MOBERLY PIT 2012/13 MINING PLAN

Prepared for:

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1. **INTRODUCTION**

1.1. Objective

To design a mine plan for extraction of silica rock at a rate of 400,000 tpa for 35 years using safe conventional mining practices and taking into account the particular circumstances at the Moberly Silica Mine.

1.2. Location

HCA Mountain Minerals' Moberly Pit is located in the western flank of the Beaverfoot Range of the Kootenay Ranges in the Canadian Rocky Mountains. The operation (51º 22'N, 116º 58'W) is approximately 7 kilometers north of Golden BC and about 18 kilometers by road from the processing plant.

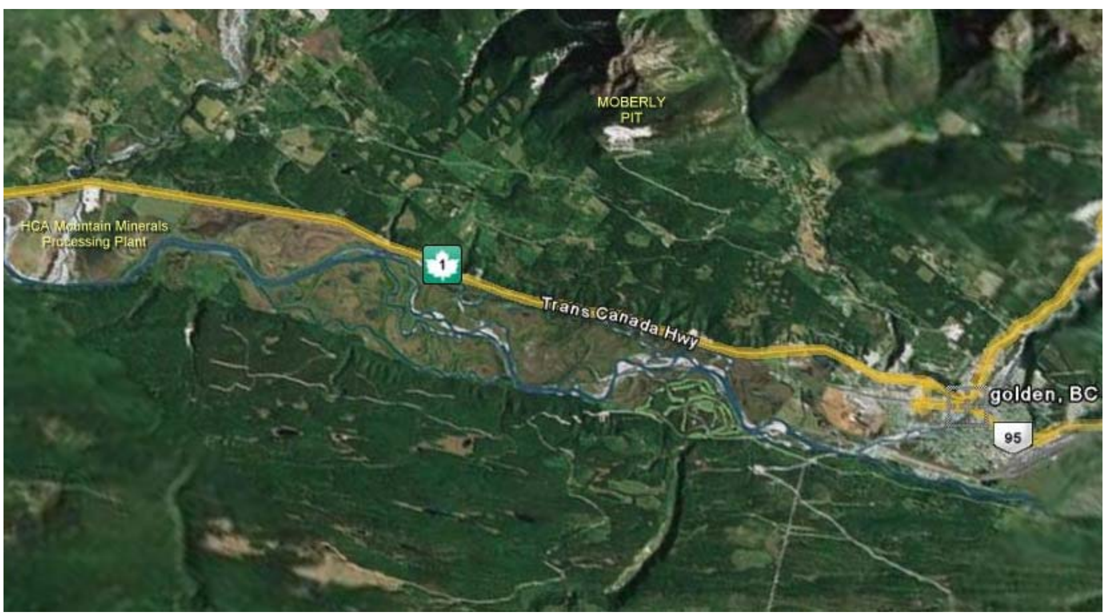


Figure 1: Aerial View of Golden, BC and HCA Mountain Minerals (Moberly) Operations

1.3. Climate

The historical climatic norms for Golden, BC, as recorded by Environment Canada for the period 1971 to 2000, show a average daily maximum range of -5.6 ºC in January to 24.4 ºC in July and average daily minimum range of -13.7 ºC in January to 9.7 ºC in July. Recorded extreme temperatures are -46.1 ºC on January 15, 1907 and 40.0 ºC on July 17, 1941.

Recorded monthly snowfalls peaks in December and January with about 500 mm and monthly rainfall is maximum during June through August with an average monthly rainfall ranging from 46 mm to 48 mm.

The extreme recorded daily snowfall and rainfall are December 4, 1918 with 548.4 cm of snow and September 22, 1903 with 58.9 mm of rain.

1.4. Geology[1]

In the vicinity of the open cut, the geology is relatively simple. The strata have been folded into an open anticline-syncline pair with a thrust fault along the axis of the syncline. The crest of the anticline forms the exposure of quartzite ('Wilson Quartzite') that is being mined. The quartzite is underlain by brown argillite and overlain by limestones and dolomites (exposed in road cuts along the south-west edge of the workings).

