



COLORADO
Division of Reclamation,
Mining and Safety
Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

June 4, 2018

Dan Moore
City of Greeley
1100 10th Street, Suite 300
Greeley, CO 80631

**Re: City of Greeley; 25th Avenue Site; File No. M-2002-020
Technical Revision No. 1 (TR-01) Second Adequacy Review**

Mr. Moore,

The Division of Reclamation, Mining and Safety (Division/DRMS) has reviewed the content of the adequacy response from Wenck dated April 5, 2018 for technical revision (TR-01) at the 25th Avenue Site and submits the following comments. The Division is required to make an approval or denial decision no later than June 13, 2018 therefore; a response to the following additional adequacy review concerns should be submitted to the Division as soon as possible.

The questions below are based on the Operator's response to the Division's adequacy letter dated August 30, 2017:

Comment 1:

- a) P. 2, bottom paragraph, attachment reference: The response references Attachment A2. The submittal mislabeled this attachment as "Appendix 2, Approach Velocity Sensitivity Analysis". If there was a more recent version of this attachment, please provide it. Otherwise the DRMS will assume Appendix 2 was mislabeled and no response is necessary.
- b) P. 3, second paragraph, drawing reference: The response references Sheet No. C-102. The only drawing received with the submittal was Sheet No. C-501. Drawing C-501 has apparent anomalies (see Comments 1d, and 3b below). Was the Division supposed to receive Sheet No. C-102 or C-501?
- c) P. 4, first paragraph, shear stress and permissible velocities: Although no reference to Attachment B2 is made here, Attachment B2 appears to be the source for the maximum permissible velocity and shear stress for graded riprap. As such, it appears the two values were flip-flopped for the design criteria. According to Attachment B2



- (second page) boulders (medium, >20-inch diameter) have an allowable shear of 9.3 psf, and a maximum permissible velocity of 14 fps. The calculated shear is reported to be 11.51 psf, which clearly exceeds the 9.3 psf allowed. Please redesign the graded riprap portion of the spillway to meet the shear stress criterion.
- d) P. 4, second bullet, design standards: the third line cites UDFCD's standard of leaving the top third of grouted boulders ungrouted (to provide roughness for energy dissipation). However, Sheet No. C-501, Grouted Riprap Detail shows only the top 25% of the grouted riprap layer (4 ft minus 3 ft) being ungrouted. This same detail shows multiple boulders in the "layer" of grouted riprap. Pursuant to Figure 9-15 of the UDFCD manual (Vol. 2) referenced on p. 6, third paragraph of this submittal (and Figure 2.7 of the also referenced CWCB's Floodplain and Stormwater Criteria Manual), the grouted riprap armoring should be a single layer of boulders grouted to within one third of the top of the rock. This is not how the design is depicted in this detail on Sheet No. C-501 and is critical in demonstrating to the construction contractor how the spillway is to be constructed. Please revise the appropriate drawing to meet the design standard.
 - e) P. 4, third bullet, design standards: the discussion on iterating the Manning's roughness coefficient states the roughness was evaluated assuming the upper half of the grouted boulder is left ungrouted, again contradicting the top third design standard. Please re-evaluate.

Comment 2: The response was adequate.

Comment 3:

- a) P. 6, third paragraph, drawing reference: See Comment 1b above.
- b) P. 6, third paragraph, drawing reference: The last sentence references "concrete cutoffs" for the design. Sheet No. C-501 Section A-A' and Key In/Anchor Detail both show a shaded rectangle where one would expect the cutoff wall, but it is not labeled. Please show and label as such the concrete cutoff wall on the appropriate drawing.

Please be advised the technical revision for the 25th Avenue Site may be deemed inadequate, and the revision may be denied on June 13, 2018 unless the above mentioned adequacy review items are addressed to the satisfaction of the Division.

If you have any questions, please contact me at peter.hays@state.co.us or (303) 866-3567 Ext. 8124.

Sincerely,



Peter S. Hays
Environmental Protection Specialist

Ec: Michael Cunningham; DRMS