STATE OF COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

Follow up comments / questions AR2, Castle resubmit 1.14.20

1 message

Warren Dean <warren@whd22.com> Tue, Jan 14, 2020 at 6:16 PM
To: "Cazier - DNR, Tim" <tim.cazier@state.co.us>, "Cunningham, Michael" <michaela.cunningham@state.co.us>, "Means - DNR, Russ" <russ.means@state.co.us>
Cc: "Carl Mount (carlmount1@yahoo.com)" <carlmount1@yahoo.com>

Hello Tim, First, thanks for taking the time to meet on Friday. Though we have some different perspectives, I think we are moving to address the same issues. At the end of the day, we all want the stabilization and reclamation of the Pikeview Quarry to succeed.

I have attached a memo from me related to Castle's latest response and I have also attached comments from Carl Mount. Please consider them as one document.

We are around if you have any questions or want to talk about the project.

Thanks.

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2 attachments

200113 Pikeview Adequacy Review 2 1.13.20 v5 redline cbm edits.pdf
125K

Pikeview AM04 AR2 response Memo to WDean final w aerials 1.14.20.pdf
4245K

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MEMORANDUM

To: Tim Cazier, Michael Cunningham, Russ Means, Colorado Division of Reclamation, Mining and Safety

From: Warren Dean

Date: January 14, 2020

Re: Review of DRMS Letter Dated December 18, 2019, Continental Materials Corporation January 9, 2020 resubmittal, and January 10, 2020 meeting

On November 14, Tim Cazier wrote a letter to Jerry Schnabel notifying him that I had sent an objection letter and requested that Mr. Schnabel respond to its points.

On November 24, Tim Cazier wrote an Adequacy Review letter to Castle Aggregates (Castle) related to its Permit Amendment #4 (PA4) and on November 25, he also wrote a Geotechnical Adequacy Review

Castle responded on December 11, 2019 and Mr. Cazier wrote a second Adequacy Review dated December 18, 2019.

On January 9, 2020, Castle responded to Mr. Cazier's December 18, 2019, second set of Adequacy Review comments.

Carl Mount and I met with DRMS staff January 10, 2020. I have enclosed and I would highly recommend that DRMS carefully read Carl B. Mount and Associate's January 14, 2020 memo that addresses issues (the same issues addressed in our letters forwarded to DRMS on October 30, 2019) usually required under the Colorado Mined Land Reclamation Act for Construction Materials and the Mineral Rules and Regulation for Construction Materials.

I have reviewed both of Castle's Adequacy Review responses and Mr. Cazier's most recent comments and found that they lacked detail and didn't address Pikeview's

significant, longstanding financial, geologic, geotechnical, reclamation and water issues.

I have general comments and questions below with more detailed versions later in the memo.

Financial / Bond – Castle has a complicated ownership structure, and as always, there is a possibility that it might not complete the stabilization and reclamation work. However, I am confident that CDRMS will fully protect Colorado's interests as clearly stated in its Rules and Regulations. We citizens should not need to cover a financial shortfall, if DRMS has to step in and complete/correct the work. . We discussed in the meeting that the actual ownership form is minimally important, however, the bond quality and it being for the proper bond amount are critical. DRMS is fully equipped to manage the bonding process and I expect it will be conservative as it determines the proper amount through its own calculations.

Additionally, due to the many challenges of the Pikeview mine, and its proposed unique design, and the nature of geologic time, does DRMS think Castle should have any extended obligation to assure that the stabilization and reclamation work and function properly over the longer term?

For the record, Castle is out of compliance with the Board Order signed July 18, 2019, which required Castle to file a complete Amendment within 60 days of June 26, 2019. This was not done as Amendment #4 became complete on September 25, 2019. If everyone is playing by the same Rules, DRMS would require Castle to post the entire CDRMS determined bond amount for Pikeview until satisfactory completion of AM04, which would then contain an adjusted bond amount. If Castle intends to complete the work, the bond is a mere required statutory item. However, if Castle fails to perform for any reason or fails to complete the AM04 process, the bond, in the correct amount, becomes extremely important to Colorado

Geology - For context, the PIkeview Quarry sits in a unique and complex geological system, as noted by The Colorado Geologic Survey (CGS), which notes its:

- "inherent weakness of rock mass"
- "steeply inclined strata"

This background, combined with past poor mining practices and the area's many faults, has created a history of slope failures and large rockslides over the past 25 years. These are well documented but I cannot determine whether Castle's Permit Amendment #4 is being reviewed in this context. Past efforts and work have come up short, caused slides and have delayed reclamation. With no more information than the public documents, I ask the following unanswered questions:

- Has DRMS reviewed the assumptions and limitations of the geologic submittals?
- Is DRMS comfortable with the assumptions? Are they Industry Standard?
- What are the conclusions, in plain English? Are there any caveats?
- Has a third party reviewed them?

Castle has used prisms and lasers to monitor movement within Pikeview since at least 2008.

- Has Castle provided that data or a summary of it?
- If so, what did that data indicate?
- Is the slope still sliding?
- If there is movement, how do we know the proposed buttressing will stabilize it?
- With Limited Testing and analysis, how do we know that all materials (imported and existing site) have the structural qualities to be the basis of the buttress?
- With limited testing and analysis, how do we know how the same materials need to be compacted to properly buttress the west wall?
- What are the Industry Standards for these types of geologic work?

Reclamation, How has Castle shown that the fill, soils, seeds, and other plantings will remain in place on the proposed slopes, which are much steeper than industry standard.

Does DRMS expect that any special work will be needed to establish the seed and landscaping on the steep slopes?

Can DRMS or Castle refer me to examples of steep slopes, like these, in other quarry projects which were successfully reestablished?

This reclamation will use no required irrigation to establish grasses, bushes or trees. Again, can DRMS or Castle point me to examples where unirrigated, steep slope reclamation has been successful?

Please request that Castle address the questions in Warren Dean's Letter dated October 16, 2019 and this memo.

From here I will address Mr. Cazier's Adequacy Review #2 and Castle's January 9, 2020 response. Reference numbers below correspond to the numeration of Mr. Cazier's review:

1, 2, 3, - Castle's response refers to Continental Materials Properties Holding Company (Delaware), Muscle Shoals, AL. This is not Continental Materials Corporation. The permittee is a different entity than the owner.

- I understand that DRMS is comfortable with whatever entity is responsible for the reclamation. There appear to many layers of partnership, LLC and corporations which may be difficult and time consuming if Castle fails to perform or any of the entities files bankruptcy. This is exactly why we all seem to agree that the strength and the proper amount of the bond is so important.

4. - OK

5. – OK

6. – Is DRMS comfortable the onsite fill can be generated from the limited areas on Exhibit C. Please detail the exact onsite areas from which the backfill material will be generated and how much fill would come from each area?

