October 14, 2016

Mr. Dustin Czapla
Colorado Division of Reclamation Mining and Safety
101 South 3rd, Suite 301
Grand Junction, Colorado 81501

Re: Restoration Completion Report Board Order Signed-March 3, 2016
Little Deadwood Gulch and Chief Portal
May Day Idaho Mine Complex Permit No. M-1981-185
112d-1 Reclamation Permit

Dear Mr. Czapla,

The following is Wildcat Mining Corporation's (Wildcat) completion request for the restoratoration of the Little Deadwood Gulch (LDG) adjacent to the Chief Portal.. This completion report summarizes site activities pursuant to the approved Technical Revision (TR-8)[1]. The original drainage plan was designed by Carroll & Lange-Manhard (Manhard) and submitted to the Division on March 18, 2013 and approved on April 1, 2013. (Attachment 1).

Pursuant the Colorado Mined Land Reclamation Board (Board) Order dated March 3, 2016, Wildcat committed to initiating site remedial activities on or before May 15, 2016 and to completing site remedial activities on or before July 1, 2016. At the request of Wildcat, the Board approved an extension to the deadline restoration to October 15, 2016. The extension was extended to allow Wildcat Mining Corporation the time to obtain permit approval from the Army Corp of Engineers and the U.S. Environmental Protection Agency.

On June 28, 2016, Wildcat submitted a Chief Portal "As-Built" completion report summarizing the portal and road stability report. The report was approved with two conditions. Conditions required the revegetation of the Chief Manway restored portal slope and the stabilization of the Incas access road and berm above the Chief Manway. Both conditions have been addressed.

On July 20, 2016, Wildcat signed a U.S. Department of Justice (DOJ) Consent Decree which required the implementation of an approved EPA/Army Corp of Engineers restoration plan. The Army Corp Nationwide permit was approved on September 30, 2016. The Nationwide permit is consistent with the CDRMS approved drainage restoration work plan

[1] Little Deadwood Gulch and Chief Portal Reclamation Report

Wildcat Mining Corporation
3926 North State Hwy 67
Sedalia, Colorado 80135
303.832.7664

Field construction was under the direction of Mr. Erich Rauber (PE) and the supervision of Mr. George M.L. Robison (CPG-5022). The following summarizes the Little Deadwood Gulch (LDG) drainage construction installation and revegetation completion activities:

1. Installed 100 foot-24 inch CMP pipe with end sections (11 percent grade) and a trash rack. The CMP is designed to convey the peak flow from a 10-year-24 hour storm (19.5 cubic feet per second (cfs)) (Manhard, 2013)[2] (See Table 1);

2. The CMP flow rate is estimated to be 12 feet per second. Pipe flow discharges onto a rip rapped (D50-12 inch) apron. (See Photos);

3. The 24-inch culvert was installed in accordance with TR-8 (Approved August 28, 2016);

4. Pipe discharges occurs approximately 7 feet below the down gradient fill crest (See Photo);

5. Gravity blocks (See Photo) were installed in front of the Chief manway (Figure 1);

6. To provide stability to site alluvial materials outside of the portal manway, gravity blocks were placed immediately upgradient and parallel to of the manway portal. The upgradient block extension is approximately 4-feet wide and approximately 16-feet long. (See photo). A manway entry ramp was constructed to permit mine rescue crews to gain access to the mine in the event of an emergency.

7. Installed a 12-inch CMP sub drain (5.5 percent grade) at the entrance of the 66-inch culvert to drain collected water that may collect in front of the manway. (See Photo) Water from the manway entrance will be gravity drained to a downgradient point near the crest of the LDG bench and in close proximity to the LDG-24 inch CMP discharge point. (See Photo)

8. Constructed a trapezoidal channel. (See Photo-See TR-5 and TR-8 design);

9. The disturbed area was revegetated in accordance with TR-5 approved design;

10. BMPs (wattles, silt fences, rip rap) were installed in accordance with (TR-05; April 1, 2013);

11. Debris was removed from the drainage channel and disposed offsite; and,

12. Submitted a drainage "as-built" drawings (See Figure 2).

[2] Appendix A Little Deadwood Gulch Drainage Analysis –Technical Revision-5, Carroll & Lange-Manhard, March, 2013

Site construction actives were completed on October 7, and revegetated on October 8, with erosion control BMPs installed on October 10, 2016.

Wildcat has completed site activities in accordance with the Board order and requests the completion report be approved.

Regards

George M.L. Robinson-CPG-2055
President
Wildcat Mining Corporation

Figures

Figure 1 Approved Drainage Alignment;

Figure 2 –Little Deadwood Gulch Drainage As-Built Drainage Map

Photos

Photo 1-Little Deadwood Gulch Gravity Blocks;

Photo 2-Manway Drainage Control;

Photo 3-Little Deadwood Gulch Upgradient Perspective;

Photo 4-Little Deadwood Gulch Downgradient Alignment

Attachment

Attachment A-LDG Restoration Plan

Figures

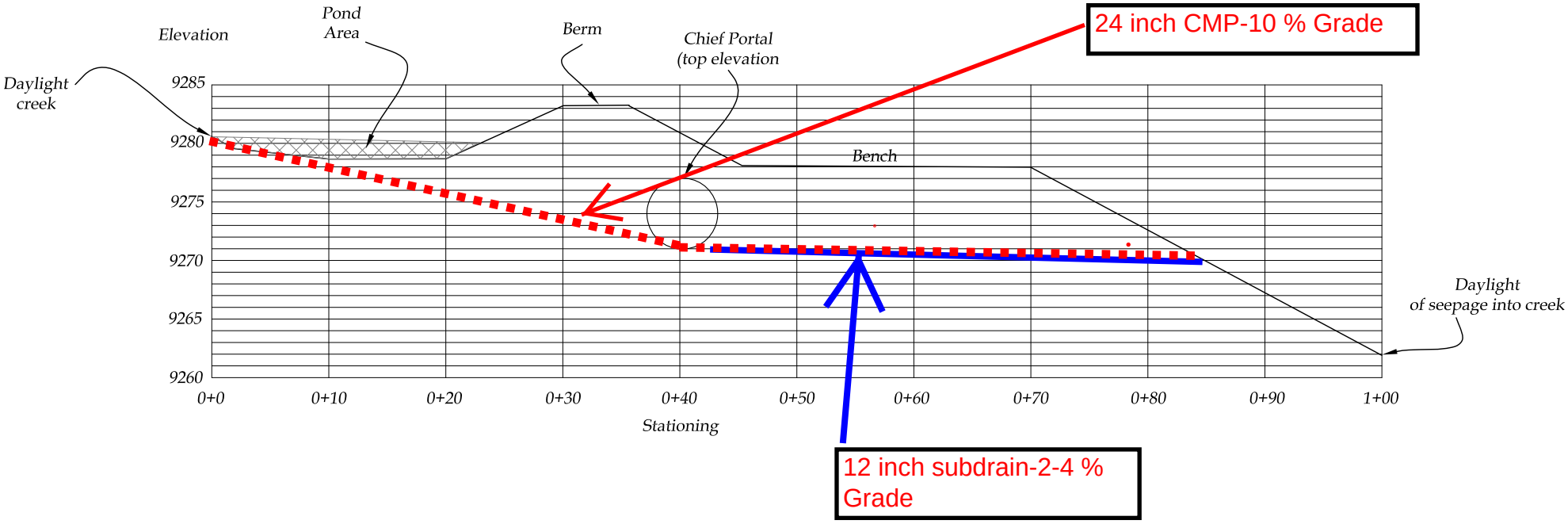
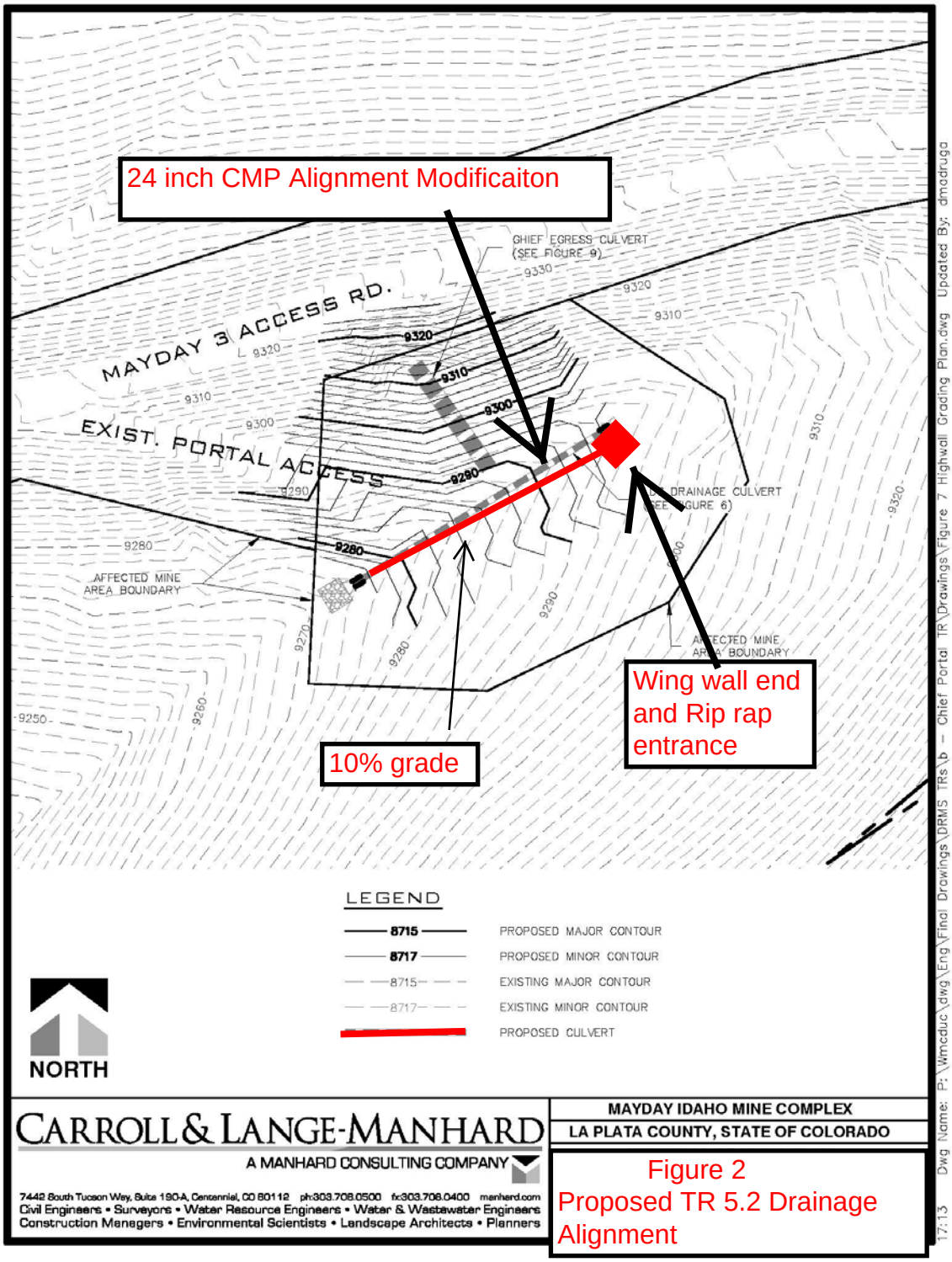


Figure 1
24 inch CMP and 4-6 inch sub drain Installation Alignment
Chief-Little Deadwood Gulch Drainage



CARROLL & LANGE-MANHARD
A MANHARD CONSULTING COMPANY

7442 South Tucson Way, Suite 190-A, Centennial, CO 80112 ph:303.708.0500 fx:303.708.0400 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO

Figure 2
Proposed TR 5.2 Drainage Alignment

Dwg Name: P:\Wmcduc\dwg\Eng\Final Drawings\DRMS TRs\b - Chief Portal TR\Drawings\Figure 7 Highwall Grading Plan.dwg Updated By: dmadruga 17:13

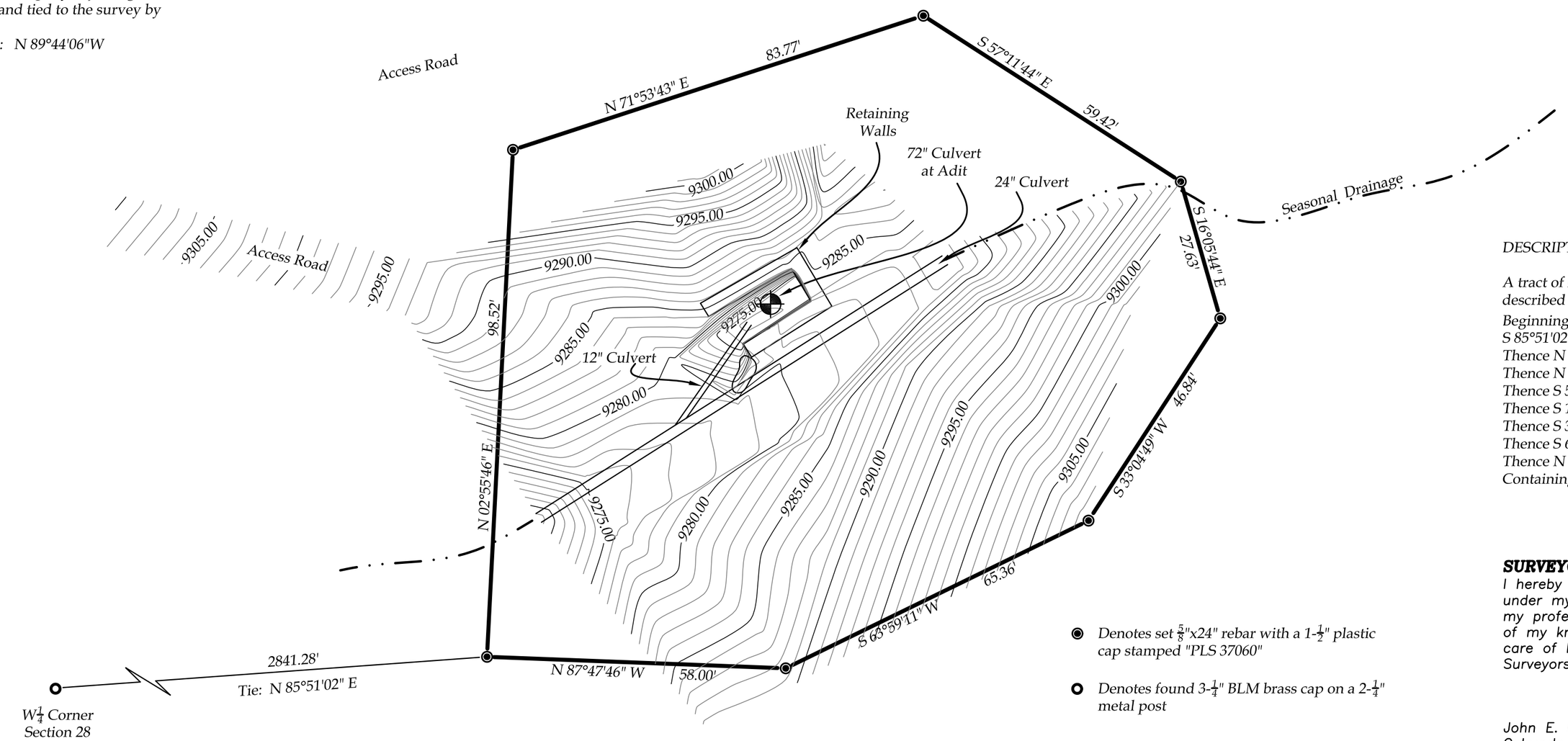
As-Built and Topographic Survey
Renovation
"CHIEF MINE ADIT"
located in Section 28, T36N, R11W, N.M.P.M.
La Plata County, Colorado

N

1" = 20 feet

20' 10' 0' 20'

Bearings were based on the southerly line of the Fairview Land Company adjoining County Road 124 and tied to the survey by traverse.
Reference Bearing: N 89°44'06"W



- Denotes set ⅝"x24" rebar with a 1-½" plastic cap stamped "PLS 37060"
- Denotes found 3-¼" BLM brass cap on a 2-¼" metal post

DESCRIPTION OF LIMITS OF OPERATION (CHIEF ADIT):

A tract of land located in Section 28, T36N, R11W, N.M.P.M., and being described more particularly as follows:
Beginning at a point whence the W¼ Corner of said Section 28 bears S 85°51'02"W, 2841.48 feet;
Thence N 02°55'46"E, 98.52 feet;
Thence N 71°53'43"E, 83.77 feet;
Thence S 57°11'44"E, 59.42 feet;
Thence S 16°05'44"E, 27.63 feet;
Thence S 33°04'49"W, 46.84 feet;
Thence S 63°59'11"W, 65.36 feet;
Thence N 87°47'46"W, 58.00 feet to the point of beginning.
Containing 13,309 sqft. (0.31 acres), more or less.

SURVEYOR'S STATEMENT
I hereby state that this survey and plat was prepared by me or under my direct responsibility, supervision and checking, and that, in my professional opinion, it is true and correct to the best of my knowledge, belief and information based on the standards of care of Professional Land Surveyors practicing in the State of Colorado.

