Braun

Braun Environmental, Inc.

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November 17, 2021 SENT VIA EMAIL

Elliot Russell
Colorado Division of Reclamation, Mining and Safety (DRMS)
1313 Sherman, Room 215
Denver Colorado 80203

RE: Response to November 12, 2021 Adequacy Review, Mineral Mountain Project, Permit M-2014-045

Dear Mr. Russell;

Attached, find responses to your comments, along with an updated design for installation of concrete floors, walls and berms, along with an updated designated/general chemical table. The information you have provided is useful and includes a great amount of detail for more complicated and higher load bearing installations. However, for this simple floor, we could dwarf the cost of the actual installation, if all of the tests included in the references were performed going all the way back to ASTM C-88 and C-535 standards for source aggregates, and then going on to consider other components and certifications that could be investigated. The concrete in this simple pour requires no special accelerators, depressors, special additives, or any specialized installation incorporating the use vibrators or other special equipment for installation. The only requirement is that the concrete supplier ensures that the product supplied meets the compression and slump requirements, and if this occurs, then the final product will perform as intended. The qualified person (QP) that will perform the QA/QC is in place to ensure that the engineer's designs are followed.

Sincerely,
BRAUN ENVIRONMENTAL, INC.

C. A. Braun, P.E., CPG, REC
enc.
CAB/rl

Responses to Elliot August 6, 2021 Deficiency Letter
September 16, 2021
Responses to Elliot October 22, 2021 Deficiency Letter
October 26, 2021
Responses to Elliot November 12, 2021 Adequacy Letter #3
November 17, 2021

EXHIBIT C – Mining Plan (Rule 6.3.3)

Comment 6. Please describe how the Operator will prepare the floor and key-in the proposed 0.5 foot high concrete berm at the entrance to the sump room to ensure that all fluids captured by the berm are contained directed to the sump room.

Response: The most recent response is as follows: *"A 0.5 foot high berm has been added to the entrance to the sump room to ensure that all fluids entering up-gradient are captured into it. This room had 5 times the fluid holding capacity of the entire processing equipment, thus it is sufficiently large to retain any overflow of spill. Further, the operator commits at limiting it use to no more than 90 percent of its capacity, thus, making additionally sure that no overflows will occur."*

As for all properly constructed mine seals it is essential to key in the feature to cause it to stay in place and to retain its seal, and the installation is considered standard to the industry. The specific detail to this is so common that it was not included in the last response. However, the detailed installation has now been added to the Engineering Design for Concrete Floor in Mill Room and in Chemical Storage Room.

Comment 15 The Division has updated the 2014 reclamation cost estimate with up-to date unit costs and additional reclamation tasks associated with AM1. The Division has calculated the total required financial warranty for the site to be $36,640.00, which is an increase of $8,290 from the $28,350 financial warranty currently held for the site. A copy of the reclamation cost summary is attached for the Operator's review. At this time, upon approval of the AM1, the required financial warranty for the proposed operation will be set at $36,640.00 and the additional amount will be due within 60 days of approval; please contact me prior to the decision date to discuss any questions regarding the cost estimate or if you identify any errors with this calculation.

Response: No comment necessary

EXHIBIT U – Designated Mining Operation Environmental Protection Plan (Rule 6.4.21)

Comment 38 The Operator has stated that a Quality Assurance and Quality Control (QA/QC) program will be implemented and since "DRMS regulations require approval by DRMS, Elliot Russell of DRMS, or his designee shall inspect the installation to meet the acceptance criteria by DRMS". In accordance with Rule 7.3.1(4), it is the responsibility of the Operator to provide adequate QA/QC or certification of the construction of the EPF. The QA/QC program is to be completed by a 3rd party engineer or designee. Please revise the *Engineering design for Concrete floor in Mill Room and Chemical Storage Room* to include the QA/QC program. Please note, the Division may still inspect the installation of the secondary containment, however QA/QC is to be performed by the 3rd party engineer or designee. In accordance with Rule 7.3.2(2), the Operator must provide a certified verification by a professional engineer or other appropriately qualified professional that will confirm that the facility was constructed in accordance with the approved design plan. This final facility certification report will be reviewed and accepted by the Division.

