in Colorado and experienced in dam engineering.

### Method/Procedure

Prior to the inspection the team will meet with the UP&B and D&S staff to obtain available information on operational procedures, maintenance practices, problem areas. and discuss the history of repairs to the dam. Available historic photographs of the dam will be reviewed to help identify the progression of structural damage.

A health and safety plan will be prepared for the dam inspection and a tailgate safety meeting will be held to review procedures and address specific safety concerns prior to conducting the inspection. The inspection will consist of a visual examination of the components of the dam listed below. During the inspection photographs will be taken to illustrate any deficiencies. A field sketch will be included to identify the location and orientation of the photographs.

- **Abutment:** The team will walk and examine the abutment sections for alignment, deformation, depressions, sinkholes, erosion, animal burrows, sloughs, seepage, vegetation cover, tree encroachment and erosion protection. Seepage points will be photographed and mapped using measurements from the stations identified on the site survey. An estimate of seepage quantity will be made. Particular attention will be paid to identify wet areas, and enhanced vegetation at abutment contacts.
- **Concrete Structures:** The team will examine the crest, upstream face, and downstream face of the concrete structure for alignment, settlement, cracking, leakage spalling, exposed aggregate, exposed rebar, delamination, joints, undermining, and obvious voids as indicated by sounding. Deficiencies will be photographed and located from the stationing identified by the site survey. Visible portions of the concrete structure gate structures will be examined to assess the condition and operational function.
- **Mechanical water control equipment:** The team will examine gates, valves, stop logs and appurtenances, for wear, corrosion and operational function. UP&B or D&S staff will assist in the inspection by operation of the gates if needed.
- **River conditions:** Water levels at the time of the inspection will be recorded. River conditions upstream and downstream will be observed in regard to sedimentation, scour and the formation of new channels.

#### Deliverable

A Technical Memorandum will be prepared to document the findings of the inspection.

### **TASK 3 – Geotechnical Investigation**

#### Description of Task

A geotechnical investigation will be conducted of the project site to evaluate the subsurface and foundation conditions for the conceptual design of the alternatives. The investigation will include an analysis of the underlying geology, location and quality of bedrock, material sampling, laboratory analysis and recommendations for construction of the proposed alternatives.

#### Method/Procedure

The investigation will include drilling approximately ten test borings to be located during the inspection described in Task 2. Approximately five borings are anticipated to be located adjacent to the existing structure. The remaining borings will be located near the alignment of a possible new diversion dam. Drilling will be completed using a lightweight tracked rig. The drilling will be conducted during a low flow period in the river. A tracked excavator will accompany the drilling rig to provide temporary access across minor river channels using native river bed materials. The drilling will be extended to refusal and at least ten feet of rock core will be obtained at each boring location. Samples of rock and soil materials will be obtained during the drilling at interval of at least five feet. Laboratory testing will be conducted to determine material types and classification according to the

Unified Soil Classification System (USCS) and to evaluate engineering properties. Rock Quality Designation (RQD) will be determined for rock cores.

The geotechnical investigation will also include obtaining up to four bulk river bed samples for the river mechanics analysis. Two samples will be obtained upstream of the existing diversion structure and two samples will be obtained below the structure at locations designated by the river mechanics sub-consultant.

#### Deliverable

The deliverable for the geotechnical investigations will be a Geotechnical Investigation Report (GIR) that will include the results of the investigations including a description of the project, general site geology, narrative of the subsurface conditions and material types, generalized interpreted subsurface profiles, tabulated results of the field and laboratory testing, and logs of borings. The report will be included as an appendix to the report described in Task 6.

### **TASK 4 – Environmental Evaluation**

#### Description of Task

An environmental evaluation will be conducted of the project site to determine the regulatory permitting requirements for the project. The evaluation will include wetlands identification and mapping at the location of the proposed alternatives. The natural resource/environmental agencies with regulatory authority over the potential improvements will be identified and a preliminary determination will be made of the permitting requirements, costs, and timing for regulatory approval.

#### Method/Procedure

The project area will be mapped by environmental scientists who will walk the perimeter of the anticipated construction area for the dam alteration and identify and mark the wetlands boundaries in accordance with the Corps of Engineers Wetland Delineation Manual. The environmental scientists will characterize the riparian vegetation along the river both upstream and downstream of the existing diversion structure and the proposed new structure. The boundaries will be subsequently located in the field using differential GPS. Each wetland will be classified according to the U.S. Fish and Wildlife Service (FWS) Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979). The GPS points will be downloaded, processed, and saved as a separate electronic file to be shown on the base map described under Task 1 – Site Survey.