The material within the pit area consists of a fractured, steeply dipping to vertical quartzite which hosts 2 main cleavages and is variably and irregularly altered. The amount of sand alteration varies between 0% to over 80% and generally manifests itself as pods and seams to 6 cm width of weakly cemented sand in an unaltered to less altered hard quartzite.

There are no significant faults mapped within the pit and the dominant parting direction is along bedding, but this is generally weak.

[1] Source material from [communication from Mr. Malcolm Ward, Principal, Mining Advisory Pty Ltd]

Along the south-west margin of the pit, the quartzite-sand unit contacts the dolomitic limestone horizon with a WNW-ESE strike. This contact, which is for all intents and purposes vertical, isn't over a single horizon so an arbitrary mineral contact is set approximately 10 metres inside the sand quartzite unit.

The north-eastern boundary of the silica unit has not been defined or exposed in the pit, but is expected to lie some 30 to 40 m beyond the present exposure. Along the north-eastern edge of the pit, the silica varies from hard quartzite to softer, sand rich material.

1.5. Mine Plan Philosophy

The Moberly silica mine is based on a very large sandy quartzite resource. Mining over the past 30 years has exposed over 800m of quartzite but the full strike width has yet to be fully delineated. Even at the increased mining rates planned for in this Mine Plan, the Moberly mine could have a life of over 50 years. As the full strike extend of the resource has not been defined, even in the area of the most recent mining, it is not practicable to delineate a life-of-mine Mine Plan.

This 2012 Mine Plan details mining operations for about 35 years, based on the currently exposed silica resource. However it is recognized that as the full strike width of the resource is defined, the mine plan will need to change in following years, as is normal for most mining operations.

This mine plan also involves mining over all the currently exposed area, so it is not practicable to delineate areas of reclamation within the pit outline at this time.

The pit is designed to be developed in two expansions, the first being the 'west expansion' which carries on where the last significant mining was concluded in 2008 (minor tonnes were won in early 2012) and the second is the 'east expansion' which mines the deposit to its currently exposed eastern limit.

2. WEST AND EAST EXPANSION PHASES

The west expansion for Moberly Pit includes the mining of approximately 1.27 million cubic metres of silica, yielding approximately 3.22 million tonnes of ore. The east expansion includes the mining of approximately 4.14 million cubic metres of silica, yielding approximately 10.51 million tonnes of ore. The resource depletion schedule, based on mining rates of 170,000 tonnes in 2013, and 400,000 tonnes per year thereafter are shown in table 2. Again, it is expected that the resource will expand when the strike width of the deposit is determined, allowing for a wider and, ultimately, deeper pit.

Annual yearend mine plans for years 2013 through 2017 are shown in attached drawings C200-X-012 Sheets 4 – 7. Thereafter the mine plans are shown for yearends at 5 year intervals starting in 2022 through completion in 2047 are shown in attached drawings C200-X-011 Sheets 2 – 7.

3. DESIGN CRITERIA

3.1. Pit Wall Stability Considerations

The basic components of a pit slope are the operating bench height and the bench face angle that can be achieved in the excavation, as shown in Figure 2.

The bench height is a function of the type of excavation equipment that is used. The bench face angle is normally a function of geotechnical factors such as the material strength or the structural discontinuities in the rock mass. However, where no such geological controls exist, it may be a function of the blasting damage or the type of excavation equipment used.

It is normal practice to establish catch-berms on a pit slope to retain any loose materials that may fall from either the immediate bench face or from the upper part of the slope. Where conditions are suitable, it is common practice to place catch-berms at vertical intervals of two or occasionally more operating bench heights, thereby creating a multi-bench configuration.

