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

1313 Sherman Street, Room 215
Denver, CO 80203

Date: August 30, 2016

To: Amy Eschberger

From: Tim Cazier, P.E.

RE: Hitch Rack Ranch Quarry, DRMS File No. M-2016-010;
Second Adequacy Review – Exhibit G, Water Information

The Division of Reclamation, Mining and Safety (Division) engineering staff has reviewed the July 21, 2016 and August 19, 2016 revised Exhibit G Water Information and Exhibit F portions of the 112c mine reclamation permit application prepared by Norwest Corporation for Transit Mix Concrete Company. The following comments are posed to ensure adequate engineering analyses and design practices are implemented to eliminate or reduce to the extent practical the disturbance to the hydrologic balance expected by the mining operation with respect to water quality and quantity in accordance with Rules 3.1.6(1), 6.4.7. The comment numbers below are consistent with the May 3, 2016 preliminary adequacy review for the purpose of tracking responses.

1. Page G-3, paragraph a, Little Turkey Creek. Figure G-5 provides the requested cross-section demonstrating the horizontal and vertical mining offsets, but does not indicate positive drainage will be promoted for either the North Pit Area or the Plant Area/South Pit. The North Pit contours show positive drainage from the northwest towards the southeast, but the southeast portion of the North Pit appears to be contained by an unmined "block" ranging in height from 20 to possible 80 feet. This is also apparent in Figure F-2 for the reclamation plan. A similar, but less prominent blockage may be present in the Plant Area/South Pit, as shown in cross-section A-A' on Figure G-5 where it shows an approximately five-foot rise near Little Turkey Creek that might prevent positive drainage at closure if the rise persists along the creek and until after reclamation is complete. Please provide additional discussion and figures demonstrating how positive drainage will be maintained during operations and after reclamation.
2. Page G-9 *[now p. G-10]*, paragraph b, Deadman Creek. The response is adequate.
3. Page G-9 *[now p. G-10]*, paragraph c, Drainage Discussion. The response is adequate.

4. Page G-11 *[now p. G-12]*, 100-year, 24-hour storm. The response commits to designing stormwater structures using the 100-year, 24-hour storm event as required by the Division, but continues to defer to El Paso County rules and regulations regarding precipitation data, which may be outdated. As explained below, the Division requires the application acknowledge and utilize current references for precipitation data.

   Paragraph a. Site Climate (p. G-12) acknowledges NOAA Atlas 14 has superseded NOAA Atlas 2 (on which the county regulations are based, using data available only prior to 1973), but cites using this older 1973 data. Depending on the "point" selected in the NOAA Atlas 14 (based on data available in 2013), the 100-year, 24-hour precipitation depth can reasonably be expected to be between 5.34 and 5.4 inches. This is 16 to 17 percent higher than the outdated NOAA Atlas 2 selected estimate of 4.6 inches used in the revised analyses. As such, the SEDCAD results in Appendix G-1 are not adequate for Division approval. Please revise the runoff estimates using NOAA Atlas 14 data. Additionally, as the Division requires designs based on the 100-year event, please refrain from providing results to the Division for the 10-year event.

5. Page G-11 *[now p. G-13]*, Table G-3. The response is adequate.

6. Page G-12 *[now p. G-14]*, paragraph a, Ditches. The response is adequate.

7. Page G-12 *[now p. G-14]*, paragraph i, Terrace Ditches. The response is adequate.

8. Page G-13 *[now p. G-15]*, paragraph ii. This paragraph states the PADER method is used for riprap sizing. The response is adequate with the exception of reclamation phase channel DD-F1-1 which Table G-4 indicates has a slope of 25 percent. The USACE EM-1110-2-1601 steep slope method (eq. 3-5) is valid for channels sloped between 2 and 20 percent. An alternative method for sizing riprap for the channel must be selected.

9. Page G-13 *[now p. G-16]*, Table G-4. The response is adequate. Please see Comment No.32.

10. Page G-13 *[now p. G-17]*, paragraph b, Sediment Ponds. The response confirming none of the detention basins will be jurisdictional is adequate.

11. Page G-14 *[now p. G-18]*, paragraph c, Culverts. The response is adequate. Table G-6 was not checked as peak flows will increase based on the response to Comment No. 4.

12. Page G-15 *[now p. G-18]*, Culverts LTC-CC-1 through LTC-CC-6. The response is adequate. However, Table G-6 was not checked as peak flows will increase based on the response to Comment No. 4.