John E. Mower, P.L.S.
Colorado Registration No. 37060

Deposited this _____ day of_____, 2016 at _____ .m., in Book _____ of the La Plata County Surveyor's land survey plats at Page _____.
Reception Number_____.

Mountain Man Surveying

P.O. Box 636
Durango, Co. 81302
Phone: 970-375-6358
Cell: 970-946-1886

As-Built and Topographic Survey
Renovation
"CHIEF MINE ADIT"
located in Section 28, T36N, R11W, N.M.P.M.
La Plata County, Colorado

Prepared By: J.E.M.	*Scale:* 1"=20'
Checked By: J.E.M.	*Project No.:* CHIEF
Date: 10-14-16	

Photos

Photo 1-Gravity Blocks
Photo 2-Manway Drainage Control
Photo 3-Little Deadwood Gulch Upgradient Drainage
Photo 4-Little Deadwood Gulch Upgradient Drainage

Repaired Access Road Above Chief Portal

Rock Barrier-above Chief Man Way Head Wall

Restored Chief Headwall

Incas access Road

Manway Barriers Construction

Chief Manway-with Sub drain

12 inch CMP Sub Drain

66 inch CMP Man Way

Manway-Post Construction

LDG-Chief Down Gradient Channel Pre-Construction

LDG-Chief Down Gradient Channel Post Construction

LDG-Upgradient Culvert End Section w/o Trash Rack

LDG-Chief Channel Construction

Chief-LDG Post Construction

Chief-LDG Post Construction

Man way access road

Restored Chief Portal

Chief Manway Access Road

Chief –LDG Drainage Reclaimed

Erosion Control Blanket Installation Chief –LDG Revegetation

Erosion Control Blanket Installation
Chief –LDG Revegetation-Upgradient

Erosion Control Blanket Installation
Chief –LDG Revegetation-Upgradient

Erosion Control Blanket Installation
Chief –LDG Revegetation-Adjacent to Manway

Attachment

Attachment A-LDG Restoration Plan

CARROLL & LANGE-MANHARD
A MANHARD CONSULTING COMPANY

Civil Engineering
Surveying
Water Resources Management
Water & Wastewater
Engineering
Supply Chain Logistics
Construction Management

March 18, 2013

Mr. Dustin Czapla
Division of Reclamation, Mining and Safety
101 South 3rd Street, Suite 301
Grand Junction, CO 81501

INTRODUCTION

This Work Plan presents Wildcat Mining Corporation's (Wildcat) approach to remove run-of-mine rock that was placed within the Little Deadwood Gulch (LDG), install a culvert to convey the flows in the LDF and create a bench area for egress from the Chief Portal (Phase 1). After material has been removed from the LDG and the bench has been graded, Wildcat will stabilize the highwall above the Chief Portal and repair the manway exit used for emergency escape from the mine and for mine ventilation.

Wildcat is proposing to operate the May Day Idaho Mine Complex and activated MSHA mine identification (ID) number 05-03674. Wildcat will implement the corrective actions described herein when all of the following conditions have been met:

1. Colorado Division of Reclamation, Mining and Safety (DRMS) approval of this work plan;
2. Approval of Wildcat's Restoration Plan (which includes this Work Plan) from the U.S. Army Corp of Engineers (USACE) and the U.S. Environmental Protection Agency (EPS);
3. Suitable construction weather and ground conditions.

Historical mining activities constructed the Chief Portal and disposed run-of-mine rock in the Little Deadwood Gulch drainage channel. A portion of the drainage channel was further disturbed in 2009. In early 2010, a cease and desist order to conduct any mining related activities, including operating equipment without written authorization from DRMS was issued to Wildcat. Wildcat has followed the cease and desist order and has been unable to complete any modifications to the LDG since that time.

Additionally, the U.S. Environmental Protection Agency (EPA) issued an order to Wildcat on April 9, 2012 for compliance for minor fills in waters of the U.S. Wildcat has prepared a separate restoration plan as required by the EPA. The work in this restoration plan will be consistent with the work outlined in this work plan. The EPA will be responsible for verifying compliance with Section 404 of the Clean Water Act.

After a site investigation by DRMS, an order was issued (MV-2010-020) for constructing an illegal portal, the Chief Portal, near the existing May Day 3 level. Wildcat submitted as Exhibit D, Attachment D-4 to its amended Section 112d permit application the Chief Drainage Channel Reclamation Work Plan (the Original Work Plan). This Original Work Plan generally addressed existing drainage conditions, construction activities required to remove disposed rock from the LDG and stabilization activities after construction was completed. Additional information was required at the time of approval of the Original Work Plan, including a geotechnical stability analysis that demonstrates that the proposed means of stabilization of the Chief Portal will have an acceptable factor of safety and the removal of all mine waste

from the LDG. Wildcat committed to submitting a Technical Revision (TR) for review and approval by DRMS once the additional information was available.

The proposed work to remove debris from the Little Deadwood Gulch and stabilize the highwall above the Chief Portal will be broken into two phases as outlined below:

Phase 1 – Removal of mine debris from Little Deadwood Gulch:

1. Installation of erosion and sediment control BMP's at the site.

2. Remove approximately 550 cubic yards of unauthorized fill from the LDG. Removed material will be stockpiled and used for stabilization of the highwall above the Chief Portal.

3. Installation of a 24" culvert to allow the LDG to flow along its historical path.

4. Grade a bench area above the culvert that will provide vehicular access to the emergency manway for the Chief Portal and install BMP's to prevent erosion while vegetation establishes.

5. Complete riparian and channel restoration activities required by the Restoration Plan that was prepared for the EPA. This work in the Wetland Restoration Plan is beyond the requirements of this TR and will be overseen by the EPA and/or the USACE.

Phase 2 – Stabilize the highwall above the Chief Portal

1. Remove debris and loose dirt from the area immediately above the portal entrance. All loose dirt removed will be stockpiled for use in reconstruction of the highwall. Trees, roots and trash remove during this portion of the project will be disposed in a landfill.

2. Reconstruct the highwall above the Chief Portal to meet the recommendations stated in the Rule 6.5 Geotechnical Stability Report – Chief Portal, dated March 16, 2013, prepared by Wildcat Mining Corporation (the Geotechnical Stability Report), completed by J. Erich Rauber, PE.

3. Extend the portal opening, through the use of a 66" pipe to the toe of the backfilled slope.

4. Stabilize the existing access road to May Day 3 and the portal access road. Stabilization includes scarifying, moisture treating and compaction of the existing road alignment.

5. Installation of final BMP's to re-establish vegetation and stabilize the disturbed areas.

WORK PLAN

The following presents a corrective action work plan to remove debris from the LDG, install a culvert within the channel, stabilize the highwall and access road immediately above the Chief Portal and repair the emergency manway exit at the Chief Portal. Additional investigations were initiated to evaluate the soil conditions in the immediate vicinity of the Chief Portal. Based on those recommendations, the following design has been prepared to meet the conditions imposed by DRMS as part of the conditionally approved 112d permit. This TR uses current geotechnical and topographic data to further refine the design that was presented in the Original Work Plan and prepare the final construction documents for the Little Deadwood Gulch and Chief Portal.

Phase 1 Scope of Work

Design Analysis:

To determine the amount of run-of-mine rock that was placed within the drainage way of the LDG that will be removed, an analysis was completed of the slopes and cross sections of the Gulch upstream and downstream of the disturbed area. Cross sections were cut on a 25-foot interval to determine approximate side slopes of the Gulch in an undisturbed state as well as to determine the approximate longitudinal grade prior to rock being placed within the Gulch. The existing profile of the Gulch and the cross sections are shown in Appendix B, Figures 1, 2, 2A and 2B.

Based on this analysis, it was determined that the side slope on the west side of the Gulch was approximately 4:1 and the side slope on the east side of the drainage way varies from approximately 2:1 to approximately 8:1. The longitudinal slope of the Gulch flattens in front of the Chief Portal to about 15%, with longitudinal slopes of approximately 25% upstream and 30% downstream of the portal area. Using these parameters, the approximate configuration of the LDG would be as shown in Figure 4 – Proposed Little Deadwood Gulch Grading (see Appendix B). It will be necessary to cut the area along the channel per Figure 4 to remove the debris from the channel prior to placing the culvert in the channel and grading the bench over the culvert.

A drainage analysis was completed for the LDG (at this point in the drainage way) to determine the maximum flows that could be conveyed by a 24" culvert (vertical constraints prohibit a larger pipe). The Little Deadwood Gulch has a tributary area of approximately 311 acres and a 10-year and 100-year, 24 hour flow of 19.5 and 87 cubic feet per second (cfs), respectively. Using these numbers, a CulvertMaster calculation was completed and it was determined that a 24" RCP could convey 29.4 cfs. The remaining run-off will overtop the pipe and flow across the bench. The bench area has been graded as a trapezoidal channel with a 1-foot depth and a minimum bottom width of 10 feet. Calculations were run on a channel of these dimensions and it was determined that 113 cfs could be conveyed. During a 100-year event, 57.6 cfs would overtop the culvert, so there will be approximately 0.3 feet of freeboard during this storm event. Drainage calculations are shown in Appendix A.

Construction of Improvements:

Prior to the start of construction, wetlands within the project area will be delineated and clearly marked to meet the EPA order and remain in compliance with the Clean Water Act. After wetlands have been delineated, construction will begin with installation of necessary runoff and erosion BMP controls as shown on Figure 3 – Initial SWMP in Appendix B. Following installation of these controls, grading operations will begin by removing debris from the LDG to meet the proposed grading shown in Figure 4.

It is estimated that approximately 550 cubic yards will be excavated from the LDG. As shown in Figure 5 – Stockpile Areas, all of the excavated material to be stockpiled will be transported to May Day 3 for storage and to construct the bench and to repair the highwall above the Chief Portal. The stockpile will be surrounded with silt fence and, if it will remain undisturbed for more than 30 days, seeded and mulched.

After the material has been removed from the LDG, a 24" RCP culvert will be installed as shown in Figure 6 – Little Deadwood Gulch Culvert Plan & Profile. A bench will be graded over the top of the pipe to provide emergency egress from the Chief portal. The proposed grading of this bench is also shown on Figure 6.

After completion of grading activities, all disturbed areas will need to be stabilized to prevent erosion. Rock Check Dams will be placed along the flow line of the channel above and below the culvert to slow the velocity of run-off and prevent scouring. Seeding and mulch will be placed on all disturbed areas. Due to the high probability that water will flow through this area, it is recommended that slopes greater than 3:1 disturbed during grading activities be covered with erosion control blankets. Erosion control measures are shown on Figure 7 – Interim SWMP.

Phase 2 Scope of Work

After work within the LDG has been completed, as outlined above, construction will proceed to stabilizing the highwall and the access road immediately above the existing portal and repair of the existing manway exit from the mine. A geotechnical stability report was completed on March 16, 2013 by Wildcat Mining Corporation that gives recommendations on how to stabilize the highwall.

Geotechnical Investigation:

The Rule 6.5 Geotechnical Stability Report – Chief Portal, dated March 16, 2013, prepared by Wildcat Minning Corporation (the Geotechnical Stability Report) was completed by J. Erich Rauber, PE to provide recommendations to stabilize the highwall above the Chief Portal. The full Geotechnical Stability Report can be found in Appendix D.

The subsurface investigation included excavating five test pits, two on the bench in front of the portal and three along the existing access road to May Day 3, and performing moisture content, Atterberg Limits and compaction tests on samples taken from each of the test pits. Based on this analysis, the Geotechnical Stability Report made the following recommendations for the reconstruction of the highwall in Section 5.0 – Recommendations:

- Loose fill and debris should be removed from the highwall area and a buttress should be constructed to establish a pad on which the portal improvements can be supported. A typical detail of the buttress can be found in the Appendix of the Geotechnical Stability Report.

- The finished slope of the highwall shall not exceed 1.5:1.

- Fill materials should be free of organic material with the largest particle sizes less than six inches. Fill should be placed in layers of eight inches or less, moisture conditioned and compacted.

Additional recommendations were provided for the repair of the portal entrance and repair of the Portal Access Road.

Construction of Improvements:

Reconstruction of the highwall will start with the removal of trees, vegetation, debris and loose dirt and rock from the collapsed area above the portal. The trees, vegetation and debris will be hauled off-site and disposed of in a landfill. The loose dirt and rock will be stockpiled with the material removed from the LDG on May Day 3.

Once the highwall has been cleared, the Contractor will reconstruct the slope to meet the design prepared in Figure 8 – Highwall Grading Plan (see Appendix C) and the recommendations of the Geotechnical Stability Report.

The portal opening will need to be extended as part of the reconstruction of the highwall because the proposed slope will completely cover the existing opening. To extend this emergency exit, a 66-inch pipe will be installed at a 11% slope from the proposed retaining wall to a point that catches inside the existing opening. A plan and profile of this design has been provided in Figure 9 – Chief Portal Plan & Profile.

The portal access road and the existing access road above the Chief Portal will need to be stabilized after the grading of the highwall has been completed. The alignment and elevations of both of these access roads will remain the same, but both roads will need to be scarified, moisture treated and compacted to meet the recommendations of the Geotechnical Stability Report.

The contractor will need to place erosion control measures (BMP's) on the proposed improvements as work is completed. Slopes will need to be stabilized with seeding and mulching or hydromulch with a tackifier. All disturbed slopes steeper than 3:1 shall also have erosion control blankets to prevent

stormwater run-off from washing the seed and mulch or hydromulch off of the slope prior to vegetation becoming established. Erosion control measures are shown on Figure 10 – Final SWMP.

At the completion of mining operations, the improvements discussed in this work plan will be left in place. Maintenance will be performed on the culvert to repair any damage that occurred during mining operations and disturbed areas will be reseeded. The seeded areas will be planted with the seed mix summarized in the approved mine permit (shown below) and steep slopes will be protected with erosion control blankets to prevent erosion while the seed is establishing.

Seed Mix (pending approval from USACE/EPA):

- 35% Slender Wheatgrass (7 lbs/ac)
- 35% Mountain Brome (7 lbs/ac)
- 10% Blue Bunch Wheat Grass (2 lbs/ac)
- 10% Canadian Wild Rye (2 lbs/ac)
- 10% Lewis Flax (2 lbs/ac)

APPENDIX A

- **LITTLE DEADWOOD GULCH DRAINAGE ANALYSIS**

Table
Chief Channel Design Calculations
Wildcat Mining Company
Durango, Colorado

Annual Rainfall	19.9	inches
Snowfall	68.8	inches
Average Temp High	62.7	inches
Average Temp Low	29.9	inches
Rain fall low	May	
Rain fall high	August	
Pan Evaporation	37.8	inches

Peak Flow (Type II Storm-Steep Slope >16% slope
Figure D--2)
NRCS Runoff Curve Number 58

Return Period	Rainfall Duration	Rainfall Amount	Runoff	Drainage Area (acres)	CFS/inch Runoff	Peak flow
2	24	1.25	0.00	311	150	0.0
10	24	2.5	0.13	311	150	19.5
25	24	3.5	0.45	311	150	67.5
100	**24**	**3.78**	**0.58**	**311**	150	**87.0**
		Sq feet	Acres	311		
Drainage Area	311	acres				

Reference

U.S. Department of Commerce, 1961, Technical Paper 40-Rainfall Frequency Atlas of the United States for Durations from 30 minutes to 24 hours and Return Periods fromm 1 to 100 years. Washington , D.C.

Wilkes, S. Glade and Erke C. King, 1975, Procedures forDetermining Peak Flows in Colorado, Incorporateds and Supplements Technica Release No. 55 Uraban Hydrology for Small Water

Soil Conservation Service, Soil Conservation Naltion Engineering Handbook, Section 4- Hydrology NEH-4.