#### Deliverable

The methodology and findings of the environmental evaluation including the wetlands mapping will be summarized in a technical memorandum. The memorandum will include a table listing the designation and area of wetlands mapped and a table summarizing the environmental regulatory agencies, contact information, required permits, anticipated permit review time and cost. The technical memorandum will be included as an appendix to the report described in Task 6.

## **TASK 5 – Hydraulic Modeling**

### Description of Task

A hydraulic model of the South Platte River will be developed. The model will be used as the basis of a river mechanics study to evaluate the impact of the diversion dam alternatives on channel alignment and formation. The study will identify geomorphic characteristics of the South Platte and evaluate the location of proposed structures and gates to optimize sediment control and channel stabilization. The impact of the alternatives on the sediment regime of the river will be evaluated.

### Method/Procedure

The U.S. Army Corps of Engineers HEC-RAS model will be used for the hydraulic modeling of the South Platte River. The model will be developed using the cross-sections from Task 1 – Site Survey. Additional data as available from recent modeling of the South Platte River will be incorporated in the HEC-RAS model to extend the study reach as appropriate for the analysis. The model will include the 2, 10, 50, 100 and 500 year floods as determined from river gaging records.

### Deliverable

The methodology and findings of the hydraulic modeling and river mechanics study will be summarized in two technical memorandums. The first memorandum will detail the hydraulic model and include profiles and inundation limits for the 2, 10, 50, 100 and 500-year floods. A summary table of hydraulic data at each cross-section in the study reach will be included. An electronic copy (CD) of the HEC-RAS model will be provided as part of the memorandum. The second technical memorandum will detail the river mechanics study, listing geomorphic characteristics and impacts of the alternatives on channel alignment and formation.

## **TASK 6 – Preliminary Design/ Recommendations**

### Description of Task

Preliminary plans will be prepared at the 30 percent level for the alternative of rehabilitating the existing diversion dam and the alternative of constructing a new diversion dam upstream of the existing dam. The preliminary plans will include the plan, typical sections, details for gates, cut-off wall, stilling basin, downstream scour protection, and abutment slope protection. An evaluation of project cost will be made including site preparation, clearing, demolition and earthwork; material delivery, storage, and staging area requirements; materials handling and placement equipment; encroachments and necessary property or easements acquisitions; roadway obstruction and traffic management during construction; and seasonal constraints. Recommendations will be made and the next steps needed to complete the project will be outlined.

### Method/Procedure

The preliminary plans will use the base map developed as part of Task 1 – Site Survey and be developed using ACAD on 22 inch by 34 inch format sheets. The preliminary plans are expected to include a cover sheet showing vicinity and site maps, plan and profile of the diversion dam structure, typical sections of the diversion dam, detail sheets of the associated gates and structures and river cross-sections.

### Deliverable

A preliminary design report will be prepared to incorporate the findings of the previous tasks, a description of the proposed alternatives, the preliminary plans, the project cost evaluation and the recommendations. The technical memorandum developed as part of Tasks 2 through 5 will be attached in an appendix. The draft preliminary design report will be submitted to the CWCB in electronic format. Five paper copies of the draft report will also be submitted if requested. Comments from the CWCB will be addressed and a final report will be submitted in electronic format. Ten bound paper copies of the report will also be submitted if requested.

## **REPORTING AND FINAL DELIVERABLE**

**Reporting:** The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the statement of work including a description of any major issues that have occurred and any corrective action taken to address these issues.

**Final Deliverable:** At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report will contain photographs, summaries of meetings and engineering reports/designs.



## PROJECT COST ESTIMATE

The Colorado Water Conservation Board approved a grant for \$93,750.00 (\$46,875 from the WSRA Statewide Account and \$46,875 from the WSRA South Platte Basin Account). The total project cost is estimated to be \$125,000 (including match funding from Grantee).

**Table 1: Estimated Costs/Funding Sources**

Task		Project Costs
1		13,875
2		10,875
3		30,000
4		5,250
5		18,375
6		15,375
Total WSRA Project Costs:		\$93,750
CWCB Loan Funding:		\$0
Grant Recipient Cash Match:		\$31,250
Total Project Costs:		\$125,000

## SCHEDULE

**Table 2: Project Schedule**

Tasks 1-6	Start Date	Finish Date
	Effective Date	Effective Date + 24 months