COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, Colorado 80203

February 12, 2018

Andre LaRoche
Transit Mix Concrete Co.
444 E. Costilla St.
Colorado Springs, CO 80903

Re: Preliminary Adequacy Review; 112 Construction Materials Reclamation Permit Application Hitch Rack Ranch Quarry; File No. M-2017-049

Mr. LaRoche:

The Division of Reclamation, Mining and Safety (Division) has completed its preliminary adequacy review of the above referenced application. All comment and review periods for the application began on November 9, 2017 when the application was deemed complete for filing purposes. Per Construction Materials Rules 1.1(10) and 1.4.1(7), the Division has determined the application to be "complex", thereby extending the review period by sixty days. The review period for the application is currently scheduled to close on **March 30, 2018**. The following adequacy items must be addressed to the Division's satisfaction before a favorable recommendation can be issued for the application. In your response, please reference the item numbers utilized herein.

EXHIBIT A - Legal Description (Rule 6.4.1):

1) On the Exhibit A Index Map, the northern proposed permit boundary appears to be located north of Little Turkey Creek in some areas. However, other maps submitted with the application show the proposed permit boundary to be located north of the creek only in two areas (where groundwater monitoring wells are installed). Please revise the map to show the correct location of the proposed permit boundary.

EXHIBIT B - Index Map (Rule 6.4.2):

2) On the Exhibit B Index Map, the northern proposed permit boundary appears to be located north of Little Turkey Creek in some areas. However, other maps submitted with the application show the proposed permit boundary to be located north of the creek only in two areas (where groundwater monitoring wells are installed). Please revise the map to show the correct location of the proposed permit boundary.

EXHIBIT C - Pre-mining and Mining Plan Map(s) of Affected Lands (Rule 6.4.3):

3) Please clarify the location of the northern proposed affected land boundary with respect to Little Turkey Creek and Little Turkey Creek Road. Will the affected land boundary include any portion of Little

Turkey Creek Road or the 20 foot easement on the road? How will the affected land boundary be delineated in the field pursuant to Rule 3.1.12(2)?

4) In Figure C-1, the pit crest appears to align with the edge of the F1 fines stockpile. Please clarify the relationship between these two features, including during operations and final closure.

5) In Figure C-2, the gate present at the western edge of the property along Little Turkey Creek Road is not identified. Please include this structure on Figure C-2, and identify the owner of the structure. Has the Applicant attempted to obtain a structure agreement for this gate?

6) In Figure C-2, all of the seven groundwater monitoring wells are shown to be owned by RMBC Group, LLC. Is this correct?

7) In Figure C-2, RMBC Group, LLC is shown to be the structure owner for a seep area identified within the mining area. Please provide clarification.

8) Please confirm no significant, valuable, and permanent man-made structures are located within the 200 foot offset which overlaps parcels owned by Dry Head Ranch LLC, United States Government, and State of Colorado.

9) In Figure C-2, a structure owner is not identified for the dam located south of the Glen Cairn Reservoir. Please identify the owner for this structure on Figure C-2.

10) In Figure C-2, road locations appear to be indicated by both light yellow solid lines and dark yellow solid lines. However, the legend only includes the dark yellow solid line as a symbol for roads. If the Applicant intended to differentiate two types of roads, please provide the appropriate symbol and description in the legend. During previous site inspections, the Division observed Little Turkey Creek Road to be the only road present in the valley just north of the proposed quarry area. However, on Figure C-2 there are two roads identified in this valley, one marked by a dark yellow solid line and the other marked by a light yellow solid line. In comparing the figure with Figure C-1, it appears the dark yellow solid line represents Little Turkey Creek Road. However, the position of the dark yellow solid line appears to be shifted slightly southward from its position shown in Figure C-1. Please revise Figure C-2 to correct these errors.

11) The location of Little Turkey Creek appears to shift between Figures C-1 and C-2. For example, in Figure C-1, the creek aligns with the proposed permit boundary in the western and eastern portions of Section 16. However, in Figure C-2, the creek is shifted slightly north of the proposed permit boundary in these same areas. Please correct this error on the appropriate figure.

12) The location of the proposed affected land boundary appears to shift between Figures C-1 and Figure C-2. For example, in Figure C-1, the affected land boundary is closer to portions of Little Turkey Creek Road than it is shown in Figure C-2. Additionally, the shape of the proposed affected land boundary in the area of the East Fault System appears to vary slightly between the two figures. Please correct these errors on the appropriate figure.

13) In Figure C-2, some of the culverts appear to be slightly mislocated (perhaps due to a slight mislocation of the creek as mentioned above). Please confirm the culvert locations are correct, or correct any errors on this figure.

14) In Figure C-2, a blue solid line is present in the eastern portion of the property, crossing the proposed access road, and oriented approximately north-south. According to the legend, a blue solid line represents a water resource. The Division believes this blue line represents a section of Little Turkey Creek. However, the way it is portrayed on Figure C-2 is confusing, with a large segment of the creek (located outside the proposed permit boundary) being absent from the figure. Please be sure this figure shows the entire length of Little Turkey Creek as it exists in the entire area shown on the figure.

15) In Figure C-2, there are two fences and a road segment located along the proposed access road which do not have an identified structure owner. One of the fences is located at the property entrance off Hwy 115. The other fence and the road segment are located west of the Glen Cairn Reservoir. Please identify the owner(s) for these structures on Figure C-2.

16) In Figure C-2, groundwater monitoring wells MW-LTC-2 and MW-LTC-6 are shown to be located outside of the proposed permit boundary. However, in Exhibit G and in other figures submitted with the application, these wells are described as being located within the proposed permit boundary. Please correct this error on Figure C-2.

17) In most of the Exhibit C figures, the proposed permit boundary and affected land boundary are indicated with a dashed line. In some areas, particularly in the eastern portion of Section 16 where the boundaries have several curves, it is difficult to determine the exact location of the boundaries and their relationship with nearby features and each other due to the line spacing. For these particular boundaries, the Division recommends the Applicant use solid rather than dashed lines for better clarity. Alternatively, the Applicant may submit a separate Exhibit C figure showing a closer view of Section 16, with the proposed permit boundary and affected land boundary indicated with solid lines.

18) In Figures C-4 through C-9, the northeast pit crest appears to be located very close to the proposed affected land boundary, particularly at the northeastern corner of the proposed plant area. Please specify the minimum distance the proposed pit crest will be maintained from the proposed affected land boundary.

19) In Figures C-6 through C-8, the TS1 topsoil stockpile appears to extend north past the pit crest. However, in Figures C-4 and C-5, the TS1 stockpile is shown to be located within the pit/plant area. Please explain this discrepancy or correct any errors on the appropriate figure(s).

20) Please provide clarification on how the TS1 topsoil stockpile will be protected from any disturbances caused by plant operations.

21) Figures C-4 through C-8 show topsoil stockpiles stored within and on the other side of reclaimed areas adjacent to the proposed access road. As indicated in these figures, and described in the mining and reclamation plans, the cut/fill areas adjacent to the proposed access road will be reclaimed immediately

after the road has been constructed. However, reclamation of the access road will not occur until mining is completed at the site. Therefore, please explain how these topsoil stockpiles will be accessed for reclamation of the access road while minimizing disturbance of previously reclaimed areas.

22) In Figure C-6, backfill areas F2 and F3, and topsoil stockpile TS4 are initiated during this phase. It appears the TS4 topsoil stockpile would be stored on top of the F3 backfill area. Is this correct? Please clarify how the topsoil in TS4 will be stored separately from the F3 fines/overburden. Additionally, please clarify how the operation would continue to load fines/overburden in the F3 backfill area once the TS4 stockpile is created. Please provide a cross-section oriented roughly northwest-southeast through the proposed TS4 stockpile and F3 backfill area, showing their operational configurations. Please also provide a similarly-oriented cross-section showing the anticipated final configuration of the F3 backfill area.

23) In Figures C-6 through C-8, the northern slope and portions of the eastern slope of the F2 backfill area are shown to be reclaimed. Please describe what reclamation will be completed during these mining phases (III-IV). Will these portions of the F2 slopes be graded to 3H:1V or flatter, retopsoiled, and revegetated during these mining phases?

24) In Figure C-8, there is a gap shown between the reclamation area across the northern slope of the F2 backfill area and the western edge of the plant area. However, in Figures C-6 and C-7, this gap area is shown as being reclaimed. Is this an error? Please explain or correct any errors on the appropriate figure(s).

25) In Figure C-7, the southwestern pit crest is adjacent to the F1 fines/overburden stockpile area, and no access road is shown connecting the pit to this stockpile area (as shown in Figures C-4 through C-6). Please clarify how the operation will continue to access the F1 fines/overburden stockpile area and TS2 topsoil stockpile during this mining phase.

26) In Figures C-6 through C-8, the F2 backfill area is shown to be expanded southward during these mining phases (III-IV). Please explain how the operation intends to construct and continue to expand this backfill area, particularly with regard to access. How will the operation minimize disturbance of the previously reclaimed northern and eastern portions of the F2 backfill area as the backfill pile is extended to the south?

27) In Figure C-9, a portion of the reclamation area extends southeastward from the northeastern edge of the pit area down to Little Turkey Creek. Please provide clarification on why this area is to be reclaimed, and whether any structures or features will be present in this area during operational phases. Please confirm that any surface disturbance in this area will be kept within the proposed affected land boundary.

28) Figures C-9b and C-9c show cross-sections of the F1 and F2 backfill areas with final slope configurations. Please provide similar cross-sections for these two backfill areas showing operational slope configurations.

29) Please specify the minimum distance that will be maintained between the toe of the F1 backfill pile and Little Turkey Creek. Please also specify the minimum distance that will be maintained between the toe of the pile and the proposed affected land boundary.

30) In Figure C-9c, the cross-sections of the F2 backfill area indicate that a ridge of unmined rock will remain along the northern edge of the pit. Please specify the anticipated height of the northern pit crest with respect to the pit floor and to Little Turkey Creek. (The Division understands the pit floor elevation will be maintained a minimum of 10 feet above the elevation of Little Turkey Creek).

31) In Figure C-9c, on the D-D' cross-section, the elevations on the right side of the cross-section (D' side) are not lined up correctly with the ones on the left side of the cross-section (D side). Please correct this error.

32) In Figure C-9c, on the C-C' cross-section, please indicate the location of the proposed affected land boundary (near the C' side). Also, on the D-D' cross-section, please indicate the locations of the proposed affected land boundary, the proposed permit boundary/Little Turkey Creek (which appear to be aligned in this area), and Little Turkey Creek Road (on the D side).

33) Please specify the estimated maximum length of highwall to remain for reclamation above the final grade of the F2 backfill area.

34) In Figure C-11, on the B-B' cross-section, please identify the location of Little Turkey Creek. If the creek is located at the far right edge of the cross-section (B' side), please explain why the generalized water level is shown to be below the creek elevation on this cross-section. Are groundwater levels not at creek elevation at this location?

35) In Figures C-11 and C-12, a generalized water level is indicated on the cross-sections. Please provide clarification on the information used to locate the generalized water level. Does the generalized water level represent anticipated saturated conditions? Additionally, please explain what information was used to indicate the approximate 100 foot drop in elevation of the generalized water level just east of the West Fault.

36) In Figures C-11 and C-12, the locations of all monitoring wells are shown on the Insert Plan View except for MW-LTC-7. Please add the location of MW-LTC-7 to the inset. Additionally, monitoring wells MW-LTC-2 and MW-LTC-6 appear to be mislocated, as they are placed outside of the proposed permit boundary. In Exhibit G and in other figures submitted with the application, these wells are described as being located within the proposed permit boundary. Please correct the locations for these two wells.

37) In Figure C-12, on the Insert Plan View, Little Turkey Creek is located approximately 300 feet from the northern pit crest on section line C-C'. However, on the C-C' cross-section, it appears the northern pit crest is located approximately 200 feet from Little Turkey Creek. Which is the correct distance at that location? Please revise the cross-section and/or inset so that they are consistent and correct. Additionally, please provide clarification on whether the proposed operation intends to mine into the Little Turkey

Creek fault zone. (The pit outline is difficult to make out on this cross-section due to the patterned background and other features present at that location.)

