STATE OF COLORADO

Eschberger - DNR, Amy <amy.eschberger@state.co.us>

Cross Gold Mine, Permit No. M-1977-410; TR-7 close out

rmittasch@nedmining.com <rmittasch@nedmining.com> Mon, Nov 23, 2020 at 1:22 PM
To: "Eschberger - DNR, Amy" <amy.eschberger@state.co.us>

Amy

Please review, the TR-7 close out document for your review

If you have any questions, please call or write.

Regards,

Richard Mittasch

VP operations

Cross Gold Mine, Permit No. M-1977-410 TR-7 close out.pdf
909K

GRAND ISLAND
RESOURCES

November 19, 2020
Permit No. M-1977-410

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

RE: Cross Gold Mine, Permit No. M-1977-410, Technical Revision No. 7 (TR-07) Close Out

Dear Ms. Eschberger,

This letter is provided by Grand Island Resources (GIR) in response to the Adequacy Review letter from the Division of Reclamation, Mining and Safety (DRMS) dated June 29, 2020 and email of October 9 in conjunction with Permit No. M-1977-410, Technical Revision 7 (TR-07). After reviewing the materials submitted, DRMS identified several items that require additional information before TR-07 can be closed out. Based on our understanding, these items are summarized as follows (in italics), along with a reply or response from GIR as appropriate:

1. *Provide a summary of the work completed to stabilize the "glory hole" and the slope face around the portal, including as-built information on the current slope geometry, cellular concrete and anchor placement, and the shotcrete placement.*

Significant sloughing and raveling into the Idaho Tunnel has occurred during advance of the excavation for the 4th, 5th, 6th (x3), and 7th steel sets. In each case a chimney to the surface was created which was subsequently backfilled with pervious cellular concrete as described in TR-5. The geometry of the chimney features and backfill placement results in an exposed overlapping bench structure with subsurface extension down to the tunnel horizon over the full width of the tunnel. Each sloughing event exposed the undersurface of the previous cellular concrete such that successive pours form a continuous mass. Individual lifts are secured to the preceding lift with No. 8 rebar anchors on 1-ft center-to-center spacing.

The cellular concrete serves to backfill the void, stabilize the ground above the tunnel opening, buttress and stabilize the slope above the adit. In the last two instances the first stage of backfill placement was conducted using high strength grout in lieu of cellular concrete to further stabilize the immediate crown of the tunnel. The most recent caving incident occurred on October 7 during excavation to install the 7th steel set. The chimney feature that was created was backfilled with 7 to 9-inch diameter riprap to prevent further instability. The riprap will be flushed with cellular concrete to fill the void spaces between individual rocks and thereby create a solid mass. The following table provides a summary of the backfill placement to stabilize the voids created by soil material sloughing into the tunnel.

Date	Cellular Concrete (cy)	Grout (cy)	Riprap (tons)	Steel Set Excavation Sequence	Bench Elevation
5/19/20	20			4th and 5th	9766.0
6/18/20	19			4th and 5th	9766.0
6/30/20	57			6th	9769.5
7/6/20	19			6th	9769.5
7/13/20	36			6th	9773.5
10/2/20	59	16		6th	9776.6
On-going		8	70	7th	9776.6

The attached figure presents the current as-built configuration of the adit opening, adjacent wing walls, and slope above the portal up to the County Road. Included on this figure are the extent of shotcrete placement and surface exposure of the pervious cellular concrete

The pervious cellular concrete serves to provide drainage with greatly reduced lateral earth pressure relative to granular fill due to its high cohesive strength and stiffness. The cellular concrete is stronger than the original soil and the low weight of the material reduces driving forces that could destabilize the slope. Unless the level of saturation increases substantially, the slope should be more than adequately stable for a temporary interim construction slope. This entire mass will be anchored into the slope using grouted threadbar to serve as a permanent slope retaining structure.

The slope and roadway are inspected regularly for any changes or signs of distress using an observational approach until a more permanent final configuration has been constructed. GIR has placed Jersey barriers along this portion of the road and obtained a structure agreement with Boulder County for any and all damage to Caribou Road caused by the mining activities.