Response: Construction will be QA/QC inspected by a 3rd Party engineer of designee. The Engineering design for the concrete floor in the mill room has been revised to include the QA/AC requirements.

New Adequacy Review Items:

Comment 42 To accompany the *Diagram of Processing Area,* please provide cross section designs with a North-South and East-West trending depiction to show the concrete floor, sills/berms and rib coverings of the upper and lower levels of the mill including the sump room berm. Upon review of the *Diagram of Processing Area*, the

Division has discovered the Operator has relocated the proposed Designated Chemical Storage Room from the western upper mill room to a separate room located east of the grinding area. The designs, exhibits, and adequacy review response narratives do not depict or describe containment of this new proposed room. Please confirm this room will be similarly constructed as the mill room(s). Please also provide cross sectional diagrams of this room too.

Response: In the previous response the following paragraph was included to specifically address the Designated Chemical Storage Room. *"The chemical storage room and mill room is carved out of solid low permeability rock which provides a low permeability sill and low permeability ribs and backs. A low permeability concrete floor is to be poured over the low permeability rock, and that combination will easily retain the designated chemicals stored there. In addition, the operator commits to additionally use commercially available spill containers designed specifically for the size of the containers containing designated chemicals which will be stored in the room"*. The discussion was intended to be informative and relay to the reviewer that both individually and separately, that both the low permeability natural rock and the concrete floor that is to be installed are suitable for secondary containment. However, the operator was going to install individually manufactured secondary containment trays to be used as his secondary containment for the primary containers. Thus the concrete floor would essentially be tertiary containment and the rock itself would be quaternary containment.

The reviewer is reminded of the discussions that occurred between him and the operator regarding this subject, and upon receiving the reviewer's concurrence that manufactured secondary containment was suitable for retaining spills and that the concrete floor would be only a necessity to the operator to do his housekeeping. Thus, the floor is a simply a smooth surface on which the secondary containment trays can be placed and a floor that can be swept making housekeeping easy. Per discussions between the operator and the reviewer, it was agreed that the floor within the storage room be gently back-sloped away from the entrance. However, it is cautioned that the slope not be too great so that it might cause a hazard that might increase the odds of an accidental release of the contents from the primary containers. The design drawing has been modified to reflect the updated features.

Comment 43 Please revise the *Engineering design for Concrete floor in Mill Room and Chemical Storage Room* to include a mixing and material specifications for the concrete containment structure.

Response: We are not sure what this comment means. Concrete is typically composed of aggregate, sand, and Portland cement. There are specific variations that have specialized uses, including masonry mixes, both high and low strength formulations, and for lightweight and increased concrete, and for concretes that have special resistances. For construction of floors at the permit area, and for most similar construction sites, the first description is what is called for. The commercial company that supplies the concrete is best qualified to make the proper mix that meets the standard as set by the engineer, and it is not typical for that particular detail to be dictated by either the permit operator or the engineer. See discussion and specifications on design documents.

Comment 44 Within the *Engineering design for Concrete floor in Mill Room and Chemical Storage Room*, the installation instruction step #5 describes existing concrete foundations within the mill room which will be thoroughly cleaned so that good adhesion occurs between the existing foundations and the floor. Please address the following items: a. Please describe and account for all existing foundations.
b. Please depict these existing foundations on the cross section diagrams requested above.
c. In addition to thoroughly cleaning, the Operator will need to propose further measures to ensure a water tight seal occurs between the existing foundations and the new floor (water stops or other seals, use of a bonding agents, etc.).

Response: For some reason, the reviewer does not acknowledge the fact that the permeability of the rock unit located below the concrete floor has low permeability and is essentially water tight, and up until this point, this feature has been a key part of the secondary containment within the facility. That non-fractured rock was inspected by both the DRMS inspectors and the engineer, was found to be effective. Typically, following proper washing of previously installed concrete, new concrete and mortar ground bonds well to the older concrete surface. The only exception being if the surface has accumulated some coating such as paint, or oil and grease. If any of these are present, then the surface needs to be washed with detergent and then abraded to ensure that clean fresh concrete is available for the bond. For existing concrete, a bonding agent such as Sackcrete© bonding additive is simply painted on with a brush or roller, prior to pouring the concrete against it. These additional instructions have been added to the engineering design.

