STATE OF COLORADO

Simmons - DNR, Leigh <leigh.simmons@state.co.us>

M2022013, Two Rivers groundwater review

Simmons - DNR, Leigh <leigh.simmons@state.co.us> Mon, Feb 13, 2023 at 6:04 PM
To: Rob Zuber <rob.zuber@state.co.us>

Rob,

My review memo is attached.

You'll see that there are several new adequacy items based on material submitted in response to earlier reviews.

Item 17 is worded more vaguely than I typically prefer, however my intention is to give the applicant room to make their case for their proposed groundwater quality monitoring plan rather than prescribe the plan to them.

I apologize for the delay in getting this memo to you. I'm available to meet if any of these issues need further discussion.

Leigh Simmons
Environmental Protection Specialist

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

P 303.866.3567 x 8121 | C 720.220.1180 | F 303.832.8106
1313 Sherman Street, Room 215, Denver, CO 80203
leigh.simmons@state.co.us | https://drms.colorado.gov

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

Interoffice Memorandum

February 24, 2023

From: Leigh Simmons
To: Rob Zuber

Subject: Two Rivers Sand, Gravel and Reservoir Project (Permit No. M-2022-013) Application

I have reviewed the material submitted in response to the Division's second adequacy review letter, which included my second memo. My comments on the applicant's response are given below, together with the original comment for reference.

Comments:

1. *The response is sufficient*

2. *The response is sufficient*

3. *Water level data from piezometers P124-1 through P124-12 has been given in the text of Exhibit G but the locations of the piezometers are not shown on Exhibit G: Water Information Map (or Exhibit C-1: Existing Conditions Map).*
   Please add the piezometer locations to Exhibit G: Water Information Map

   Piezometer locations have been shown on the updated version of Exhibit G: Water Information Map, however they are labelled using a different naming convention (see figure 1). Please label the piezometers on the map as they are referred to in the text of the AWES study.

The response is sufficient, piezometer locations have been marked and labeled as MW-1 through -12. Although there is some potential ambiguity since AWES also used MW-1 through -4 to identify their virtual wells for model calibration, anyone reviewing the permit in sufficient detail to notice this duplication of labels will likely be able to differentiate between the two.

4. *The key of Exhibit G: Water Information Map shows a symbol for wells, but no wells are identifiable on the map. It's not clear whether they were omitted or are not legible.*
   Please identify all registered wells on Exhibit G: Water Information Map. Please also add a table to section 6.4.7 with details of these wells including their permit IDs, owners, date of construction and registered use.

   Water wells have been added to the updated version on Exhibit G: Water Information Map. No table has yet been provided.

Water wells have been shown on the map and a table has been added to the edge of Exhibit G: Water Information Map with the requested information. The same table is proposed to be added to the file as Exhibit G, Addendum 11.

Eight wells are listed, including two that are owned by Varra Companies and three more that are on the south side of the South Platte River which can be considered a groundwater divide. The three remaining wells (Shable, Dos Rios and Lafarge) are each within the modeled cone of depression, which suggests that there is the potential for their yield to be impacted by the proposed operation. The data presented suggests that the water level in the Shable well could be reduced by around 10', and a bit less in the Dos Rios and Lafarge wells.

Since impacts to three existing wells are predicted, please address in Exhibit G how such impacts will be mitigated. It is likely that this will take the form of a signed agreement with the well-owner that can be included in the Exhibit.

5. *Exhibit G: Water Information Map shows several symbols that are not included in the map key, and the text in many of the labels on the map is illegible (including what are presumably stream stage elevations).*
   Please revise Exhibit G: Water Information Map to improve its legibility and to provide a complete key for map symbols (it may be helpful to remove the aerial imagery base-map). The revised map should be prepared and signed by a registered land surveyor, professional engineer, or other qualified person, as is required by Rule 6.2.1(2)(b).

   (With reference to the updated version of Exhibit G: Water Information Map): When the pdf of the map is viewed at 300% zoom most of the labels are legible (except where they are obscured by other map elements), however this level of zoom makes the map very difficult to use.

   Several symbols are used on the map but are not identified in the key or labelled on the map, these include:
   - *Inverted red triangles (as shown in figure 1) – symbols for point of access, smaller scale than key*
   - *Bold red lines and squares (as shown in figure 2) - removed*
   - *Yellow highlighting on contour lines (as shown in figure 2) - removed*
   - ***Dashed brown line (as shown in figure 2)***
   - *Yellow polygons (as shown in figure 3) - removed*
   - ***Blue marks (as shown in figure 3) – partially removed***
   - *Fine dashed red lines (as shown in figure 3) - removed*
   - *Light red dots (as shown in figure 3) - removed*
   - *Black triangles (as shown in figure 3) - removed*

   The map has not been signed, stamped, or otherwise certified by a registered land surveyor, professional engineer, or other qualified person.