The angle subtended by a line joining the toes of the bench on the wall and the horizontal is a basic element of slope design and is termed the "inter-ramp slope". The incorporation of ramps onto a wall will result in a slope that has an "overall slope angle" that is shallower than the "inter-ramp angle".

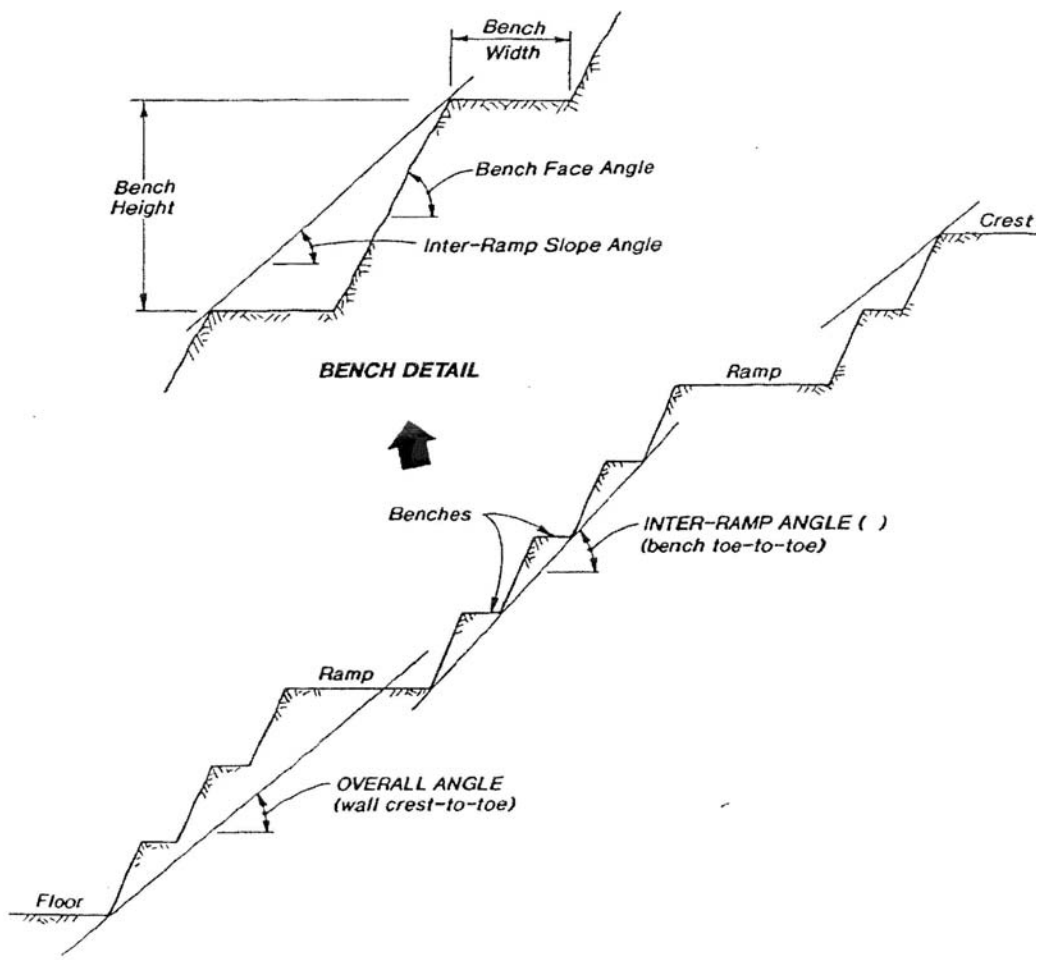


Figure 2: Pit Wall Slope Design Elements

3.2. Geotechnical Considerations[2]

Instability in rock slopes can generally be classed according to two principal

[2] Source material from [Golder Associates Letter Report "Geotechnical Inspection and Open Pit Slope Stability Assessment of Proposed Interim Mining Plan -Moberly Quarry", *April 3rd, 2008*]

failure mechanisms, specifically: structurally controlled failures and rock mass strength failures, as shown on Figures 3 and 4. These principal failure mechanisms are discussed briefly below.