Comment 45 There appears to be a typo/miscalculation regarding the volume of concrete needed for the Designated Chemical Storage Room. Please revise this volume calculation within the *Engineering design for Concrete floor in Mill Room and Chemical Storage Room*.

Response: The volume in the text has been modified to 2.3 cubic yards to make it consistent with the volume shown on the drawing. Thanks for catching the typo.

Comment 46 Any changes or additions to the application on file with the Division, must also be reflected in the public review copy. Please submit proof that the public review copy has been updated or a copy of the response to this adequacy letter has been added to it.

Response: The paperwork will be filed and a proof of receipt collected.

Comment 47 Although the design calls for a thickness less than 4 inches, which I think is usually the trigger point (greater than 4") for needing reinforcement I believe the total square footage and the weight/vibration of milling equipment may require the pad to have reinforcement to prevent cracking. Within the Adequacy Review Response #3, please formally address if fiber mesh, wire mesh, or rebar will be a part of the pad design or provide a thorough technical justification that reinforcement is not needed. You can either provide this in the cover letter or add it at Item #47.

Response: The contact in the Division has steered the reviewer toward an incorrect conclusion. From an engineering perspective, the thickness of concrete has no relationship to the incorporation of steel into concrete beyond there being a minimum thickness that the insertion of steel will negatively affect it. The reason that steel is used with concrete is because concrete has significantly lower tensile strength than compressive strength, and by adding another material that has a greater tensile strength, the best characteristics of both materials can be used beneficially. In this case, the concrete floor is being installed over a material (native rock) that has a much higher compressive strength than the product from which the floor had been constructed out of. Thus, the concrete floor is coupled directly to this strong rock, and with this connection, it will not be possible for the concrete to be in tension. Since there is no tension, there can be no tensile stresses, thus no strain-related related fracturing. For this exercise, the top surface of the floor also needs to be considered. At this permit area there is no anticipated loading stresses in excess of the compressive strength of the concrete, so for this application, the use of rebar or wire mesh would make the floor no more durable, nor would it provide any addition strength. Alternatively the addition of fiber to the concrete can add more vibration tolerance and may be included. In fact if steel were to be added in the form of reinforcing bar or mesh, it presence would simply be a waste of our precious natural resources and it would serve no useful purpose to protect the environment.

Engineering Design for Concrete Floor in Mill Room and Chemical Storage Room and Sump Room Berm.

Mineral Mountain Gold LLC
Braun Environmental, Inc. - C. A. Braun, P.E
October 22, 2021
Rev: November 17, 2021

Discussion

The mill and storage rooms have been blasted out of solid volcanic rock. Detailed mapping has found that the in-place rock within the mill room and chemical storage room contains no open fractures thus the rock is not capable of internal fluid flow. The rock permeability is approximately 1 x 10^{-8} centimeters per second, and the calc-alkaline nature of the volcanic in which the rooms have been carved out of have an acid neutralization potential of greater than 10 tons $CaCO_3$ per kiloton. The clay alteration product of the rock tends to further plug and retard any fluid flow on the rock surface and in fractures in the general area. To promote housekeeping and to make cleanup of spills or losses easier, a concrete floor is to be installed on the lower mill level. The current floor on the upper level where comminution occurs need not be covered in concrete as no reagents are used in that process, and any spills of water will travel via gravity to the lower milling area. The west end of the upper level where the process tank is to be located will have a concrete floor that slopes toward the lower level. The ribs for one foot above the concrete floor in the mill room will be concrete covered by a mortar grout covering applied by troweling.

Concrete Specifications of Concrete Floor and Berms

1. Concrete and shall have a compressive strength of 2,500 psi or greater (ASTM Standard C-39, and can include fiber.
2. The pour of the floor is to have no greater than a 6-inch slump,
3. The concrete used for berms and vertical walls shall have a slump no greater than 4 inches,
4. The concrete is to either be mixed on site, or can be pre-mixed and pumped from the portal to the locations,
5. The floors may be level or gently sloped toward a sump area. The floor must be sufficiently level so that milling components may be easily set and leveled,
6. The floor is to be a minimum of 4 inches in thickness (standard milled 2 x 4 board).