Removal of large quantities of material makes the scar much larger and requires more reclamation. Instead of natural terrain, that new area will be a reclaimed scar/borrow pit.

- Are these new quarry areas, which will generate the fill, in the Reclamation Plan and are the reclamation costs included in the bond? It is difficult to tell, given the lack of detail in the bond calculation.

- I note that Castle makes claims about the source of fill for the project. On one hand it claims that all needed material is located on site. And on the other it states that it plans to solicit and accept donations form the generous public. If all material is on site, why does it need donations? Answer: because donations are cheaper. In calculating the bond amount, I think DRMS cannot plan on public generosity and should establish the bond amount based upon having to mine the fill. The same would apply with topsoil.

7, 8. – OK

9. – CDRMS states that the Operator has sufficiently addressed these questions. I believe the response is vague and doesn't address the outstanding questions.

- Testing only “fill material from sources greater that 100,000 CY” is not thorough enough.

- Has DRMS determined that material, which will buttress the west slope only needs to be tested and analyzed per Castle’s submittal?

- This seems inadequate in light of the fact that Castle is relying on “donations” from what will be many unknown sources, many of which might be small and unique with unknown geologic properties. Are there industry standards for testing materials? Are these standards being applied to this Amendment?

- How has CDRMS verified that truck and bulldozer traffic will be enough to sufficiently compact the three foot flits of soils to achieve 90% standard proctor density? Is this a commonly accepted practice in the industry.

- What are the details of any density testing? Those described provide no detail in terms of frequency, spacing, depths, moisture content etc. Are the State’s review geologists comfortable with this specification? What is industry standard?

- Are three foot lifts accepted practice in the industry given the load and importance of this work? Will the additional compaction testing occur for every new borrow source, as implied? What is industry standard?

- Will the compaction results be available for real time public review?

Will Castle guarantee or repair the work in the event of a slide or a failure? Per the submittals, Castle is setting the specification for the work materials, lifts and compaction, Therefore it should assure CDRMS that the work will perform as stated and guarantee to rebuild / repair it as needed for a reasonable period of time.

The last sentence states “These slopes achieve the required factor of safety and eliminate nearly all of the existing highwall.

- This is not true. Exhibit C-3 shows highwalls of over 400 feet tall. Please have the operator state the maximum highwall height that will exist after reclamation is completed under this proposal.

10. - Monitoring – Castle proposes to monitor for only one year “following the commencement of grading operations”? How can this be, when the project will take years to complete? They are proposing to stop monitoring years before completion.

Are visual inspections and prism data made by Castle enough of an inspection program?

History has shown that slides occur repeatedly over multi year periods and instability and water infiltration can cause slides to occur many years after disturbance, especially with the known history of unstable geology of the Pikeview quarry.

What happens when inspections identify a problem? What would Castle's obligations be in that case?

Thus the guarantee period is important. Has DRMS established a period under which Castle will remedy any issues? What is that period?

12. – Is there any provision to assure that only clean topsoil is brought to the site? Please refer to the significant noxious weed issues related to the Queens Canyon quarry to the south. In that case, quality control was promised, but not performed. What is the remedy if such a problem occurs at Pikeview?

- Does DRMS believe there might be any issues with the quantity or quality of the topsoil already stored on site? Has it tested any or has it estimated the quantity.

13 – I disagree. The voids will be large and uncontrolled. Any void will allow water to infiltrate and could undermine the fill, and could cause collapse. And this process could take years. Has the stated geological review signed off on this concept?

14. – OK

15. – OK

16. – OK

17. – Given the complexity of the quarry and the importance to control drainage before, during and after reclamation, please advise whether the CDRMS is comfortable with the drainage plan and assumptions underlying it. Will engineered as-builts be required for engineered structures built at this site?

18. – Who will maintain the facilities on an ongoing basis?

19. – Same as above.

Reclamation Costs

20. – The area north of the maintenance shop and the permit boundary is small and the required quantity is huge. Has CDRMS asked Castle to show how this area can provide the needed fill? See # 6.

21. – OK

22. – Math.

23. – OK

24. – OK

25. – OK

26,27,28,29 – Have these been reviewed by a Geotechnical Engineer?

- There are several references to Seegmiller's 2012 analysis and reports. These reports are known to be incorrect, so why are we continuing to use them as the basis of large and important decisions?

30 – OK

31 – Would it be appropriate to speak with the City of Colorado Springs about its storm drain requirements and coordination?

32 – OK

END

Thank You

Carl B Mount and Associates, Inc. LLC

Memo

To: Warren Dean

From: Carl B. Mount

CC: None

Date: January 14, 2020

NOTE: Six Figures plus Attachment 1 at end of this memo.

Re: Continental Materials Corporation/Castle Aggregate, Pikeview Quarry, Permit M-1977-211, Amendment 04, December 11, 2019 Operator Adequacy Answer Review.

Introduction

I reviewed the Application for Amendment 04 (AM04) submitted by Castle Aggregates (Castle Concrete dba Castle Aggregates, which has permission to file on behalf of the listed operator, Continental Materials Corporation (CMC or operator)) to the Colorado Division of Reclamation, Mining and Safety (DRMS or Division), received on August 26, 2019 and deemed complete on September 20, 2019. Subsequently, the Carl B Mount and Associates (CBMA) review along with your own cover letter and review were delivered to and accepted by the DRMS on October 30, 2019. The DRMS forwarded these reviews to CMC via letter dated November 14, 2019. The letter accompanying the reviews stated that DRMS received our reviews in a timely fashion and directed the operator to provide responses to the concerns prior to the decision date, which at that time was December 19, 2019. On December 11, 2019 the operator delivered its adequacy review responses to DRMS. On December 16, 2019 CMC requested and the DRMS approved a decision date extension to January 18, 2019. However, since January 18, 2020 falls on a Saturday and the next Monday is a State Holiday, the real new decision date will be the close of business on January 21, 2020. On January 3, 2020 the Division delivered its Notice of Formal Board Hearing, Pre-hearing Conference and DRMS Recommendation Date to me (as an "Interested Person") via email. On January 10, 2020 we met with Tim Cazier, Michael Cunningham and Russ Means of DRMS. That meeting consisted of a discussion of process, definitions of what DRMS considered to be within their purview and what was not, what would be considered "new issues" as opposed to issues already raised in the review process by written communications submitted to the DRMS before closing of the public comment period. During that meeting we were also told about the

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third adequacy review response submitted by CMC on January 8, 2020. The Pre-hearing Conference is to be held on February 6, 2020 beginning at 10:00 a.m. and will end no later than noon. The Formal Mined Land Reclamation Board (Board) Hearing has been scheduled for the February 19 and 20, 2020 Board meeting. This meeting will be held at 1313 Sherman Street, Room 318, Denver, Colorado, beginning at 9:00 a.m. or aa soon thereafter as the matter can be considered.