13. Page G-15 *[now p. G-19]*, Table G-6. The response is adequate.

14. Page G-16 *[now p. G-20]*, Paragraph d. The response is adequate.
15. Figure G-5. The purpose of the LTC culverts… The response is adequate.
16. Figure G-6. The response is adequate.
17. Figure G-7. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
18. Figure G-8. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
19. Figure G-9. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
20. Figure G-10. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
21. Figure G-11. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
22. Figure G-12. The requested ditch and grade-to-drain directions were not provided. Please provide the requested information.
23. Figure G-14. Cross Section A-A' shows an outlet pipe to the creek. The expressed intent "to excavate a trench/notch for the pipe" is an adequate response.
24. Figure G-15. The culvert profile. The expressed response and minimum "1% slope" note added to the drawing provides an adequate response.
25. Attachment G-1, SEDCAD Model Reports – Times of Concentration. The revised SEDCAD times of concentration limiting overland flow lengths is an adequate response. However, the stated initial assumption suggesting vegetative and litter cover would cause overland flow to occur for longer distances demonstrates an incomplete understanding of how excess rainfall flows through a watershed. Greater litter and rough cover actually cause the length of overland (or sheet flow) to decrease. Sheet flow is defined as that which is about 0.1 feet in depth. Litter, rocks and ground debris cause these shallow flows to be deflected around these small obstacles causing rivulets to form; forcing the second category of runoff flow (shallow concentrated flow) to be initiated. Steep slopes have a similar effect by accelerating the sheet flow such that it is more likely to initiate small erosion rills (as is frequently observed on steep unvegetated soil stockpiles), leading to shallow concentrated flow. Shallow concentrated flow is the formation of small rivulets observed between the shallow uniform flow (sheet flow) and the channel flow that occurs in small streams. No additional response to this adequacy issue is necessary.
26. 100-foot horizontal and 1-foot vertical offsets for mining activities… The response is adequate.

New Comments:

27. Page G-18, Table G-5. There appears to be a discrepancy between a sediment pond label in Table G-5 when compared to the Mining Phase figures (Figures G-6x through G-12) and the SEDCAD sediment pond sizing model. Table G-5 lists "F1-DET-1" that cannot be found on the figures, nor in the SEDCAD model, but it has the same contributing area (149.13 acres) as the sediment pond labeled "P-DET-1" on Figure G-6A and in the SEDCAD model. Please correct Table G-5 to be consistent with the figures and SEDCAD model labels.

28. Figures G-6A, B & C:

    a. The former Figure 6 has been converted from one drawing to three which provide a great deal more hydrologic and stormwater management information. However, portions of the drawings are difficult to differentiate the different kinds of information and the lack of major contour labels and arrows indicating direction of flow make it difficult to interpret the intent in some areas. For example, it is difficult to determine which subbasins contribute to which sediment ponds. Please provide major contour labels and channel/ditch flow direction arrows. The Division suggests using different colors to differentiate undisturbed subbasins (and their culverts and/or ditches) from affected area subbasins that have runoff intercepted and directed to sediment ponds. In this case, it would be helpful if affected area subbasins and their labels were the same color.

    b. On both Figures G-6B and C, there are two rational method subbasins labeled "F1". Both have 5.30 acres, and 0.46 and 0.60 runoff coefficients for the 10- and 100-year events. Please correct the drawings.

    c. The reservoir (Glen Cairn Reservoir?) near the proposed access road does not appear on this drawing. Where is the reservoir with respect to the access road and how is sediment prevented from impacting the reservoir?

29. Figures G-7, G-8, G-9 and G-10.

    a. The area "P1" contributing to pond P-DET-1 appears to be identical to the P-1 area on Figure G-6A, but is shown as being 37.88 acres smaller (Note Figures G-9 and G-10 increase this area by 0.05 acres over that shown in Figure G-8). Please provide an explanation for the difference in area.

    b. Also, please provide major contour labels, channel/ditch flow direction arrows, and use color to differentiate which channels contribute to which ponds as suggested in Comment No. 28a.

    c. Please define the "honeycomb" hatch pattern shown in the west end of the North Pit area on the legend.

30. Figures G-8 and G-9. There appears to be a culvert in the expanded portion of the fines stockpile. Please explain whether or not this culvert is accessible for maintenance and if not, remove it as previously directed.

31. Figures G-9, G-10 and G-11. Unimpacted Drainage. The line representing the upland diversion ditch along the west side of the topsoil stockpile (as shown on Figure G-8) does not appear on either of these drawings. How is undisturbed runoff from subbasins P1 and P2 handled?

32. Figure G-12 and Table G-4. The Division could not find closure channel designs or analyses for either the terrace channels on the reclaimed fines stockpile (T-1, T-2, or T-3) or the contact channel along the west side of the south end of the reclaimed fines stockpile (F1b). Please provide the appropriate analyses and designs for these channels.