38) For Figure C-12, please clarify the purpose of cross-section D-D'.

39) On Figures C-4 through C-8, please add the proposed 100-foot mining setback from Little Turkey Creek.

EXHIBIT D - Mining Plan (Rule 6.4.4):

40) On page D-2, the Applicant states that final development elevations will remain a minimum of 10 feet above the level of Little Turkey Creek. Please also confirm the pit floor will remain a minimum of 10 feet above the thalweg of Little Turkey Creek during mining operations.

41) On page D-3, the Applicant states that prior to commencing mining…. mining crest limits and affected lands boundary will be GPS surveyed and staked to delineate mining activity and total disturbance areas to mitigate the potential for off-site impacts. Please be advised, the affected land boundary proposed in the application must be the boundary delineated in the field. If additional surveys indicate any revisions to the proposed affected land boundary, these changes would require submittal of a Technical Revision or Amendment to the permit.

42) On page D-4, the Applicant states the operation intends to survey and stake the permit boundary, affected lands boundary, and pit crest boundary. Please clarify how these boundaries will be differentiated. It is especially important that the affected land boundary and permit boundary are visually differentiated to keep operations within the affected land boundary. The Applicant's proposal to delineate all three boundaries exceeds the Division's requirements. However, the Division agrees that marking these boundaries would be helpful, especially along the northern edges in the Little Turkey Creek valley area. The Division would also recommend the proposed 100 foot mining setback from the center line of Little Turkey Creek be marked.

43) In Table D-1, the combined affected area for all six mining phases is 239.03 acres. Please confirm the proposed affected area for the operation is 239.03 acres.

44) On page D-8, the Applicant states affected areas adjacent to the access road are not shown as reclaimed in Figure C-4 to present the topography in those areas. Please explain. Are there other areas that will be affected by the operation not shown on the mining plan maps? All proposed surface disturbance by mining phase should be depicted on the mining plan maps.

45) On page D-11, the Applicant states that during mining phase V, a drainage channel will be established at F2 to provide an open channel connecting the stockpile to the pit floor in preparation of final reclamation. This drainage channel will be reclaimed as a riparian corridor. Please identify this feature on Figures C-8 and C-9. Also please provide cross-sections of the proposed channel for each significant difference in grade, a profile of the channel, and conceptual drawings for the proposed discharge area. Will this channel require any riprap protection?

46) On page D-13, Table D-3 includes affected lands by mining phase. According to this table, the operation will affect a total of 239.03 acres during life of mine, with no more than 164.51 acres of disturbed lands at any time that are not in reclamation. Please be advised, the Division considers all land disturbed by the operation to count toward the maximum disturbed area at any time, until it has been fully reclaimed in accordance with the approved reclamation plan. Therefore, based on the information provided in Table D-3, the maximum allowed disturbed area at any time by this operation would be 239.03 acres. If the operation wishes to propose a maximum disturbed area of 164.51 acres initially, this acreage must correlate with the cost estimate provided in Exhibit L. The maximum disturbed area may be increased at a later time through submittal of a Technical Revision, at which point, the required bond would be re-evaluated. Please confirm the proposed maximum disturbed area for the operation, and commit to submitting a Technical Revision prior to disturbing any additional acreage.

47) On page D-14, the Applicant states the permanent plant (to be constructed in mining phase II) will be electric powered with power supplied by the local electric utility. Please be sure costs for removing any structures associated with the permanent plant are included in Exhibit L. Additionally, please include the locations of these structures (e.g., substation, power line poles) on the appropriate Exhibit C figure and/or Exhibit L figure. If these details are not known at this time, please commit to providing this information in a Technical Revision prior to installing any permanent power supply structures on site.

48) The Appendix B referenced in the Pre-Blast Survey Plan is missing. According to the application, Appendix B should include a sample pre-blast survey condition inspection form and water well survey form. Please submit Appendix B.

49) In the Introduction section of both the Pre-Blast Survey Plan and the Blasting Plan, the Applicant states the proposed quarry will develop approximately 399 acres of the 1,432 acre parcel known as Hitch Rack Ranch. Although the proposed permit area is approximately 399 acres, the proposed affected area is 239.03 acres. Therefore, no more than 239.03 acres will be "developed" by the operation. Please correct the contradictory language.

EXHIBIT E - Reclamation Plan (Rule 6.4.5):

50) On page E-2, the Applicant states the category of "Mining Related Area" accounts for the area between the areas potentially affected by mining related activities and the affected lands boundary; which includes the area between the permit boundary and pit crest area. The Applicant further states that disturbance within this area is not planned, but it may be affected to construct water management features, a perimeter fence, two-track roads, etc. Please be advised the operation must keep all disturbances (including stormwater management structures, fencing, and roads) within the affected land boundary. A permit Amendment would need to be submitted in order to increase the affected area.

51) If the operation intends to install fencing, please provide more details in Exhibit D including the fence type, height, approximate linear length of installation, and whether the fencing will be wildlife friendly as recommended by Colorado Parks and Wildlife. Additionally, please indicate on the Exhibit C mining plan maps the location(s) where fencing will be installed. Will all fencing be removed for reclamation? If so, costs for fence removal and disposal off site must be included in Exhibit L.

52) In Table E-1 - Reclamation Areas by Affected Land Type, there are values given for highwall slopes in mining phases II, V, and VI, totaling 14.27 acres. However, in the text below Table D-3 in Exhibit D, the Applicant states highwall slopes will not be reclaimed (only highwall benches will be reclaimed). Therefore, please explain why acreage for highwall slopes was included in Table E-1. Additionally, Table D-4 shows the estimated affected lands consisting of highwall slopes to be a total of 27.17 acres. Based on Table E-1, which shows 14.27 acres of highwall slopes will be reclaimed, this would mean 12.9 acres of highwall slopes would not be reclaimed. Please provide clarification on the values included for highwall slopes in Table E-1, or make any necessary correction(s).

53) On page E-9 – Riparian, the Applicant states the drainage across the quarry area and the drainage adjacent to the F1 stockpile will be planted primarily with aspen trees. However, aspen trees were not included in the riparian species mixture. If the Applicant proposes planting aspen trees for reclamation, this species must be added to the riparian seed mixture, and associated costs must be added to the bond estimate provided in Exhibit L. The Applicant indicates slight differences in the riparian mixture may be necessary for areas with sufficient water available (Little Turkey Creek crossing) versus areas that may not have sufficient water available (drainage across quarry area and drainage adjacent to F1 stockpile). If this is the case, the Division recommends the Applicant propose two separate riparian seed mixtures. These mixtures should be displayed in a list or table format. Please provide a planting rate for all reclamation species.

54) On page E-11, the Applicant states during subsoil placement, gouges and minor undulations will be created with a backhoe or hydraulic excavator to reduce erosion on slopes. The Applicant states these features will be 1-1/2 to 2 feet deep, with the width of a hydraulic excavator bucket, and the edges of these features will be sloped to allow egress by wildlife. These depressions will be repeated in a random and overlapping pattern. The Division agrees this configuration can be an excellent method for protecting reclaimed slopes from erosion, promoting revegetation, and creating wildlife habitat. Please indicate on a figure in Exhibit F the approximate area(s) where this slope configuration will occur. Please provide an estimated acreage for which this process will be implemented. Will this process be implemented after subsoil and topsoil has been placed? Additionally, please be sure costs for creating these features are included in Exhibit L. The Division understands the process will be random, and therefore, values given in the bond estimate will be approximate.

55) Please provide more details in Exhibit E regarding the drainage channels to be constructed across the quarry area and adjacent to the F1 stockpile for final reclamation. Please provide their approximate dimensions, slopes, the type of material they will be constructed in (i.e., backfill fines/overburden, granitic bedrock), and whether any additional materials will be required in their construction (i.e., rip rap). Please provide cross-sections of the proposed channels for each significant alteration in grade, profiles of the channels, and conceptual drawings for the proposed discharge areas.

56) On page E-9, the Applicant states riparian reclamation areas are shown on Figures F-1 and F-2. The riparian areas across the pit and at the Little Turkey Creek crossing are shown on these figures. However, the drainage adjacent to the F1 stockpile area is not shown on either of these figures. Please show the location of this riparian area on Figures F-1 and F-2.

57) On page E-9, the Applicant lists additional plant species to supplement the Mountain Shrubland mixture of Mountain Mahogany and Gambel Oak. The Applicant indicates differences in the supplemental mixtures may be necessary for dry upland areas versus moist areas. Please clarify the two separate seed mixtures for Mountain Shrubland reclamation areas. Please display the seed mixtures in a list or table format, as was done with the Riparian Mixture and Grass Seed Mixture. Please provide a planting rate for all reclamation species.

58) Please provide in Exhibit E the acreage accorded to each revegetation type (Grassland, Mountain Shrubland, Mixed Conifer, Riparian). For revegetation types with more than one seed/plant mixture anticipated, please break down the total acreage for that revegetation type by seed/plant mixture.

59) In Exhibit E, please state whether the operation anticipates applying fertilizer for reclamation. If so, please specify types, mixtures, quantities, and time of application.

60) Exhibit E does not provide any details on reclamation of stormwater management structures. Please provide this information in Exhibit E, or state where this information can be found in the application.

EXHIBIT F - Reclamation Plan Map (Rule 6.4.6):

61) On Figure F-2, for the inset cross-section. please include the following:

    a) Inset label

    b) Highwall bench slope angle (63º)

    c) Recommended catch berm height (4 feet)

62) Please either remove the Scale House label from Figures F-1 and F-2, or revise the label to clarify the scale house will be removed during final reclamation. For example, if the Applicant wishes to keep the label, it could be changed to "Reclaimed Scale House Area".

63) Please provide additional figures in this exhibit that better show reclamation details for the proposed mining area. These figures may be replications of Figures F-1 and F-2, but with closer views of the proposed mining area, and less view of the access road.

EXHIBIT G - Water Information (Rule 6.4.7):

64) On page G-4, the Applicant refers to Exhibit E for more details on the reclamation drainage in the quarry area. However, very little information about this drainage is provided in Exhibit E. Please provide more details on all proposed drainages to remain for reclamation in either Exhibit E or G. Additionally, please provide clarification on how the locations of these drainages were chosen.

65) On Table G-2A, the value given for Phosphorus under 6/16/15 Results is 110 mg/L. However, the Segment 14d Standard for Phosphorus is 0.11 mg/L. Please explain or correct this error.

66) On page G-26, the Applicant states that water will most likely be purchased from Colorado Springs Utilities with water hauled from Colorado Springs and stored on site. Please provide an estimate of the project water requirements including flow rates and annual volumes for the development, mining, and reclamation phases of the project.

67) On page G-27, the Applicant states the 2017 drilling program identified the existence of saturated groundwater conditions within the granodiorite rocks above the level of Little Turkey Creek. Please expand the discussion, providing more details about these saturated conditions. Does the Applicant believe these conditions to represent the groundwater table for this area?

68) On page G-31, the Applicant states that monitoring wells GW-1, GW-3, and GW-4 are installed in areas of potential groundwater discharge to Little Turkey Creek surface flow or to ground surface within Little Turkey Creek valley in the form of seeps. Based on the proposed mining plan, the areas of GW-3 and GW-4 will be mined by the operation. Does the Applicant anticipate the seep areas to have any negative impacts on the stability of the F2 backfill area or on reclamation of these areas?

69) On page G-36, in Table G-10, the groundwater quality results for the monitoring wells installed on site are compared with Segment 14d Standards for surface water (Little Turkey Creek). The groundwater quality data should be compared with groundwater standards. Because groundwater is not classified for this area, groundwater quality data should be compared with the Colorado Department of Public Health and Environment, Water Quality Control Commission's Interim Narrative Standards established in Regulation No. 41 – The Basic Standards for Groundwater, last amended November 14, 2016. Additionally, please highlight any exceedances in the groundwater quality results from the most stringent Interim Narrative Standards.