Structurally controlled failure in rock occurs as the result of sliding along pre-existing geologic discontinuities. The geologic structures that will control slope stability are the continuous bedding, faults and pervasive joints sets.

The three basic mechanisms of structurally controlled failure in rock slopes are:

- *Plane Failures* can occur when a geologic discontinuity dips out of a rock slope at an angle that is shallower than the inclination of the slope. Plane failures will generally only develop to a significant extent if the azimuth of the geologic discontinuity is within ±20 to 30 degrees of the strike of the rock slope.

- *Wedge Failures* may occur when two or more geological discontinuities intersect to form an unstable block. In order for wedge failure to occur, the line of intersection of the wedge must dip out of the slope at an inclination that is shallower than the inclination of the slope, but steeper than the effective angle of friction along the discontinuities. Wedge failures will only develop to a significant extent if the azimuth of the line of intersection is within ±45° of the azimuth of the slope face.

- *Toppling Failures* may develop when a rock mass contains multiple, steeply dipping, continuous geologic structures, such as bedding or foliation planes, that strike nearly parallel to the strike of the face of the rock slope. Toppling failure will generally only develop when the strike of the structures is within ±20° of the azimuth of the slope face. However, in the presence of continuous release structures that strike near-perpendicular to the slope, toppling can occur at higher angles.

All structurally controlled failure modes are aggravated by water pressures within the slope and toppling failures are particularly sensitive to water pressure. This will largely affect deep-seated failures, and will be less of a factor on shallow-seated bench scale failures, where the near surface relaxation of a fractured rock mass is expected to improve drainage conditions.

