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May 5<sup>th</sup>, 2012

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

RE: Old Castle SW Group, Inc. dba Four Corners Materials, File No. M-2011-028  
Animas Glacier Gravel (AGG), 112(c) Permit Application –  
Second adequacy Review

Dear Ms. Pickford,

This letter is in response your April 24, 2012 letter concerning the Animas Glacier Gravel Pit. We have included the original comments within the letter for your information. If you have any subsequent comments please feel free to let us know.

Rule 6.5 Geotechnical Stability Exhibit

The Division's staff engineer has reviewed the geotechnical stability reports submitted by the applicant and has identified the following concerns.

- 1.) Relative to drainages associated with the proposed access road:
  - a.) Culvert analysis indicated reinforced concrete pipe (RCP) with headwalls are to be used. The drawings and text state corrugated metal pipe (CMP) is to be used and no reference is made to headwalls for the CMP. The analyses, text and drawings need to be consistent.

*Response: The error in the analysis has been corrected to reflect the proposed CMP pipe.*

- b.) The times of concentration (Tc) for the small basins contributing to the access road appear very large for the basin size and slope. I believe this is the result of using too long of an overland flow path length (200ft) and too large of a Manning's coefficient for the terrain (0.40 – woods with light underbrush). If the Applicant insists on using 0.40, then the length should be limited to between 50 and 100 feet. If

Applicant uses  $n=0.13$  for Range, then an overland flow path length of up to 150 might be acceptable. The Tcs should be recalculated and used to recalculate the peak flows.

*Response: The overland flow path's have been reduced as requested to decrease the Tc. Please note that as a result of this change, Design Point C's culvert was upsized to an 18" CMP instead of the previously proposed 15" CMP. All other culverts were sufficient.*

2.) Relative to drainage into Basin Creek:

- a.) Pond water management: The DRMS is concerned about the potential for inadequate storage in detention pond during periods of inactivity. That is, if a 100-yr event occurs, fills up the pond, but no effort is made to reduce the pond volume in a reasonable time period, a subsequent significant storm event may lead to discharge from the pond. The DRMS needs a storm water management policy to address the type of scenario. If the pond does spill, the Applicant needs to demonstrate the existing grouted riprap channel will not be damaged by the discharge.

*Response: Based on the operator's proposed water usage, dust mitigation will utilize 0.092 acre-ft of water each day, which would drain the pond in roughly 120 days under normal use. If and when there is a significant event the operator will consider using more water on the site (additional water trucks for dust control, wash plant water, redimix batch plant), as discussed in the report. The operator will also have the ability to construct additional storage within the footprint of the gravel pit to ensure that no discharge occurs from the site. We have shown that the probability of a second large storm occurring once the pond is full, while low, is still a possibility. We believe the operator/owner has the data, tools and incentives to prevent discharge from the site, so it comes down to an operation and execution issue.*

- b.) Stormwater conveyance: There are no drawings or text in the Drainage Report addressing the specifics of conveying the impacted runoff in the pit/active area and how the DRMS can be assured potentially impacted stormwater and ONLY potentially impacted stormwater is directed to the retention pond. Conveyance channels design to convey the 100-yr peak flow should be included on drawings and hydraulic calculations presented to demonstrate conveyance capacity. Also, some discussion and plans as to how unimpacted runoff is diverted away from the retention pond throughout the mine life is necessary to assure the DRMS that too much runoff does not reach the retention pond.

*Response: The Drainage Report and Engineering Plans have been updated to include swales to both convey the Disturbed and Undisturbed Areas flows both to the pond and away from the pond as necessary. For simplicity the same swale section and minimum/maximum slopes will be utilized and each can carry the contributing area's 100 year flow. Because of the temporary nature of gravel pit improvements we have only shown general locations and provided details of how the improvements should be constructed.*

- c.) Retention pond design: There is no discussion of the pond design. Is it all excavated with no berm or dam? Is the pond lined? If not The Applicant needs to demonstrate the stability of the slope to the west as this is a perched pond. If the pond is lined, are there ground water influences that might cause the liner to float? A liner would also have impacts to the response to Item 1) above. How is sediment managed in the pond? Is sediment storage accounted for in the freeboard. Is there an overflow spillway or low level outlet?

*Response: The Engineering Plans have been updated to include details for the construction of the retention pond. The proposed pond is intended to be entirely located within cut to simplify its design, however should the operator choose to increase the volume using fill material there are details for this consideration.*

*The pond will not be perched on the rim, likely several hundred feet from the rim, but no constraints have been placed on its location. (Let us know if you want this added to plans.) The pond will not be lined, as this will allow infiltration to occur, which has not been accounted for within the Drainage Study consideration of the operator's ability to empty the pond. Sediment will need to be removed from the pond and a note to this effect has been added to the Details. There will be an emergency overflow and there is 3' of freeboard above the spillway elevation. The pond's volume will be measured from the bottom of the spillway to ensure that there is adequate volume.*

- 3.) Relative to the berm along the western edge of the mining activity:
- a.) Stability: depending on the depth and duration of water stored behind the berm, it could seep into the underlying material and cause the existing outslope to become unstable, resulting in a slope failure leading to a debris flow into Basin Creek. If water is stored, a stability analysis should be performed for two conditions: a) saturated slope and, b) partially saturated slope (i.e., the upper portion based on seepage analysis for the depth and duration of water storage).

*Response: The berms along the edge of the slope will have the proposed drainage swales buffering them so that water will not be*

*stored or allowed to erode the base of the berm. The original purpose of the berms was to buffer the site (visual and audibly) and we agree that storing water behind them or allowing water to be conveyed solely by them is a poor idea, so we are returning them to their original intent.*

Erosion: if the berm area is graded to drain (say to the north and the proposed pond), it would certainly reduce the potential for Issue #1, but if the flow velocity is high enough ( $>5$  fps during the design event), the berm could erode away, resulting in loss of containment and another potential debris flow into Basin Creek. If the berm area is graded to drain, the flow side of the berm should be armored appropriately (demonstrated with calculations) or an analysis presented showing non-erosive velocities are expected.

*Response: By buffering the berms with the grass-lined swales we have eliminated the erosion concerns from the berms. We have run a velocity analysis on the swales and they show that we can maintain velocities below 7.4fps for a 100 year storm. It is our opinion that this is an acceptable velocity for a rare storm and the swales would more effectively remove sediment (thus improving the quality of Basin Creek) if they were allowed to be seeded and maintained as grass lined swales. (Please advise if you disagree)*

If you have questions or need additional information on any issue, please let us know.  
Sincerely,



Steve Winters, P.E.  
Russell Engineering, Inc.