70) Figure G-8B is titled "Pit Area". The Division believes the title to be incorrect as the figure shows the access road area and not the pit area. Please correct this error in the label.

71) On Figure G-10, no culvert is shown for the sediment detention basin P-Plant2. However, a culvert is shown for this basin on Figures G-11 and G-12. If a culvert is proposed for P-Plant2 during mining phase III, please be sure it is shown on Figure G-10.

72) In this exhibit, please affirmatively state that the Applicant has acquired (or has applied for) a National Pollutant Discharge Elimination System (NPDES) permit from the Water Quality Control Division at the Colorado Department of Public Health and Environment, if necessary, pursuant to Rule 6.4.7(5).

73) In Attachment G-2, on page 1-2, Hydro-Logic Solutions, Inc. states that mining activity will intercept groundwater in the south ridge area, mostly in the form of seepage along the western and southern highwalls, and is projected to result in mine inflows ranging from less than 10 gpm to about 50 gpm over most of the 40-year mining operation, with a peak inflow of about 100 gpm at maximum excavation. Does the operation anticipate the mine inflow to create any issues with slope stability of the western and southern highwalls or with reclamation of highwall benches?

74) In Attachment G-2, on page 1-4, Hydro-Logic Solutions, Inc. states that water will be trucked to the site daily for use by the operation. However, previous text in Exhibit G states that water will be stored on site for use by the operation. Please provide clarification or correction(s) if needed.

75) In Attachment G-2, on page 2-17, Table 2-3 includes domestic wells in the vicinity of the proposed quarry. Please add well permit numbers in this table so the wells can be correlated with the well locations shown in Figure 2-11.

76) In Attachment G-2, Table 3-3 compares groundwater quality results for the monitoring wells installed on site with Segment 14d Standards for surface water (Little Turkey Creek). The groundwater quality data should be compared with groundwater standards. Please refer to Item No. 69.

77) On page 1-1 of the proposed Surface Water and Groundwater Monitoring Program, the Applicant states the purpose of the monitoring plan is to characterize surface water and groundwater conditions prior to mining development, and that monthly surface water and quarterly groundwater monitoring will be conducted for a length of approximately 15 months.

    Please be advised, the Division will require the monitoring plan outlined in this application to be conducted for the life of mine or until a Technical Revision to modify the monitoring plan has been submitted to and approved by the Division. All surface water and groundwater monitoring data and results shall be submitted to the Division with the Annual Report.

78) In the proposed Surface Water and Groundwater Monitoring Program, the Applicant proposes two wells for compliance groundwater monitoring, LTC-GW-1 (upstream) and LTC-GW-2 (downstream). Both of these wells were installed north of Little Turkey Creek. Please provide clarification on how these wells will effectively monitor for potential impacts to water quantity or quality caused by the quarry operations occurring south of the creek.

79) Please be advised, approval of this permit application would not constitute final approval of the Applicant's proposed points of compliance for groundwater monitoring. The points of compliance will not be determined until after the Division has reviewed the 15-month characterization report for the site.

EXHIBIT H - Wildlife Information (Rule 6.4.8):

80) On page H-5, the Applicant states that permits to install necessary culverts will be obtained prior to construction. Please be sure to include in Exhibit M all permits and licenses the Applicant holds or will be seeking to conduct the proposed mining and reclamation operations.

81) On page H-5, under Mitigation Measures, the Applicant states that no mining will occur within 100 feet of Little Turkey Creek besides construction necessary to create the reclamation channel discussed in Exhibits G and F. The Applicant then states that any development or surface disturbance within this 100-foot setback will be minimized to the extent possible and will only occur where necessary for mining operations. Please explain this contradictory language, clarifying the type of development or surface disturbance (other than the drainage mentioned) that might occur within the 100-foot setback.

EXHIBIT L - Reclamation Costs (Rule 6.4.12):

82) On page L-4, Table L-1 includes 20.41 acres of highwall slopes to be reclaimed for mining phase III, and Table L-2 includes 20.41 acres of highwall slopes to be revegetated for mining phase III. However, the application states that highwall slopes will not be reclaimed. Please explain why highwall slope acreage is included in these tables. If highwall slopes will not be reclaimed, these areas need not be included in reclamation acreages (only in affected land acreages in Exhibit D).

83) On page L-4, Table L-1, please explain the category of Pit Floor/Stockpile Tops, which totals 36.17 acres. Why are these two features combined here? Does this acreage include all surfaces to be reclaimed on the pit floor and the F2 and F3 backfill areas for mining phase III?

84) On page L-4, Table L-1, please explain what type of disturbance is included in the category of Mining Related Area, which totals 32.64 acres.

85) On Page L-4, Table L-1, please explain why acreage for the Plant Area was differentiated from acreage for the Pit Floor/Stockpile Tops, as the plant area is located on the pit floor. Will these areas be reclaimed differently?

86) On page L-4, Table L-1, please clarify which topsoil stockpiles are included in the 3.00 acres for Topsoil Stockpile. Does this acreage include TS1, TS2, and TS4? Are the topsoil windrow areas adjacent to the access road included in the Topsoil Stockpile acreage or the Roads acreage?

87) On page L-4, Table L-1, please clarify which fines stockpiles are included in the 13.98 acres for Fines Stockpile. Does this acreage include F1, F2 and F3 fines/overburden backfill areas? Or does this acreage only include the F1 stockpile area, with acreages for F2 and F3 areas included in the Pit Floor/Stockpile Tops category?

88) On page L-4, Table L-1, please clarify which roads are included in the 37.22 acres for Roads. Does this acreage account for the access road and any roads in the quarry area that will be reclaimed? Will the haul road along the southern highwall shown on Figure C-6 be reclaimed?

89) On page L-4, Table L-1, the acreages given under each column do not add up to the total area given in the far right column (36.17 acres + 16.50 acres + 20.41 acres + 12.35 acres + 37.22 acres + 3.00 acres + 13.98 acres + 32.64 acres = 172.27 acres and not 159.92 acres). Please explain this discrepancy and correct any errors if needed.

90) On page L-4, Table L-2, areas that will be revegetated to Mixed Conifer include Highwall Benches, Highwall Slopes, Fines Stockpile, and Mining Related Area. Figure F-1 shows portions of the F2 backfill area and pit floor will be reclaimed to Mixed Conifer. Is acreage for these areas included in the Mining Related Area category on Table L-2? Please explain this discrepancy and make any necessary corrections to Figure F-1 and/or Table L-2 so they are consistent.

91) On page L-4, Table L-2, areas that will be revegetated to Mountain Shrubland include Highwall Benches, Highwall Slopes, and Roads. Firstly, please clarify whether highwall slopes will be revegetated. Secondly, Figure F-1 shows areas reclaimed to Mountain Shrubland across the pit floor and F2 backfill area. Therefore, please explain this discrepancy and make any necessary corrections to Figure F-1 and/or Table L-2 so they are consistent.

92) On page L-4, Table L-2, areas that will be reclaimed to Grassland include Pit Floor/Stockpile Tops, Plant, Roads, and Topsoil Stockpile. In Exhibit E (on page E-8), the Applicant states that all affected areas will be seeded with the grass seed mixture included in Table E-3 to provide a base revegetated cover. Therefore, please confirm that all disturbed areas (159.92 acres) will be seeded with the grass seed mixture. Additionally, please explain if the total given in Table L-2 for areas to be revegetated to Grassland (60.90 acres) was meant to include areas to only be seeded with the grass mixture.

93) On page L-4, Table L-2, areas that will be revegetated to Riparian include only the Pit Floor/Stockpile Tops. However, Figure F-1 shows a small section of the access road (at the Little Turkey Creek crossing) to also be reclaimed to Riparian Area. Is this area included in the Riparian acreage on Table L-2?

94) On page L-7, the Applicant states the revegetation summary provides the total affected area consisting of 159.92 acres with the steep highwall slopes consisting of 16.50 acres being excluded from revegetation. However, in Tables L-1 and L-2, the value given for highwall slopes is 20.41 acres (16.50 acres is given for highwall benches). Does this mean the acreage given for remaining areas that will be revegetated (143.42 acres) is incorrect? Is the acreage given for Mixed Conifer (63.33 acres) also incorrect? Please clarify or correct any errors as necessary.

95) On page L-7, the Applicant states that 60.90 acres will be revegetated to Grassland. However, in Exhibit E (on page E-8), the Applicant states that all affected areas will be seeded with the grass seed mixture included in Table E-3 to provide a base revegetated cover. Please clarify or correct any errors as necessary.

96) In the demolition cost estimate, costs are included for removing a power substation, power line poles, a portion of asphalt road, and 8 foot chain link fencing. Please show the approximate locations where these structures/features will be constructed on a figure in Exhibit C and in Exhibit L.

97) In the demolition cost estimate, costs are included for Deadman Stream Crossing/Culvert Removal 48". However, this application does not propose affecting land near Deadman Creek. Please remove this item from the demolition costs. Please be sure removal costs are included for all culverts proposed in this application.

98) On page 8 of the cost estimate, the values for Highwall Slope and Highwall Bench are switched, according to Tables L-1 and L-2, which show 16.50 acres for Highwall Benches and 20.41 acres for Highwall Slopes. Please make any necessary corrections.

99) On page 8 of the cost estimate, the Applicant indicates the volume estimates for earthwork include costs for regrading the top of the F1 stockpile area and cutting a drainage across the F2 backfill area and pit

floor. In order for the Division to calculate the required financial warranty, these costs must be separated into separate tasks. Please provide estimated material volumes for these items, and be sure to include all other required information in their respective worksheets.

100) The way the reclamation tasks and costs are presented in this exhibit, particularly for earthwork tasks, it is difficult for the Division to separate them in order to calculate the required financial warranty. Please separate all earthwork tasks and be sure to include all applicable information such as stockpile source (e.g., F1, TS1), material volume, material description, haul or push distances, average push gradient, and type and number of equipment used to complete that specific task. Some examples of how the Division needs the earthwork tasks separated in order to complete the bond calculation are as follows: Load subsoil from F1 for highwall benches; Haul subsoil from F1 to highwall benches; Spread subsoil on highwall benches; Load topsoil from TS1 for highwall benches; Haul topsoil from TS1 to highwall benches; Spread topsoil on highwall benches. Please be sure all earthwork tasks in your bond estimate are appropriately labeled.

101) On page 26 of the cost estimate, the revegetation summary includes acreages that vary slightly from those given on page L-7 of this exhibit. On page 26, mixed conifer slopes and pit bottoms total 79.84 acres (33.22 acres + 46.62 aces); whereas on page L-7, the mixed conifer area is 63.33 acres. On page 26, the riparian area is 2.87 acres; whereas on page L-7, the riparian area is 2.83 acres. Additionally, on page 26, the total affected area to receive grass seeding is 155.77 acres; whereas on page L-7, the total affected area which would receive grass seeding is 159.92 acres. Please explain or correct these errors. It is the Division's understanding that all disturbed areas during mining phase III, besides the highwall slopes, would be seeded with grasses, then, if not to be left as grassland, will be planted with the appropriate revegetation mixture (i.e., mixed conifer, mountain shrubland, riparian). If this is not the case, please clarify here and in Exhibit E.

102) On page 26 of the cost estimate, the revegetation summary should include the seed or plant species for each revegetation category (rather than initialisms such as DF for Douglas Fir). The grass seeding costs should include the grass seed mixture. Additionally, please specify quantities per acre for each species rather than giving percentages. If more than one mixture will be used for a particular revegetation category, as discussed above under Exhibit E (i.e., for Mountain Shrubland), please be sure this is reflected in the revegetation summary on page 26.

103) Will subsoil be placed on the access road for reclamation prior to topsoil replacement (as will be done in the pit area)? If so, please specify which fines/overburden stockpile the subsoil will be hauled from for placement on the access road. Additionally, please be sure costs for this specific task are included in the bond estimate, and the task worksheet is appropriately labeled.