Culvert Master

Culvert Calculator Report
Chief LDG Culvert

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	9,294.00	ft	Headwater Depth/Height	2.00	
Computed Headwater Eleva	9,294.00	ft	Discharge	29.44	cfs
Inlet Control HW Elev.	9,294.00	ft	Tailwater Elevation	9,273.20	ft
Outlet Control HW Elev.	9,293.60	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	9,290.00	ft	Downstream Invert	9,273.15	ft
Length	102.90	ft	Constructed Slope	0.163751	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.80	ft
Slope Type	Steep		Normal Depth	0.78	ft
Flow Regime	Supercritical		Critical Depth	1.85	ft
Velocity Downstream	25.17	ft/s	Critical Slope	0.014663	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	9,293.60	ft	Upstream Velocity Head	1.46	ft
Ke	0.20		Entrance Loss	0.29	ft

Inlet Control Properties					
Inlet Control HW Elev.	9,294.00	ft	Flow Control	N/A	
Inlet Type	Groove end projecting		Area Full	3.1	ft²
K	0.00450		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Chief Bench Max Flow

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.069	
Channel Slope	20.000	%
Normal Depth	1.00	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft

Results

Discharge	113.00	ft^3/s
Flow Area	14.00	ft^2
Wetted Perimeter	18.25	ft
Hydraulic Radius	0.77	ft
Top Width	18.00	ft
Critical Depth	1.32	ft
Critical Slope	0.07132	ft/ft
Velocity	8.07	ft/s
Velocity Head	1.01	ft
Specific Energy	2.01	ft
Froude Number	1.61	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	1.32	ft
Channel Slope	20.000	%

Chief Bench 100-year Flow

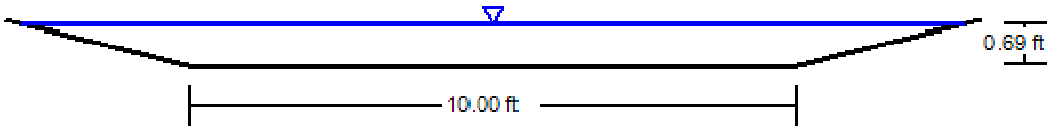
Project Description

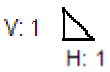
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	20.000	%
Normal Depth	0.69	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	57.60	ft³/s

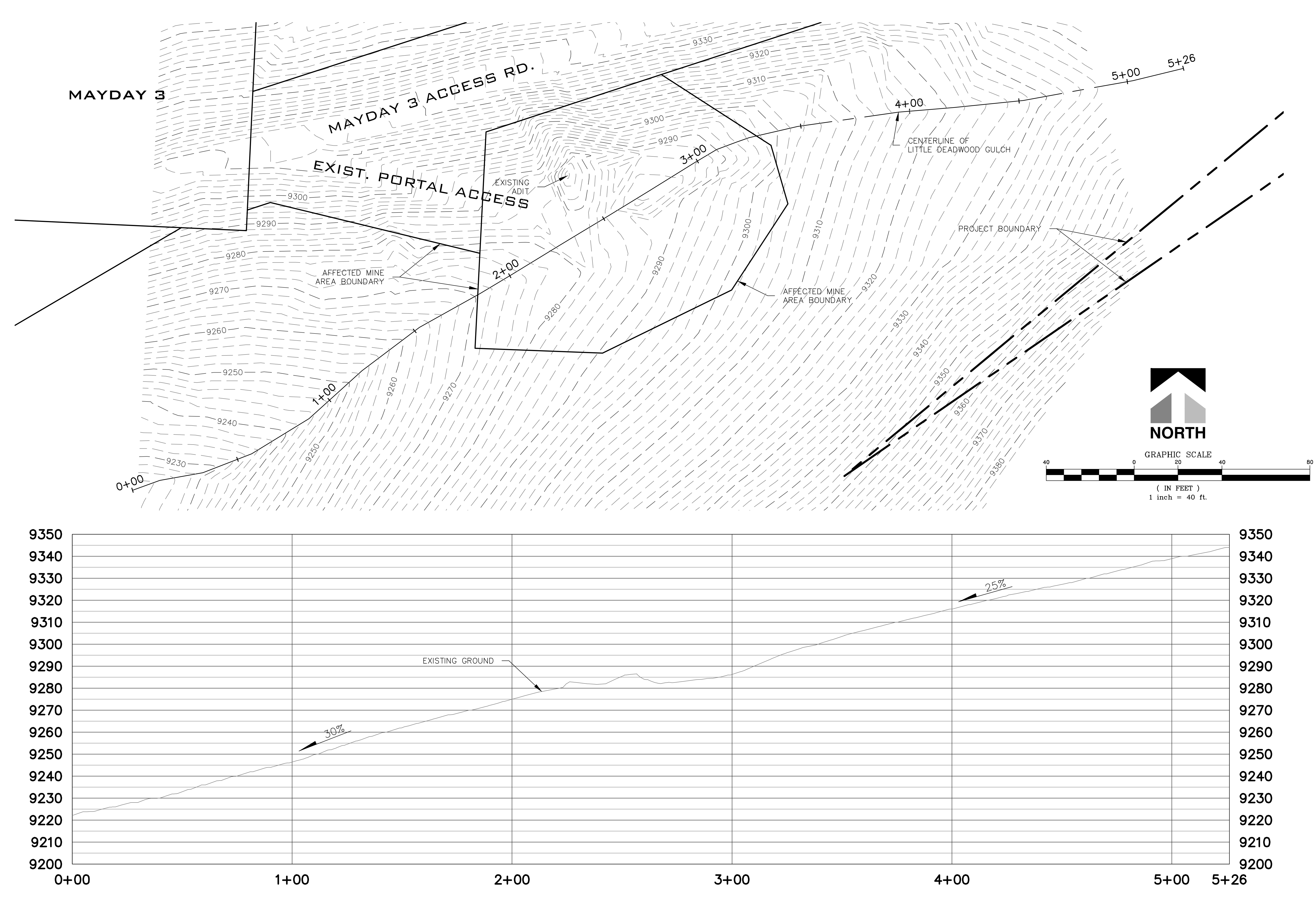
Cross Section Image





APPENDIX B – PHASE 1 CONSTRUCTION FIGURES

- FIGURE 1 – EXISTING CONDITIONS & LITTLE DEADWOOD GULCH PROFILE
- FIGURE 2, 2A AND 2B – LITTLE DEADWOOD GULCH CROSS SECTIONS
- FIGURE 3 – INITIAL SWMP
- FIGURE 4 – PROPOSED LITTLE DEADWOOD GULCH GRADING
- FIGURE 5 – STOCKPILE AREAS
- FIGURE 6 – LDG CULVERT PLAN & PROFILE
- FIGURE 7 – INTERIM SWMP



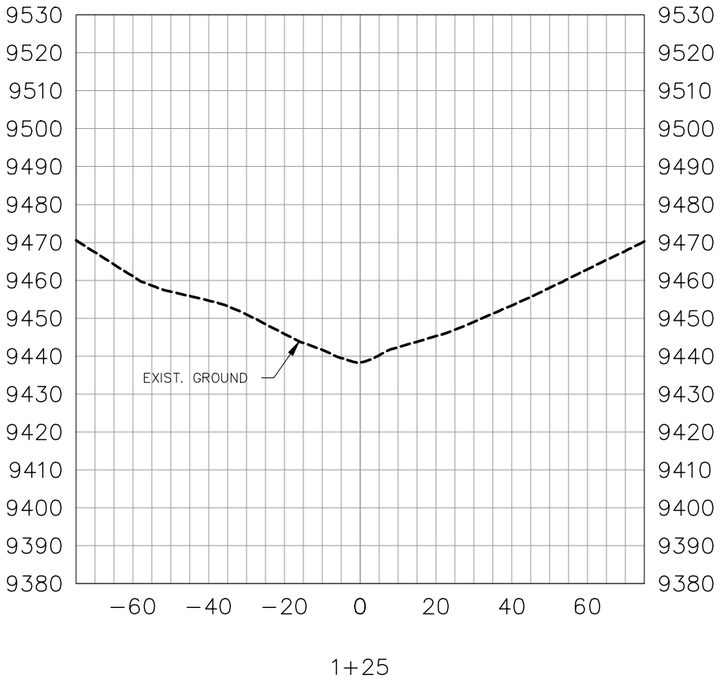
CARROLL & LANGE·MANHARD
A MANHARD CONSULTING COMPANY

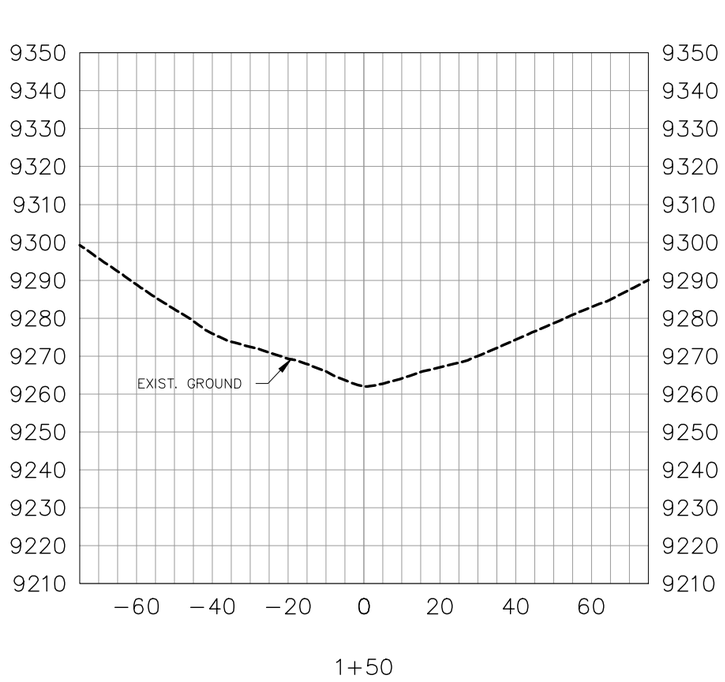
03/08/13 INITIAL DRMS SUBMITTAL DJM

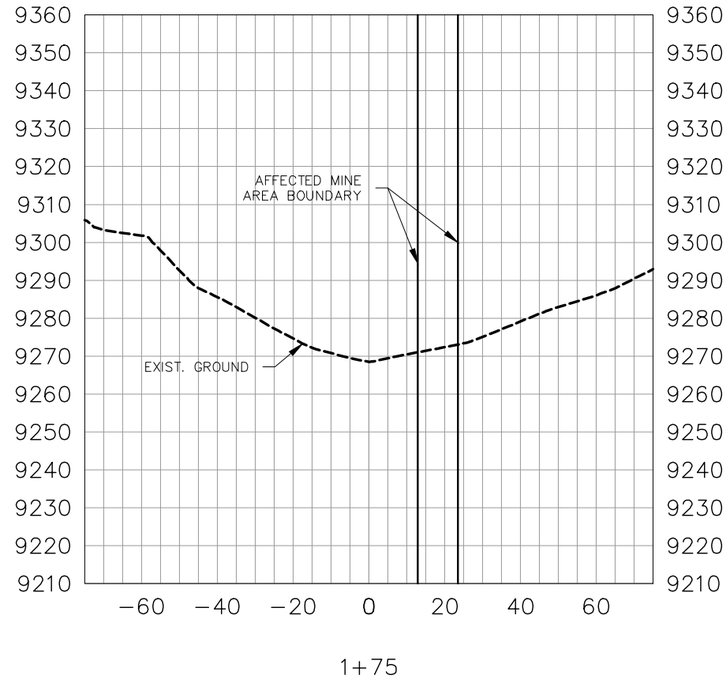
MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
EXIST. CONDITIONS & LITTLE DEADWOOD GULCH PROFILE

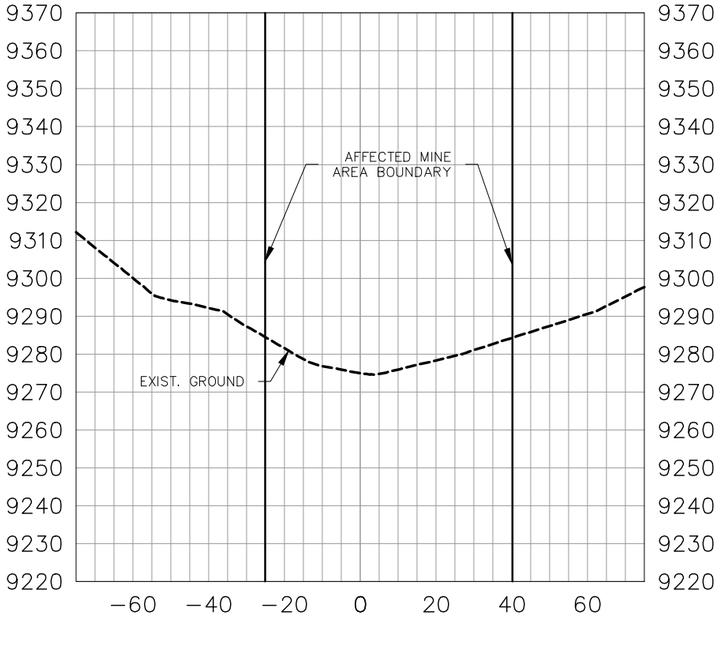
PROJ. MGR.: DJM
PROJ. ASSOC.: TLR
DRAWN BY: DJM
DATE: 03/01/13
SCALE: 1"=40'

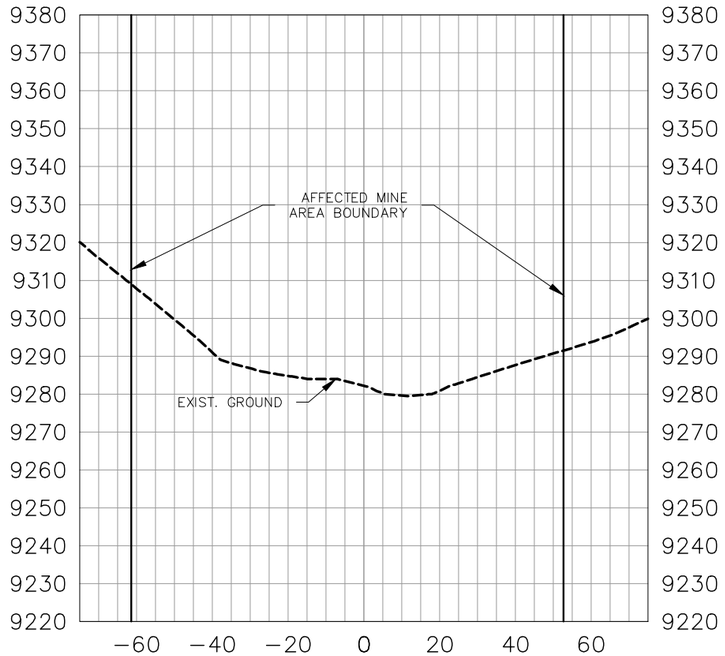
SHEET
FIG 1
WMCDUC 120574

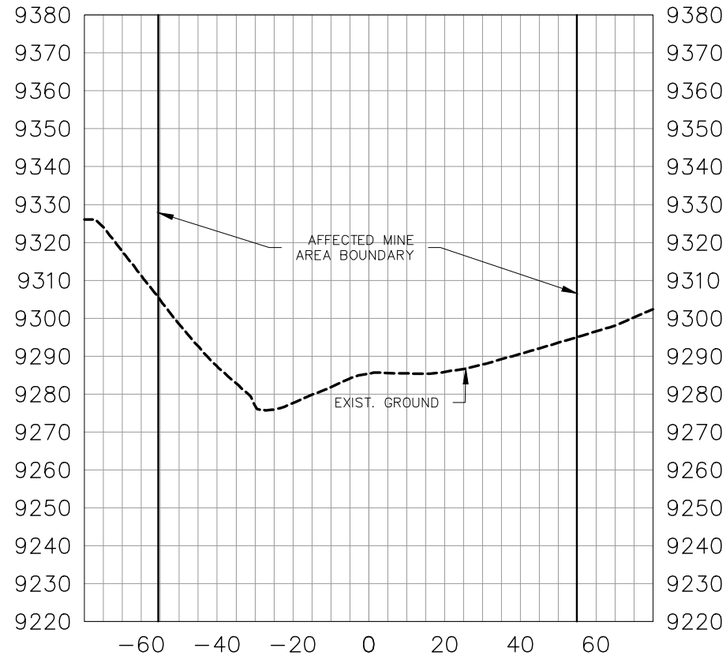












DRAWN BY	REVISIONS	DATE	
DJM	INITIAL DRMS SUBMITTAL	03/06/13	1

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MAYDAY IDAHO MINE COMPLEX

LA PLATA COUNTY, STATE OF COLORADO

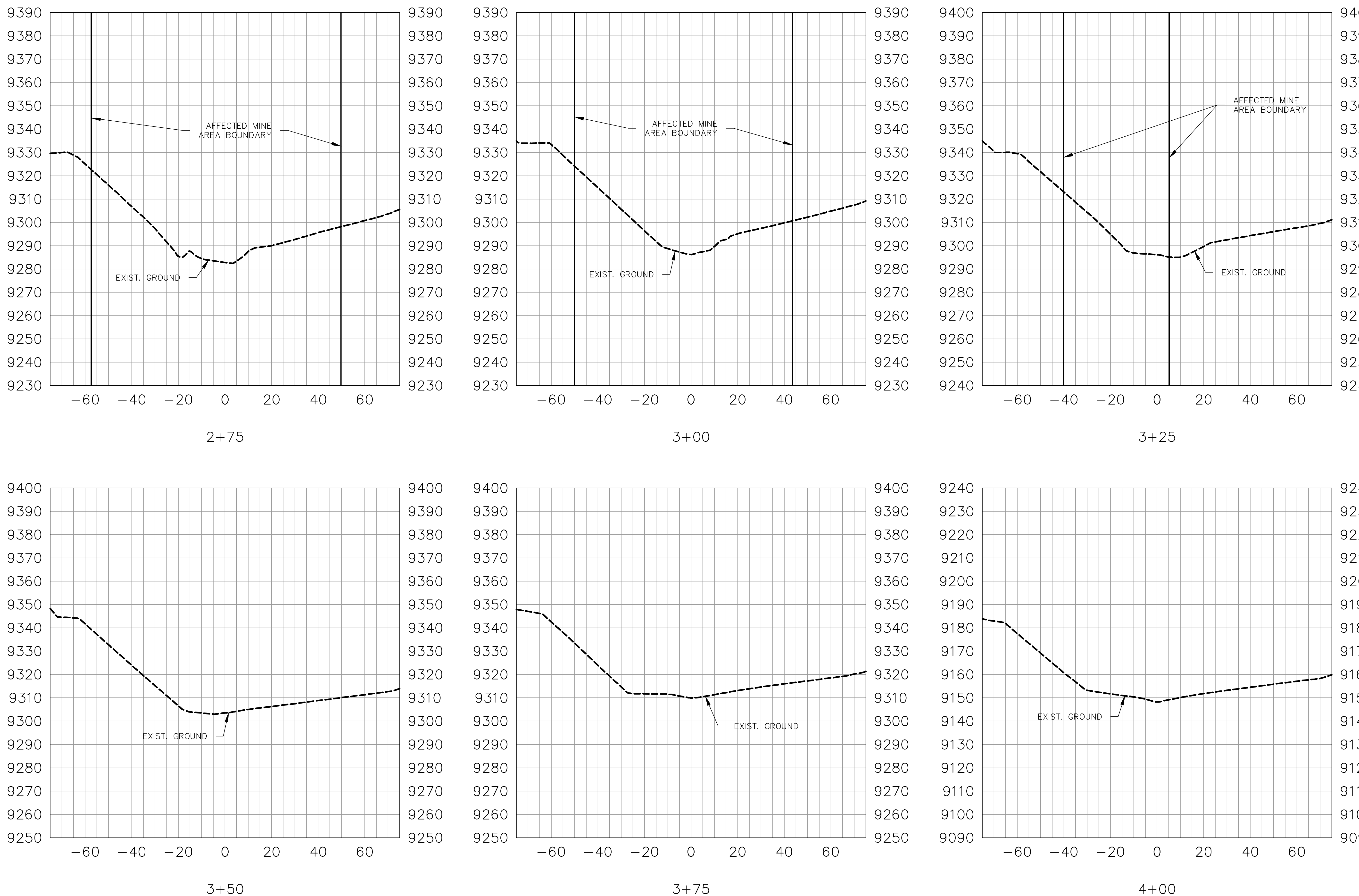
LITTLE DEADWOOD GULCH CROSS SECTIONS - 01