Concrete Installation Instructions

1. Bar down ribs and back,
2. Move or raise equipment and clean sill thoroughly so that concrete will bond to rock,
3. Smooth and level any high spots in sill,
4. Thoroughly clean sills and ribs where concrete or mortar grout is to be applied,

5 For existing concrete foundations, the existing foundation shall be thoroughly cleaned prior to pouring of the concrete so that good adhesion between the existing foundation and the floor will occur,
6 The cleaned surfaces, prior to installation of the concrete, will be coated with a bonding agent, such as Quickrete© bonding adhesive. The product may be applied with either a brush or roller,
7 The concrete surface is to be screed and floated and finished with a broom to produce a safe walking for personnel,
8 Construct south retaining berm on lower mill level at same time, using low slump concrete and/or forms. As shown in diagrams, the height of the berm is to be 1.0 feet, and the berm or wall will extend from rib to rib,
9 Personnel shall not walk on the concrete surface for two days,
10 No equipment shall be placed on the surface until after seven days following the pour.

Concrete Volumes

Lower Mill Room
Area: 1,175 square feet
Thickness of Floor: 4 inches (standard milled 2 x 4 board)
Volume of Concrete: 12.5 cubic yards

Upper Mill Room
Area: 200 square feet
Thickness of Floor: 4 inches (standard milled 2 x 4 board)
Volume of Concrete: 2.0 cubic yards

Designated Chemical Storage Room
Area: 300 square feet
Thickness of Floor: 4 inches (standard milled 2 x 4 board)
Volume of Concrete: 2.3 cubic yards

Sump Room Berm
Area: 50 square feet
Volume of Concrete: 2.5 cubic yards

One Foot High Grout Cover over Base of Mill Room Ribs

1 Thoroughly clean the areas where the treatment is to be applied and dampen surface.
2 Mix Type S Mortar mix with water to make a thick paste and trowel onto rib, making sure to rub mix into low areas to produce a final smoothed thickness of approximately one inch.
3 Allow time to set up and when dry, inspect for thickness and coverage, and if thickness is insufficient, repeat step 2.

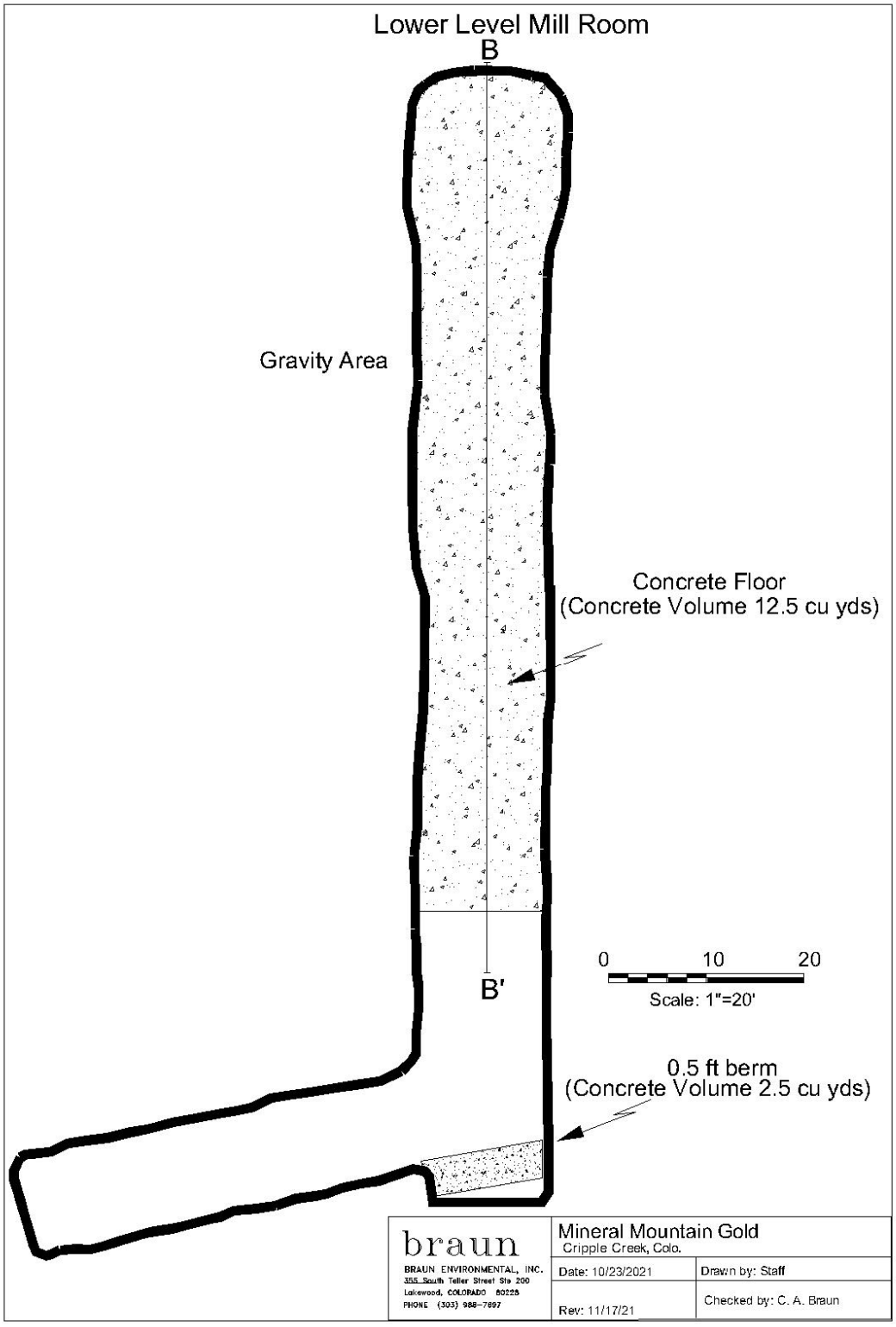
Install Half-Foot High Berm at Entrance to Sump Room