The revised map addresses some of the points from the previous adequacy review, but not all. In particular, the scale at which some of the labels are drawn renders them illegible, even at 300% zoom. The map has been digitally signed by Peter Christensen, but his qualifying credentials are not given.

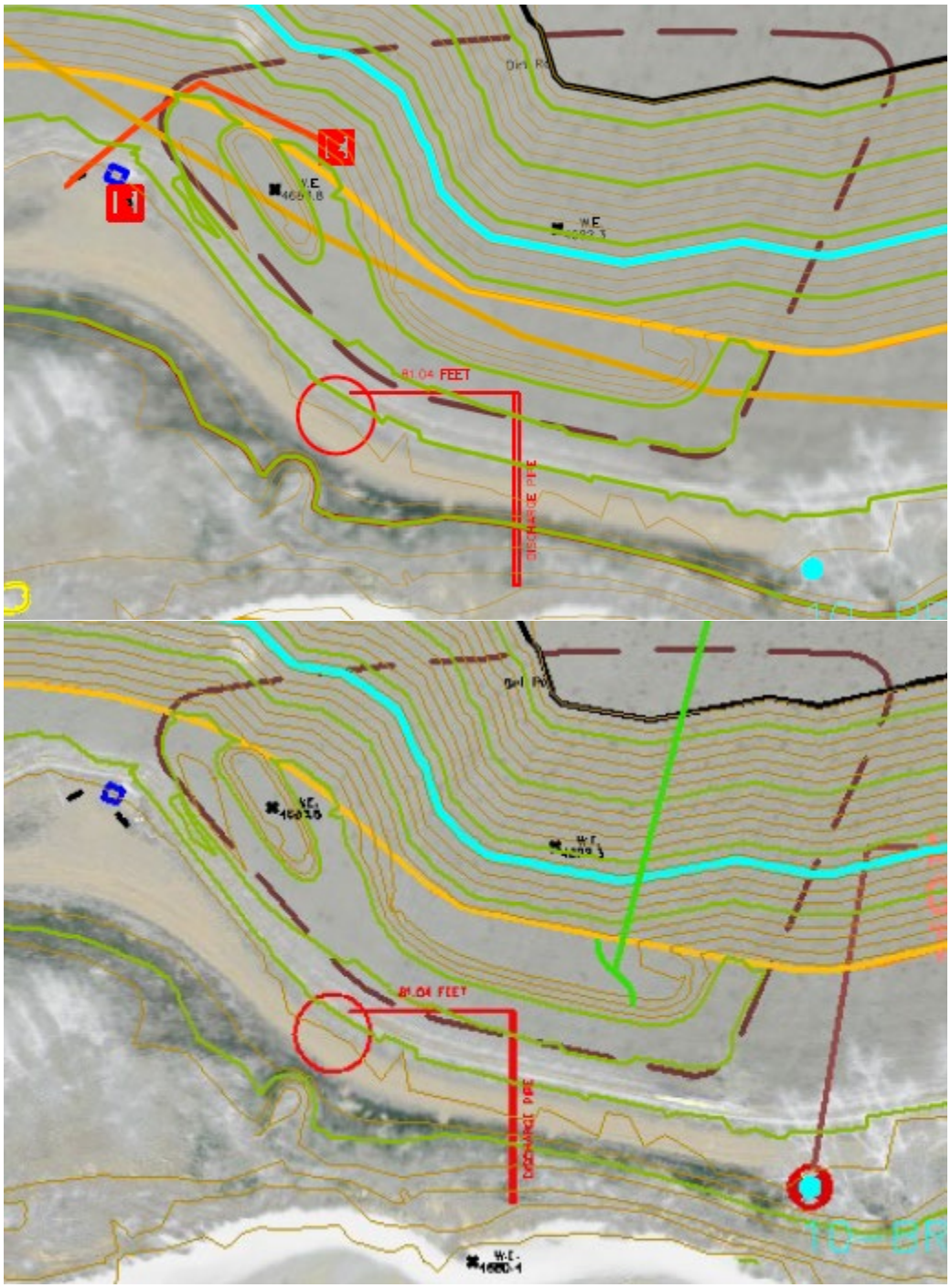

Figure 2: Screenshot of portion of Exhibit G: Water Information Map @ 300% zoom, previous version above, most recent version below