PROJ. MGR.:	DJM
PROJ. ASSOC.:	TLR
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	N/A

SHEET

FIG 2

WMCDUC 120574



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DATE	REVISIONS	DRAWN BY
03/08/13	INITIAL DRMS SUBMITTAL	DJM

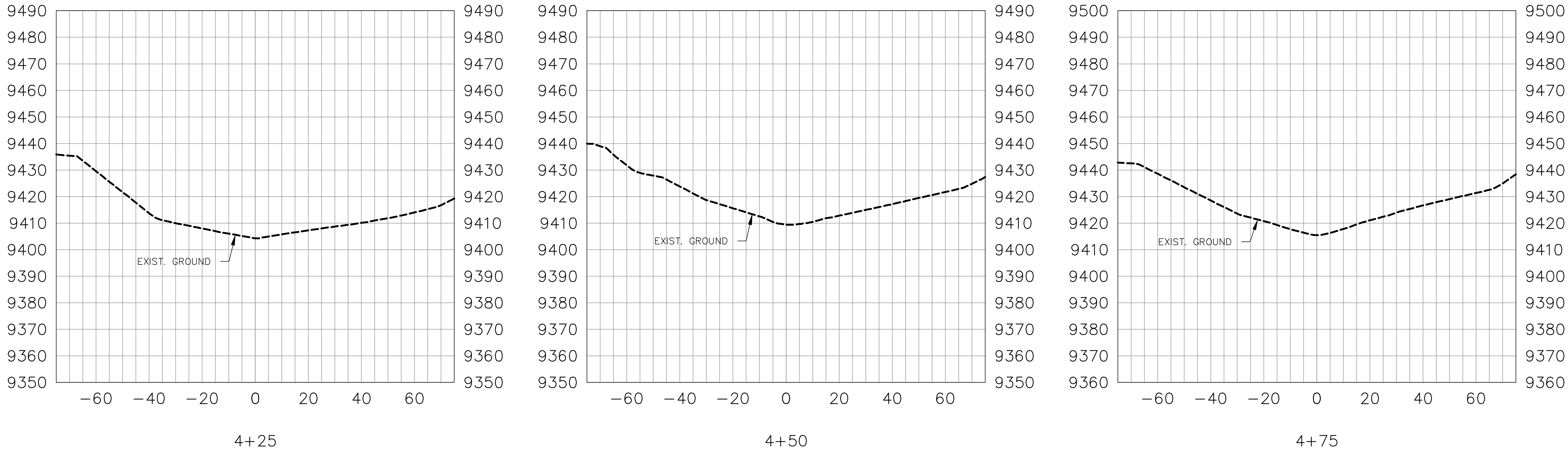
MAYDAY IDAHO MINE COMPLEX

LA PLATA COUNTY, STATE OF COLORADO

LITTLE DEADWOOD GULCH CROSS SECTIONS - 02

PROJ. MGR.: DJM
PROJ. ASSOC.: TLR
DRAWN BY: DJM
DATE: 03/01/13
SCALE: N/A

SHEET
FIG 2A
WMCDUC 120574



DATE	REVISIONS	DRAWN BY
03/08/13	INITIAL DRMS SUBMITTAL	DJM

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MAYDAY IDAHO MINE COMPLEX

LA PLATA COUNTY, STATE OF COLORADO

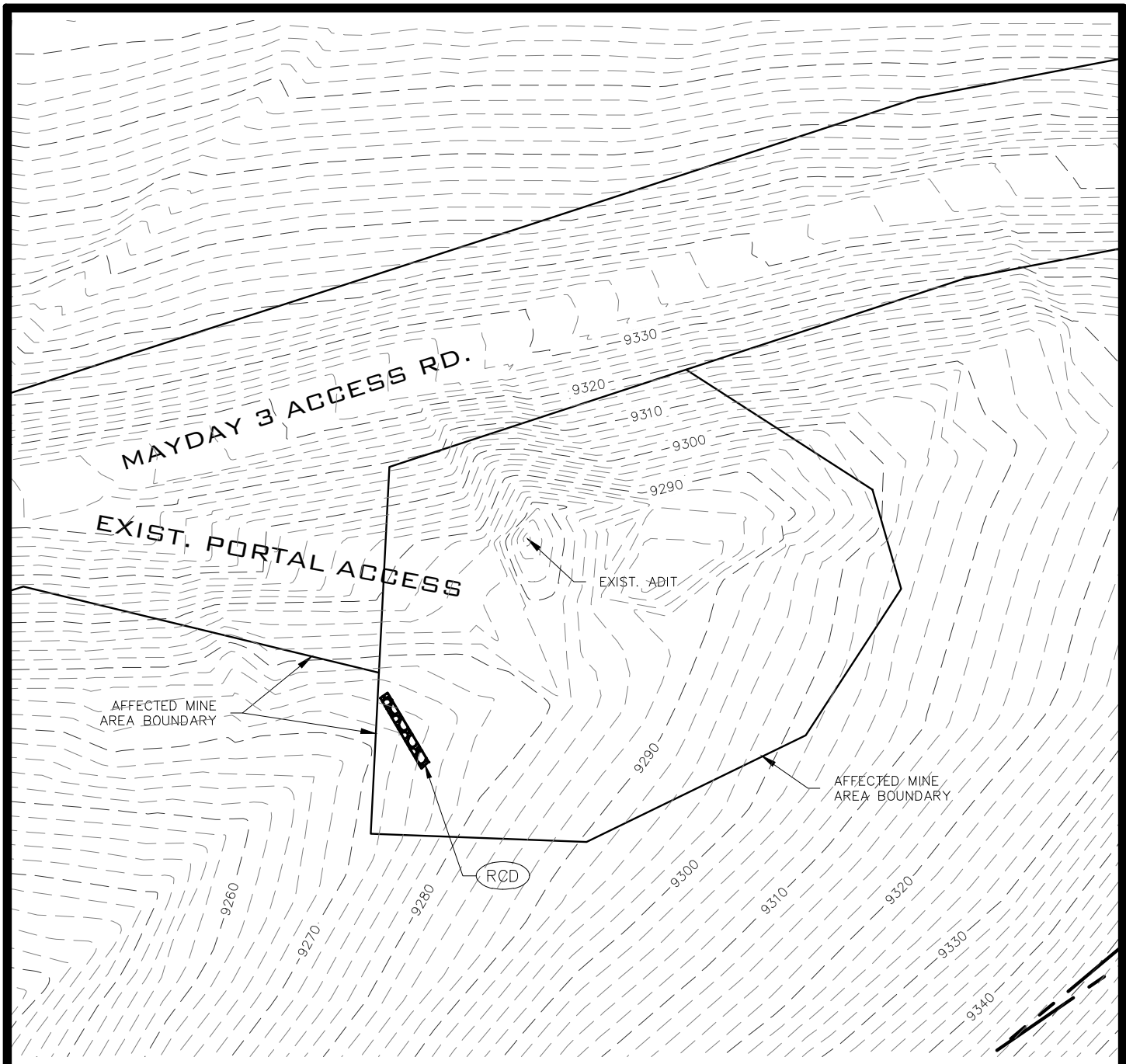
LITTLE DEADWOOD GULCH CROSS SECTIONS - 03

PROJ. MGR.: DJM
PROJ. ASSOC.: TLR
DRAWN BY: DJM
DATE: 03/01/13
SCALE: N/A

SHEET

FIG 2B

WMCDUC 120574



LEGEND

—— 8715 ——	EXISTING MAJOR CONTOUR
—— 8717 ——	EXISTING MINOR CONTOUR
RCD	ROCK CHECK DAM

NORTH

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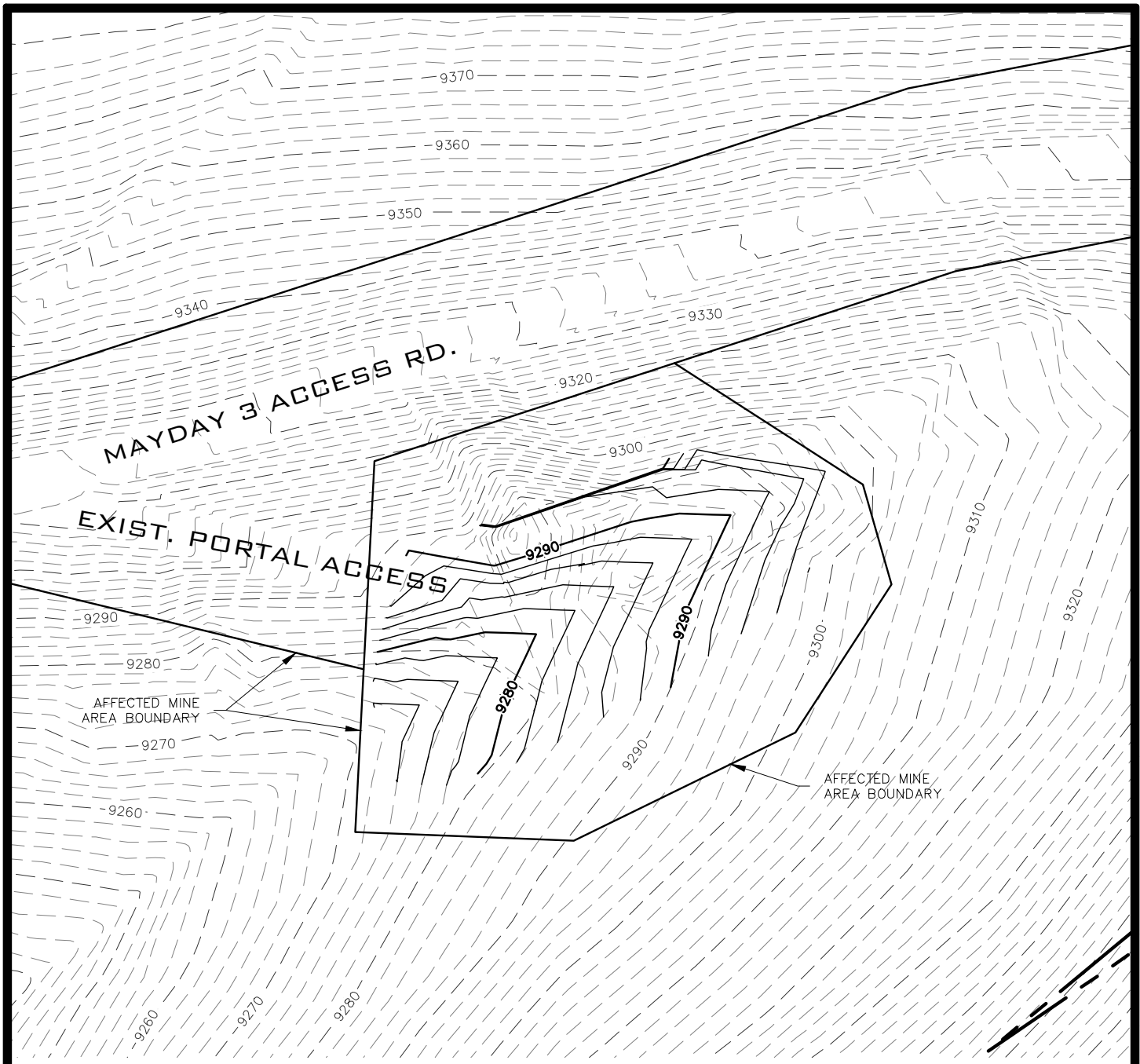
MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
INITIAL SWMP

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 3
WMCDUC 120574



LEGEND

8715	PROPOSED MAJOR CONTOUR
8717	PROPOSED MINOR CONTOUR
8715	EXISTING MAJOR CONTOUR
8717	EXISTING MINOR CONTOUR

NORTH

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MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
PROP LITTLE DEADWOOD GULCH GRADING

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 4
WMCDUC 120574

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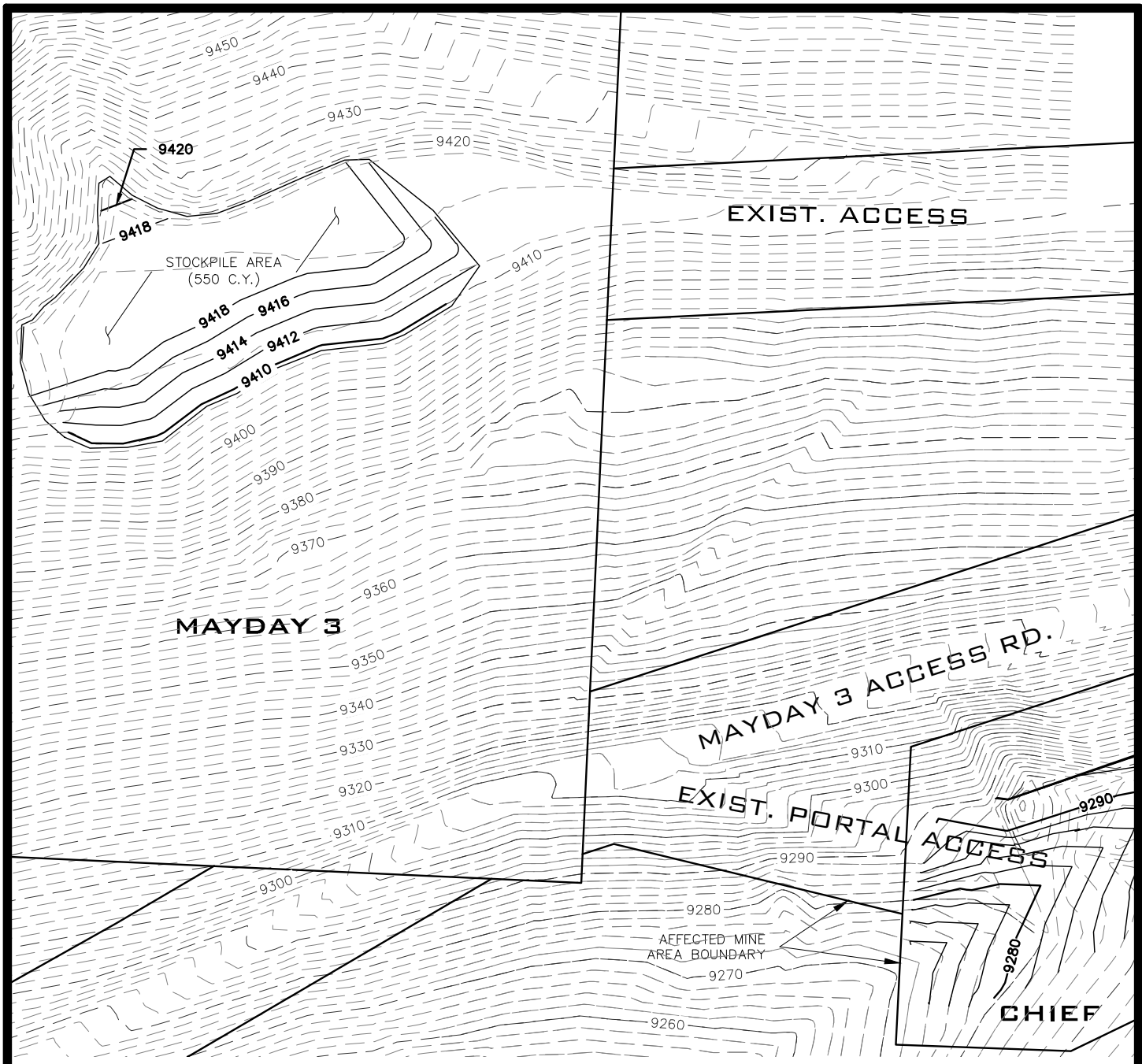