2. *The Division will not be able to approve TR-7 without an updated analysis that meets the minimum FOS requirements provided in the May 27, 2020 Memorandum from Peter Hays. Therefore, once the operator is able to collect and analyze the necessary data to provide a sufficient stability analysis for the portal slope, this revised analysis must be submitted to the Division through TR-7. Commit to submitting a Technical Revision to provide an engineering stability analysis for the proposed final slope configuration of the portal slope once the necessary information can be collected and analyzed.*

A critical aspect of the stability analysis is the distribution and character of the geologic materials comprising the slope and rock mass surrounding the tunnel opening. The stability analysis results are more sensitive to the location of the transition between material types (e.g. soil, decomposed, weathered or fresh bedrock) than to the geomechanical properties of the various materials. While the material properties can be accurately estimated based on observation and correlation with known parameters, the position of the materials comprising the slope cannot.

To date, GIR has been unable to collect the necessary subsurface geometry data due to on-going ground control problems in the tunnel. GIR intends to evaluate, rehabilitate, and replace the remaining timber sets as necessary to provide tunnel access. This will allow GIR to evaluate the ground conditions which are exposed in the tunnel itself and by drilling probe holes in the crown prior to completing the on-going excavation and full rehabilitation per TR-5 through the installation

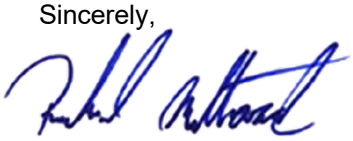
of steel sets. GIR anticipates performing this work during the winter when frozen ground conditions will improve stability around the tunnel.

Field and laboratory testing of the various material encountered during this interim construction phase will be conducted to verify or update the material properties adopted in the analyses presented with TR-07. These data will be used in conjunction with the as-built slope geometry (see attached) to provide analyses which demonstrate that the slope meets the long-term slope stability requirements of MLRB policy.

This approach will also allow for better assessment of ground conditions and approach prior to performing excavation and tunnel rehabilitation directly beneath the county road. Ultimately, full tunnel rehabilitation will be conducted from the inside out such that the steel sets will be installed from a point of stable ground and progress outward to the portal and less stable ground. This will allow for better control of poor ground to limit sloughing and ground losses that could impact the county road.

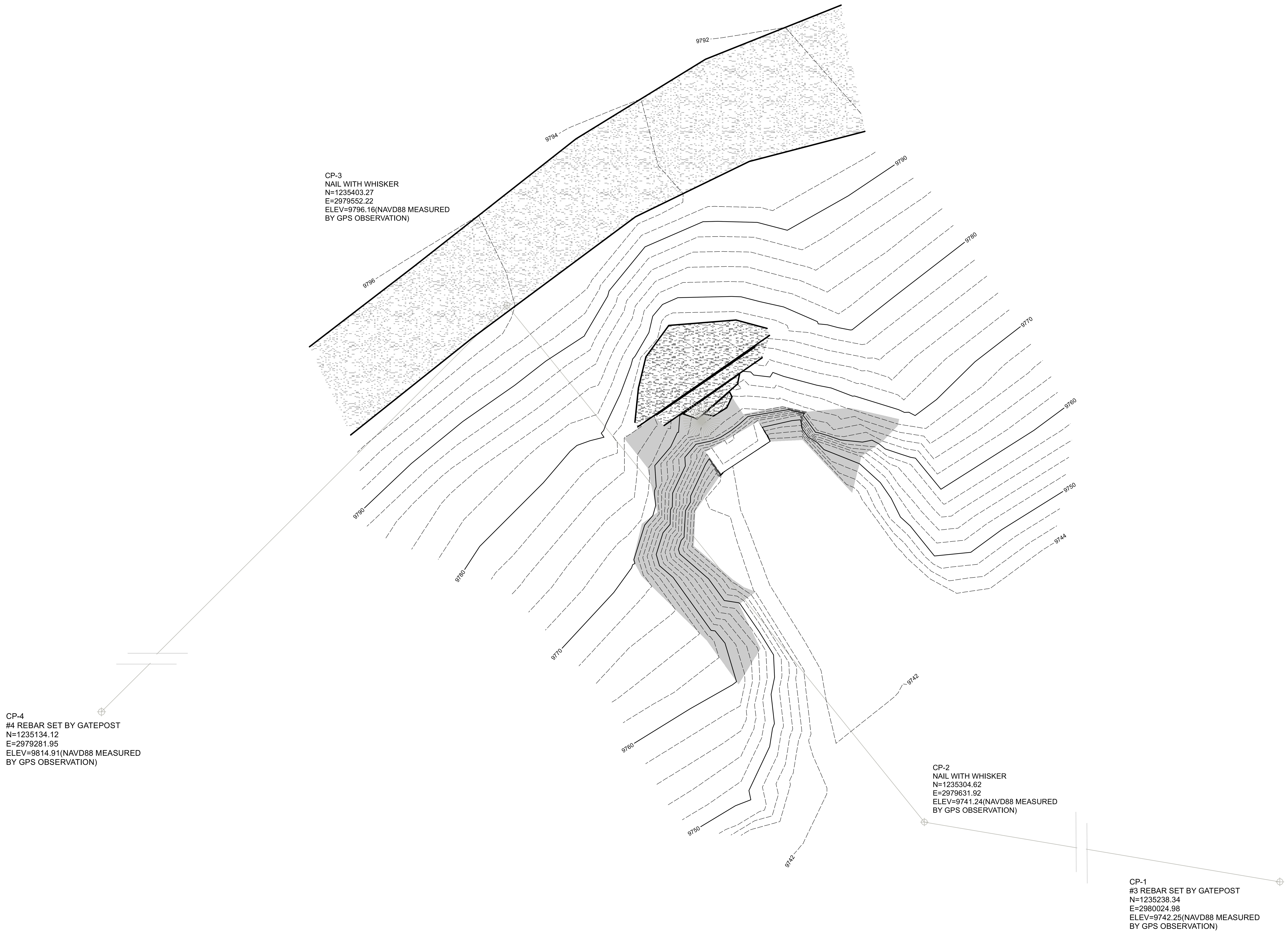
Should you have any additional questions or concerns please feel free to contact me at (516) 582-0833 or by email at Rmittasch@nedmining.com at your convenience.