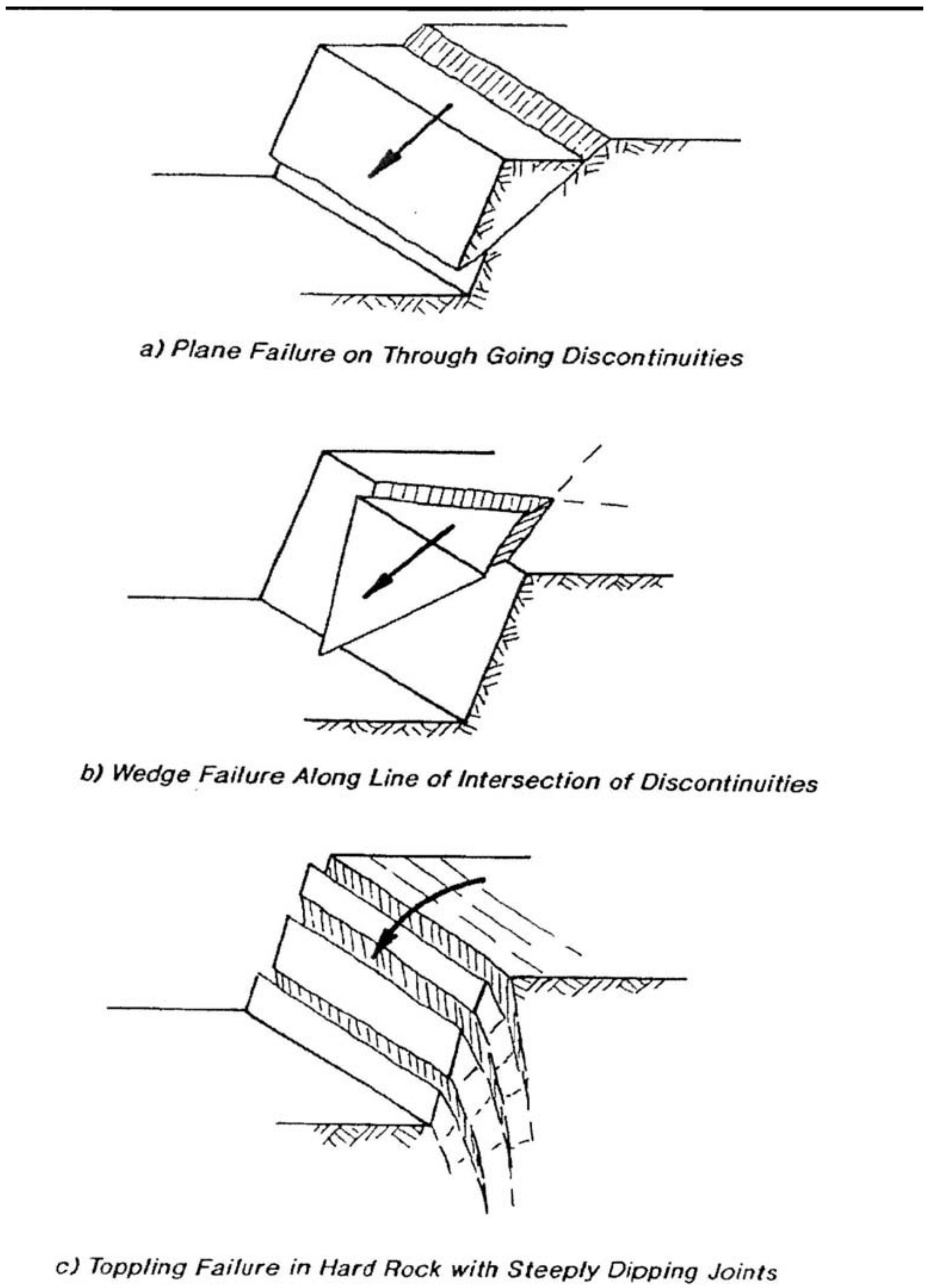


Figure 3: Structurally Controlled Instability Mechanisms in Rock Slopes

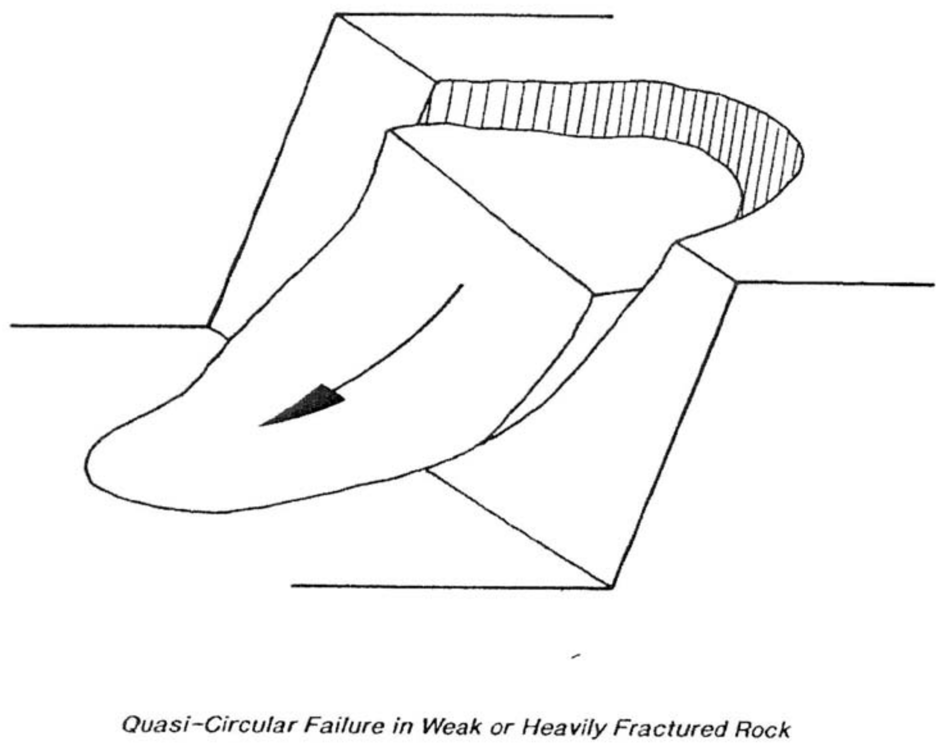


Figure 4: Overall Rock Mass Strength Failure Mechanism

The magnitude and frequency of structurally controlled failures are directly related to the continuity of the structures along which sliding can occur. Rock mass structures that exhibit limited continuity, such as less continuous joints, may result in small bench-scale failures that are rarely of consequence to overall slope stability, but may affect access ramps or fixed equipment adversely. Conversely, larger scale failures can occur along continuous, through-going structures, such as major faults and more continuous and pervasive joint sets. It is, therefore, these more continuous structures that are of primary concern.

Slopes excavated in weak or heavily fractured rock masses, or extremely high slopes, can be susceptible to overall rock mass failure, which involves the development of pseudo-circular type failure zones through intact rock. Where major structures are present with an appropriate orientation, these may be partially involved in a more complex failure mechanism, for example, by combining sliding planes with rock mass failure or creating release planes for the rock mass failure.

3.3. Pit Wall Anticipated Stability Factors[3]

At the time of the site inspection, no signs of overall instability were observed on the existing pit walls. Despite the "poor" condition and appearance of the individual bench faces and of portions of overall slope, which is large due to mining practices, it appears that the excavated pit walls have exhibited adequate overall stability conditions. The very rough and irregular appearance of the bench faces is due to the lack of controlled blasting practices in the pit. In addition, the mining method has involved pushing blasted rock over the benches so can be mined from a lower elevation loading platform. The rock that has been pushed over the slopes has eroded the bench crests, and this has also contributed to the ragged nature of the individual bench faces and to the amount of ravel debris that has accumulated on the individual benches. Where the benches are sufficiently wide, this ravel debris should be cleaned from the benches. In general, however, the walls excavated in competent rock on the east side of the pit exhibit an adequate degree of catchment on the slopes.