LEGEND

8715	PROPOSED MAJOR CONTOUR
8717	PROPOSED MINOR CONTOUR
8715	EXISTING MAJOR CONTOUR
8717	EXISTING MINOR CONTOUR

NORTH

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MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
STOCKPILE AREAS

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=50'

SHEET
FIGURE 5
WMCDUC 120574

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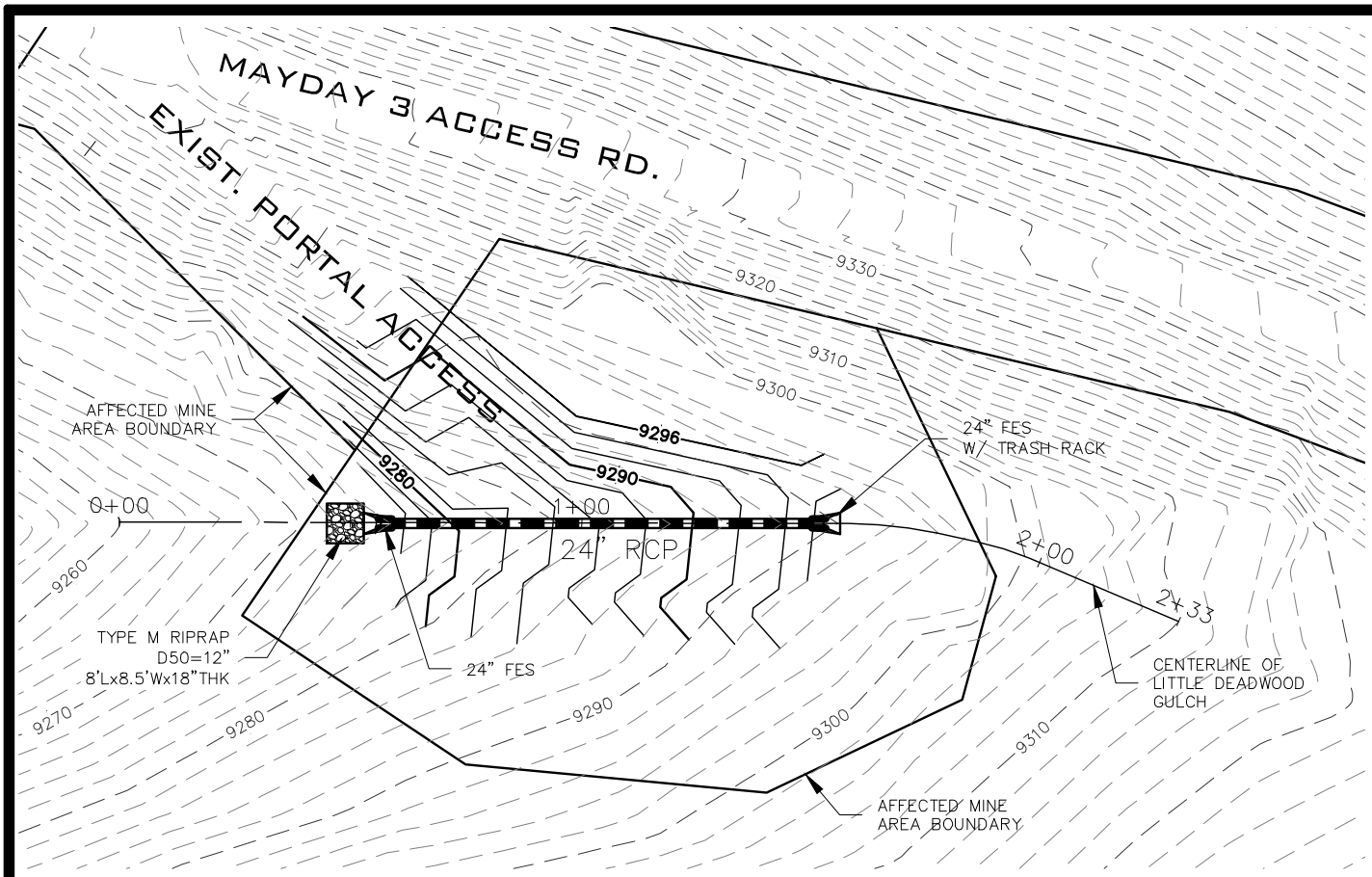

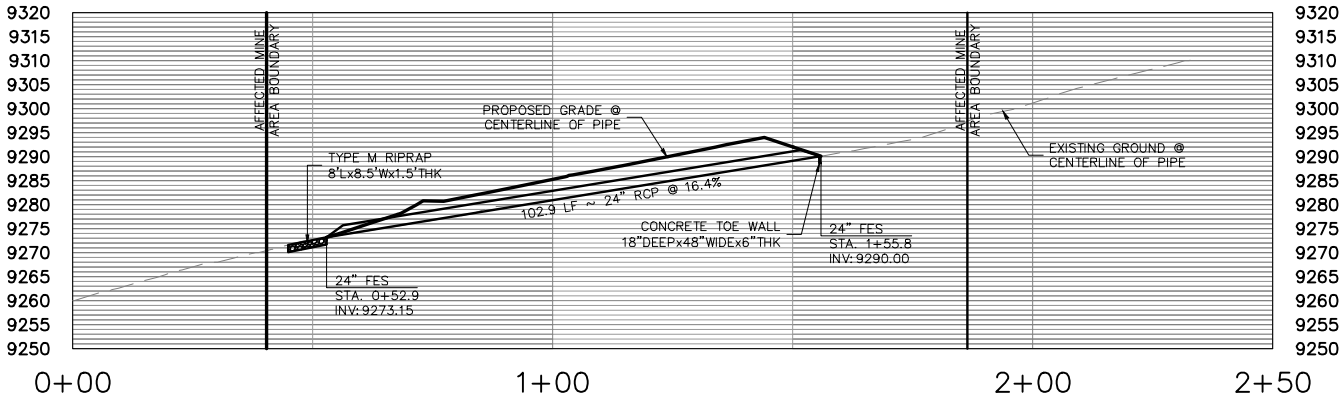

LEGEND

8715	PROPOSED MAJOR CONTOUR
8717	PROPOSED MINOR CONTOUR
8715	EXISTING MAJOR CONTOUR
8717	EXISTING MINOR CONTOUR
	PROPOSED CULVERT

NORTH

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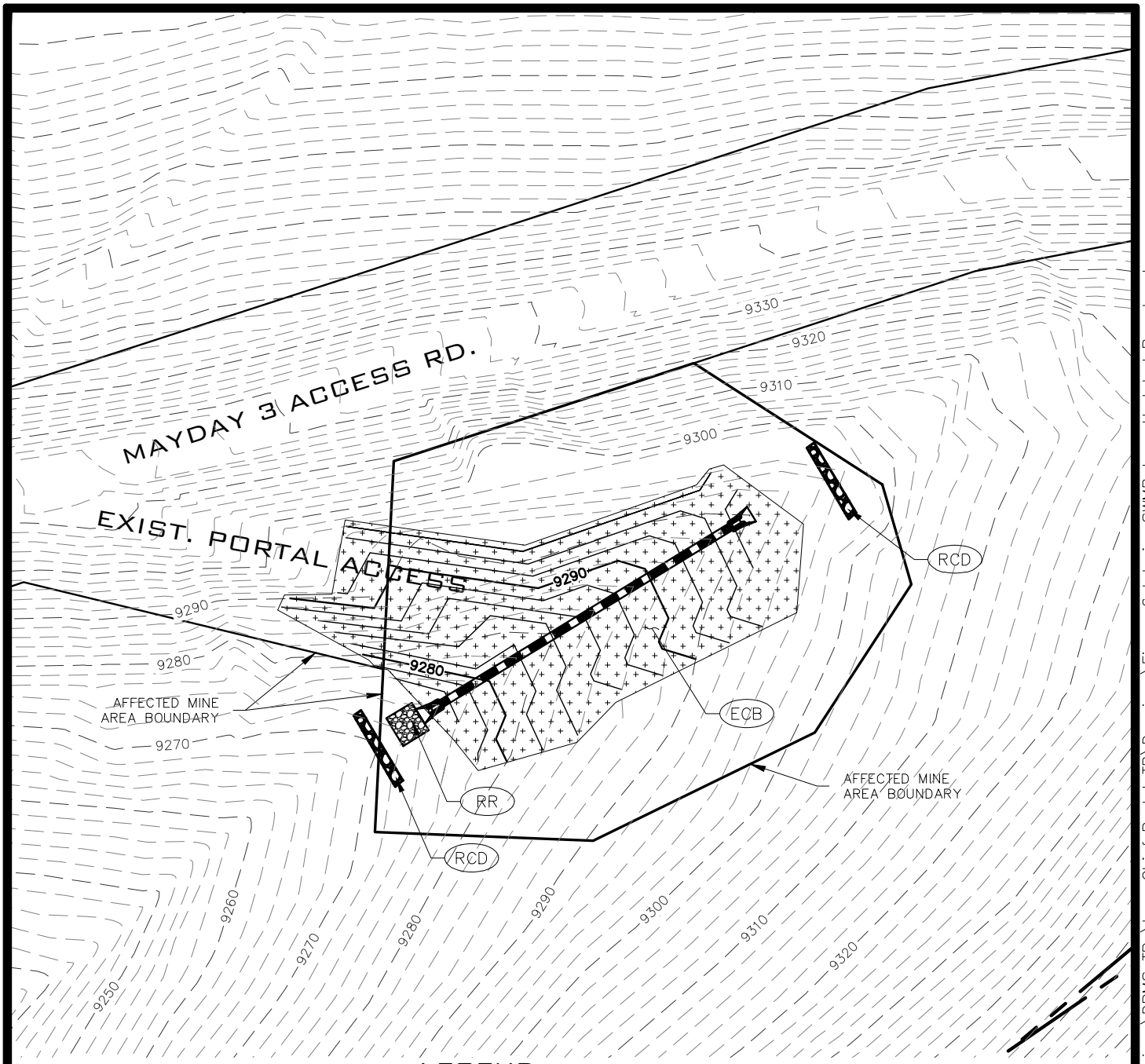
MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
LDG CULVERT PLAN & PROFILE

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 6
WMCDUC 120574

Dwg Name: P:\Wmcduc\dwg\Eng\Final Drawings\DRMS TRs\b - Chief Portal TR\Drawings\Figure 6 Little DeadWood Gulch P&P.dwg Updated By: dmadruga 17:00



LEGEND

8715	PROPOSED MAJOR CONTOUR
8717	PROPOSED MINOR CONTOUR
8715	EXISTING MAJOR CONTOUR
8717	EXISTING MINOR CONTOUR
RCD	ROCK CHECK DAM
ECB	EROSION CONTROL BLANKET
RR	RIPRAP

NORTH

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MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
INTERIM SWMP

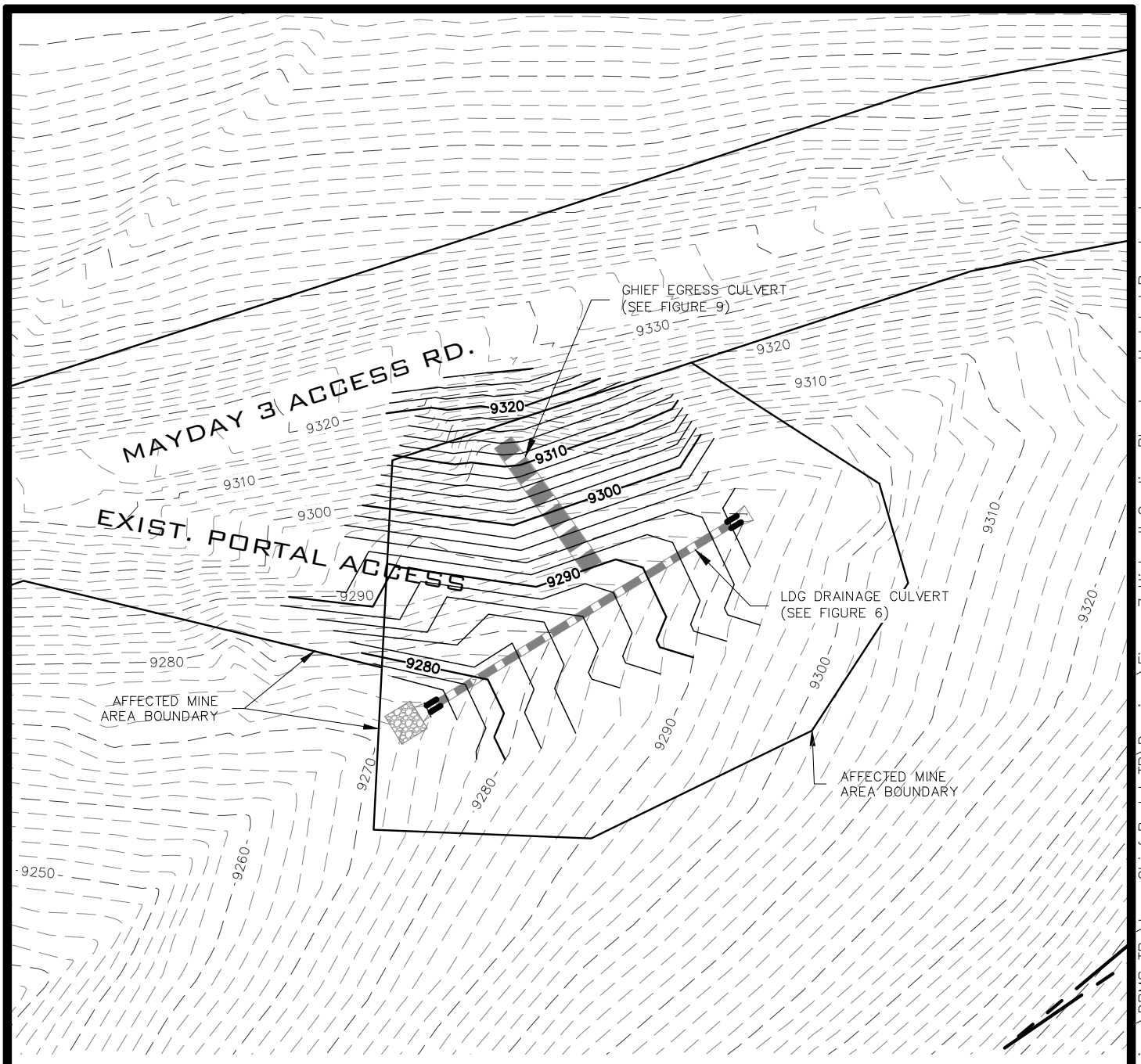
PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 7
WMCDUC 120574

Dwg Name: P:\Wmcduc\dwg\Eng\Final Drawings\DRMS TRs\b - Chief Portal TR\Drawings\Figure 6 Interim SWMP.dwg Updated By: dmadruga 17:25

APPENDIX C – PHASE 2 CONSTRUCTION FIGURES

- **FIGURE 8 – HIGHWALL GRADING PLAN**
- **FIGURE 9 – CHIEF PORTAL PLAN & PROFILE**
- **FIGURE 10 – FINAL SWMP**



LEGEND

8715	PROPOSED MAJOR CONTOUR
8717	PROPOSED MINOR CONTOUR
8715	EXISTING MAJOR CONTOUR
8717	EXISTING MINOR CONTOUR
	PROPOSED CULVERT

NORTH

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MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
HIGHWALL GRADING PLAN