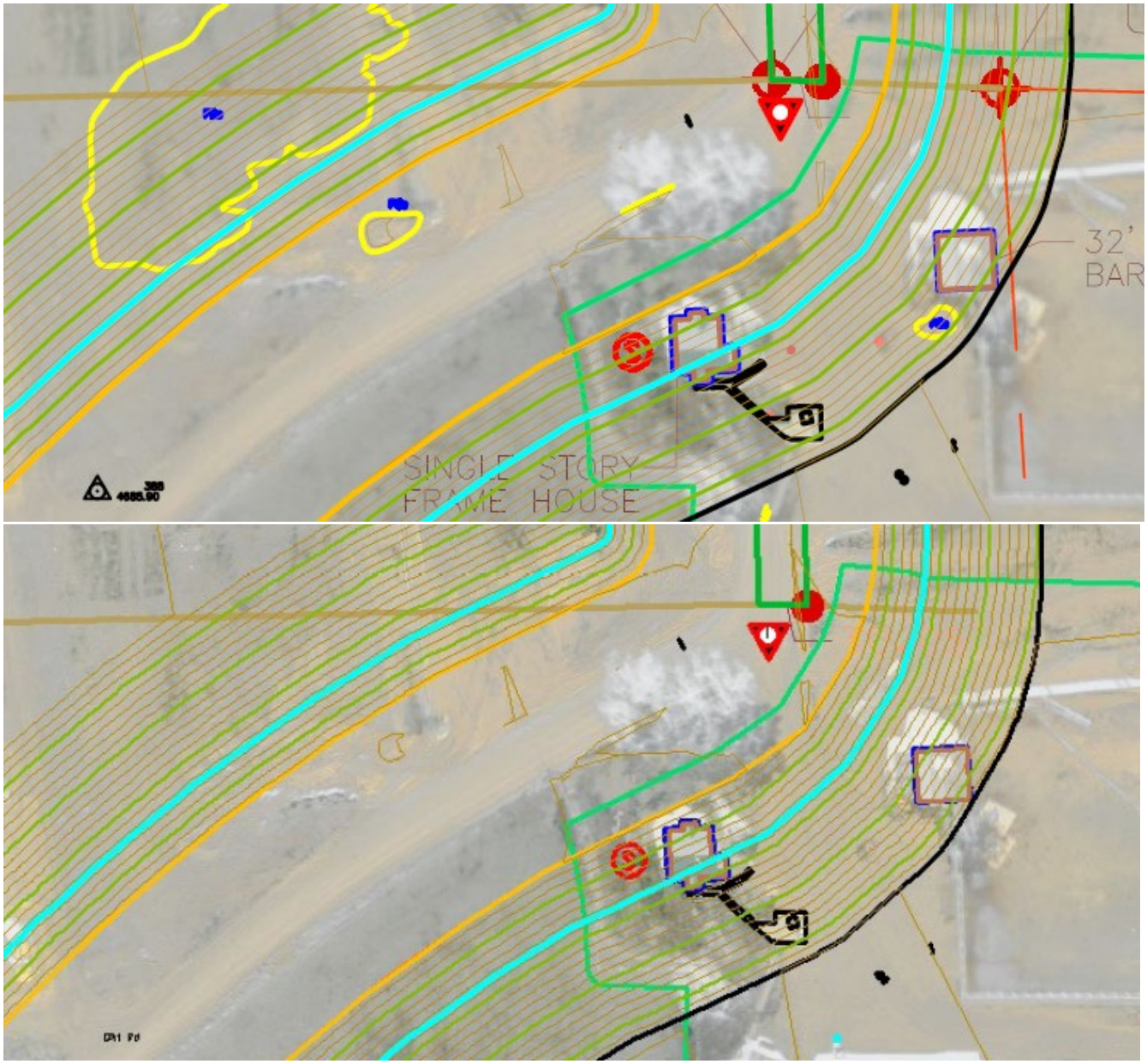

Figure 3: Screenshot of portion of Exhibit G: Water Information Map @ 300% zoom, previous version above, most recent version below

The AWES report was updated on August 31, 2022.