Sincerely,



Richard Mittasch
VP of Operations
Grand Island Resources, LLC

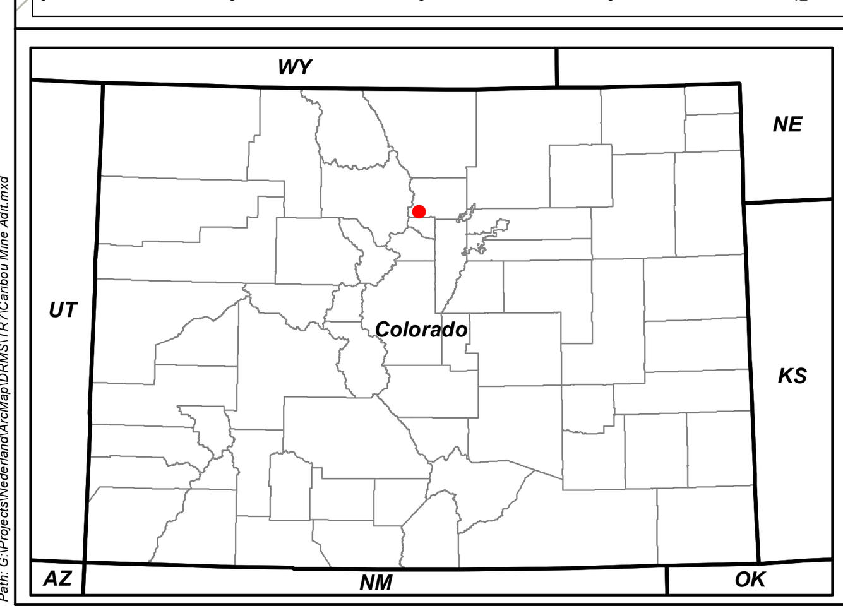
Encl: Figure



Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet

0 10 20 30 40 Feet

0 3 6 9 12 Meters



Legend

- Concrete Benches
- Gravel / Dirt Road
- Shotcrete

N

Project: Caribou Mine Technical Revision No.7

Title:

Topographic Exhibit
Caribou Mine Adit Excavation

GRAND ISLAND RESOURCES

Project No. 0801			File No.	
GIS:	JST	11/19/20	Scale As Shown	Rev 0
Check:	JST	11/19/20	**Map 1**	
Review:	JST	11/19/20		