104) Will the F2 backfill area require additional grading during mining phase III? If so, please be sure costs for this specific task are included in the bond estimate, and the task worksheet is appropriately labeled.

105) Please specify all areas that will be ripped for reclamation (e.g., pit floor, haul roads), and include estimated acreages for each area. Please be sure costs for this specific task are included in the bond estimate, and the task worksheet is appropriately labeled.

106) On page 1 of the cost estimate, the direct cost given for mobilization and demobilization is $30,100. Based on the Division's experience, this amount seems low given the amount of equipment required for reclamation of the site. Please provide a separate worksheet for mobilization/demobilization that lists all equipment to be mobilized/demobilized for reclamation, numbers of equipment by type, and the nearest major city or town within the project area region that could supply the required equipment. If mobilization/demobilization costs for demolition have already been factored into the Demolition portion of the estimate, this equipment need not be included in the requested mobilization/demobilization worksheet.

107) On Figure L-1, a few labeled images are cut off at the far right edge of the plant area shown. It appears these images indicate locations(s) of fuel storage. Please adjust the figure so that all labeled portions of the plant area are visible.

EXHIBIT M - Other Permits and Licenses (Rule 6.4.13):

108) In this exhibit, the Applicant states an individual permit will be obtained from the United States Army Corps of Engineers for disturbances in Little Turkey Creek drainage. Please clarify the type of disturbances to the creek the operation anticipates. Additionally, please describe the location(s) where these disturbances will occur.

109) In this exhibit, the Applicant does not list any permits or licenses to be obtained for the use of explosives on site. It is the Division's understanding that any person that will use, possess, control, manufacture, purchase, sell, store, transport, or dispose of any explosives material in this state must first obtain a valid permit from the Colorado Department of Labor and Employment, Division of Oil and Public Safety (DOPS). In Exhibit D, the Applicant proposes using a U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives licensed third party blasting contractor to conduct all blasting activities on site. According to the DOPS, if a person holds a federal explosive license or permit, they are still required to obtain a Colorado Explosives Permit for any explosives work conducted in this state. Please confirm the blasting contractor and any mine personnel that will possess, control, or have access to explosives materials on site will be appropriately licensed and/or permitted with DOPS. Any licenses or permits the Applicant holds or will obtain for the use of explosives on site should be listed in this exhibit. If the appropriate licenses and/or permits will be held by the third party blasting contractor, the Applicant is not required to list them here. However, please confirm this is the case.

110) In this exhibit, the Applicant included a cultural resource inventory of the proposed site conducted by Cultural Resource Analysts, Inc. (CRA) in 2015. CRA recorded five historic archaeological sites in the area, all recommended as not eligible for inclusion in the National Register of Historic Places. CRA states that no further work is recommended for these resources, and recommends cultural clearance for the project. Please confirm the Applicant has obtained any necessary clearance from the SHPO to conduct the operation. If clearance from the SHPO has or will be obtained, it should be listed in this exhibit.

111) In this exhibit, the Applicant lists monitoring well permits and a groundwater permit will be obtained from the Division of Water Resources (DWR). Based on the comment letter the Division received from

DWR on January 4, 2018, a well permit and associated Substitute Water Supply Plan/Augmentation Plan will not be required for the proposed operation, for which small amounts of water will be incidentally encountered during the mining process. Therefore, it appears that a "groundwater permit" will not be required, and should be removed from this exhibit list.

EXHIBIT S - Permanent Man-Made Structures (Rule 6.4.19):

112) In this exhibit, the Applicant shows that a structure agreement form was sent to RMBC Group LLC on October 30, 2017 for their Schluckebier Headgate and Ditch and Glen Cairn Reservoir. The certification page is signed and notarized by the permit Applicant. However, the notary for structure owner was not signed and notarized. Has the Applicant obtained an executed structure agreement for these structures? If so, please provide this agreement to the Division. If an agreement cannot be reached, please be sure to provide an engineering evaluation for these structures, pursuant to Rule 6.4.19(b).

113) In this exhibit, the Applicant shows that a structure agreement form was sent to Centurylink on October 3, 2017 for the phone/data lines along Highway 115. The certification page is signed and notarized by the permit Applicant. However, the notary for structure owner was not signed and notarized. Has the Applicant obtained an executed structure agreement for these structures? If so, please provide this agreement to the Division.

114) In this exhibit, the Applicant shows that a structure agreement form was sent to Colorado Springs Utilities on October 3, 2017 for their distribution lines along the west side of Highway 115, to Fort Carson, and on Hitch Rack Ranch property. The certification page is signed and notarized by the permit Applicant. However, the notary for structure owner was not signed and notarized. Has the Applicant obtained an executed structure agreement for these structures?

115) In this exhibit, the Applicant shows that structure agreement forms were sent to the easement owners for Little Turkey Creek Road on October 3, 2017. The certification pages are signed and notarized by the permit Applicant. However, the notary for structure owner pages were not signed and notarized. Has the Applicant obtained any executed structure agreements for this structure? If so, please be sure to provide these agreements to the Division.

116) In Exhibit C, Table C-2 lists 43 easement owners for Little Turkey Creek Road. However, in this exhibit, the Applicant demonstrates that 30 easement owners were sent structure agreement forms for this road. Please provide clarification on why the Applicant did not attempt to obtain structure agreements from 13 of the easement owners identified in Table C-2.

117) In this exhibit, the Applicant lists three distribution lines owned by Colorado Springs Utilities, one on the west side of Highway 115, one to Fort Carson, and one on the Hitch Rack Ranch property. However, the Division was unable to locate the distribution line on the Hitch Rack Ranch property on Figure C-2. Please be sure this line is shown on Figure C-2, and the owner of the structure is identified.

118) In this exhibit, the Applicant lists State Highway 115 and a fence along State Highway 115 owned by the Colorado Board of Land Commissioners (State of Colorado). However, the Division was unable to

locate the fence on Figure C-2. Please be sure the fence is shown on Figure C-2, and the owner of the structure is identified.

119) Pursuant to Rule 6.4.19, where the mining operation will adversely affect the stability of any significant, valuable and permanent man-made structure located within 200 feet of the affected land, the Applicant may either:

a) Provide a notarized agreement between the Applicant and the person(s) having an interest in the structure, that the Applicant is to provide compensation for any damage to the structure; or

b) Where such an agreement cannot be reached, the Applicant shall provide an appropriate engineering evaluation that demonstrates that such structure shall not be damaged by activities occurring at the mining operation; or

c) Where such structure is a utility, the Applicant may supply a notarized letter, on utility letterhead, from the owner(s) of the utility that the mining and reclamation activities, as proposed, will have "no negative effect" on their utility.

The Applicant provided engineering evaluations for particular structures, including for the State Highway 115 and fence owned by State of Colorado (structure agreement reached); the road, gate, and fence owned by Fort Carson; the overhead electric distribution lines owned by Colorado Springs Utilities and Black Hills Energy; the buried communications and data lines owned by Centurylink; and Little Turkey Creek Road owned by RMBC Group LLC (structure agreement reached) with 43 easement owners that have an interest in the structure. An engineering evaluation was not provided for the Schluckebier Headgate and Ditch and Glen Cairn Reservoir owned by RMBC Group LLC for which an executed structure agreement has not yet been submitted. Please provide either a properly executed structure agreement or an engineering evaluation for these structures.

120) In all of the engineering evaluations provided, the Introduction section states the location of the structure(s) is shown on Figure 1. However, the Division could not find a Figure 1 in this exhibit. Please provide the Figure 1 referred to in the evaluations.

EXHIBIT T – Emergency Response:

121) In the Hazardous Materials Management Plan, please revise the Spill Reporting Procedures to include, at a minimum, reporting to the Division all the following items per Rule 3.1.13(2):

a) Operation name, DRMS permit number, and name of person reporting the spill,

b) Telephone number of a responsible company official for the Division to use as a contact,

c) Date and time of the spill

d) Type of material spilled [CAS number if applicable, from the material safety data sheet (MSDS) form],

e) Estimate of the amount spilled, whether any material has left the permit area, and where the spilled material went, and

f) Initial measure taken to contain and clean up the spill

122) In the Hazardous Materials Management Plan, per Rule 3.1.13(3), please commit to copying the Division on any correspondence and/or written reports provided to other agencies (pertaining to a spill), and supplementing those reports if necessary to include the information outlined in Rule 3.1.13(2).

Geotechnical Stability Exhibit (Rule 6.5):

123) On page 2 of the Waste Stockpile Stability Analyses, in Table 3.1 – Design Criteria for Waste Stockpile Stability, the value given for Operation Inter-bench Slope Angle is 1.7H:1V. Please clarify whether slopes of all fines/overburden stockpiles and backfill areas (F1, F2, and F3) will be maintained at 1.7H:1V during operations. If so, does the bond estimate (in Exhibit L) include costs for grading all fines/overburden pile slopes in mining phase III from 1.7H:1V to 3H:1V? This reclamation task should be separated from all other earthwork tasks in the bond estimate, and also separated by pile. Additionally, please be sure the proposed operational slope gradients for these stockpiles is provided in Exhibit D.

124) On page 5 of the Waste Stockpile Stability Analyses, the Applicant states that seeps are known to be present in the vicinity downstream of stockpile TS1, but they are located below the toe of the stockpile near the creek. However, information provided in Exhibit G shows an upward vertical hydraulic gradient component at groundwater monitoring wells GW-1, GW-3, and GW-4, indicating areas of potential groundwater discharge to Little Turkey Creek surface water flow or to ground surface within the Little Turkey Creek valley in the form of seeps. Monitoring wells GW-3 and GW-4 are located upgradient from stockpile TS1. This is particularly well shown in Figure 3-2 – Potentiometric Elevations for Groundwater in the Hydrogeology and Impact Analysis by Hydro-Logic Solutions, Inc., where locations of the monitoring wells are plotted along with mine features. Figure 3-2 shows GW-3 (7,072 feet potentiometric elevation) located within the F2 backfill area, approximately 375 feet from the northern quarry edge. Figure 3-2 shows GW-4 (7,024 feet potentiometric elevation) located within the plant area, approximately 300-375 feet from the northern quarry edge. This means that potential seeps are present upgradient from the proposed TS1 stockpile. Please provide clarification on these seep areas, including any potential impacts they might have on stability of stockpiles/backfill areas. Additionally, because the plant area is to be mined down to an elevation of approximately 6,950 feet, which is well below the potentiometric elevation of GW-4, please discuss whether the Applicant anticipates this having any effects on plant operations.

125) In the Waste Stockpile Stability Analyses, Figures G1.1 through G2.2 for Section G (across F2 backfill area) do not appear to correlate with the G-G' section line shown in Figure 1 – General Arrangement with Section Lines, particularly at the G' end of the sections. The G end (left side) of the sections appear

to line up with the G-G' section line shown on Figure 1, as they start at about the elevation of the pit floor, 6,950 feet. However, the elevations of the ground surface at the G' end (right side) of the sections is not consistent with the elevations shown on the G-G' section line on Figure 1. For example, on Figure 1, the G-G' section line intersects the quarry edge at an elevation of 7,040 feet. However, on the G sections, the quarry edge is shown at an elevation of approximately 7,000 feet. The Figure 1 G-G' section line shows elevations mainly decreasing west of the quarry edge to a final elevation of approximately 7,010 feet at the G' edge of section line. However, on the G sections, the ground surface past the quarry edge rises to approximately 7,050 feet in elevation, then drops off slightly to 7,025-7,030 feet in elevation at the G' edge of section line. Please make the necessary corrections so that Figures G1.1 through G2.2 correlate with Figure 1.

126) In the Pit Wall Geotechnical Assessment, the Applicant mentions the six new monitoring wells and piezometer installed on site in July 2017, stating that although they were primarily intended to provide information on groundwater levels, they do provide information on rock types, rock quality, and other geotechnical information in the area. These 7 wells are listed in Table 1 – Borehole Details along with the 13 boreholes that were drilled previously. Please clarify whether information from the 2017 wells was used in the pit wall geotechnical assessment.