A letter from AWES responding to the initial adequacy review, dated August 30, 2022, was added to the application as Exhibit G, Addendum 12 with the January 4, 2023 submission. The letter is a valuable addition to the file and helps to clarify the issues raised in the adequacy correspondence.

6. *The response is sufficient*

7. *The response is sufficient*

8. *The response is sufficient*

9. *The response is sufficient*

10. *The response is sufficient*

11. *The response is sufficient*

12. *The response is sufficient*

13. *The results of the dewatering simulation are presented as Plate 6. This is presumably a steady state simulation. It simulates dewatering of the central and north-west pits only. Please simulate the dewatering of the full extent of the mined area. Please estimate the time to achieve steady state conditions.*

    The steady state drawdown scenario is presented on Plate 7. In the Conclusions section of the report the author states: "The predicted drawdown associated with the mine dewatering represents the worst case scenario and a substantial amount of time will be required before maximum drawdowns will occur". Please estimate the amount of time, based on model results, for maximum drawdowns to occur.

The response is sufficient, a paragraph clarifying the estimated time to reach steady-state conditions was added to the text of Exhibit G, supported by a detailed explanation in Exhibit G, Addendum 12. Under idealized modeled conditions the time would be 273 days, but under more realistic operational conditions (i.e. progressive mining) a time of 1000 days from initial dewatering to maximum drawdown is estimated.

14. *The response is sufficient*.

15. *The response is sufficient*

A groundwater monitoring plan, prepared by AWES, was submitted with the January 4, 2023 packet. The plan proposes to use 12 existing holes, which were completed as 1" monitoring wells in 2015. Boring logs are given as an appendix to the plan, but no well completion data is available. The elevation of each hole is given in a table in Exhibit G, Addendum 10, together with monthly water level data from September 2015 through June 2022. Adequacy comments on the proposed plan are given below, organized by the section of the plan itself.

Section 1 of the proposed plan states the objectives and gives the background information.

Section 2.2 states that water levels will continue to be monitored on a monthly basis during dewatering operations, then quarterly for one year following reclamation, then annually until the permit is terminated.

16. **Please amend section 2.2 of the plan to continue quarterly monitoring until the permit is terminated**

Section 2.3 describes the monitoring of groundwater quality. It states that "two baseline samples will be obtained from one upgradient and two downgradient wells no less than two months apart. The wells will be sampled for the laboratory parameters if there is an exceedance in the stormwater laboratory parameters. On an annual basis field parameters of pH, specific conductance and temperature will be measured in waters obtained from the selected wells after three well bore volumes have been evacuated." The only laboratory parameters proposed to be measured are Arsenic (total) and Selenium (dissolved).

17. **The proposed water quality monitoring program described in section 2.3 needs further consideration. In addition to enforcing the requirements of the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials ("Minerals Rules"), the Division is an implementing agency for Regulation No. 41 – The Basic Standards for Groundwater ("Reg. 41"), available from the Colorado Department of Public Health and the Environment website:**
https://cdphe.colorado.gov/water-quality-control-commission-regulations

In order to better explain how the Division interprets its responsibilities under Reg. 41, a Groundwater Monitoring and Protection Technical Bulletin was produced in 2019 and is available on the DRMS website, or from the following link:
https://drive.google.com/file/d/121Uc_KmuAx7xhc8heQcROPnK_u-kcG-J/view?pli=1

Since the proposed operation clearly has the potential to impact groundwater, and groundwater at the site has not yet been classified, the Division will apply the Interim Narrative Standard from Reg. 41. At least one downgradient groundwater point of compliance will need to be established, where the standard will be applied. Typically the Division requires 5 quarters of water quality data prior to disturbance in order to establish baseline conditions, (without reliable baseline data the most restrictive parameter values from Tables 1-4 of Reg. 41 would apply). When evaluating a groundwater monitoring plan the Division typically looks for an analytical suite that includes the parameters from Tables 1-4, however the parameter list may be reduced if justification is provided.

Section 2.4 describes how water level data will be used for drawdown and mounding analyses. It states that "Variations in pre-mining water levels will be presented on a two dimensional contour map and will be compared to numerical predictions and will be provided to the Division upon request."

18. **Please amend section 2.4 to specify that water monitoring data will be compiled into a report and submitted to the Division annually. Please also specify the date. The report should include the operator's analysis of the data, as well as the data itself.**

Section 2.5 describes a contingency plan and abatement

Section 3 specifies responsible personnel and subcontractors

Section 4 describes a Quality Assurance and Quality Control plan.

Sampling methods are given in Appendix B.

References:

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