CMC attempted in the December 16, 2019 letter only to change the Amendment 04 decision date but not waive the automatic approval provision provided in Construction Materials Rule 1.4.13(1). This attempt is significant because the automatic approval rule allows the approval of whatever the operator has submitted "…upon submittal by the Applicant and approval by the Office of the appropriate performance and financial warranties" with which the operator could argue that the financial warranty should be much less since the proposal in AM04 might cost far less to implement than the financial warranty presently posted. This statement by the operator is troubling, giving the appearance that the operator is to not negotiating AM04 in good faith. DRMS correctly noted in the December 16, 2019 extension approval request that the automatic approval provisions of Rule 1.4.13(1) no longer applied because of Rule 1.4.13(2).

Also concerning in the CMC adequacy review response cover letter received by DRMS on December 11, 2019 was the statement, "The attached exhibits are intended to supersede the previously submitted documents, and revised text has been highlighted for your convenience." In the December 11, 2019 CMC letter, many questions are answered by referencing materials contained in approved AM03 documents. If CMC wants to answer adequacy review questions pertaining to AM04 by referring back to sections and/or statements made and approved via AM03, then those specific sections must be carried forward to AM04 documentation. Otherwise, CMC can claim, upon approval of AM04, that the sections of AM03 no longer apply.

The DRMS reviewed the adequacy review responses and issued a second adequacy review letter dated December 18, 2019. The DRMS letter of December 18, 2019 signed off on certain adequacy review items that CMC either did not change at all or addressed in vague, rudimentary and unenforceable ways.

Consequently, I have now reviewed:

- Amendment 01 (Allowed mining at toe of slope up to 200 feet deep) and correspondence relating to its review approval.
- Amendment 02 (Allowed mining at top of highwall to sandstone layer and layback of granite above highwall and mining at the toe of the limestone an additional 150 feet deep) and correspondence relating to its review and approval.
- Technical Revision (TR) 11 (approved 8/31/01) which allowed deepening of the south part of Area H approximately 105 feet more than AM02 approval allowed.

- Correspondence from the operator and several governmental agencies (MSHA, DRMS and others) related to the December 2, 2008 highwall failure.
- The Colorado Geological Survey (CGS) Quarry wall rockslide at the Pike View Mine Summary Report dated January 7, 2009.
- DRMS enforcement action related to the slide and the Board Order for Notice of Violation Number MV-2009-012.
- CGS Review of Slope Stability Evaluation (the CTL Thompson report) dated September 10, 2009.
- CGS Assessment of new September 2009 rockslide (just below the South Block) at the Pike View Quarry dated November 2, 2009.
- Amendment 03 (Approved 4/13/13) and correspondence relating to its review and approval.
- TR15 to allow backfilling of the north side of Area H and blasting behind (to the west of) both North and South Blocks or hanging walls.
- CGS Assessment of TR15 dated June 18, 2010.
- TR16 to extend the review period for AM03.
- The Seegmiller International Report (Exhibit 6.5 of Adequacy responses for AM03 in both sets of adequacy responses) received by DRMS on July 23, 2012 and March 4, 2013.
- The DRMS AM03 Stability Analysis Review Memo dated September 24, 2012.
- TR17 (would have allowed importation of up to 30,000 cubic yards of cured concrete to the site but was withdrawn on September 24, 2012).
- The DRMS AM03 Adequacy Review Comments dated October 15, 2012.
- AM03 Adequacy Review responses received by DRMS March 4, 2013.
- The AM03 approval letter and bond calculation dated April 11, 2013.
- TR18 (change sequence of mining and reclamation since the 2015 slide and monitoring has provided information that the 2008 and 2015 slide material is still moving.
- TR19 (allows importation of inert material). Approval could not be found in the public file but apparently this was approved on or around December of 2017.
- All AM04 initial submittals, reviews and responses including the CMC Adequacy Responses received by the DRMS on December 11, 2019 and January 8, 2020.

I could not review (because it is not in the public record as of the date of this memo) the Exponent Report of the Site-Specific Geology (performed in 2011) on which some of the assumptions of the Seegmiller International Report and the current AM04 Stantec Geotechnical Exhibit 6.5 are based. I also could not review any slide monitoring data because I could not find it in the public record.

This letter contains a complete review of the entire set of adequacy review responses because the operator misstated (summarized and paraphrased) items raised in the initial memo and then failed to answer most of the concerns brought up in the CBMA memo dated October 16, 2019.

None of the questions contained in this memo are "new issues" since they all relate to basic requirements of mined land reclamation as modified for this specific site and include:

- Geologic investigations and requests for baseline geologic data.
- Geologic stability of rocks underlying the engineered buttress fill.
- Geologic stability of the rock slopes above and to the west of the quarry highwall.
- Monitoring and the lack of availability of records for review by the public.
- Stability of the final engineered buttress fill including how design assumptions cannot be verified because of lack of information included in the public record, definition of properties and monitoring of material to be used for construction, engineering techniques to build the fill (including but not limited to the material used, lift thickness, moisturizing and compaction techniques, lack of as-built verification for structures already on site and protection of the final fill.
- Surface water management on site especially as related to lack of upland drainage control both during operations while conducting the reclamation plan and after construction of the engineered buttress fill.
- Accelerated erosion from overly long reclaimed slopes that are now planned for the engineered buttress fill with no upland drainage diversion.

Lack of Availability of Documents in the Public Record:

1. The 2011 Exponent report (referenced by the Seegmiller International Report (2012) and the current Exhibit 6.5 of AM04) is unavailable in the public file at https://dnrweblink.state.co.us/drms/SearchPermit.aspx?dbid=0&cr=1. This document is critical for review and understanding of the baseline geology at the site. This basic information it necessary to allow independent evaluation of the mitigation plans proposed in AM04 and whether assumptions used are appropriate. It is also impossible to determine how DRMS and the Colorado Geologic Survey (CGS) reviewers reached their conclusions regarding approval of AM03. This needs to be provided in the public record.

2. Data from slide monitoring except very limited amounts contained in Exhibit 6.5. Could DRMS please point out where in the public record this is located? There are no raw data and no periodic reports or interpretations of slide monitoring data in the record that I could find. This makes it impossible to determine whether the buttress fill design is responsive to the on-site conditions of the quarry especially with respect to the upper, possibly unstable hanging block of limestone material in the south part of the quarry and the granite slopes west and above the quarry highwall.

Recent Mine History

The review of several documents written over 33 years indicates that the Pikeview Quarry exhibits ongoing instability primarily because of inherently weak limestone rock and mining methods that mined out the toe of the steeply dipping Manitou Limestone beds and eventually also loaded up the top of the limestone beds with granitic material intended to lessen water infiltration into the limestone.