127) On page 13 of the Pit Wall Geotechnical Assessment, the Applicant states that a Limit Equilibrium "L-E" analysis has been carried out for a cross-section for the highest section of the Phase 1 pit wall which is approximately 200 feet in height. However, in Exhibit D, the Applicant states the total pit depth during Phase 1 will be 300 feet. Please explain this discrepancy or make any necessary corrections. If the 200 feet height is incorrect, please be sure to make any necessary changes to the "L-E" analysis.

128) On page 13 of the Pit Wall Geotechnical Assessment, the Applicant states the ultimate wall heights for the proposed quarry range from approximately 300 feet to 500 feet. However, in Exhibit D, the maximum pit depth during mining phase IV is 590 feet. Please explain this discrepancy or make any necessary corrections.

Additional Items:

129) Please review and respond to the adequacy reviews provided by Division staff, including Peter Hays, Tim Cazier, Eric Scott, and Elliott Russell (see enclosed letters).

130) The Division received comments on the application from Colorado Parks and Wildlife on January 22, 2018 (see enclosed). Please review these comments and other agency comments previously sent to the Applicant (History Colorado, Colorado State Land Board, Division of Water Resources), and inform the Division of how any agency issues or recommendations will be incorporated into the permit.

131) In previous mailings, the Division sent the Applicant copies of all timely objections and comments received for the application. Please inform the Division of how the Applicant intends to address the jurisdictional issues raised by objectors.

132) Pursuant to Rule 1.6.2(1)(c) and (2), the response to these adequacy items must be placed with the County Clerk and Recorder and thereby made available for public review. Please ensure the Applicant's response to these adequacy items includes proof that this was done.

Please be advised that on March 30, 2018, the application may be deemed inadequate and denied unless all adequacy items identified by the Division are addressed to the Division's satisfaction. Please ensure the Division has sufficient time to complete its review process by responding to these adequacy items at least two weeks prior to the decision/recommendation date, by March 16, 2018. The Division reserves the right to further supplement this document with additional adequacy items and/or details as necessary.

If you have any questions, you may contact me by email at amy.eschberger@state.co.us or by telephone at 303-866-3567, ext. 8129.

Sincerely,

Amy Eschberger

Amy Eschberger
Environmental Protection Specialist

Enclosures: Adequacy Review of Pre-Blast Survey Plan and Blasting Plan; From Peter Hays, DRMS; Dated December 28, 2017

Adequacy Review of Exhibit 6.5 – Geotechnical Stability; From Peter Hays, DRMS; Dated December 28, 2017

Adequacy Review of Groundwater Information; From Eric Scott, DRMS; Dated January 24, 2018

Adequacy Review of Stormwater Management Information; From Tim Cazier, DRMS; Dated January 26, 2018

Adequacy Review of Wildlife Information; From Elliott Russell, DRMS; Dated January 29, 2018

Comment from Colorado Parks and Wildlife, received January 22, 2018

Ec: Paul Kos, Norwest Corporation at: pkos@norwestcorp.com
Brandon Heser, Transit Mix Concrete Co. at: brandon_heser@transitmix.com
Tony Waldron, DRMS at: tony.waldron@state.co.us
Wally Erickson, DRMS at: wally.erickson@state.co.us
Peter Hays, DRMS at: peter.hays@state.co.us
Eric Scott, DRMS at: eric.scott@state.co.us
Elliott Russell, DRMS at: elliott.russell@state.co.us
Tim Cazier, DRMS at: tim.cazier@state.co.us
Scott Schultz, AGO at: scott.schultz@coag.gov

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

MEMORANDUM

Date: December 28, 2017

To: Amy Eschberger; Division of Reclamation, Mining & Safety

From: Peter Hays; Division of Reclamation, Mining & Safety

Re: Adequacy Review of Pre-Blast Survey Plan and Blasting Plan
Transit Mix Concrete Co.; Hitch Rack Ranch Quarry; File No. M-2017-049

The Division of Reclamation, Mining and Safety (Division/DRMS) has reviewed the Pre-Blast Survey Plan and Blasting Plan included within Exhibit D - Mining Plan for the Hitch Rack Ranch Quarry 112c permit application. The Applicant will need to address the following adequacy items identified in the review:

1. Item #41 of the Board Order signed by Jill Van Noord, Vice Chair on December 20, 2016, denying the previous permit application for the Hitch Rack Ranch Quarry, states the Applicant failed to meet its burden to show the application met the minimum requirements of the Act to show the source of legal right to enter and initiate a mining operation as set forth in Section 34-32.5-112(1)(b)(IV), C.R.S to close Little Turkey Creek Road temporarily during mining (blasting) operations. In the current application, the proposed Blasting Plan for the site is again proposing to close Little Turkey Creek Road temporarily during blasting operations.

   Please demonstrate how the Applicant has met the minimum requirements of the Act to show the source of legal right to enter and initiate a mining operation as set forth in Section 34-32.5-112(1)(b)(IV), C.R.S. Item #43 of the Board Order states that the Board does not have jurisdiction to resolve the legal dispute over Little Turkey Creek Road and that "Without resolution of this issue, however, Applicant cannot meet its burden to demonstrate that is has obtained the legal right of entry to initiate a mining operation on Little Turkey Creek Road." How does the Applicant plan to meet its legal burden to prove that it has the legal right to close Little Turkey Creek Road for blasting?

2. In the Pre-Blast Survey Procedure section of the Pre-Blast Survey Plan, the Applicant states the survey will be offered to the neighbors of Hitch Rack Ranch Quarry where a structure is located within three-quarters (3/4) mile of the permit boundary (north and west of the scale house) at no cost to the owner. The Pre-Blast Survey notice letter included in Appendix A of the Pre-Blast Survey states the Applicant is offering a pre-blast survey to every resident and

owner of a structure within the pre-blast survey radius of one-half (1/2) mile from the proposed disturbance boundaries of the mine permit. Please revise the Pre-Blast Survey notice letter to indicate a pre-blast survey distance of within three-quarters (3/4) mile of the permit boundary.

3. On at least one Exhibit C – Mining Plan Map, please indicate the three-quarter (3/4) mile offset from the permit boundary (north and west of the scale house).

4. Please provide a list of all structure owners and structures located within three-quarter (3/4) mile offset from the permit boundary (north and west of the scale house).

5. The Division did not receive the contents of the Pre-Blast Survey Plan Appendix B. Please provide the Division with Appendix B of the Pre-Blast Survey Plan.

6. In the Documentation section of the Blasting Plan, the Applicant states a third party blasting contractor will prepare a paper record of each blast completed at the quarry. Please confirm the blasting reports will contain the following minimum information:

    a. Name of the operator conducting the blast
    b. Location, date, and time of blast
    c. Name, signature, and license number of blaster-in-charge
    d. Identification, direction and distance, in feet, from the nearest blast hole to the nearest permanent man-made structure
    e. Weather conditions, including temperature, wind direction, and approximate velocity
    f. Type of material blasted
    g. Sketches of the blast pattern including number of holes, burden, spacing, and delay pattern
    h. Sketches shall also show decking, if holes are decked to achieve different delay times within a hole
    i. Diameter and depth of holes
    j. Types of explosives used
    k. Total weight of explosives used per hole and maximum weight of explosives used per 8-millisecond period
    l. Initiation system
    m. Type and length of stemming
    n. Mats or other protections used
    o. Type of delay detonator and delay periods used
    p. Number of persons in the blasting crew
    q. Reasons and conditions for each unscheduled blast

Additionally, please commit to maintaining the following information, at minimum, for seismographic and airblast records:

r. Type of instrument, sensitivity, and the calibration signal of the gain setting or certification of annual calibration
s. Exact location of instrument and the date, time and its distance from the blast
t. Name of the person and firm taking the reading
u. Name of the person and firm analyzing the seismographic record
v. The vibration and/or airblast level record

If you have any questions regarding these adequacy items, please contact me by email at peter.hays@state.co.us or by telephone at 303-866-3567, Ext. 8124.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

MEMORANDUM

Date: December 28, 2017

To: Amy Eschberger; Division of Reclamation, Mining & Safety

From: Peter Hays; Division of Reclamation, Mining & Safety

Re: Adequacy Review of Exhibit 6.5 – Geotechnical Stability
Transit Mix Concrete Co.; Hitch Rack Ranch Quarry; File No. M-2017-049

The Division of Reclamation, Mining and Safety (Division/DRMS) has reviewed the Geotechnical Exhibit included within Exhibit 6.5 for the Hitch Rack Ranch Quarry 112c permit application. The Applicant will need to address the following adequacy items identified in the review:

Hitch Rack Ranch Quarry Waste Stockpile Analyses:

1. Please explain how the downhill toe of the F1 - Fines/Overburden Stockpile will be stabilized to prevent potential downgradient movement of the stockpile. Please provide geotechnical investigation data and details for the starter dam/embankment/retaining wall design, if available.

2. Please provide a cross-section through F2 and F3 Fines/Overburden Stockpiles during Mining Phase V and the Final Reclamation Phase to clarify the interaction between the two stockpile areas.

3. Please provide the SLOPE/W data for the Waste Stockpile Stability Analyses SLOPE/W performed by Norwest to allow the Division to duplicate the analysis with Clover Technology's Galena software for verification purposes.

4. In the Soil Properties section of the stability analyses, the site specific geotechnical information on the overburden is limited to the visual inspection done in the drilling programs. Please commit to collecting and testing the overburden to determine the actual strength parameters and submit the material parameters report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

5. Please commit to collecting and testing the topsoil, fine reject, and compacted engineered sand and gravel to determine the actual strength parameters, and submit the material parameters report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

6. In the Slope Stability Model section of the analyses, the Applicant states it is assumed the F1 footprint is cleared and grubbed prior to material placement. The stability analyses model sections E and F indicate the F1 stockpile is underlain by overburden. Please explain this discrepancy and revise the stability analyses as needed.

7. The Figure 1 – General Arrangement with Sections Lines map provided with the stability analyses indicates a C – C' through the proposed quarry. The Division did not receive copies of the C-C' stability analyses models. Please provide the stability models for the Division's review.

8. The Section F stability analyses models for Bench-scale and Phase 5 – Operational indicates the TS2 stockpile on top of the F1 stockpile. The Mine Plan Map submitted with Exhibit C, Figure C-8, indicates the TS2 stockpile has been used to reclaim the F1 stockpile. Please explain this discrepancy and revise the stability analyses model as needed.

9. The Section F stability analyses models for Bench-scale and Phase 5 – Operational appears to represent the status of the F1 stockpile in Mining Phases 3 and 4 as depicted on Mining Plan Maps Figures C-6 and C-7. The lower half of the F1 stockpile would be reclaimed with topsoil. The topsoil layer is not indicated in the stability analyses model. Please explain this discrepancy and revise the stability analyses model as needed.

10. The Section F stability analyses models for Bench-scale and Phase 5 – Operational indicates the TS2 stockpile as a maroon color. The Material Type key for the stability analyses does not indicated a material type for topsoil. Please explain this discrepancy and revise the stability analyses model as needed.

11. The Section F stability analyses models cross-section profile for Phase 5 – Closure does not match the cross-section profile for the F1 stockpile as represented in Section B-B' on Figure C-9b. Please explain this discrepancy and revise the stability analyses model as needed.

12. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to performing a site specific investigation, such as test pits, completed at the footprint of F1 to confirm overburden thickness, material characteristics, and groundwater conditions, and submit the investigation report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

13. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to collecting and testing samples

of the overburden and topsoil stockpiles and perform testing for strength to determine their actual parameters, and submit the material parameters report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

14. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to collecting and testing samples of the fines stockpile material and perform testing for strength to determine their actual parameters, and submit the material parameters report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

15. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to reviewing and revising the engineering designs using the site specific data as needed prior to construction, and submit the engineering designs report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

16. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to managing the upstream surface water run-on above the stockpile to limit infiltration and erosion, and submit all changes to the water management plan for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

17. As stated in the Recommendations section of Hitch Rack Ranch Quarry Waste Stockpile Stability Analyses, dated August 29, 2017, please commit to reviewing and updating the stability analysis to evaluate the difference in parameters and determine any adjustments to the analysis once the final site conditions, construction design, placement method, and monitoring plans are in place, and submit the updated stability analysis report for Division review and approval through either the technical revision or amendment process, to occur subsequent to the issuance of the permit.