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 8
WMCDUC 120574

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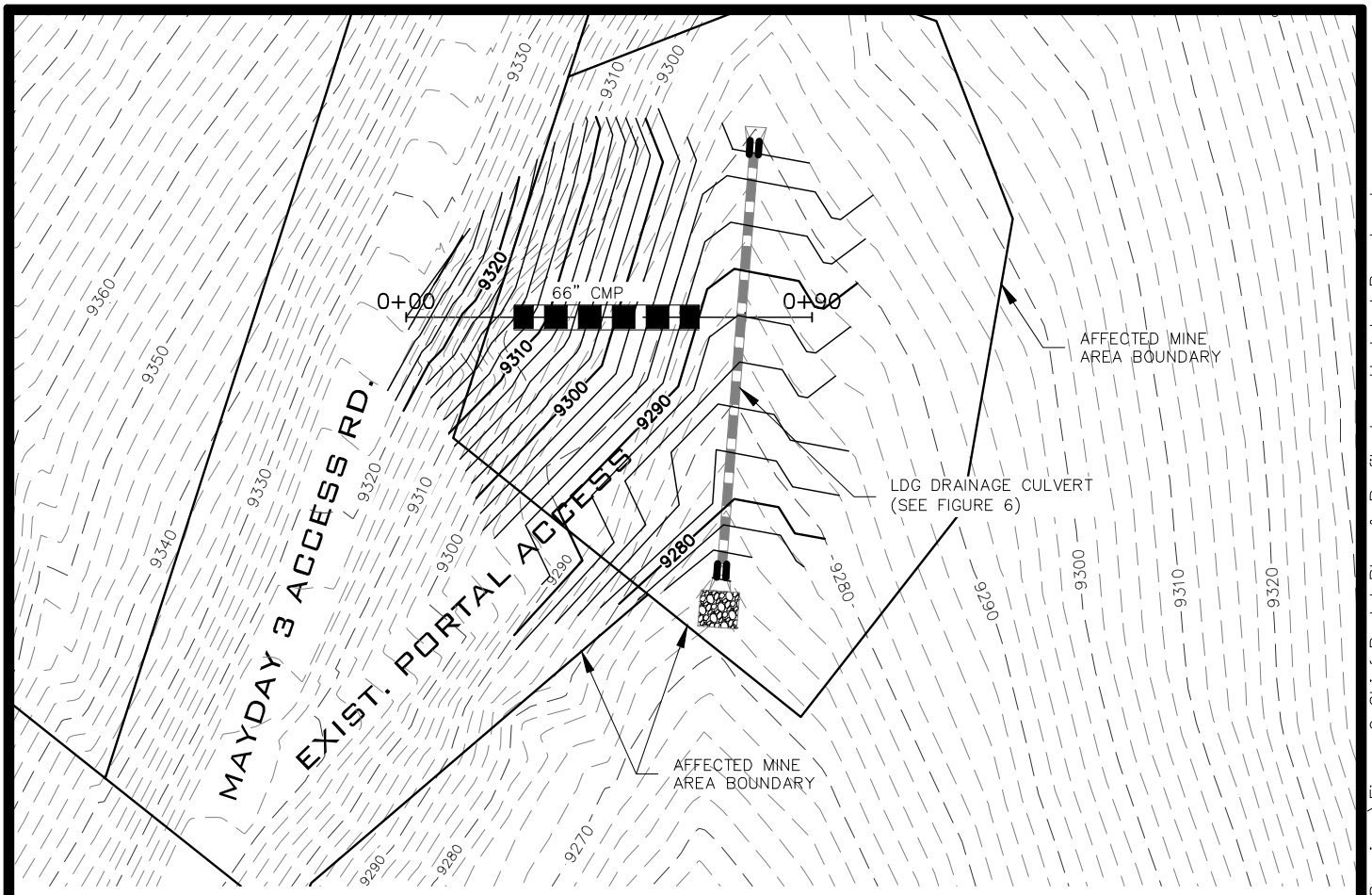

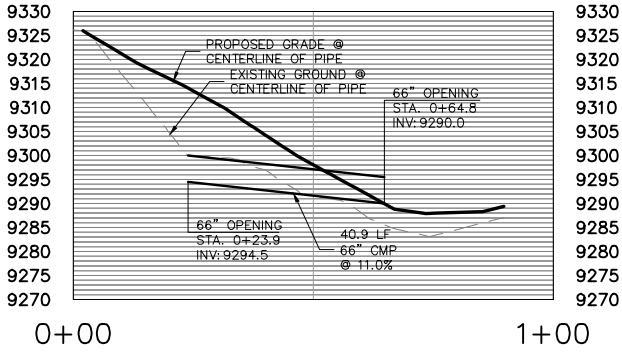

LEGEND

- 8715 — PROPOSED MAJOR CONTOUR
- 8717 — PROPOSED MINOR CONTOUR
- 8715 — EXISTING MAJOR CONTOUR
- 8717 — EXISTING MINOR CONTOUR
- PROPOSED CHIEF EGRESS CULVERT
- PROPOSED DRAINAGE CULVERT

NORTH

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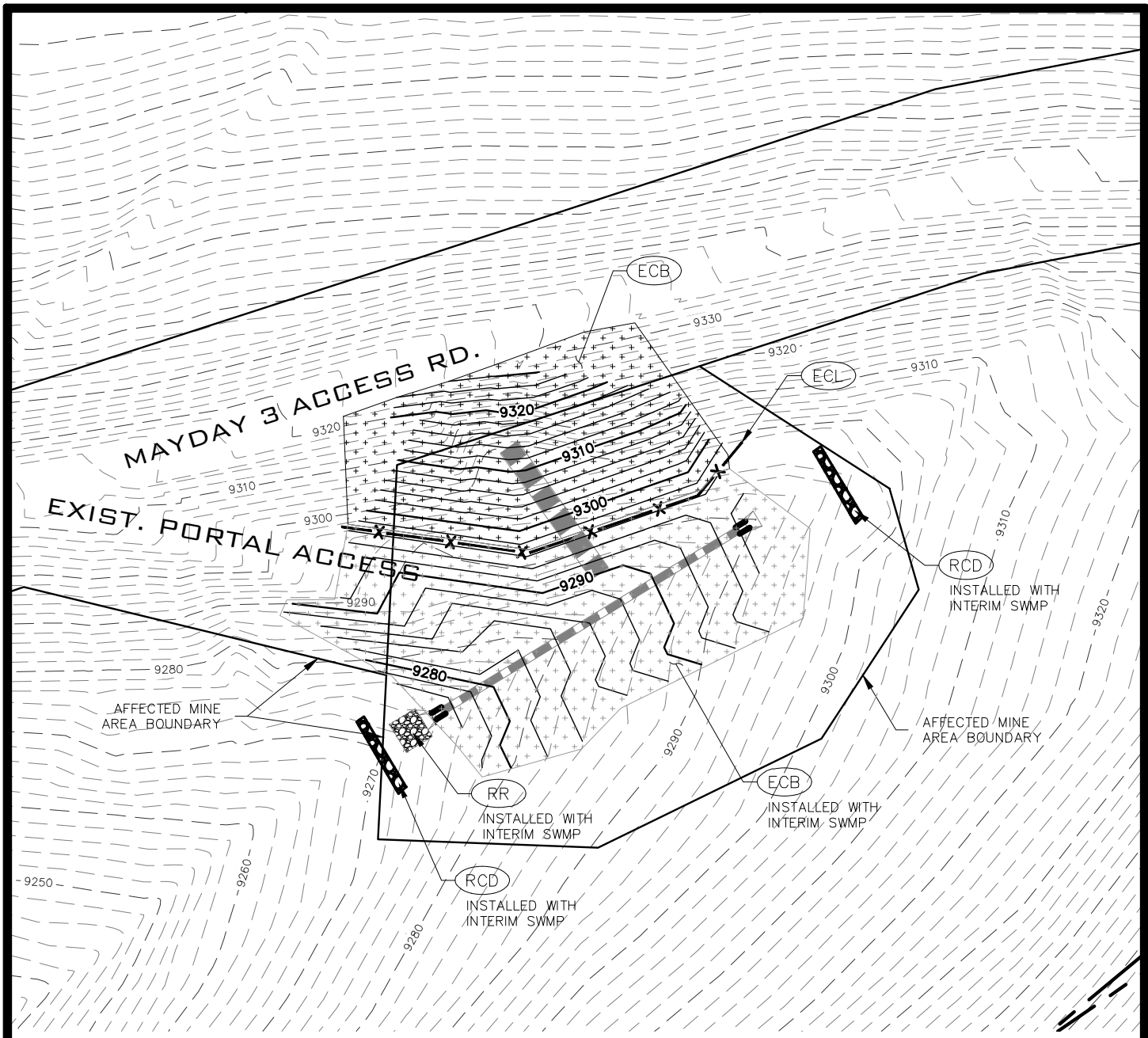
MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
CHIEF PORTAL PLAN & PROFILE

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	N/A

SHEET
FIGURE 9
WMCDUC 120574



LEGEND

8715		PROPOSED MAJOR CONTOUR
8717		PROPOSED MINOR CONTOUR
8715		EXISTING MAJOR CONTOUR
8717		EXISTING MINOR CONTOUR
X	ECL	EROSION CONTROL WATTLES
	RCD	ROCK CHECK DAM
	ECB	EROSION CONTROL BLANKET
	RR	RIPRAP

NORTH

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MAYDAY IDAHO MINE COMPLEX
LA PLATA COUNTY, STATE OF COLORADO
FINAL SWMP

PROJ. MGR.:	DJM
DRAWN BY:	DJM
DATE:	03/01/13
SCALE:	1"=40'

SHEET
FIGURE 10
WMCDUC 120574

Dwg Name: P:\Wmcduc\dwg\Eng\Final Drawings\DRMS TRs\b - Chief Portal TR\Drawings\Figure 10 Final SWMP.dwg Updated By: dmadruga 17:25

APPENDIX D

- **RULE 6.5 GEOTECHNICAL STABILITY REPORT**
  - **CHIEF PORTAL**

Wildcat Mining Corporation
A Public Company: VRCVOB

MAY DAY IDAHO MINE COMPLEX
WILDCAT MINING CORPORATION

Rule 6.5 Geotechnical Stability Report
Chief Portal
March 16, 2013

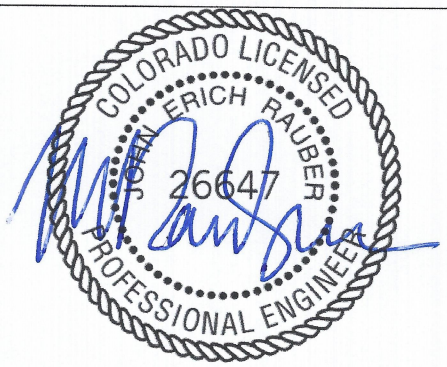
Signature Block		
Author	**John Erich Rauber, P.E.** **Professional Engineer** **CO License #26647**	

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

This report presents the results of a geotechnical investigation performed in connection with planned improvements to the Chief Portal (the portal) located on Little Deadwood Gulch at the May Day Idaho Mine Complex, on County Road 124, Hesperus, La Plata County, Colorado (Figure 1). This investigation was performed to provide criteria for design of planned improvements, and in fulfillment of requirements for additional geotechnical investigation activities as described in the Colorado Division of Reclamation, Mining, and Safety's sixth adequacy letter dated September 30, 2011, and the Permit 112d-1 Permit approval, dated December 12, 2011. The scope of work included reviewing existing information, performing a subsurface investigation, field and laboratory testing, engineering analyses to develop criteria for design of the portal improvements, and preparation of this report.

1.1 Site Description

Historical mining activities (pre-1926) included construction of the portal, and disposing of run-of mine-rock in the adjacent Little Deadwood Gulch (the drainage channel), a tributary to the La Plata River. The portal was reconstructed in 2009 and the bench leading to the portal was graded to remove debris at the portal entrance.

1.2. Objectives of the Work

The objectives of the planned improvements to the portal are listed below.

1. Remove pre-1985 fill from and re-establish the pre-mine drainage channel in Little Deadwood Gulch;
2. Re-establish, and stabilize the portal as a escape manway and for mine ventilation;
3. Stabilize the section of Incas Road above the portal; and
4. Maintain all-terrain vehicle access to portal.

2.0 Investigation

The investigation included a document review, subsurface investigation, and geotechnical analysis. Existing maps and publications of the geology of the portal vicinity were reviewed and potential geological hazards discussed with Dr. David Gonzales of Fort Lewis College (Gonzales, 2012).

The subsurface investigation included excavating five test pits at the approximate locations shown in Figure 2. Test pits were excavated with a backhoe and extended to practical

excavation refusal, approximately 4 to 7 feet deep[1]. Test pit locations were surveyed by Mountain Man Surveying of Durango, Colorado. The field engineer, David McLay, logged the pits and obtained bulk samples of the materials encountered. Logs of test pits are presented in Appendix A.

Bulk samples collected from the test pits were placed in sealable 5-gallon buckets. They were observed to confirm field classifications; selected samples were transported to Terracon Materials Testing Laboratory in Farmington, New Mexico for laboratory testing. Laboratory tests performed included the following:

- Moisture Content (ASTM D2216-10)
- Atterberg Limits (ASTM D4318 – 10)
- Compaction (ASTM D1557 – 09)

The laboratory results are presented in Appendix B.

3.0 Site Conditions

3.1 Geology

The geology in the portal area generally consists of 5 to 7 feet of Holocene or Late Pleistocene age colluvium, ranging from unsorted, clast-supported, pebble to boulder gravel in a sandy or silty matrix to matrix-supported gravelly sand or clayey silt (CGS, 2000). Underlying the colluvium is bedrock consisting of brecciated Entrada Sandstone and Pony Express Limestone. Although there are numerous fractures in the bedrock, they are generally sealed by calcite and quartz. The fractures tend to be random and thus do not have a preferred orientation (Gonzales, 2012).

3.2 Surface Conditions

As shown on Figure 3, surface conditions on the slope above the portal consists primarily of colluvium. During the 2009 portal reconstruction, material was removed directly above the portal, causing some of the colluvial material to fall down the slope. The slope above the portal is approximately 50 feet high and has an approximate slope of 1:1 (horizontal:vertical). The portal is partially covered with rock and fill. There is an approximate 1,200 square-foot bench south of the portal. The access road to the portal from the Incas Access Road is approximately 10 to 12 feet wide, and is at an approximate 3:1 downward slope.

[1] Test borings were planned but not installed during the Chief Portal investigation. Attempts to access to the portal location by the drilling rig were not successful.

3.3 Subsurface Conditions

As noted above, the material exposed on the slope above the portal primarily consists of colluvium. These materials consist of dense to very dense angular to subrounded cobbles from 2 to 6 inches in diameter in a sandy silt/clay matrix; occasional boulders up to 18 inches are also present.

Test pits excavated on the portal bench indicate fill materials consists of loose to medium dense lean gravelly sandy silt/clay overlying colluvium. Bedrock was not encountered, but based on mapping performed by Dr. Gonzales and surrounding oucrops, it is estimated to be less than 10 feet deep.

As discussed above, some colluvial material has been removed directly above the portal during its 2009 reconstruction which, in turn, undermined the slope and created the unstable condition in Figure 3.

4.0 Conclusions

4.1 Portal Slope Stability

On the basis of the geotechnical investigation and analysis, we conclude that the portal repair is feasible. The primary stability concerns include the following:

- Loose, poorly or uncompacted fill on the portal bench and on the outboard side of the above Incas Access Road
- Steep marginally stable slopes above the portal

The potential impacts associated with these concerns can be minimized by incorporating the following recommendations in the portal and Little Deadwood Gulch drainage channel design.

5.0 Recommendations

5.1 Portal Slope

Following removal of fill and debris from the drainage channel, a buttress should be constructed to establish a pad on which portal improvements can be supported and the slope above the portal stabilized. Figure 4 presents recommendations for fill over slope (buttress) construction. The buttress should extend at least 10 feet beyond the lateral extent of the portal, and be keyed into stiff colluvium or rock beneath the fill. The buttress width and keyway depth should be observed by the geotechnical engineer to check that suitable bearing materials are exposed. The slope of the buttress fill should be no steeper than 1.5:1 horizontal:vertical.

Materials used as fill should be free of organic material, have a liquid limit and plasticity index less than 30 and 15, respectively, with the largest particle sizes less than six inches. The investigation indicates onsite materials will generally be suitable for use as fill. The fill should

be placed in layers less than 8 inches thick, moisture conditioned to within 3 percent of the optimum moisture content, and be compacted to at least 90 percent relative compaction per ASTM D1557-09. Oversize rocks should be removed during fill placement and stockpiled at a geotechnically stable location for future use as slope revetment or rip rap as necessary.

During placement, the fill should be benched (Figure 4) at least 3 feet into the existing slope. The resulting bench should be smooth and non-yielding, and slope to drain away from the portal. The buttress fill should then extend upslope to the level of the Incas Access Road above. Upon completion, resulting slope should be trimmed of loose material and planted with ground cover appropriate to the area. The fill materials are highly erodible and thus should be protected until vegetation becomes established.

Surface water runoff should be intercepted and diverted from the top of the buttress using v-ditches or graded berms. Concentrated flows should be collected in a lined ditch or closed pipe and discharged away from the slope face into natural drainages. Energy dissipators should be provided as necessary to prevent concentrated flows from causing erosion.

To prevent the development of hydrostatic pressures within/behind the buttress, subdrainage should be installed as shown in Figure 4. The keyway subdrain, like the keyway itself, should extend to dense/stiff colluvium or rock over the entire width of the buttress. The geotechnical engineer should observe the keyway bottom to check that suitable bearing materials are exposed. If seepage zones or signs thereof are encountered during buttress construction, intermediate subdrains should be installed to intercept these zones.

5.2 Retaining Walls

If existing slopes above the portal preclude a buttress sloping a 1.5:1 or flatter extending from the portal to the Incas Access Road, retaining walls will be required. Retaining walls should be designed to resist lateral earth pressures imposed on them from the sloping buttress fill. Use the lateral earth pressures summarized in Table 1 for design.