The MSHA Report of 1986 states, "An immediate recommendation is to terminate the practice of undercutting (thereby daylighting) the steeply dipping bedding planes of this limestone deposit" and "If the final west quarry wall is excavated in the steeply dipping limestone beds as currently practiced, an eventual total failure of the entire west wall can be expected." This 1986 MSHA report was in response to several rockslides in the 1970s and 1980s that moved several hundreds of thousands of yards of material.

Nevertheless, in 1994 the operator proposed and the Division approved an amendment (AM01) to the quarry. No more than 25% of the toe of the limestone beds was supposed to be exposed at any one time. AM01 allowed mining a maximum of 150 feet deeper into the toe of the Manitou Limestone. This was after up to 200 feet of limestone had already been removed from the toe of the limestone beds (letter dated and received July 26, 1994 from Mark Heifner, consultant to Jim Dillie, DRMS). AM01 also stated that the exposed and benched limestone decays rapidly upon exposure. However, this was discussed as an advantage because this small-scale bench sloughing was supposed to lessen the possibility of major slope failure. Major slope failure was considered a low possibility because it was claimed, with no drilling and no evidence, that the clay seam that made the limestone slide in the past had been mined through.

TR11 approved by the DRMS on August 31, 2001 allowed deepening the Area H pit up to 105 feet more than in Amendment 01 (approved 1994). Recall that AM01 allowed limestone bed toe mining up to 350 feet deep.

A 1.5 to 2.5 million-yard slide occurred on December 2, 2008 after approximately 60% of the toe of the limestone bed was exposed instead of no more than 25% as required by the AM01 mining plan. Subsequent large slides then occurred on September 13-14, 2009 (another million yards perhaps) and another 1.5 million yards on May 11, 2015 The 2015 slide moved material below some part of the Rampart Range fault in the Pike's Peak granite to the west of the quarry highwall or a splay thereof. It is hard to determine whether there are more splays above what has now become the top scarp of the slide body based on information in the file.

The operator filed Amendment 03 on July 23, 2012 in response to Notice of Violation MV-2009-012 dated June 12, 2009 as required by the Mined Land Reclamation Board (MLRB) on May 13, 2009.

A series of Technical Revisions were filed and approved before, during and directly after the review and approval of AM03. The TRs were:

- TR12 – Approved 05/06/09 – Slide monitoring plan.

- TR13 – Approved 06/18/09 – CTL Thompson Report on slide body only.
- TR14 – Approved 02/19/10 – Blasting allowed in scarps above hanging bodies (despite warnings from CGS saying it could make the situation worse and that fly rock could not be easily controlled).
- TR15 – Approved 07/20/10 – Blasting behind scarps and removing rubble below hanging blocks with fill placed in Area H at the base of the slide (despite warnings from CGS that personnel should not enter anywhere below the head scarp and that blasting may make the situation worse).
- TR16 – Approved 06/28/11 – Extend decision date for AM03
- TR17 – Withdrawn.
- TR18 – Approved 04/01/14 – Change mining sequence from south to north to north to south because of continuing movement indicating instability in the south area of the quarry.
- TR19 – Approval letter unfound in file. However, submitted on 11/06/17 and automatically approved in December of 2017. The TR allowed inert material importation for fill and buttressing.

AM03 was reviewed and greatly modified by the operator in response to DRMS and CGS concerns around lack of baseline geologic data, slide movement monitoring, the danger of placing personnel in the slide area and on or below what were termed the north and south hanging blocks (blocks of material underlain by the same limestone beds that failed and caused the December 2, 2008 slide which removed support from downhill of the North and South Blocks), the difficulty of final site reclamation stabilization given the lack of reliable geologic and engineering stability information and other considerations. TRs 12 through 16 were approved in order to give the operator leeway in handling the unfinished slide (North and South Block problems). TR15 describes the results of the unsuccessful blasting in the scarps above the North and South Blocks and how that blasting did not produce the desired results of bringing down the blocks. TR15 also allowed the operator to remove some amount of limestone to facilitate separation of the North and South Blocks.

It is significant to note that CGS reiterated Recommendation #5 from the report dated November 2, 2009. “We believe that retrogressive movement of the slope above what is now the major scarp remains a good possibility. The granite is weathered and abundant discontinuities in the rockmass (related to the proximity of the Rampart Range fault) has weakened it. With the loss of lateral support, we would expect dilation of the fractured rockmass over time and additional tension cracks to open above the scarp.”

Amendment 03 was approved on April 11, 2013. Bond was calculated by DRMS upon approval and was set at $4,226,000.00. This amount was only for Phase 1 of the Reclamation Plan, not for completion of the Reclamation Plan.

AM03 plans were not fully implemented by the operator. Of special note is that the Seegmiller International Report (Exhibit 6.5 of AM03 written by an operator hired geotechnical engineering consultant with more than 40 years of experience) recommended:

- Development and implementation of an extensive fill monitoring plan (after analyzing the 3.7-3.9H:1V slopes agreed to for the buttress that would stabilize the quarry highwall),
- Visual monitoring on a daily basis as the reclamation was being done with monitoring on a monthly

basis for at least the first year after fill placement,

- Surface water diversion such that "Surface runoff water should be diverted from the quarry and not allowed to enter the final slopes" and "…any diversion ditches used at the site must drain water away from the quarry and not serve as catchment channels allowing water to seep into the quarry slope crest" and,
- "During the reclamation process, new exposures of Granite will be created. Discontinuity data in these exposures should be examined. Such data should, as a minimum, include spacial orientation data (strike, dip and location) for the various joint sets and any encountered faults. Qualified stability personnel should map the Granite exposures as they become exposed. If adverse discontinuity orientations are encountered, a new bench geometry should be designed and used to prevent slope instabilities."

The final iteration of AM03 contained only some of the suggestions that were prudently recommended by their own consultant, Seegmiller International.

On May 11, 2015 another large slide occurred at Pikeview and DRMS inspected the quarry on May 15, 2015. The inspection was written and delivered to the operator on February 23, 2016 (more than 9 months after the inspection was performed). The inspection noted that the operator notified DRMS via email on May 12, 2015 that a slide had occurred. A copy of the email cannot be located in the public file.

The DRMS sent notice to the operator on March 14, 2019 of reclamation bond increase to $21,924,090.00 or an increase of $17,698,090.00. This amount was required in order to bond for completion of the reclamation plan as approved under AM03. The operator appealed the DRMS bond increase to the Mined Land Reclamation Board. The Board had a hearing on June 26, 2019. The operator at that meeting testified "…the AM03 plan was based on overengineering to address stability issues that resulted in the 2008 slide." The Board ordered the operator to post a total of $15,000,000.00 in bond at that time and to submit a complete amendment within sixty days of June 26, 2019. The operator posted the $15,000,000.00 bond but did not complete the AM04 application until September 20, 2019. The legal consequence of the operator being out of compliance with the Board Order signed on July 18, 2019 would be DRMS requiring posting of the entire bond amount until satisfactory completion of AM04. Lack of posting this bond amount could lead to the operator delaying finalization of Amendment 4.