Hitch Rack Ranch Pit Wall Geotechnical Assessment:

18. In 3.7.2 Faulting section of the geotechnical assessment, the Applicant states additional mapping and drilling is a requirement as the quarry design is advanced in order to confirm the orientation and quality of the seams/potential faults and the effect on pit wall design through the various pit phases. Please commit to performing the additional mapping and drilling to evaluate the effects of the faulting on the highwall stability.

19. In 3.7.2 Faulting section of the geotechnical assessment, the Applicant states given the Phase 1 pit configuration (relatively shallow highwalls during initial mining of Phase 1), it is expected that adverse dips can be addressed by adjusting the mining sequence and direction.

Please describe how the Applicant intends to adjust the mining sequence and direction to address the impacts of the faults on the highwall stability.

20. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to implementing water management procedures to divert surface runoff away from the pit walls.

21. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to installing instrumented groundwater monitoring wells behind highwalls where natural topography continues above the pit crest.

22. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to consequent investigations (mapping and drilling) to determine if adversely dipping low angle faults are present.

23. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing controlled blasting practices to minimize damage to the final quarry walls.

24. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to clearing berms of rock and debris to the extent possible while access is possible, and performing scaling of pit wall bench faces in order to minimize potential raveling and rock fall hazards.

25. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing routine bench face mapping by a qualified personnel on a monthly basis during the initial development, to match the rock mass quality and structural geology against the design assumptions throughout quarry development.

26. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing visual inspections of the pit slopes by a qualified personnel to identify blast damage and modify blasting techniques, as required to be completed immediately after scaling is completed and the bench face is visible.

27. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to conducting routine pit slope movement monitoring with EDM/Prism surveying, laser scanning, and/or extensometers during the initial mining development and as final highwalls are developed.

28. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing routine visual inspection by a qualified personnel to asses pit slope stability, catchment benches, berms, clean-up efforts, restricted access points, and monitoring systems. The inspection should be completed daily

and communicated to the site personnel, and the inspections should be documented and stored at the site for review.

29. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing surveys of the pit walls and completing reconciliation with designs on a regular basis.

30. As recommended in Section 6.4 of the Hitch Rack Ranch Pit Wall Geotechnical Assessment, dated September 11, 2017, please commit to performing the recommended inspection, monitoring, and mapping frequencies for the initial quarry development annually or when unexpected ground conditions are encountered, or if there is a significant design change.

31. Please provide a map indicating the cross-section profile locations for the Geotechnical Model Analysis for the Slope L-E models.

32. Please provide the SLOPE/W slope stability analysis model inputs for the Geotechnical Model Analysis for the Bench L-E and Slope L-E models to allow the Division to duplicate the analysis with Clover Technology's Galena software for verification purposes.

If you have any questions regarding these adequacy items, please contact me by email at peter.hays@state.co.us or by telephone at 303-866-3567, Ext. 8124.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, Colorado 80203

MEMORANDUM

Date: January 24, 2018

To: Amy Eschberger; Division of Reclamation, Mining and Safety

From: Eric Scott; Division of Reclamation, Mining and Safety

Re: Adequacy Review of Groundwater Information
Transit Mix Concrete Co.; Hitch Rack Ranch Quarry; File No. M-2017-049

The Division of Reclamation, Mining and Safety (Division) has reviewed the groundwater information within Exhibit G for the Hitch Rack Ranch Quarry 112c permit application. The Applicant will need to address the following adequacy items identified in the review:

Groundwater Quantity:

1) The Applicant should provide geologic cross section(s) perpendicular to section A-A' or parallel to Little Turkey Creek illustrating the relative depths of the upstream well completions, the elevation of Little Turkey Creek, completion depth of LTC-GW-01, depth to groundwater in the pit area, and the pit floor elevation.

2) The Applicant should provide Well ID's in Table 2.3 of attachment G-2.

3) The Applicant should provide some discussion as to why modeling impacts are predicted to the three domestic upstream wells even though they are located some distance upstream of the pit, and completed adjacent to Little Turkey Creek. The text previously states that water elevations in the wells adjacent to the creek are controlled primarily by the level of the water in the creek.

4) The Applicant should clarify whether any attempt has been made to measure/monitor water levels in the adjacent domestic wells.

5) The Applicant should clarify how and how often groundwater level monitoring will be conducted during the life of the mine. Given the concerns for impacts to surrounding wells, and the usefulness of the data for the groundwater model calibration/verification, the Applicant should commit to monthly groundwater level monitoring for the life of the permit.

6) Exhibit G should include a proposed mitigation plan for the event that nearby domestic wells show adverse impacts due to mining activities. If this plan is included in another exhibit in the application, it should be referenced in Exhibit G.

7) The Applicant should commit to updating the groundwater model with all available monitoring data annually, and submitting the results and monitoring data with the Annual Report.

Groundwater Quality:

8) The Applicant should confirm the total phosphorus level in Table G-2A for the 6/16/15 samples. The result shown is 110 and the applicable standard is shown as 0.11.

9) Table G-10 does not provide total phosphorus data, and compares groundwater data to surface water standards. Groundwater data should be compared to the CDPHE, Water Quality Control Commission's Interim Narrative Standards established in Regulation No. 41 – The Basic Standards for Groundwater, as appropriate throughout the application. Same comment for Table 3-3 standards.

10) The Applicant should confirm whether any of the surface water standards provided for "Segment 14d" are subject to "hardness based" benchmarks.

The following comments apply to the groundwater sampling plan:

11) In Section 2.4.1, both compliance well locations are listed with the same ID (LTC-GW-1). The Applicant should correct this error.

12) Only two "compliance well" locations have been specified and will only be sampled from the middle zone. The plan states that other locations/zones will be sampled "as needed". The Applicant should provide some discussion on how the proposed compliance wells were selected, and what will determine if additional sampling locations/zones are needed.

13) The second footnote in Table 2-2 has been cut off. The Applicant should correct this error.

14) Where appropriate, the Applicant should list chemical preservatives to be used when sampling.

15) The Applicant should discuss any QA/QC samples to be collected such as blanks, duplicates, etc. to verify field and lab procedures.

16) The groundwater standards listed are referenced as CDPHE 2008. The most recent standards from the updated Regulation should be used.

17) The Applicant should provide monitoring well diagrams for the completed multi-zone wells, not an inaccurate conceptual diagram.

18) The groundwater sampling/monitoring plan provided appears to be intended for only the required 15 months of pre-mining site characterization. There is no discussion about what the groundwater monitoring plan will be once mining commences. I would recommend the monitoring plan be carried forward on a quarterly basis for the life of mine, with water levels collected monthly, or

until a permit revision to reduce the sampling frequency and parameters has been submitted by the Applicant and approved by the Division.

Additional Item:

19) The well that is listed as improperly located, Permit #34643, should be confirmed, and if in error, removed from all figures and text.

If you have any questions regarding these adequacy items, please contact me by email at eric.scott@state.co.us or by telephone at 303-866-3567, ext. 8140.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

MEMORANDUM

Date: January 26, 2018

To: Amy Eschberger; Division of Reclamation, Mining and Safety

From: Tim Cazier, P.E.; Division of Reclamation, Mining and Safety

Re: Adequacy Review of Stormwater Management Information
Transit Mix Concrete Co.; Hitch Rack Ranch Quarry; File No. M-2017-049

The Division of Reclamation, Mining and Safety (Division) engineering staff has reviewed the stormwater management information within Exhibit G of the 112c permit application submitted for the Hitch Rack Ranch Quarry. 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) and 6.4.7.

1. Page G-16, section c, Drainage Discussion. The narrative states "Once this water is diverted back to Little Turkey Creek, Transit Mix will fully mitigate any possible impacts to the hydrological system." Please explain how Transit Mix will mitigate hydrologic impacts after flows are diverted back to Little Turkey Creek.
2. Page G-19, Table G-4. Please provide rationale as to how the CN of 63 was determined as "Fir/Pine" is not an option in TR-55 curve number tables.
3. Page G-21, Ditch CWD-1/MegaDitch. The "prefabricated channel material" is planned for conveying unimpacted drainage from detention basin P-DET-1. The Division has some limited experience with this product suggesting it may require frequent maintenance which may not be accomplished with heavy equipment. Additionally, there appears to be steep sections (30 to 40 percent grades) for this channel shown on Figure G-8a (and subsequent Exhibit G figures). Please provide the following:
    a. Means of access and maintenance for this relatively remote diversion channel, and
    b. SmartDitch's limits on channel gradient (for successful installation), and hydraulic shear stress capacity for the proposed HDPE material.
4. Page G-22, Table G-5, Slopes. Ditches DD-1 and F1-1 list slopes a 1.2% and 1.0%, respectively. Figure G-8a shows segments of DD-1 may be as steep as 40% and Figure G-13 shows segments of F1-1 may be as steep as 33%. Please be sure all steep channel segments that will require more robust armoring are addressed in Table G-5.

5. Page G-23, first paragraph, detention basins in bedrock. The narrative states "… where the detention basins will be constructed into bedrock, the sediment detention basins walls will be sloped at 0.5H:1V." Furthermore, Figure G-15 suggests these detention basins may be as deep as 20 feet. Please provide narrative addressing how these ponds, as a potential wildlife attractant will be protected against wildlife falling in and becoming injured from falls down steep slopes or become trapped. Please also address how these steep slopes will be protected from personnel and equipment from accidentally entering the steep sided pond.

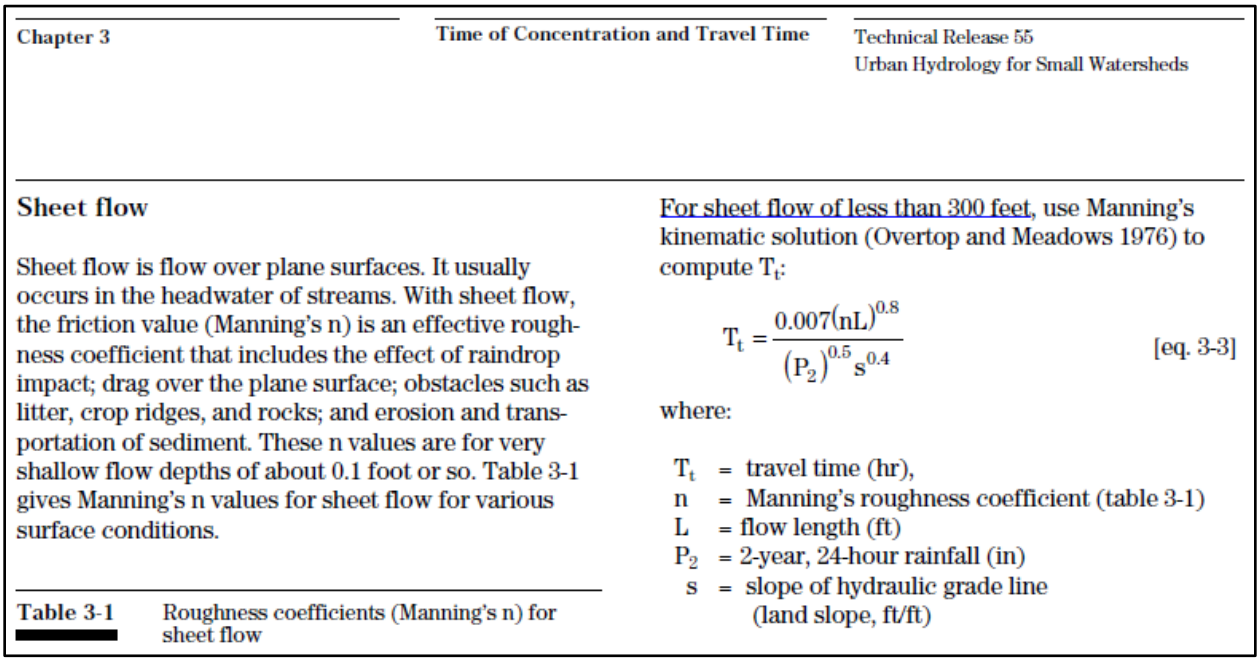
6. Page G-23, first paragraph, detention basin drain time. The narrative states "The outlet pipe will be controlled by an orifice plate at the pipe inlet and will be sized to drain the 100-year storage volume in less than 120 hours, as required by Colorado Department of Water Resources guidelines." Figure G-15, Note 4 states the drain time is 72 hours. The Division's understanding is the guideline is 72 hours. Please clarify which is intended and make appropriate corrections to the text or Figure.