In contrast, there is no catchment on the north wall. This does not appear to be due to rock quality or blasting practises. Rather, it appears that the individual catch-benches have been mined out in an attempt to recover more of the altered ore rock that is exposed on the north wall. This practise of robbing the benches where the ore is exposed on the final walls must stop, and adequate width (8 meters) catch-benches must be established on all walls.

In general, some degree of ravelling is observed on the individual bench faces as a result of the fractured nature of the rock mass and the steep dipping bedding planes. However, the excavated slopes do not appear to be generating an excessive amount of ravelling, and, with the exception of the north wall of the

[3] Source material from [Golder Associates Letter Report “Geotechnical Inspection and Open Pit Slope Stability Assessment of Proposed Interim Mining Plan -Moberly Quarry”, *April 3rd, 2008*]

lower pit, there is adequate catchment on the slopes.

To date, the existing pit walls in the Moberly Quarry have exhibited sufficient overall rock mass strength to preclude the development of large scale, deep-seated circular overall rock mass type failures, and it is anticipated that the proposed interim pit walls will likely also exhibit sufficient strength to preclude the development of such failures. In order to confirm this, an overall rock mass stability analysis was carried out as part of the present assessment, and is presented in the following section.

In view of the anticipated favourable overall slope stability performance with respect to potential deep-seated circular type instability, it is anticipated that the stability of the proposed pit walls is likely to be governed by structurally controlled failure mechanisms along pervasive geologic fabric exposed in the walls, and by any adversely oriented, continuous geologic structures that may be exposed in the walls. The potential structurally controlled failure mechanisms in the Moberly Quarry are addressed in the following section.

No signs of multi-bench or overall instability were observed in the pit, as a result of structurally controlled failure mechanisms. However, small bench scale wedge/planar failures were observed locally, mostly at the crest edge of the steep bench slopes.