Present AM04, Adequacy Review Letter, and Adequacy Review Response Concerns

Adequacy Responses received by DRMS on December 11, 2019:

Operator adequacy responses to the Dean and CBMA comments do not address many concerns raised in the initial memo dated October 16, 2019 and the letter dated October 30, 2019 and also raised by DRMS. The major ones relating to quarry stability were either ignored or not addressed. Many of these same concerns stated below were questioned by DRMS during the AM03 review. As a result of DRMS review of AM03, the proposed engineering techniques were changed to reflect accepted engineering practices for placement and monitoring of fill material that is constructed to stabilize an unstable structure.

After a review of almost the entire Pikeview file, CBMA now has the following questions:

Exhibit D, Mining Plan

Upper Slope Grading Section

1. **Exhibit D, Mining Plan, Overview, Section (b) and Upper Slope Grading Section** states "Bulldozers will push excavated material downhill to the reclamation slope configuration or to a loading area for haul trucks." This is the exact language attempted in the AM03 proposal and rejected at that time by the Division. TC Wait's Memo to Berhan Keffelew dated September 24, 2012 in response to the same method proposed in AM03 was: "The amendment describes the fill on the lower slopes being placed in a top - down manner, using dozers to push material around. This will be a considerable amount of material, with some areas nearing or over 100 feet in fill. Poorly placed fill may not provide the buttressing effect that will help with overall slope stability. Fill placement procedures and detailed specifications are needed to ensure the structural integrity of the fill section." At that time, the comment was in response to a much more conservative buttress structure that had final slopes between 3.7-4.0H:1V. After the DRMS geotechnical review, the operator changed the mining plan to read, "At the start of each phase, bulldozers will push excavated material downhill to a safe loading area for haul trucks. The haul trucks will transport the material required to fill Area H and material to be processed and sold. The Area H material will either be end dumped into Area H or pushed-in with bulldozers." It is unclear why DRMS would now not even question and possibly approve a technique that, under the review for AM03, was not acceptable. This is generally understood as an unacceptable method to use for a fill slope buttress. Has this method been studied and approved as a general engineering construction method for buttresses? Is this now an acceptable method for constructing engineered buttresses under the Universal Building Code?

2. How will sufficient compaction of the engineered buttress fill be achieved when fill lifts exceed one-foot in thickness? What engineering studies demonstrate adequate compaction throughout a three-foot lift thickness using "haul trucks and bulldozers"? In evaluating such evidence it is necessary to

compare the material used in these studies (that demonstrate adequate compaction throughout the lift thickness) with properties of materials to be used in the buttress fill at the Pikeview Quarry. Without this demonstration or a change in the proposed method of construction, the DRMS should hold sufficient bond for excavating and rebuilding the buttress fill as now proposed.

3. The operator must specify the range percentages of moisture content that will be used for the fill lifts to achieve the required compaction results of whatever is appropriate for standard proctor density.

4. How will oversized material (Universal Building Code requires material no larger than one foot in any measurement in engineered fills) be excluded from the fill without a limitation on fill lift thickness?

Lower Borrow Area Grading Section

5. In the January 8, 2020 response, CMC proposes to get material from the north lower section of the quarry to build the engineered buttress fill and add this area to the affected land. No cross sections or calculations are offered to demonstrate that there is enough material in this area to complete the reclamation plan and also claims that all material will be removed from this area without blasting. CMC also does not define where "…another borrow area…" is located if material from the first proposed area cannot be obtained without blasting. The material from this area is not characterized for its suitability to use in the engineered buttress fill. It is not clear whether there is enough material to complete the reclamation plan from this area since no calculations of the amount of material in this area are included in the application. Will DRMS require such demonstrations or hold sufficient bond to import enough material to complete the reclamation plan?

6. It is stated that foundations will be broken up and buried in the backfill of the lower borrow area. It must also be specified that none of this material will be added to the buttress fill unless no dimension of the broken up foundations exceeds 12 inches.

Slope Backfill Grading Section

7. There is a limitation on sampling and analyzing of material that is imported to the site of testing donated fill only if the amount exceeds 100,000 cubic yards. What justifies this limitation? Shouldn't all material proposed to be added to the constructed buttress fill be demonstrated acceptable as a construction material? This is a critical monitoring parameter. Material used for construction of a buttress fill needs to be demonstrated acceptable or mixed to be made acceptable for this purpose.

8. In the previous reviews of AM03 by DRMS several basic engineering techniques to construct a buttress for the unstable quarry highwall were requested (October 15, 2012 Adequacy Review with attached TC Wait Memo dated September 24, 2012). These included:

    a. Upland diversion ditches to keep surface water runoff from saturating the buttress fill (Refer to

#6 in CGS (1/7/2009) and in the MSHA Report MW09-008 (2/23/2009) recommendations and also noted as a recommendation in the Seegmiller International report (2012)).

b. No pushing of buttress fill from the top down. Material was to be pushed to a loading area and haul trucks were to transport the material to fill areas.
c. Adequate compaction of the fill material although the technique was unspecified. It is unclear how adequate compaction can be achieved without proper wetting and maximum fill lifts of one-foot thickness, not three feet as stated in the adequacy response on Page D-4 and in Exhibit 6.5.

None of these AM03 construction and protection of the constructed fill requirements have been addressed in the DRMS AM04 adequacy reviews. These are all basic requirements for mined land reclamation and especially construction of engineered fills and protection of those fills from saturation from upland surface water drainage. This quarry already experienced saturation from upland drainage in 2015 that led to continuation of sliding within the quarry. DRMS must include them to ensure stability of the constructed buttress fill.

9. Review of aerial photographs (attached to this memo) from June 6, 2018 (available via Google Earth) indicate that there is another conchoidal tension crack and scarp developing in the upper south highwall of the quarry (Figure 1). Nothing in the mining and reclamation plans recognizes this or makes for any allowance to buttress this feature properly. None of the cross sections on Maps C-1 or C-2 intersect this possible hanging block of limestone material. DRMS and the operator need to address this dangerous situation.

Monitoring Section

10. This site has a long history of instability from the inherently weak rock mass caused by the Rampart Range Fault (see #2 in the CGS memo of 1/7/09). There is no evidence in the public record that the description of rock characteristics of rock underlying the buttress fill or the layback area in the granite west of and above the quarry highwall are derived from actual drilling and investigations of the granite or the limestone. Without this data it is difficult for DRMS or the public to check liberal assumptions made in order to design a far more fragile and steep buttress for the quarry highwall as proposed in AM04 and adequacy review responses. The buttress is essentially a fill slope built at an angle that is comparable to surrounding natural slopes in undisturbed bedrock. The following are needed if approval is contemplated by DRMS:

    a. Adequate and clear compaction testing using proven professional engineering techniques and in a proper frequency to ensure statistically demonstrable results in order to certify the correct construction of the fill.
    b. As built drawings and professional engineering certifications of the constructed fill with a guarantee that a professional engineer is on site observing the fill construction and adequately documenting construction operations and testing.