1 Remove mud and debris from sill in are where berm is to be installed,
2 The key is to be cut one foot deep, or more if necessary to reach solid rock, and cut no less than 0.5 feet into each side rib, Make certain to not to over-blast and to undercut rib that might cause danger to personnel.
3 Cut key in sill at angle shown in figure. TMIC
4 Install forms as needed on lower side and use low slump concrete (less than 4" slump) to construct.
5 No mechanized traffic should be allowed to travel over berm until 7 days after pour.

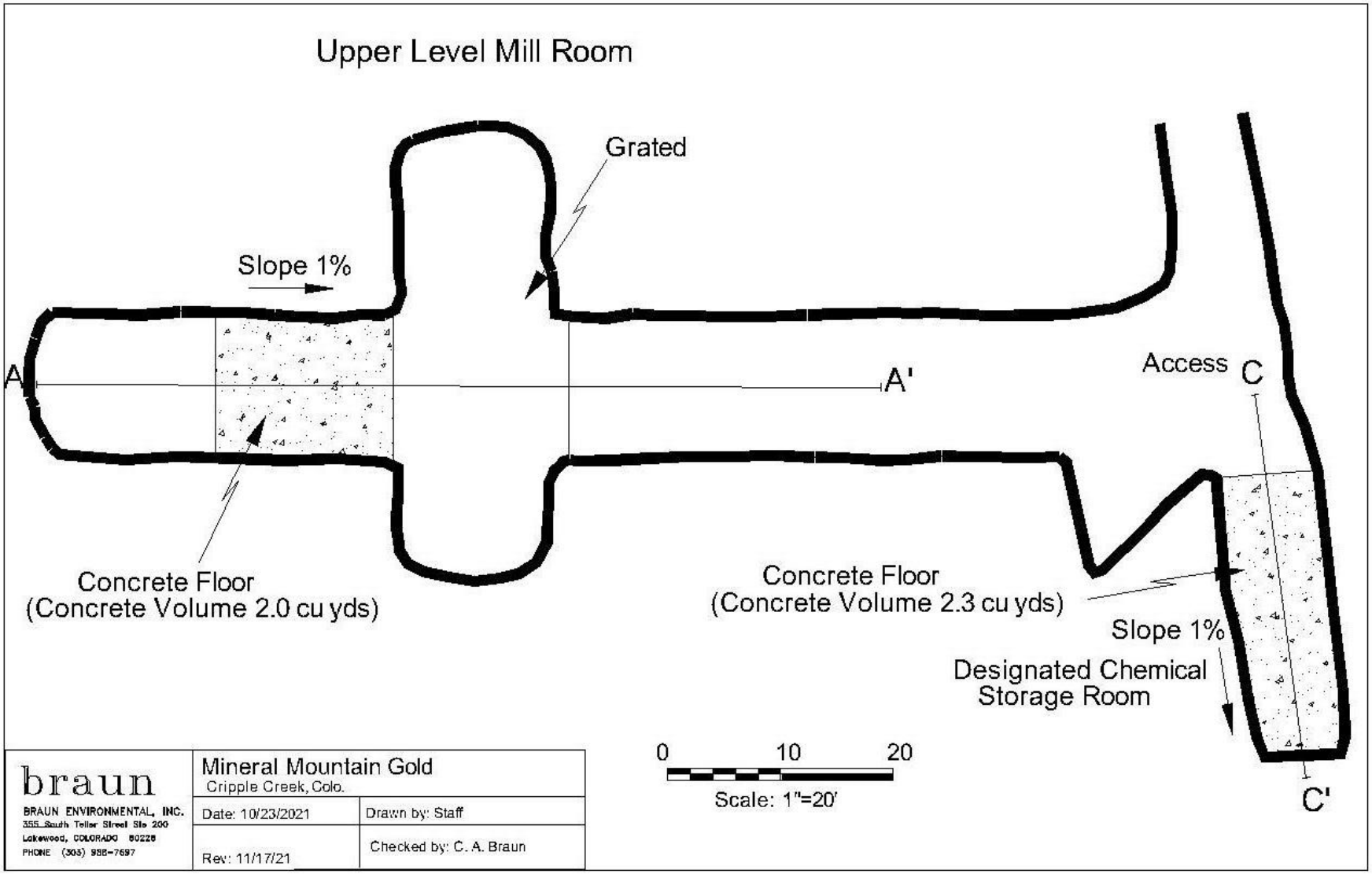
Quality Assurance/Quality Control

A qualified person QP) shall be on site to inspect and document the following:

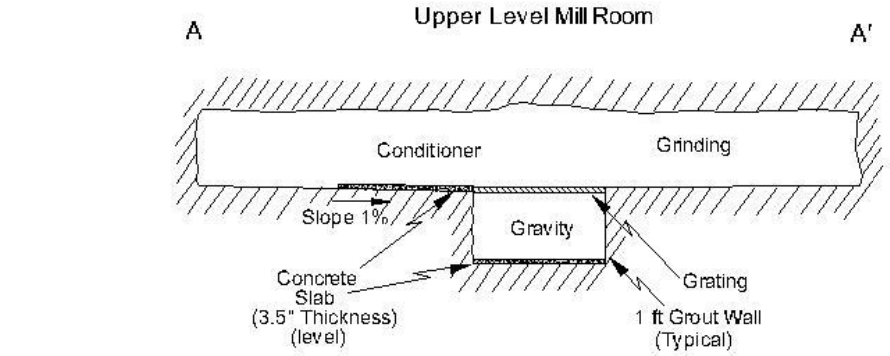
1 Prior to installation of concrete and mortar grout, the floor and walls are to be inspected to ensure that they have been properly barred down and are sufficiently clean to allow proper bonding. Inspection of the sills, ribs, and previously installed concrete foundations are to be made at the same time.
2 Inspection shall occur upon completion of the installation of concrete, and mortar grout. The inspection should include observations of the quality of workmanship of the installation, inspection of the mortar grout to ensure that it has properly bonded with the rib and that it is at least 1 foot high wherever it has been installed.
3 Inspection of the Sump Room Berm to ensure that it has been installed to specifications.
4 The inspector shall document in written format that the work has been be completed and was performed in conformance with the engineering specifications.

