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December 9, 2024

Jocelyn Carter
Environmental Protection Specialist
Division of Reclamation, Mining, and Safety
1313 Sherman St Suite 215
Denver, CO 80203

Re: M-1977-573 – West Pueblo Pit - Arkansas River Bank Erosion Repair Project

Dear Ms. Carter,

The Arkansas Groundwater and Reservoir Association (“AGRA”), permit holder of active permit M-1977-573, is working with Colorado Parks and Wildlife (CPW) to address a large scour hole that has formed along the Arkansas River, near the West Pueblo Pit (“Pit”), located in NE1/4, SW1/4, S32, T20S, R65W, 6th P.M. This scour hole is being caused by a rock fish structure placed in the river. Gravels which have settled on the bed around the rocks is being redirected towards the bank, eroding the soils along the edge of water and causing the hole to constantly increase in size. At present, the hole has increased in size to the point that it has destroyed a haul road around the pit, and if it continues to worsen, it threatens to breach a compacted clay liner inside the pit. AGRA and CPW are working jointly to oversee a design project that will develop a plan to repair this damage. This letter will provide an overview of the problem and will describe the planned repairs.

Background

The Arkansas River at the West Pueblo Pit is eroding a section of the bank near the West Pueblo Pit just west of the city of Pueblo, Colorado (Figure 1).



Figure 1. Overview of West Pueblo Pit, Showing Location of Bank Erosion.

The erosion is believed to be caused by the deposition of gravel and rocks at the location of a rock J-Hook fish habitat structure present in the river near the bank. The rock structure has forced these materials to settle upstream of the rocks, forming a large rock and gravel bar that particularly at lower flows, is high enough to force a portion of the river's flow to turn as though it was flowing over a broad-crested weir laterally into the bank line. The soils at this location did not have any armoring or protection from highly erosive hydraulic factors such as the increased shear stress resulting from the higher velocities to prevent this erosion. Additionally, the native soils themselves are highly erodible and appear to be mostly composed of fine-grained sands and silts that are cohesionless and have no ability to resist when a shearing force is applied to

them. Any native vegetation that was originally present was easily destabilized when the underlying soils started to erode away from the roots of that vegetation; soils, when they become saturated, lose strength that they need to resist loads that are applied to them. When the soils become saturated and lose strength, the mass of the upper soils becomes unsupportable and the entire bank collapses vertically down into the river; this is easily observable at this location. Figure 2 below shows an overview of the scour hole and shows the cause of the erosion and the damage that has been sustained on AGRA's property as a result.



Figure 2. Overview of The Scour Hole at West Pueblo Pit, Showing Cause of Erosion and Damaged Areas.

Figure 3 below shows an example of the vertical bank caving that is occurring due to saturated soils.



Figure 3. A Close-Up View of the Damaged Bank, Showing Where The Bank Is Failing Vertically.

AGRA is engaged with CPW to work on completing a design to the 30% level that will allow the project to proceed quickly and be completed during the winter of 2024-2025. There are important constraints that this effort is working under that will be described in more detail below.

Project Design

As stated above, AGRA and CPW are working jointly on a design to stabilize and repair this site. At this time, the planned work includes placing roughly 5,000 cubic yards (CY) of fill to restore the mass of soil and the bank line that has been lost to erosion. This volume has been estimated using recent topographic surveys of the site. The gravels in the riverbed that are re-directing flow laterally into the bank will be removed and under U.S. Army Corps of Engineers (USACE) guidelines, will be re-used as subgrade fills in the hole. Finished slopes are not known at this

time, but from survey, the undamaged banks upstream and downstream from the damaged area have slopes of about 1.25:1. The finished grades of this project will seek to match those areas in a way that also accommodates the flow the river. Slope protection measures are undetermined at this time, but may include alternatives including riprap, buried soil riprap, or koir wrap soil lifts. The rock structures will not be removed and as such, long-term coordination with CPW will be necessary to ensure that the river does not re-deposit bed materials in such a way that this problem will only occur again in the future.

A revegetation plan that makes use of native grasses, willows, and cottonwoods will be used to stabilize the finished surface of the slope. Topsoil from existing stockpiles within the pit will be used as a final lift of soil above the subgrade to help with establishment of the planting and seeding on the project.

At this time, a final contract is being negotiated between CPW and Matrix Design Group, located in Colorado Springs. Upon execution of this contract, design work will proceed. As already mentioned, field survey has already been collected by AGRA to support the design effort. Design and USACE permitting are expected to be complete by early February. SEMA Construction, from Greenwood Village, will be used to perform the earthwork for the project. It is anticipated that substantial completion of the project will be complete by mid-March 2025.

Future Technical Revision

As requested by the Division of Reclamation, Mining, and Safety (DRMS), AGRA will prepare and submit to DRMS a Technical Revision (TR) request letter that details the stabilization work that took place for this project. AGRA will prepare and complete this TR letter immediately after substantial completion of construction, towards the end of the first quarter (Q1) of 2025.

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Conclusion

AGRA, together with CPW, is working to repair and restore a section of eroded bank along the Arkansas River near the West Pueblo Pit, which is under active reclamation permit M-1977-573. A 30% design will be performed that includes slope stabilization, protection, and revegetation. The project is expected to be constructed early in 2025. Upon completion of the project, AGRA will submit a technical revision letter to DRMS describing the as-built conditions of the site, post-project.

If you have any questions or would like to discuss this project, please do not hesitate to contact me at dan@agraco.net or 719-406-2852.

Sincerely,

A handwritten signature in black ink, appearing to read "Dan R. Tucker", is written over a light gray rectangular background.

Daniel R. Tucker, PE

Water Resources Engineer,
Arkansas Groundwater and Reservoir Association