11. AM04 and adequacy reviews and responses contain no monitoring as requirements as recommended by the Seegmiller Report (2012) approval. Considering that those monitoring recommendations were based on long experience, why are they not asked for by DRMS? Long term monitoring is absolutely essential at this site considering that a very major rockslide took approximately six years to manifest fully. According to the CGS reviews, the rockslide may continue to proceed uphill in the granite until the topmost splay of the Rampart Range fault is reached. If this is a possibility, long term monitoring is necessary to demonstrate that the buttressing worked.

Imported Fill Section

12. On Page D-5 it is stated "Castle is currently negotiating with the City of Colorado Springs and private companies to develop the property adjacent to the mine. Regardless of the development type, all or nearly all of the imported material necessary for reclaiming the mine can be provided by this development with the costs to deliver the material necessary for reclaiming the mine can be provided by this development with the costs to deliver the material to the existing quarry stockpile area burdened by the developer." This scheme may well work for CMC. The purchase and importation of fill or the movement of that fill from other places in the permitted area in order to complete the entire reclamation plan should be factored into the reclamation bond until the fill material is on site and placed properly by the operator.

13. DRMS must be sure to ensure adequate ripping of haul roads to relieve compaction, so that compacted materials do not create perched water tables that could create instability in the fill. The costs for relieving compaction on the as yet unspecified haul roads that will be constructed somewhere in the already disturbed areas should be included in the reclamation bond calculation.

14. Table D-1 will probably need to be revised upon redesign of the fill according to commonly accepted engineering design principles as stated above.

Section (c) Water Diversions and Impoundments

15. As stated previously and as will be reiterated in the Exhibit G Section, it is critical that upland surface runoff from above the highwall coming from the Waldo Canyon burn area be diverted away from the engineered fill as recommended by MSHA, CGS, and the Seegmiller International Report. This is especially critical if DRMS is going to allow and approve creation of a very steep buttress fill. The lack of an engineered upland diversion structure has not addressed by CMC. A diversion structure was recommended by DRMS in the AM03 adequacy review of October 15, 2012. The operator ignored the question at the time, and DRMS did not follow up with further questions. This question still requires

an operator response.

Section (d) Size of area(s) to be worked on at any one time

16. If the operator wishes the leeway to work any and all of the 240.5 acres at any time, DRMS must hold enough reclamation bond to topsoil and revegetate any and all 240.5 acres. This should be calculated into the reclamation bond amount.

Section (e) Timetables for Mining and Reclamation Operations

17. Since these timeframes for reclamation are unenforceable, no comments on this section are offered.

Section (f) Description and Thickness of Overburden, Deposit, and Underlying Stratum

18. Topsoil stockpile areas must be specified on one of the maps in the permit document because the cost for placement of topsoil cannot be calculated without haul distances. DRMS must have the operator specify where topsoil will be stockpiled. Topsoil stabilization techniques must be specified since it is hard to determine whether such topsoil will be kept in a usable condition for reclamation without these specific techniques. Also, DRMS cannot determine the cost of stabilizing these stockpiles for inclusion in the reclamation bond without these details. Please have the operator provide them.

19. This section states, "The failure of a weak, thin laterally extensive clay layer near the top of this formation [Sawatch sandstone] has been attributed to the December 2, 2008 landslide." This statement in the permit document requires specific drilling data to back it up.

Exhibit E Reclamation Plan

20. The reclamation plan states, "Weathered granite will be pushed downhill into place or for loading and transportation to the fill zone." This statement must not be used as an approval to push material and place it for the buttress fill.

21. The reclamation plan states, "Surface runoff from the hills above the disturbed areas will be diverted around the stabilized and reclaimed slope." The informal drainage diversions in place prior to the 2015 rainstorm and subsequent slide, attributed to the rainstorm by the operator, failed and allowed surface drainage onto the site in at least two places. Photos taken the next day by DRMS showed water cascading down the face of the quarry. The Google Earth aerial photos of 2018 attached to this memo show that the informal upland diversion ditch has breached in at least two places above the quarry highwall scarp. This problem has been noted in the DRMS adequacy review letter (2012) of AM03 and ignored by the operator. The informal upland diversion ditch is not preventing upland runoff from entering the quarry and has not for at least 7 years. Good engineering practice would

include keeping upland surface runoff away from the engineered buttress fill to enhance buttress stability. Why is DRMS not asking for this?

22. Topsoil stockpile areas must be located on a map and quantities specified in each stockpile for accurate bonding for topsoil placement.

23. DRMS plans to hold bond sufficient for purchase of topsoil. DRMS should also hold sufficient bond for placement of that topsoil in appropriate areas.

24. The **Revegetation** section states, "Trees in the higher elevations (above 7450') will be planted on the graded slopes to provide visual diversity at a rate of 43 trees per acre, with the anticipation that there will be a 70% survival rate of 30 trees per acre." and "The Gambel's Oak-Mountain Mahogany community…will be planted with 336 oak or mahogany plugs/acre…". There are no goals of how many trees per acre on average will survive after a certain number of years to judge reclamation success. Enforceable reclamation success goals should be included.

25. In the **Buildings and Structures** section, there is no information as to the size or volume of these foundations and the type of construction. Information on this needs to be included to determine the difficulty and cost of breaking up these foundations and reclaiming them.

26. There are no steep slope (greater than 3H:1V) stabilization practices described in the reclamation plan. Given that DRMS may be required to use the reclamation bond to reclaim these steep slopes, DRMS should hold enough bond to cover a possible $15,000 per acre cost or more on revegetated slopes with a contingency for a high rate of revegetation failure and possible topsoil replacement, and regrading as necessary. The quarry is already showing signs of highly accelerated erosion on the quarry slopes.

Exhibit G Water Information

Surface Water

27. This section states, "The drainage basin north of North Peak has active surface flow during most of the year, but it disappears below the surface a few hundred feet west of the quarry." The 2009 MSHA report states, "Although surface and ground water was not believed to be a contributing factor in the pit slope failure, it may be a contributing factor to the stability of the current slope and any final slope design" and "Mine personnel stated that a small seasonal stream sinks into the ground near the top of the pit wall where the reclamation materials for the "hole" were excavated. This water from this sinking stream reportedly re-emerged at a spring near the mine office, although details of how this was determined were not provided." Given that ground water could have an effect on buttress fill slope stability, DRMS should ask the operator to investigate this surface runoff that turns into groundwater and may contribute to final reclamation slope stability.

