

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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April 25, 2012

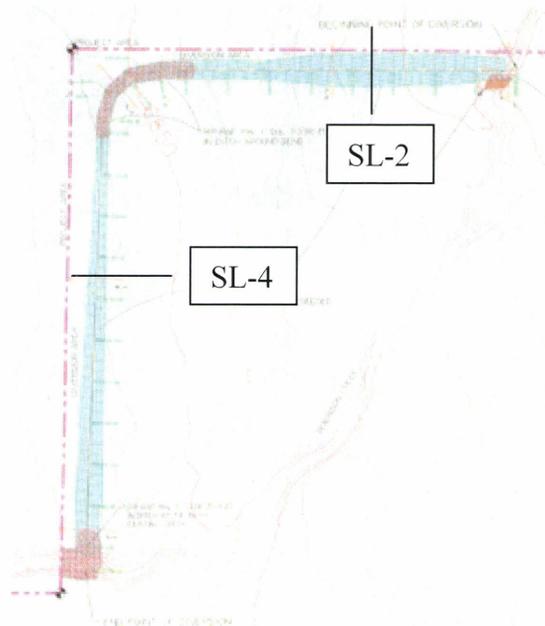
TO: Internal File

THRU: Daron Haddock, Lead *DH*

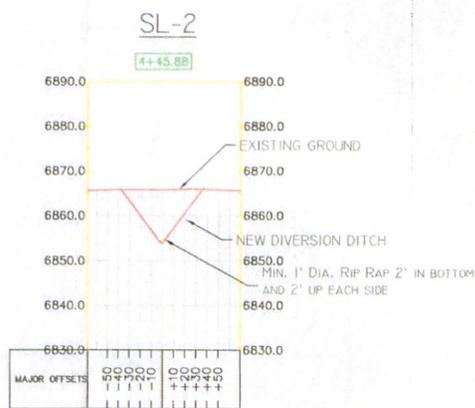
FROM: Ken Hoffman, Hydrologist *KH*

RE: Lower Robinson Creek Diversion Channel Repair, Alton Coal Development LLC, Coal Hollow, C/025/0005

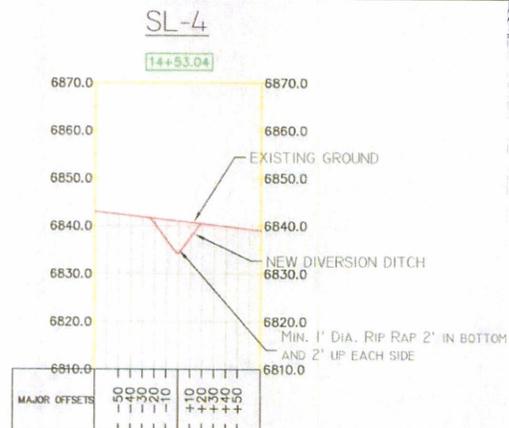
A review of the Coal Hollow MRP was conducted concerning the Lower Robinson Creek Diversion. Section 742.320 Diversion of Perennial and Intermittent Streams of Chapter 7 references Appendix 5-3 and Drawings 5-20 and 5-21. Appendix 5-3 designs for a 10-year 6-hour event and prescribes the use of heavy riprap  $D_{50}=1.0$  ft in the upper half of the diversion and  $D_{50}=0.5$  ft riprap in the lower half of the diversion. Drawing 5-20 is a plan view of the diversion and Drawing 5-21 is a profile view with cross sections of the elbows of the diversion as SL-1, SL-3, and SL-5 and cross sections of the channel as SL-2 and SL-4.



Excerpt from Drawing 5-20



Cross Section SL-2 from Drawing 5-21



Cross Section SL-4 from Drawing 5-21

Cross Sections SL-2 and SL-4 specify for "Min. 1' Dia. Rip Rap 2' in bottom and 2' up each side." On April 19, 2012 at 8:30 am Kirk Nicholes of Alton Coal was informed that installation of rip rap must meet this standard.

## References

Section 742.320 Diversion of Perennial and Intermittent Streams of Chapter 7 states:

“742.323 The temporary Lower Robinson Creek diversion has been designed to safely pass a 100 year, 6 hour storm event. The watershed for this drainage is 3.64 square miles and has a peak flow of 83.5 cubic feet per second during a 100 year, 6 hour event. Minimum dimensions for carrying this flow were found to be a channel that has the following dimensions:

Bottom width: 2 feet

Side slopes: 3h:1 v

Minimum slope height: 3 feet (1 foot freeboard added)

Details related to the design calculations are provided in Appendix 5-3. Rip-rap will be appropriately placed to minimize erosion of the channel.

Cross sections of the channel design are shown in Drawing 5-21. As shown in the drawing, all sections of the diversions exceed the minimum design standard. A plan view of the diversion design can be viewed in Drawing 5-20.”

Appendix 5-3 Stability of In Situ Soils and Riprap Protection states:

“The steep slopes along with the high flows creates a condition of super critical flow in both segments (average velocity is greater than critical velocity). However in the second segment where the slope is approximately .01 the velocity is only slightly greater than critical. The calculated shear stresses are still above stable limits for bare soils as identified in Table 2-3 of HEC 15. At the 10-year design flows the channel should be stable with a heavy riprap  $D_{so}=1.0$  ft in order to protect the steeper sloped section and a  $D_{so}=.5$  ft for the more shallow sloped segment (see Table 2-3 below).”