Table 1. Design Lateral Earth Pressures

Backfill Slope	Design Lateral Pressure (pcf)[1]
1.5:1	63
1.75:1	49
2:1	44

From Air Force AFM 88-3, Chapter 14.

[1] Equivalent fluid pressure

Retaining wall foundations can be supported on footings bearing on properly compacted fill or rock. Footings bottomed on rock or compacted fill can be designed using an allowable

bearing pressure of 3,200 psf. Footings should be at least 4 feet wide and extend at least 2 feet below lowest adjacent finish grade. A layer of compacted fill at least twice the footing width should underlay the footing. Fill should be placed and compacted as described in Section 5.1 above.

Resistance to lateral loads can be provided by passive resistance against the sides of footings and frictional resistance along the bottom of footings. Use an allowable passive pressure of 250 pounds per cubic foot (equivalent fluid pressure), and a friction coefficient of 0.35 for design.

Factors of safety for bearing capacity and lateral load resistance factors are 3.0 and 2.0 respectively; no factors of safety or scaling factors have been applied to lateral earth pressure recommendations.

5.3 Portal Exit Design Loads

A portion of the portal exit structure will extend through compacted fill. For design, use the pressures provided in Table 2 for the indicated fill thickness above the structure.

Table 2. Design Pressures on Portal Structure for Various Heights of Compacted Fill

Height of Fill Above Structure (feet)	Load per foot of Pipe (kips)	Pressure on Structure (psf)[1]
3	4	650
5	9	1500
10	23	3,800
15	32	5,300
20	52	8,650

From NAVFAC DM-7.1, Soil Mechanics, 1982, pp. 7.1-185

[1] Pressures based on a width of 6 feet, and a soil unit weight of 130 pcf

5.4 Portal Access Road

Cutslopes resulting from grading of the portal access roads should be 1:1 or flatter. The roadway subgrade should be prepared by scarifying the upper 6 inches, moisture conditioning the scarified soils to within 2 percent of the optimum moisture content, and compacted to at least 95 percent relative compaction per ASTM D1557-09. If additional roadway material is necessary, it should be placed in layers 8 inches or less, and compacted as described.

6.0 References

Colorado Geological Survey, 2000, *Geologic Map of the Hesperus Quadrange, La Plateau and Montezuma Counties, Colorado*, Open-File 00-4.

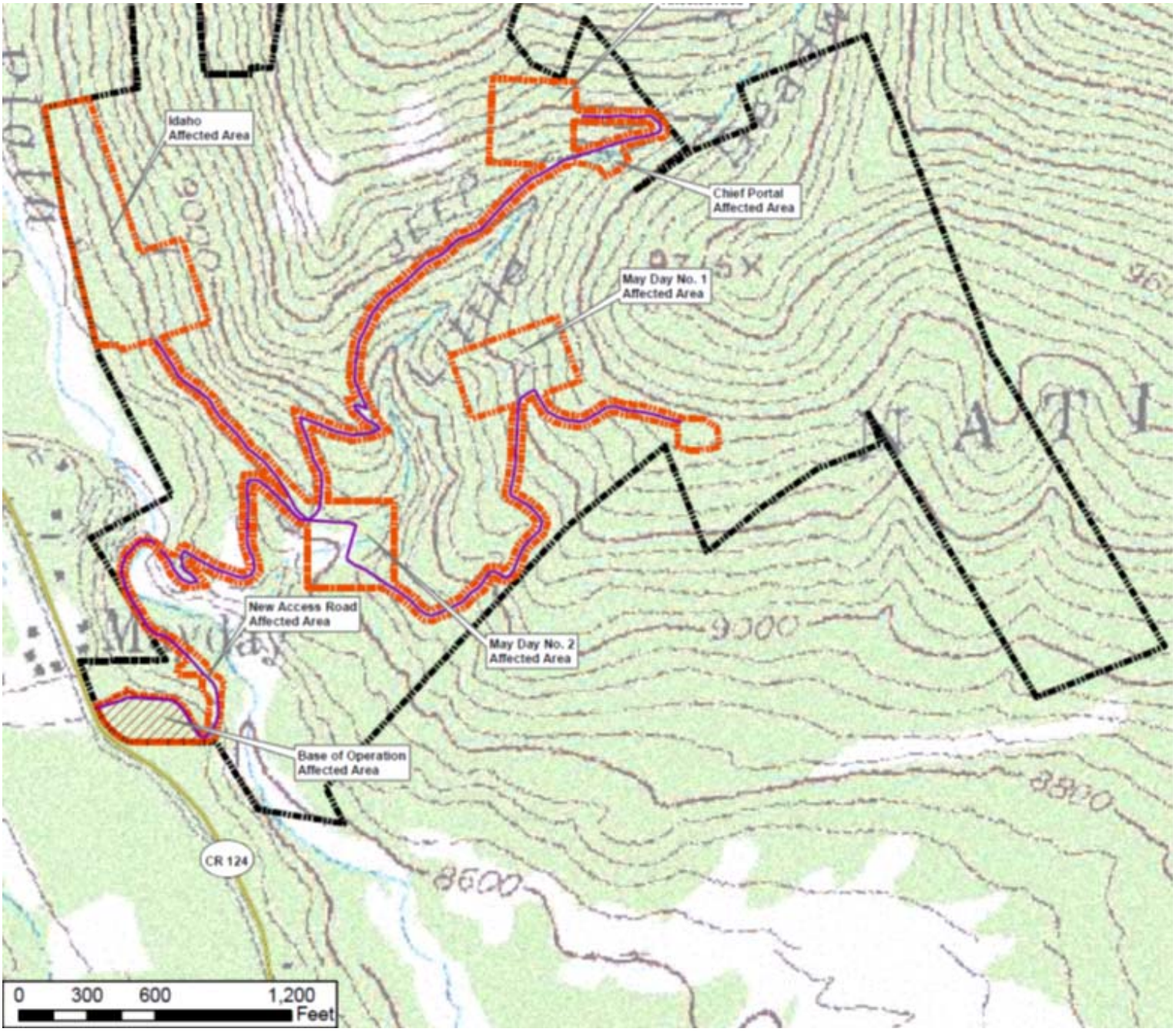
Departments of the Army and the Air Force, 1983, *Soils And Geology, Procedures for Foundation Design of Buildings and Other Structures (Except Hydraulic Structures),* Army TM 5-818-1, Air Force AFM 88-3, Chap. 7, October.

Gonzales, D., 2012, *Personal Communication with David McLay*, April 4.

Naval Facilities Engineering Command, *Foundations and Earth Structures, NAVFAC DM 7.1*, 1982.

Terzaghi, K., Peck, R.B., 1967, *Soil Mechanics in Engineering Practice,* John Wiley and Sons.

Figures



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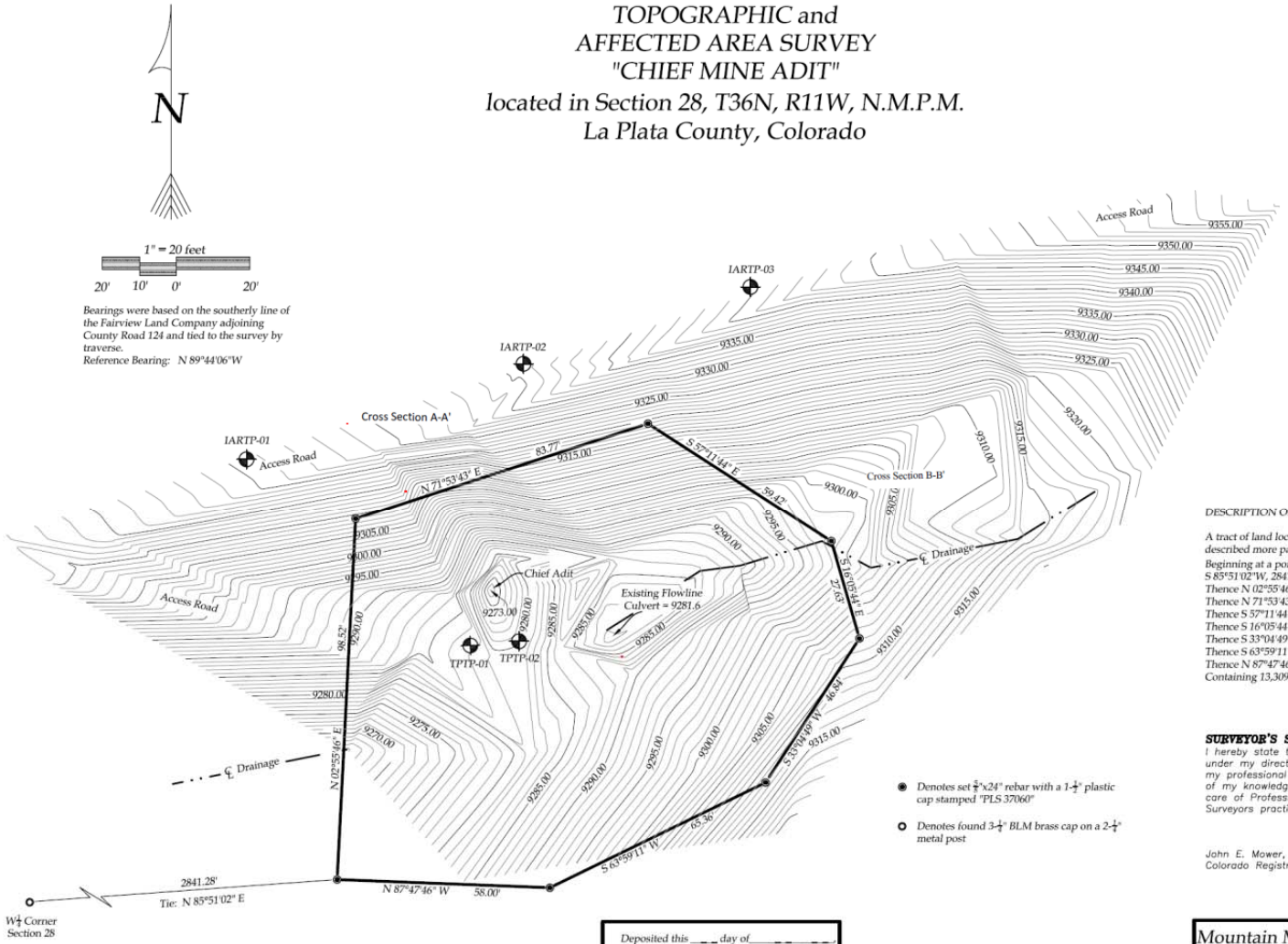
Appr.:

Date: 03/16/2013

LOCATION MAP
Chief Portal
Mayday Idaho Mine Complex
La Plata County, Colorado

Figure
1

TOPOGRAPHIC and AFFECTED AREA SURVEY "CHIEF MINE ADIT" located in Section 28, T36N, R11W, N.M.P.M. La Plata County, Colorado



Denotes set ⅝"x24" rebar with a 1-½" plastic cap stamped "PLS 37060"

Denotes found 3-¼" BLM brass cap on a 2-½" metal post

DESCRIPTION OF LIMITS OF OPERATION (CHIEF ADIT):

A tract of land located in Section 28, T36N, R11W, N.M.P.M., and being described more particularly as follows:
Beginning at a point whence the W¼ Corner of said Section 28 bears S 85°51'02"W, 2841.48 feet;
Thence N 02°55'46"E, 98.52 feet;
Thence N 71°53'43"E, 83.77 feet;
Thence S 57°11'44"E, 59.42 feet;
Thence S 16°05'44"E, 27.63 feet;
Thence S 33°04'49"W, 46.84 feet;
Thence S 63°59'11"W, 65.36 feet;
Thence N 87°47'46"W, 58.00 feet to the point of beginning.
Containing 13,309 sqft. (0.31 acres), more or less.

SURVEYOR'S STATEMENT

I hereby state that this survey and plat was prepared by me or under my direct responsibility, supervision and checking, and that, in my professional opinion, it is true and correct to the best of my knowledge, belief and information based on the standards of care of Professional Land Surveyors practicing in the State of Colorado.

John E. Mower, P.L.S.
Colorado Registration No. 37060

Deposited this ___ day of _____, 2011 at _____ .m., in Book _____, of the La Plata County Surveyor's land survey plats at Page ___.
Reception Number_____.

Mountain Man Surveying
2855 North Main, Ste. B106
Durango, Co. 81301
Phone: 970-375-6358
Fax: 970-259-3147
Cell: 970-946-1886

TOPOGRAPHIC and AFFECTED AREA SURVEY "CHIEF MINE ADIT" located in Section 28, T36N, R11W, N.M.P.M. La Plata County, Colorado

Prepared By: J.E.M.	Scale: 1"=20'
Checked By: J.E.M.	Project No.: CHIEF
Date: 12-12-11	

Wildcat Mining Corporation
A Public Company: VRCV.OB

Job No.: Geotech-001
Appr.:
Date: 3/16/13

SITE MAP
Chief Portal
Mayday Idaho Mine Complex
La Plata County, Colorado

FIGURE 2

The slope above the Chief Portal. The bedrock geology supports overall stability; however, loose fill and colluvial material creates a potential for slope raveling and rock falls.

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Appr.:
Date: 03/16/2013

PHOTO OF SLOPE ABOVE CHIEF PORTAL
Chief Portal
Mayday Idaho Mine Complex
La Plata County, Colorado

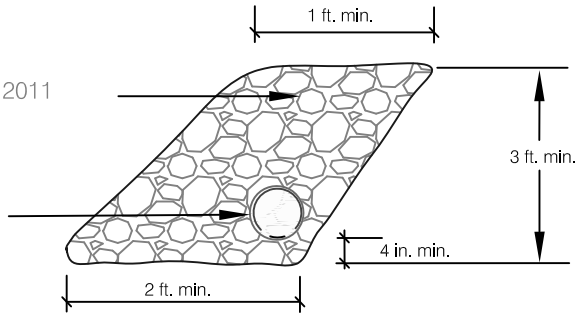
Figure
3

Class B Filter Material per CDOT specifications, 2011

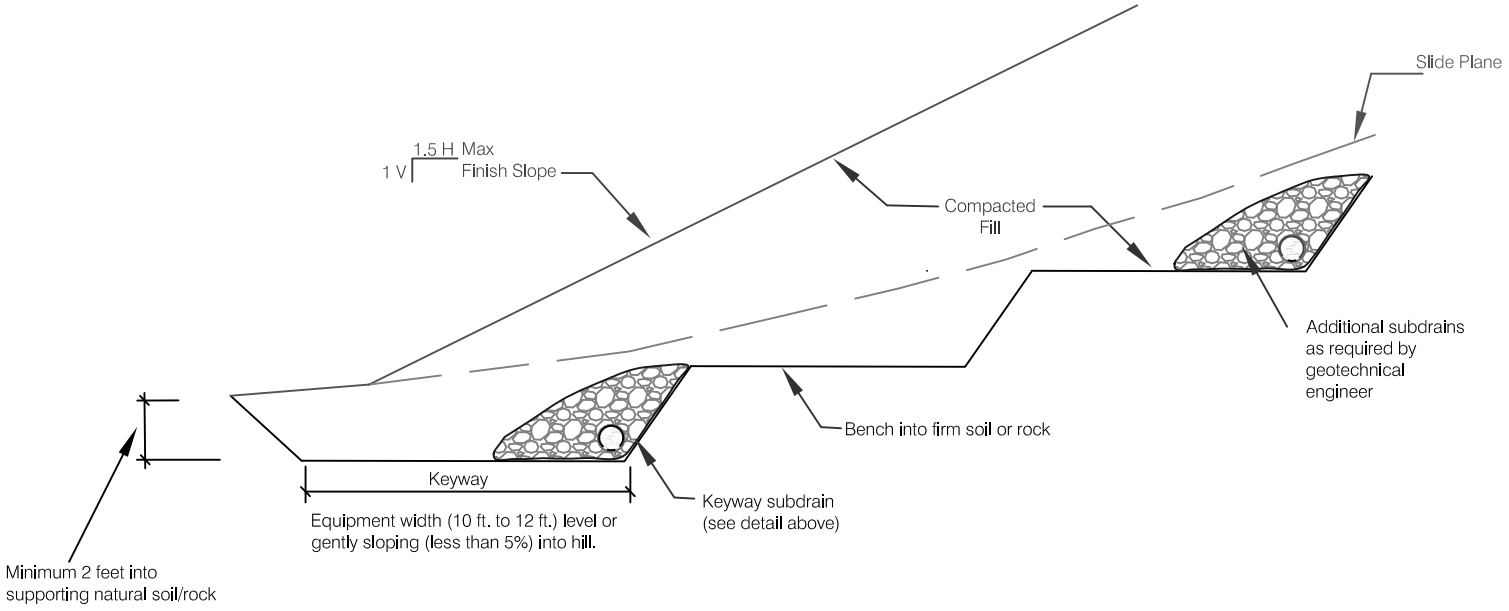
NOTES:
1. Keyway excavation and subdrain installation should be observed by geotechnical engineer.