28. This section also states, “Surface water will be affected in various ways, but, as much as possible, surface water will be diverted around the operation…” and “First, is the diversion of run-on from the NFS land to the west away from the quarry pit walls. This is accomplished by grading the existing roads at the crest of the quarry so that water is collected and conveyed to the north or south.” Though MSHA (2008) and Seegmiller (2012) recommend diversion of upland surface water around the fill buttress slope, there are no planned, designed, or approved structures for diverting surface water around the site. The present method of grading roads to divert surface water has failed repeatedly as evidenced by the picture of a cascading waterfall entering the quarry in 2015. An historic aerial photo from 2011 (Figure 2) shows the quarry before the 2015 slide. A series of aerial photos from 2015 (Figure 3), 2017 (Figure 4), and 2018 (Figure 5), show breaches in the upland road diversion system. Figure 6 shows detail of the breaches in 2018. DRMS should ask the operator to use accepted engineering practice of lessening, as much as possible, upland drainage from spilling across an engineered buttress fill and designs for a structure that meet the design storm event runoff peak flows.

Exhibit 6.5 Geotechnical Exhibit

29. The Final Initial Geotechnical Investigation Report, I-25 and Cimarron Street Design-Build, Colorado Springs, CDOT Region 2 Report performed as Yeh and Associates Project No. 213-207 and dated July 23, 2014 used Seismic Design Parameters of PGA (0.0 sec) = 0.056 g, S_s (0.2 sec) = 0.122 g, and S_1 (1.0 sec) = 0.035 g for Site Class B areas. The report is available at:

    https://www.codot.gov/content/projects/I25CimarronFinalRFP/BOOK%203-Applicable%20Standards,%20Data%20and%20Reports/Section%2010_7-24-2014_Final-RFP/Initial%20Geotechnical%20Investigation%20Report%20I-25%20and%20Cimarron%20Street%20Design-Build_FINAL.pdf

    The Pikeview Quarry is located nearby this CDOT project. Yeh and Associates do not use the US Army Corps of Engineers derivation of seismic coefficient of 0.5 x PGA and they obtained their figures from USGS Seismic Design Parameters Version 2.10 software. Logic would dictate that if halving these numbers was a standard practice, then the US Seismic Design Maps would already have that factored into the numbers in the print out and everyone would be using these design parameters.

    Stantec did not specify which seismic coefficient is being used (PGA, S_s or S_1). DRMS should require more detail and justification to allow the operator to more than halve the Seismic Coefficient for design of this buttress. Even applying the seismic coefficient from a study performed in 1984, simple mathematical calculations indicate that 0.075*0.5 = 0.0325 (standard mathematical rounding would put the SC at 0.033).

    Were the assumed shear strengths of the materials to be used in the engineered buttress fill multiplied by 0.8 as specified in the Conclusions section of Hynes-Griffin and Franklin (1984, Conclusion Section attached)?

CBMA is not recommending in any way the Hynes-Griffin/Franklin method and that more than halving the SC should be used for the design of this fill slope. Doing so without adequate justification is not wise for an engineered fill so close to a city, open space and public use. The site itself may be scheduled for development or public use in the future. Nor is CBMA suggesting that the material strength properties selected by Stantec are proper for use in this analysis. These assumptions should be carefully reviewed by DRMS with regard to other factors proposed by Stantec in the design of this slope (no upland surface drainage diversion, continued slide scarps, possible hanging block on the south end of the highwall, the unknown location of the Rampart Range fault and splays thereof with no consultation of the Colorado Geological Survey or any reference to the history of and current information on slides and instability in the area).

This may illustrate the need for an independent review of the Geotechnical Exhibit since public safety and quarry stability may be threatened by the changes proposed in Exhibit 6.5.

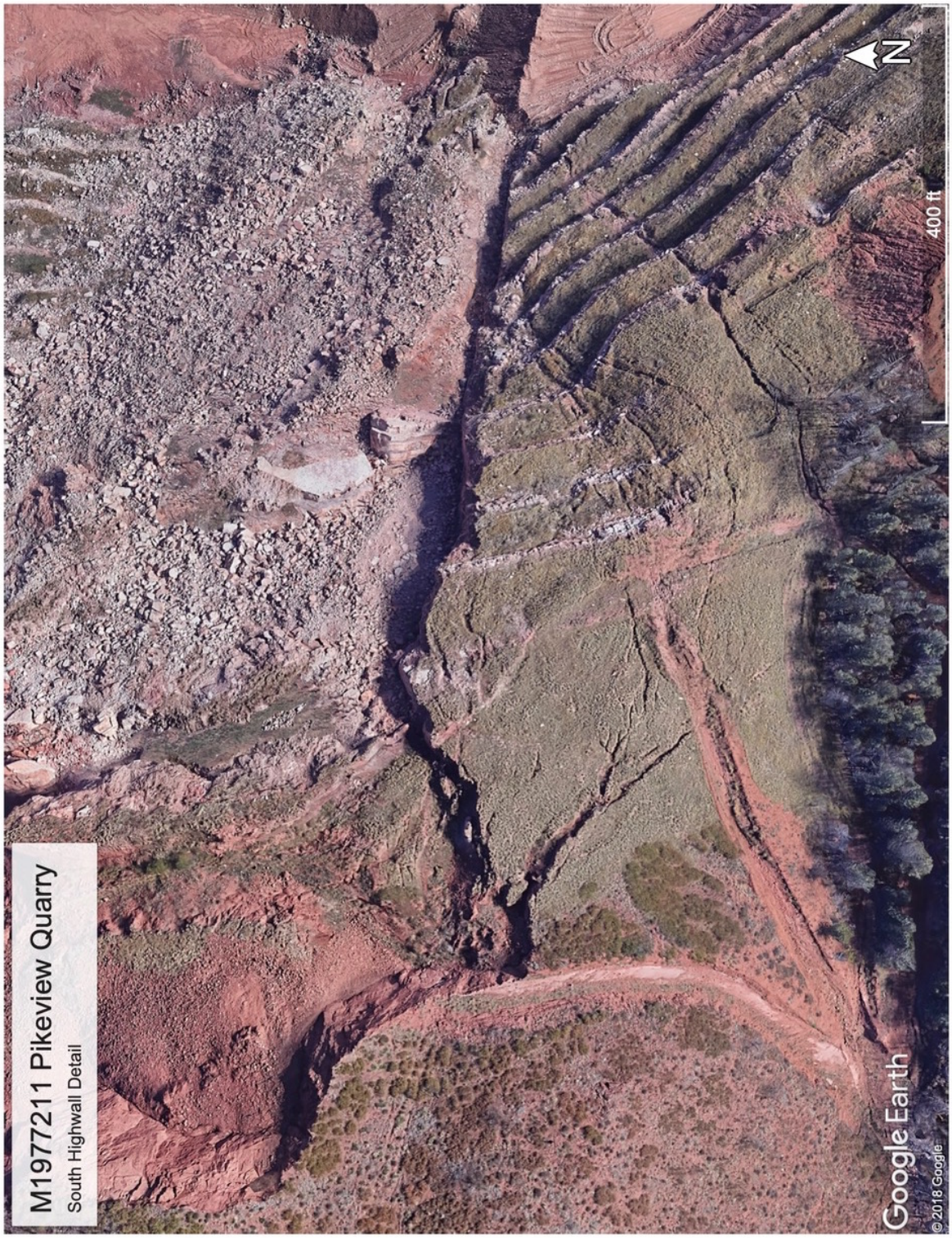

Figure 1 – Pikeview Quarry – Detail of conchoidal fractures in the south part of the West Highwall, 2018.