7. Page G-24, Table G-6, runoff volume. Based on the narrative at the bottom of page G-3, the Division expected to see the most conservative runoff volumes used for sediment pond design. The volumes presented in Table G-6 for basins P-Plant-1 and P-Plant-2 do not correspond to the largest estimated volumes from the five SEDCAD models output files for these two ponds. Model P2 estimated 24.10 ac-ft for basin P-Plant-1, and model P5 estimated 20.14 ac-ft for basin P-Plant-2. Please explain why the lower volumes (19.99 and 17.31, respectively) were presented in Table G-6.

8. Page G-24, section c, Culverts. The narrative states "Culverts will be used … in limited areas as means of conveying temporary flows down steep slopes via drop culverts." The Division could not find permit level drawings or figures depicting how these proposed drop culverts would be configured. Please provide conceptual drawings showing the proposed drop culvert configuration and the means of energy dissipation.

9. Page G-25, last paragraph, detention basin reclamation. The narrative states "For reclamation, the [notch] fill will be removed and the bedrock cut exposed to allow a positive drainage from the reclaimed pit areas." The Division expects these notches will have near vertical side walls and may have significant depth. Please address how these notches will be safe for both people and wildlife after reclamation.

10. Attachment G-1, SEDCAD Model Reports. The Division could not locate a map or figure delineating SEDCAD structures and subwatersheds which is necessary to review the SEDCAD model input and results. It also appears that some time of concentration estimates include overland/sheet flow segments greater than 300 feet (e.g., "Filename: Sediment Ponds2_100-P1.sc4" Stru #4, SWS #1 is 1,835 horizontal feet). TR-55 Upland method for time of concentration calculations limits overland flow segments to less than 300 feet (see top of page 6) and based on experience should be shorter as slopes increase. Please review all times of concentration estimates to ensure proper methodology and model input is appropriate and provide a subwatershed/structure routing delineation map.



Chapter 3 | Time of Concentration and Travel Time | Technical Release 55 Urban Hydrology for Small Watersheds

Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \quad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

Screen capture from TR-55, note 300-foot limit for sheet flow (underlined)

11. Figures G-8a through G-12 nomenclature vs. Table G-7. The Culvert IDs in the Figures for sediment ponds RE-SP-3 and -4 (RD-SP-3-CC-1 and RD-SP-4-CC-1, respectively) could not be located in Table G-7. However, Table G-7 Culvert IDs RD-SP-CC-3 and -4 could not be found in the Exhibit G figures. Are these the same culverts? If so, please correct either the Table or the Figures. If not, please explain the discrepancies.

If you have any questions regarding these adequacy items, please contact me by email at tim.cazier@state.co.us or by telephone at 303-866-3567, ext. 8169.

COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, Colorado 80203

MEMORANDUM

Date: January 29, 2018

To: Amy Eschberger; Division of Reclamation, Mining and Safety

From: Elliott Russell; Division of Reclamation, Mining and Safety

Re: Adequacy Review of Wildlife Information
Transit Mix Concrete Co.; Hitch Rack Ranch Quarry; File No. M-2017-049

The Division of Reclamation, Mining and Safety (Division) has reviewed the wildlife information within Exhibits E and H for the Hitch Rack Ranch Quarry 112c permit application. The applicant will need to address the following adequacy items identified in the review:

6.4.5 Exhibit E - Reclamation Plan

1. The Hitch Rack Ranch Quarry is located within Game Management Unit (GMU) 59, which is a part of Colorado Parks and Wildlife's (CPW) Elk Data Analysis Unit (DAU) E-23. The Applicant states the project will disturb 239 acres which is 0.04% of the winter range within DAU E-23, however states none of the winter range within GMU-59 will be disturbed. Please clarify this statement as it is the Division's understating that the winter range of GMU-59 is a portion or sub-set of the total winter range of DAU E-23.

6.4.8 Exhibit H – Wildlife Information

2. In accordance with Rule 6.4.8(1), please provide a description for aquatic wildlife species of Little Turkey Creek within the vicinity of the application area. If there are aquatic wildlife species within Little Turkey Creek, please provide a description, in accordance with Rule 6.4.8(1)(d), of the general effect during and after the proposed operation. Please also discuss, in accordance with Rule 3.1.8(1), how the operation will take in account the safety and protection of these aquatic wildlife species.

3. Within Section III. Potential Effects of Exhibit H, the Applicant states with appropriate mitigation measure, including low vehicle speeds and pre-construction nesting raptor surveys, no significant direct mortality of wildlife is expected from construction or operations. As the Applicant proposes a phased mine approach over the next 40 years, please address, in accordance with Rule 3.1.8(1), conducting pre-construction nesting raptor surveys prior to the commencement of operations and prior to mine phase advancement. Also in accordance with

Rule 3.1.8(1), please address if the Applicant intends to conduct pre-construction Mexican spotted owl (MSO) surveys in the future as well.

4. Under the Mitigation Measures portion of Section III. Potential Effects of Exhibit H, the Applicant states a noise study was completed to measure ambient noise and predict project noise levels and attenuation distances. In accordance with Rule 6.4.8(1)(d), please submit this noise study.

5. Under the Mitigation Measures portion of Section III. Potential Effects of Exhibit H, the Applicant states nesting raptor surveys were completed in the spring of 2016 and 2017. Only the 2017 Nesting Raptor Survey report was submitted in Exhibit H. In accordance with Rule 6.4.8(1) and Rule 3.1.8(1), please submit the 2016 Nesting Raptor Survey report.

6. Under the Mitigation Measures portion of Section III. Potential Effects of Exhibit H, the Applicant states in 2017 one long-eared owl nest was found. In accordance with Rule 6.4.8(1) and Rule 3.1.8(1), please discuss any future surveys and mitigation plan, prior to the commencement of mining activities, specific to this long-eared owl nest.

7. Within the Inter-seasonal Movement and Winter Habitat portion of Stantec Consulting Service's Potential Mexican Spotted Owl Habitat and Use for the Hitch Rack Ranch Project report, Stantec states data collected between 1992 and 1996 show MSO winter habitat consisted of low elevation canyons or drainages with a north-to-south orientation. With this known data, please discuss, in accordance with Rule 6.4.8(1), if any of the affected lands could be considered winter habitat for MSO.

8. Within the Potential MSO Breeding Habitat Model portion of Stantec Consulting Service's Potential Mexican Spotted Owl Habitat and Use for the Hitch Rack Ranch Project report, Stantec states the project area does not contain suitable MSO breeding habitat based on the lack of narrow, steep-walled rocky canyons typical of MSO breeding habitat in Colorado. In accordance with Rule 6.4.8(1)(d), please discuss if the final topography, as proposed in the Reclamation Plan, will create potential MSO breeding habitat in the project area.

9. Within the Discussion portion of Bio-Logic's Hitch Rack Ranch 2017 Nesting Raptor Survey report, Bio-logic states a family of Cooper's hawks, including two fledglings, was found in July 2015 on the quarry site. In accordance with Rule 6.4.8(1) and Rule 3.1.8(1), please clarify if the location of the nest for these Cooper's hawks was identified in 2015 and discuss any future surveys and mitigation plan, prior to the commencement of mining activities, specific to these Cooper's hawks.

If you have any questions regarding these adequacy items, please contact me by email at elliott.russell@state.co.us or by telephone at 303-866-3567, ext. 8132.

COLORADO
Parks and Wildlife
Department of Natural Resources

Southeast Region
4255 Sinton Road
Colorado Springs, CO 80907
P 719.227.5200 | F 719.227.5223

January, 3 2018

Amy Eschberger
Colorado Division of Reclamation, Mining and Safety
Environmental Protection Specialist
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Hitch Rack Ranch Quarry, File No, M-2017-049

Dear Ms. Eschberger:

Colorado Parks and Wildlife (CPW) is in receipt of the above referenced quarry lease application and is familiar with the site. CPW has reviewed this updated application, and it appears that TransitMix Concrete Co. incorporated many of the recommendations from our April 2016 letter.

Based on the phased approach proposed in the mining plan, ground disturbance could take place at different times during the course of site development. One additional recommendation CPW has for this updated application is that the operator conduct surveys at each location before any vegetation is removed to reduce the chance of take of protected migratory birds and avoid impacts to raptor nesting efforts.

There is suitable habitat on the site for migratory birds. The best way to avoid impacts on the nesting efforts of migratory birds is to focus construction activities outside of the breeding season (March 15th -October 31st). If construction must occur during the breeding season, CPW recommends surveys for active nests be conducted prior to groundbreaking. All migratory birds are protected under the Migratory Bird Treaty Act and removal or disturbance of any migratory bird nest would require consultation with CPW and USFWS prior to disturbance. CPW recommends the use of preconstruction surveys, as well as continuation of those surveys during disturbance periods, to identify all raptor nests within the project area and implement appropriate restrictions. CPW recommends adherence to the recommended buffer distances and timing stipulations identified in the attached document "Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors". Removal or relocation of any active raptor nest will require consultation with CPW and US Fish and Wildlife Service prior to disturbance. Both active and potential raptor nest sites, as well as winter night roosts should be considered when evaluating disturbance during construction.

CPW appreciates being given the opportunity to comment. Please feel free to contact District Wildlife Manager, Cody Wigner, should you have any questions or require additional information at 719-227-5287 or via email at cody.wigner@state.co.us.

Sincerely,

Frank McGee
Area Wildlife Manager

Attachment: April 2016 Comment Letter

Cc: SE Region File
Area 14 File
Cody Wigner, DWM

COLORADO
Parks and Wildlife
Department of Natural Resources

Southeast Region
4255 Sinton Road
Colorado Springs, CO 80907
P 719.227.5200 | F 719.227.5223

April 18, 2016

Amy Eschberger
Colorado Division of Reclamation, Mining and Safety
Environmental Protection Specialist
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Notice of 112 Construction Materials Reclamation Permit Application Consideration
Transit Mix Concrete Co., Hitch Rack Ranch Quarry, File No, M-2016-010

Dear Ms. Eschberger:

Colorado Parks and Wildlife (CPW) is in receipt of the above referenced quarry lease application and is familiar with the site. Transit Mix Concrete has already met with CPW and the United States Fish and Wildlife Service (USFWS) about the proposed quarry. Based on the location of the proposed quarry, both CPW and USFWS instructed Transit Mix Concrete to perform surveys for the federally and state threatened Mexican spotted owl, since it is known habitat for the species.

CPW notices that the mining operation is set to take place around Little Turkey Creek. All wetland areas should be buffered a minimum of 100 feet from the outside edge of the creek. Any development, surface disturbance, and outbuildings should be discouraged except where necessary for mining operations. Additionally, hydrological flows that support wetlands should remain undisturbed and not impeded.

Natural vegetation should not be altered unless for purposes necessary to the mining operation. Native grasses and forbs should be maintained and mowing strongly discouraged except as required around the immediate areas of buildings and mining operations.

The control of noxious weeds is the responsibility of the landowner. Noxious weeds shall be actively controlled using methods such as mowing and spraying. Species specific control measures should be used when pesticides are felt necessary for the control of noxious weeds. All equipment that is entering the site from a different location should be cleaned of all soil and vegetation to help prevent the spread of noxious weeds.

If any fencing is to be used, wildlife friendly fencing should be utilized. CPW will provide information on wildlife friendly fencing upon request.