2. Fill slopes should be compacted, or constructed "fat" and them trimmed back to expose firm material.

4 Inch Minimum Perforated Pipe, SDR 35, or equivalent (perforations down). A clean-out pipe with cap should be installed at the upslope end of the perforated pipe. Pipe elbows should be 45 degrees or less (for "snake" access).



DETAIL
KEYWAY SUBDRAIN
(not to scale)



(NOT TO SCALE)

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Job No.: Geotech-001
Appr.:
Date: 03/16/2013

TYPICAL FILL OVER SLOPE CONSTRUCTION
Chief Portal
Mayday Idaho Mine Complex
La Plata County, Colorado

Figure
4

Appendix A
Test Pit and Boring Logs

Key to Boring and Test Pit Log Symbols and Abbreviations

Notes

Refer to Figure 2 for boring and test pit locations
Blow counts converted to Standard Penetration Test (split-spoon sampler) where appropriate
Atterberg Limits test used to determine if soil is silt or clay, where possible.
Graphic Log descriptions included on Page 3

Abbreviations

ASTM – American Society for Testing and Materials
U.S.C.S. – Unified Soil Classification System
RWB – Roadway Boring
RWTP – Roadway Test Pit
RWBUTP – Roadway Buttress Test Pit
RWGUTP – Roadway Gabion Test Pit
TP – Test Pit Log

Sampling

MC – California sampler symbol
SS – Standard Penetration Test (Split Spoon sampler) symbol
AU – Auger cuttings sample symbol
GB – Grab sample
N – Blow counts per 6 inches
(N) – Blow counts per foot

Testing

w – Moisture Content, percent
DD – Dry Density, pounds per cubic foot
LL – Liquid Limit, PI – Plasticity Index: Atterberg Limit test results (moisture content)
UU Triaxial – unconsolidated, undrained triaxial compression test (ASTM D 2850- 03a(2007))
Compaction – modified Proctor compaction test (ASTM D 1557-09)

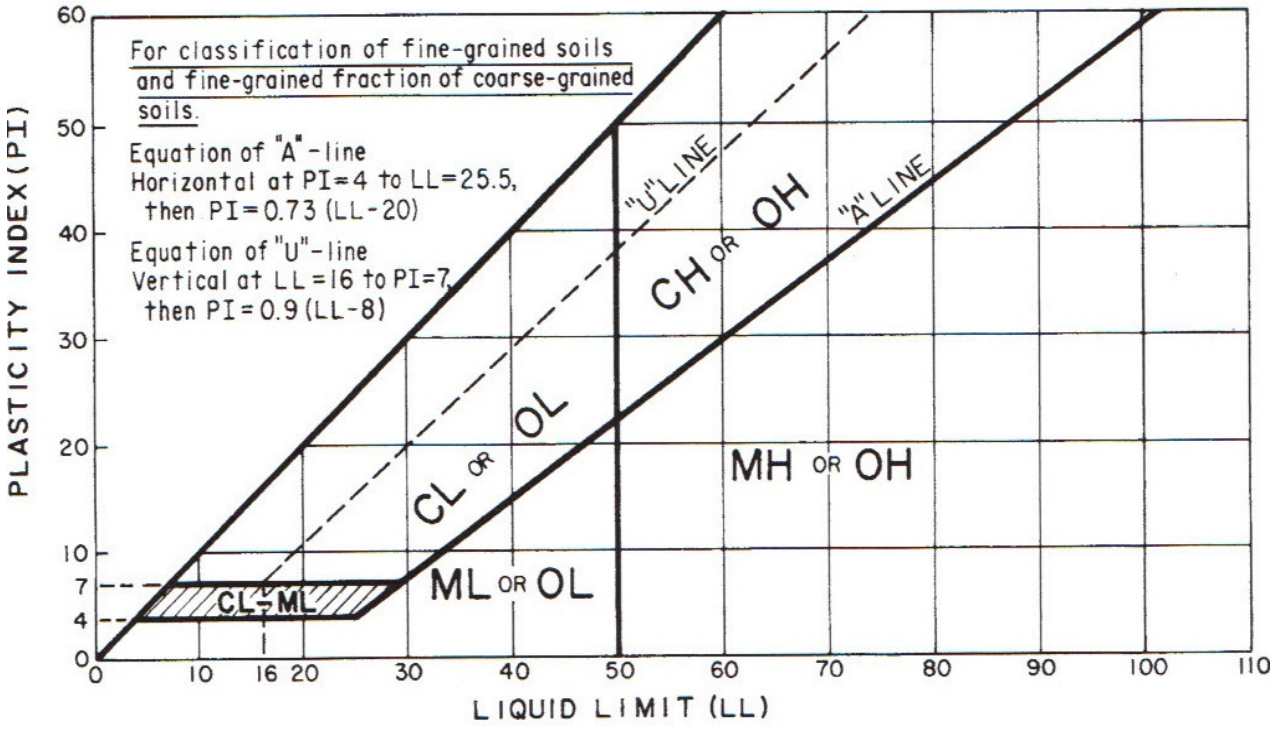
Unified Soil Classifications (ASTM D2487-11)

Group Symbol	Group Name	Group Symbol	Group Name
GW	Well-graded gravel	SW	Well-graded sand
GP	Poorly-graded gravel	SP	Poorly-graded sand
GM	Silty gravel	SM	Silty sand
GC	Clayey gravel	SC	Clayey sand
GW-GM	Well-graded gravel with silt	SW-SM	Well-graded sand with silt
GW-GC	Well-graded gravel with clay	SW-SC	Well-graded sand with clay
GP-GM	Poorly-graded gravel with silt	SP-SM	Poorly-graded sand with silt
GP-GC	Poorly-graded gravel with clay	SP-SC	Poorly-graded sand with clay
CL	Lean clay	CH	Fat clay
ML	Silt	MH	Elastic Silt
OL	Organic clay/silt	OH	Organic clay/silt

Penetration Resistance and Soil Properties (Peck, et al)

Sands		Clays	
Blows per foot (N)	**Relative Density**	**Blows per foot (N)**	**Consistency**
		Less than 2	Very Soft
0-4	Very Loose	2-4	Soft
4-10	Loose	4-8	Medium
10-30	Medium	8-15	Stiff
30-50	Dense	15-30	Very Stiff
Over 50	Very Dense	Over 30	Hard

Plasticity Chart

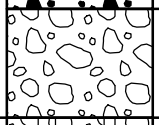
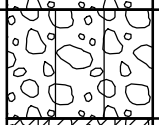
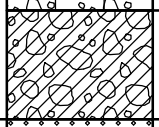
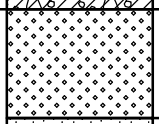
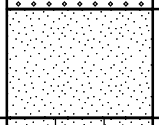
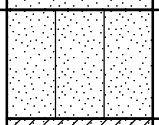
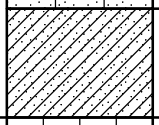
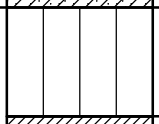
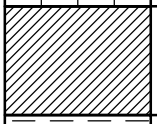
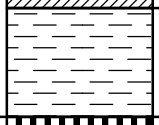
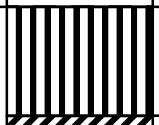
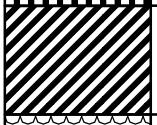
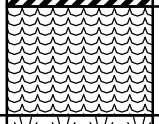
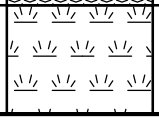


References

American Society for Testing and Materials, 2011. Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). May 1.

Peck, Ralph B., *Foundation Engineering*, Second Edition, John Wiley & Sons, 1973.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

TEST PIT NUMBER TP CPTP-01

Wildcat Mining Corporation
A Public Company: VRCV.OB

CLIENT Wildcat Mining Corporation
PROJECT NAME Chief Portal
PROJECT NUMBER Geotech-001
PROJECT LOCATION Hesperus, Colorado
DATE STARTED 1/30/12 **COMPLETED** 1/30/12
GROUND ELEVATION 9292.34 ft **TEST PIT SIZE** 3' x 5'
EXCAVATION CONTRACTOR Wildcat Mining
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION --- No Free Water Encountered
LOGGED BY David McLay, P.E. **CHECKED BY** J. Erich Rauber, P.E.
AT END OF EXCAVATION --- No Free Water Encountered
NOTES
AFTER EXCAVATION --- No Free Water Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0	GB 0'-1.5'	w=15.1%, LL=25, PI=10, Compaction	CL		(CL) Brown sandy gravelly Clay (fill)
1.5					9290.8
			GW		(GW) Brown sandy Gravel and Cobbles (angular) (fill)
2.5					
5.0					
7.0					9285.3

Bottom of test pit at 7.0 feet.

TEST PIT NUMBER TP CPTP-02

Wildcat Mining Corporation
A Public Company: VRCV.OB

CLIENT Wildcat Mining Corporation
PROJECT NAME Chief Portal
PROJECT NUMBER Geotech-001
PROJECT LOCATION Hesperus, Colorado
DATE STARTED 1/30/12 **COMPLETED** 1/30/12
GROUND ELEVATION 9289.97 ft **TEST PIT SIZE** 3' x 5'
EXCAVATION CONTRACTOR Wildcat Mining
GROUND WATER LEVELS:
EXCAVATION METHOD Backhoe
AT TIME OF EXCAVATION --- No Free Water Encountered
LOGGED BY David McLay, P.E. **CHECKED BY** J. Erich Rauber, P.E.
AT END OF EXCAVATION --- No Free Water Encountered
NOTES
AFTER EXCAVATION --- No Free Water Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0	GB 0'-1'	w=12.1%	CL		(CL) Brown sandy gravelly Clay (moist) (fill)
1.0					9289.0
			GW		(GW) Brown sandy Gravel and Cobbles (angular) (fill)
2.5					-becoming larger Cobbles and Boulders
5.0					
5.5					9284.5

Bottom of test pit at 5.5 feet.

TEST PIT NUMBER TP IARTP-01

Wildcat Mining Corporation
A Public Company: VRCV:OB

CLIENT Wildcat Mining Corporation
PROJECT NAME Chief Portal
PROJECT NUMBER Geotech-001
PROJECT LOCATION Hesperus, Colorado
DATE STARTED 1/27/12 **COMPLETED** 1/27/12
GROUND ELEVATION 9323.67 ft **TEST PIT SIZE** 4' x 5'
EXCAVATION CONTRACTOR Wildcat Mining
GROUND WATER LEVELS:
EXCAVATION METHOD Excavator
AT TIME OF EXCAVATION --- No Free Water Encountered
LOGGED BY David McLay, P.E. **CHECKED BY** J. Erich Rauber, P.E.
AT END OF EXCAVATION --- No Free Water Encountered
NOTES
AFTER EXCAVATION --- No Free Water Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0					(GW) Brown coarse to fine sandy Gravel and Cobbles (angular)
	GB 1'-2'	w=14.5%	GW		
2.5					-becoming Cobbles and Boulders
5.0				5.0	9318.7

Bottom of test pit at 5.0 feet.

TEST PIT NUMBER TP IARTP-02

Wildcat Mining Corporation
A Public Company: VRCV.OB

CLIENT Wildcat Mining Corporation
PROJECT NAME Chief Portal
PROJECT NUMBER Geotech-001
PROJECT LOCATION Hesperus, Colorado
DATE STARTED 1/27/12 **COMPLETED** 1/27/12
GROUND ELEVATION 9330.55 ft **TEST PIT SIZE** 4' x 5'
EXCAVATION CONTRACTOR Wildcat Mining
GROUND WATER LEVELS:
EXCAVATION METHOD Excavator
AT TIME OF EXCAVATION --- No Free Water Encountered
LOGGED BY David McLay, P.E. **CHECKED BY** J. Erich Rauber, P.E.
AT END OF EXCAVATION --- No Free Water Encountered
NOTES
AFTER EXCAVATION --- No Free Water Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0					(GW) Brown clayey sandy Gravel and Cobbles with boulders
	GB	w=10.5%	GW		
2.5					
4.0					9326.6

Bottom of test pit at 4.0 feet.

TEST PIT NUMBER TP IARTP-03

Wildcat Mining Corporation
A Public Company: VRCV.OB

CLIENT Wildcat Mining Corporation
PROJECT NAME Chief Portal
PROJECT NUMBER Geotech-001
PROJECT LOCATION Hesperus, Colorado
DATE STARTED 1/27/12 **COMPLETED** 1/27/12
GROUND ELEVATION 9341.23 ft **TEST PIT SIZE** 4' x 5'
EXCAVATION CONTRACTOR Wildcat Mining
GROUND WATER LEVELS:
EXCAVATION METHOD Excavator
AT TIME OF EXCAVATION --- No Free Water Encountered
LOGGED BY David McLay, P.E. **CHECKED BY** J. Erich Rauber, P.E.
AT END OF EXCAVATION --- No Free Water Encountered
NOTES
AFTER EXCAVATION --- No Free Water Encountered

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0				Brown sandy gravelly Cobbles and Boulders (angular)
2.5				
4.0				9337.2

Bottom of test pit at 4.0 feet.

Appendix B
Laboratory Report

Geotechnical Investigation Boring and Test Pit Laboratory Testing Summary

Chief Portal Geotechnical Investigation

May Day Idaho Mine Complex, La Plata County, Colorado

Location (1)	Depth (feet)	Sample Type (2)	Moisture Content %	Dry Unit Weight, pcf	UU Triaxial Compression	Atterberg Limits		Compaction			
								Rock Corrected		Uncorrected	
						LL %	PI %	MMD, pcf	OMC, %	MMD, pcf	OMC, %
CPTP-01 (3)	1.0-2.0	Baggie	15.1			25	10	139.6	5.8	130.9	7.8
CPTP-02	1.0-2.0	Baggie	12.1								
IARTP-01	1.5-2.5	Bulk	14.5								
IARTP-02	1.5-3.0	Baggie	10.5								

Notes

1. See Figure 2 for boring and test pit locations.
2. Sample Types: Baggie-sealable plastic bag, Bulk-5-gallon sealable plastic bucket, Liner-brass liner for California Sampler
3. See Attached Moisture-Density Curve (Proctor) Report

SD - Sample disturbed

pcf - pounds per cubic foot

% - percent

LL-Liquid Limit; PI-Plasticity Index

MMD - Maximum Dry Density; OMC - Optimum Moisture Content

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: 69121002.0003
Service Date: 02/13/12
Report Date: 02/17/12

#4 A CR 3499
Flora Vista, NM 87415
505-334-2900

Client

Wildcat Mining Corporation
Attn: David McLay
5555 DTC Parkway
Suite A-4000
Greenwood Village, CO 80111

Project

Wildcat Mining/Laboratory Testing Services
Laboratory
Flora Vista, NM 87415

Project Number 69121002

Material Information

Source of Material: CPTP-01
Proposed Use:

Sample Information

Sample Date: 01/31/12 **Sample Time:** 1440
Sampled By: Client
Sample Location: CPTP-01 @ 0-1.5'

Sample Description:

Laboratory Test Data

Test Procedure: ASTM D1557
Test Method: Method C
Sample Preparation: Wet
Rammer Type: Mechanical

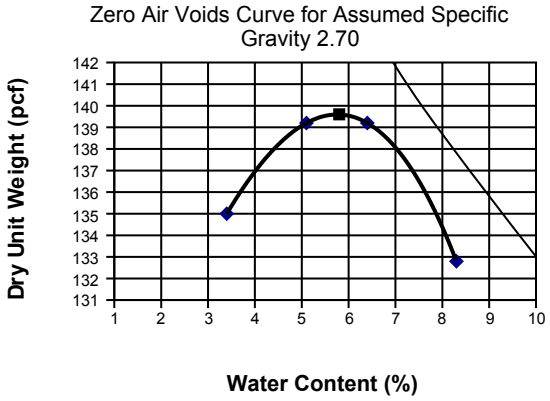
Oversized Particles (%): 30.0
Moisture (%): 1.0
Sieve for Oversize Fraction: 3/4

Assumed Bulk Specific Gravity of Oversized Particles: 2.65

Corrected for Oversized Particles (ASTM D4718)
Maximum Dry Unit Weight (pcf): **139.6**
Optimum Water Content (%): **5.8**

Uncorrected Values
Maximum Dry Unit Weight (pcf): **130.9**
Optimum Water Content (%): **7.8**

	Result	Specifications
Liquid Limit:	25	
Plastic Limit:	15	
Plasticity Index:	10	
In-Place Moisture (%):	15.1	
Passing 3/4" (%):	70.0	
Passing #4 (%):	55.0	
USCS:		



Comments: Performed testing on samples provided by Mr. Dave McLay with Wildcat Mining Corporation to our Flora Vista, New Mexico laboratory.

Services: Modified Proctor Test (ASTM 1557), Attergerg Limits (ASTM D4318) and Moisture Content (ASTM D2216)

Terracon Rep.: Client
Reported To:
Contractor:
Report Distribution:

(1) Wildcat Mining Corporation
(1) Terracon Consultants, Inc.

Reviewed By:

Zachary St Jean
Department Manager II-Professional

Test Methods: ASTM D1557