Figure 2 – Pikeview Quarry, October 27, 2011 after December, 2008 and September, 2009 slide but before May, 2015 slide.

Figure 3 – Pikeview Quarry after May, 2015 Slide.

Figure 4 – Pikeview Quarry conditions on June 9, 2017.

Figure 5 – Pikeview Quarry conditions on June 6, 2018.

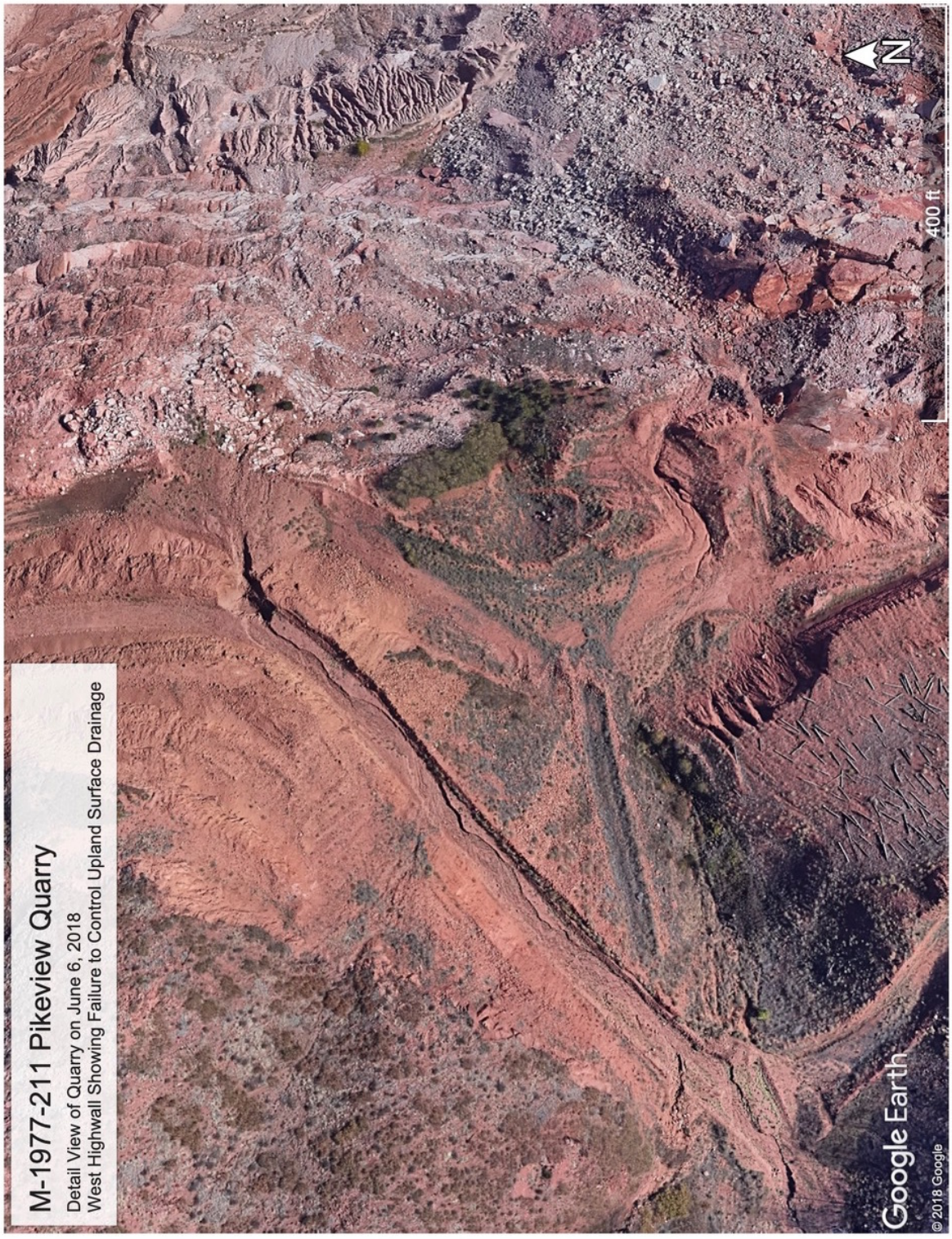

Figure 6 – Detail of West Highwall showing breaches in the informal upland surface water control structure.

PART III: CONCLUSIONS

29. The results of analysis of earthquake strong-motion records using a sliding block model and a decoupled elastic response analysis show that permanent displacements for deep-seated sliding surfaces limited to less than 1 m can be assured if the ratio of critical acceleration to peak bedrock acceleration is at least 0.5. This value is considered to be very conservative and subject to downward revision as better understanding of elastic-plastic amplification response of embankments is developed.

30. Furthermore, a pseudostatic, seismic coefficient analysis can serve as a useful screening procedure to separate dams that are clearly safe against earthquake-induced sliding failure from those that require further analysis. The permanent displacement analyses described in this report provide a rational basis for choosing the value of the seismic coefficient.

31. The suggested procedure is as follows:

a. Carry out a conventional pseudostatic stability analysis, using a seismic coefficient equal to one-half the predicted peak bedrock acceleration.

b. Use a composite S-R strength envelope for pervious soils, and the R (undrained) strength for clays, multiplying the shear strength in either case by 0.8.

c. Use a minimum factor of safety of 1.0.

32. This procedure should not be used in the following cases:

a. Where areas are subject to great earthquakes (of magnitude 8.0 or greater).

b. Where materials in either the embankment or foundation are susceptible to liquefaction under the design cyclic loading.

c. Where the available freeboard is small, or where the dam has safety-related features that are vulnerable to small deformations.

Attachment 1. From July, 1984, Miscellaneous Paper GL-84-13, Rationalizing the Seismic Coefficient Method, Mary E. Hynes-Griffin, Arley G. Franklin, Geotechnical Laboratory, Dept of the Army Waterways Experiment Station, Corps of Eng.