COLORADO
Parks and Wildlife
Department of Natural Resources

Southeast Region
4255 Sinton Road
Colorado Springs, CO 80907
P 719.227.5200 | F 719.227.5223

Due to the presence of black bears on the property, CPW recommends that the operators of the facility invest in bear-proof trash containers if trash is going to be present on the facility. Trash containers should be stored in a garage or in a solid locked storage shed until the morning of trash collection during those months when bears are most active (April - November).

Feeding of big game species is illegal in Colorado. This includes putting out salt blocks, hay, grain, or other items to attract big game. The use of bird feeders should be strongly discouraged from April through November to avoid conflicts with black bears.

Once mining is complete, all reclamation efforts could have potentially significant value to wildlife. To maximize this benefit, CPW recommends that the mining site be returned to the same condition as prior to being mined. Planting of trees and shrubs attractive to wildlife is encouraged. Reseeding of grasses and forbs over large areas should be a mix of warm and cool season plants that are palatable and attractive to wildlife. All vegetation used in reclamation should be species that are native to Colorado and present in the region. For further consultation, contact CPW.

CPW appreciates being given the opportunity to comment. Please feel free to contact District Wildlife Manager, Cody Wigner, should you have any questions or require additional information at 719-227-5287 or via email at cody.wigner@state.co.us.

Sincerely,

Frank McGee
Area Wildlife Manager

Cc: SE Region File
Area 14 File
Cody Wigner, DWM

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS FOR COLORADO RAPTORS

Tolerance limits to disturbance vary among as well as within raptor species. As a general rule, Ferruginous Hawks and Golden Eagles respond to human activities at greater distances than do Ospreys and America Kestrels. Some individuals within a species also habituate and tolerate human activity at a proximity that would cause the majority of the group to abandon their nests. Other individuals become sensitized to repeated encroachment and react at greater distances. The tolerance of a particular pair may change when a mate is replaced with a less tolerant individual and this may cause the pair to react to activities that were previously ignored. Responses will also vary depending upon the reproductive stage. Although the level of stress is the same, the pair may be more secretive during egg laying and incubation and more demonstrative when the chicks hatch.

The term "disturbance" is ambiguous and experts disagree on what actually constitutes a disturbance. Reactions may be as subtle as elevated pulse rate or as obvious as vigorous defense or abandonment. Impacts of disturbance may not be immediately evident. A pair of raptors may respond to human intrusion by defending the nest, but well after the disturbance has passed, the male may remain in the vicinity for protection rather than forage to feed the nestlings. Golden eagles rarely defend their nests, but merely fly a half mile or more away and perch and watch. Chilling and over heating of eggs or chicks and starvation of nestlings can result from human activities that appeared not to have caused an immediate response.

A 'holistic' approach is recommended when protecting raptor habitats. While it is important for land managers to focus on protecting nest sites, equal attention should focus on defining important foraging areas that support the pair's nesting effort. Hunting habitats of many raptor species are extensive and may necessitate interagency cooperation to assure the continued nest occupancy. Unfortunately, basic knowledge of habitat use is lacking and may require documentation through telemetry investigations or intensive observation. Telemetry is expensive and may be disruptive so a more practical approach is to assume that current open space is important and should be protected.

Although there are exceptions, the buffer areas and seasonal restrictions suggested here reflect an informed opinion that if implemented, should assure that the majority of individuals within a species will continue to occupy the area. Additional factors, such as intervening terrain, vegetation screens, and the cumulative impacts of activities should be considered.

These guidelines were originally developed by CDOW raptor biologist Gerald R. Craig (retired) in December 2002. To provide additional clarity in guidance, incorporate new information, and update the conservation status of some species, the guidelines were revised in January 2008. Further revisions of this document may become necessary as additional information becomes available.

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS

BALD EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area; see 'Definitions' below) within ¼ mile radius of active nests (see 'Definitions' below). Seasonal restriction to human encroachment (see 'Definitions' below) within ½ mile radius of active nests from October 15 through July 31. This closure is more extensive than the National Bald Eagle Management Guidelines (USFWS 2007) due to the generally open habitat used by Colorado's nesting bald eagles.

Winter Night Roost:

No human encroachment from November 15 through March 15 within ¼ mile radius of an active winter night roost (see 'Definitions' below) if there is no direct line of sight between the roost and the encroachment activities. No human encroachment from November 15 through March 15 within ½ mile radius of an active winter night roost if there is a direct line of sight between the roost and the encroachment activities. If periodic visits (such as oil well maintenance work) are required within the buffer zone after development, activity should be restricted to the period between 1000 and 1400 hours from November 15 to March 15.

Hunting Perch:

Diurnal hunting perches (see 'Definitions' below) associated with important foraging areas should also be protected from human encroachment. Preferred perches may be at varying distances from human encroachment and buffer areas will vary. Consult the Colorado Division of Wildlife for recommendations for specific hunting perches.

GOLDEN EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from December 15 through July 15.

OSPREY

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through August 31. Some osprey populations have habituated and are tolerant to human activity in the immediate vicinity of their nests.

FERRUGINOUS HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from February 1 through July 15. This species is especially prone to nest abandonment during incubation if disturbed.

RED-TAILED HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within 1/3 mile radius of active nests. Seasonal restriction to human encroachment within 1/3 mile radius of active nests from February 15 through July 15. Some members of this species have adapted to urbanization and may

tolerate human habitation to within 200 yards of their nest. Development that encroaches on rural sites is likely to cause abandonment.

SWAINSON'S HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through July 15. Some members of this species have adapted to urbanization and may tolerate human habitation to within 100 yards of their nest.

PEREGRINE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to ½ mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a ½ mile buffer around the cliff complex.

PRAIRIE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 15 through July 15.

NORTHERN GOSHAWK

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 1 through September 15.

BURROWING OWL

Nest Site:

No human encroachment within 150 feet of the nest site from March 15 through October 31. Although Burrowing Owls may not be actively nesting during this entire period, they may be present at burrows up to a month before egg laying and several months after young have fledged. Therefore it is recommended that efforts to eradicate prairie dogs or destroy abandoned towns not occur between March 15 and October 31 when owls may be present. Because nesting Burrowing Owls may not be easily visible, it is recommended that targeted surveys be implemented to determine if burrows are occupied. More detailed recommendations are available in a document entitled "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" which is available from the Colorado Division of Wildlife

Recommended Buffer Zones and Seasonal Restrictions Around Raptor Use Sites

Species and Use	Buffer	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Bald Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■			■	■	■
ACTIVE WINTER NIGHT ROOST without a direct line of sight- No Human Encroachment	¼ Mile	■	■	■								■	■
ACTIVE WINTER NIGHT ROOST with a direct line of sight - No Human Encroachment	½ Mile	■	■	■								■	■
HUNTING PERCH - No Human Encroachment	Contact CDOW												
Golden Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■					■
Osprey													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	¼ Mile				■	■	■	■	■				
Ferruginous Hawk													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile		■	■	■	■	■	■					
Red-tailed Hawk													
ACTIVE NEST - No Surface Occupancy	1/3 Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	1/3 Mile		■	■	■	■	■	■					
Swainson's Hawk													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	¼ Mile				■	■	■	■					
Peregrine Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile			■	■	■	■	■					
Prairie Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile			■	■	■	■	■					
Northern Goshawk													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile			■	■	■	■	■	■	■			
Burrowing Owl													
ACTIVE NEST - No Human Encroachment	150 feet			■	■	■	■	■	■	■	■		
	■	= time period for which seasonal restrictions are in place.											

DEFINITIONS

Active nest – Any nest that is frequented or occupied by a raptor during the breeding season, or which has been active in any of the five previous breeding seasons. Many raptors use alternate nests in various years. Thus, a nest may be active even if it is not occupied in a given year.

Active winter night roost – Areas where Bald Eagles gather and perch overnight, and sometimes during the day in the event of inclement weather. Communal roost sites are usually in large trees (live or dead) that are relatively sheltered from wind and are generally in close proximity to foraging areas. These roosts may also serve a social purpose for pair bond formation and communication among eagles. Many roost sites are used year after year.

Human encroachment – Any activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc.

Hunting perch – Any structure on which a raptor perches for the purpose of hunting for prey. Hunting perches provide a view of suitable foraging habitat. Trees are often used as hunting perches, but other structures may also be used (utility poles, buildings, etc.).

Surface occupancy – Any physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc.

CONTACT

For further information contact:

David Klute
Bird Conservation Coordinator
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216
Phone: 303-291-7320
Email: david.klute@state.co.us

REFERENCES

Bechard, M.J., and J.K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/172

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/506

Call, M. 1979. Habitat management guides for birds of prey. Technical Note No.338, U.S. Bureau of Land Management, Denver Service Center, Denver, CO. 69pp.

Energy Research and Development Administration (ERDA). 1977. EIA for CUI Venture application for geothermal loan guarantee (Beryl and Lund, Utah). EIA/GE/77-8. Washington, D.C. 109pp.

England, A.S., M.J. Bechard, and C.S. Houston. 1997. Swainson's Hawk (*Buteo swainsoni*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/265

Greater Yellowstone Bald Eagle Working Group. 1996. Greater Yellowstone bald eagle management plan: 1995 update. Greater Yellowstone Bald Eagle Working Group, Wyoming Game & Fish Dept., Lander WY 82520. 47p

Grier, J.W., F.J. Gramlich, J. Mattisson, J.E. Mathisen, J.V. Kussman, J.B. Elder, and N.F. Green. 1983. The bald eagle in the northern United States. Bird Cons. 144-66.

Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Athene cunicularia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/061

Holmes, Tamara L. 1993. Behavioral responses of grassland raptors to human disturbance. MS Thesis. Colo. State Univ., Fort Collins. 62pp.

Holthuijzen, A.M.A., W.G. Eastland, A.R. Ansell, M.N. Kochert, R.D. Williams, and L.S. Young. 1990. Effects of blasting on behavior and productivity of nesting prairie falcons. Wildl. Soc. Bull. 18:270-281.

Kochert, M. N., K. Steenhof, C. L. Mcintyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/684

Martin, D.J. 1973. Selected aspects of burrowing owl ecology and behavior. Condor 75:446-456.

Northern States Bald Eagle Recovery Team. 1983. Northern States Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service. 75pp.

Olendorff, R. R., and W.D. Zeedyk. 1978. Land management for the conservation of endangered birds. Pages 419-428 in S.A. Temple, ed. *Endangered birds*. University of Wisconsin Press, Madison, Wisconsin.

Poole, A.F., R.O. Bierregaard, and M.S. Martell. 2002. Osprey (*Pandion haliaetus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/683

Preston, C.R., and R.D. Beane. 1993. Red-tailed Hawk (*Buteo jamaicensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/052

Reynolds, R., R.T. Graham, H.M. Reiser. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Fort Collins, CO. U.S. Dept of Agri., Forest Service, Rocky Mountain Forest and Range Experiment Station. 90pp.

Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildl. Soc. Bull. 25(3):634-638.

Rocky Mountain/Southwest Peregrine Falcon Recovery Team. 1984. American peregrine falcon Rocky Mountain/Southwest population recovery plan. U.S. Fish and Wildlife Serv. 105pp.

Squires, J.R., S.H. Anderson, and R. Oakleaf. 1993. Home range size and habitat-use patterns of nesting prairie falcons near oil developments in northeastern Wyoming. J. Field Ornithol. 64:1-10.

Steenhof, Karen. 1998. Prairie Falcon (*Falco mexicanus*), The Birds of North America Online Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/346

Squires, J.R., and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/298

Suter, G.W. and J.L. Joness. 1981. Criteria for Golden Eagle, Ferruginous Hawk, and Prairie Falcon nest site protection. J. Raptor Res. 15(1):12-18.

Swenson, J.E. 1979. Factors affecting status and reproduction of ospreys in Yellowstone National Park. J. Wildl. Manage. 43:595-601.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.

U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

White, C.M., N.J. Clum, T.J. Cade, and W.G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/660

Revised 02/2008