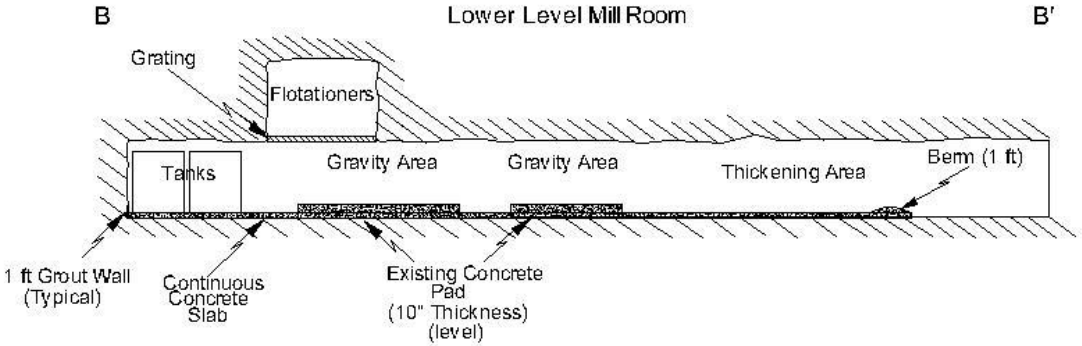


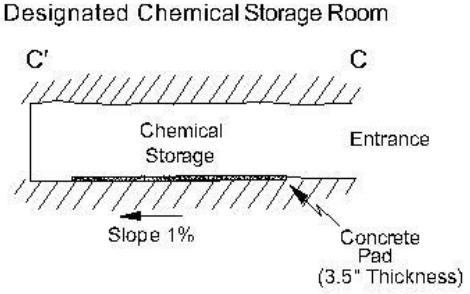
Lower Mill Room

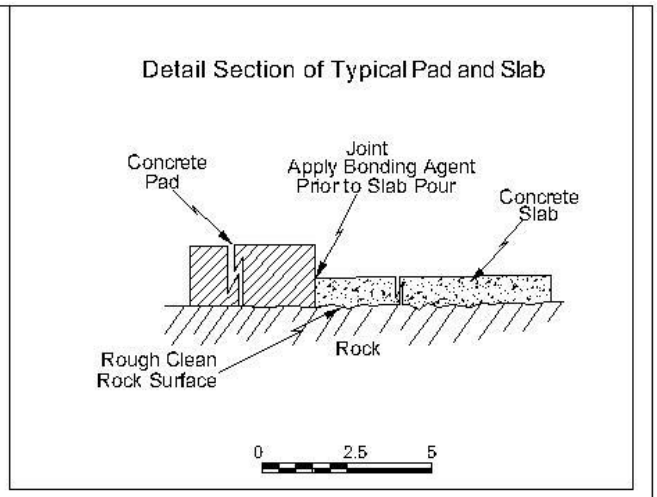


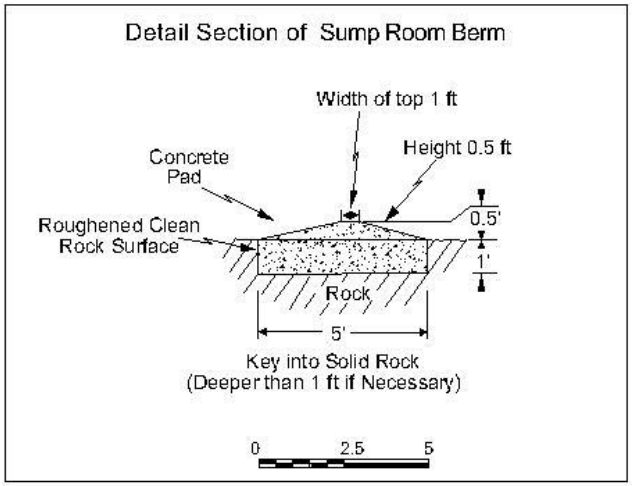
Upper Mill Room and Designated Chemical Storage Area











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Scale: 1"=20'
Hor Scale = Vert Scale

Processing and Storage Areas Sections and Details

braun	Mineral Mountain Gold Cripple Creek, Colo.	
BRAUN ENVIRONMENTAL, INC. 600 South Teller Street Ste 200 Lakewood, COLORADO 80228 PHONE (303) 984-7997	Date: 10/23/2021	Drawn by: Staff
	Rev: 11/17/21	Checked by: C.A. Braun