Finally, it can be expected that there will be some potential for developing toppling on the pervasive steep northeast dipping bedding surfaces in southwest facing wall orientations, i.e. walls striking within approximately 30 degrees to the bedding strike, particularly if surface run-off water infiltration occurs into open cracks along the crest of the walls. However, the current slope stability performance does not indicate toppling at bench or multi-bench scale to be occurring in the existing pits. The current pit wall performance also indicates that toppling has not affected inter-ramp or multi-bench stability. Furthermore, most of the steep dipping bedding intersects the pit walls at an oblique angle, i.e. northwest-southeast striking bedding intersecting a west-southwest facing wall.

This oblique intersection somewhat reduces the potential for developing toppling instability.

3.4. Bench Slope Stability[4]

The bench slope stability is anticipated to be governed by structurally controlled mechanisms. For the bench slope stability assessment, pervasive bedding and the closely-spaced joints, which are less continuous than bedding, could be expected to control the bench face stability.

The steeply dipping bedding surfaces are favourably oriented to the proposed major pit wall, i.e. wall facing west. The steep, northeast dipping bedding dips into the proposed lower slope interim wall. Also, the occasional southeast dipping bedding planes are mostly steeply dipping, with an average dip of about 86 degrees and are, therefore, steeper than the proposed Bench Face Angle (BFA) of 78 degrees. Furthermore, bedding intersects the dominant proposed wall orientation at an oblique angle of about 30 degrees, which limits the potential development of planar sliding. Therefore, undercutting of bedding planes is unlikely.

The following potential failure mechanisms have been identified:

- Planar sliding along joints of the structural Set C. Set C dips toward the west and northwest at an average dip of about 58 degrees and is unfavourably oriented with respect to the proposed major orientation of the pit walls. Some joints are anticipated to be undercut by the proposed BFA. However, due to the less pervasive and less continuous nature of the observed joints, the impact of this unfavourable structural set is expected to be fairly limited and would not require flattening of the proposed bench face angles. Any potential planar sliding at bench scale could be accommodated by scaling the localized structure and providing adequate catchment on the catch-benches.

[4] Source material from [Golder Associates Letter Report "Geotechnical Inspection and Open Pit Slope Stability Assessment of Proposed Interim Mining Plan -Moberly Quarry", *April 3rd, 2008*]

- Wedge sliding formed by joints of structural Set C and steep southwest dipping bedding planes. These structural sets form potential wedges with an average line of intersection trending to 300 degree azimuth and dipping about 60 degrees, as shown in Figure 5. The average dip of the line of intersection of these wedge structures is shallower than the proposed BFA slope so there is the potential for these structures to be undercut.

The bedding planes are predominantly dipping to northeast with only some localized being vertical to southwest. Therefore, this potential failure mechanism, is also expected to be fairly limited and localized. Consequently it would not require flattening of the proposed bench face angles. Small scale wedges, if occurring, could potentially be accommodated by scaling and trimming back any formed wedge during excavation, and the catch-benches.

- Wedge sliding formed by joints of the structural Set C and Set D. These structural sets form potential wedges with an average line of intersection trending to 220 degrees azimuth and plunging about 30 degrees, as shown in Figure 5. Since the average dip of the line of intersection of these wedge structures, if formed, is shallower that the proposed BFA slope so may be undercut. However, the results of stability analyses indicate that this wedge is expected to exhibit adequate stability. In addition, due to low occurrence of Set D combined with the less pervasive and less continuous nature of the observed joints, these wedges are also expected to be fairly limited and localized.

The result of the deterministic bench scale wedge analyses of average orientation joint Sets C and D yielded Factor of Safety of about 1.43, as shown in Figure 6, indicating that average orientation wedge could be expected to be stable.

Consequently, at the current stage, it would not require flattening of the proposed bench slopes. Small scale wedges, if occurring, could potentially be accommodated by scaling and trimming back any formed wedge during excavation.

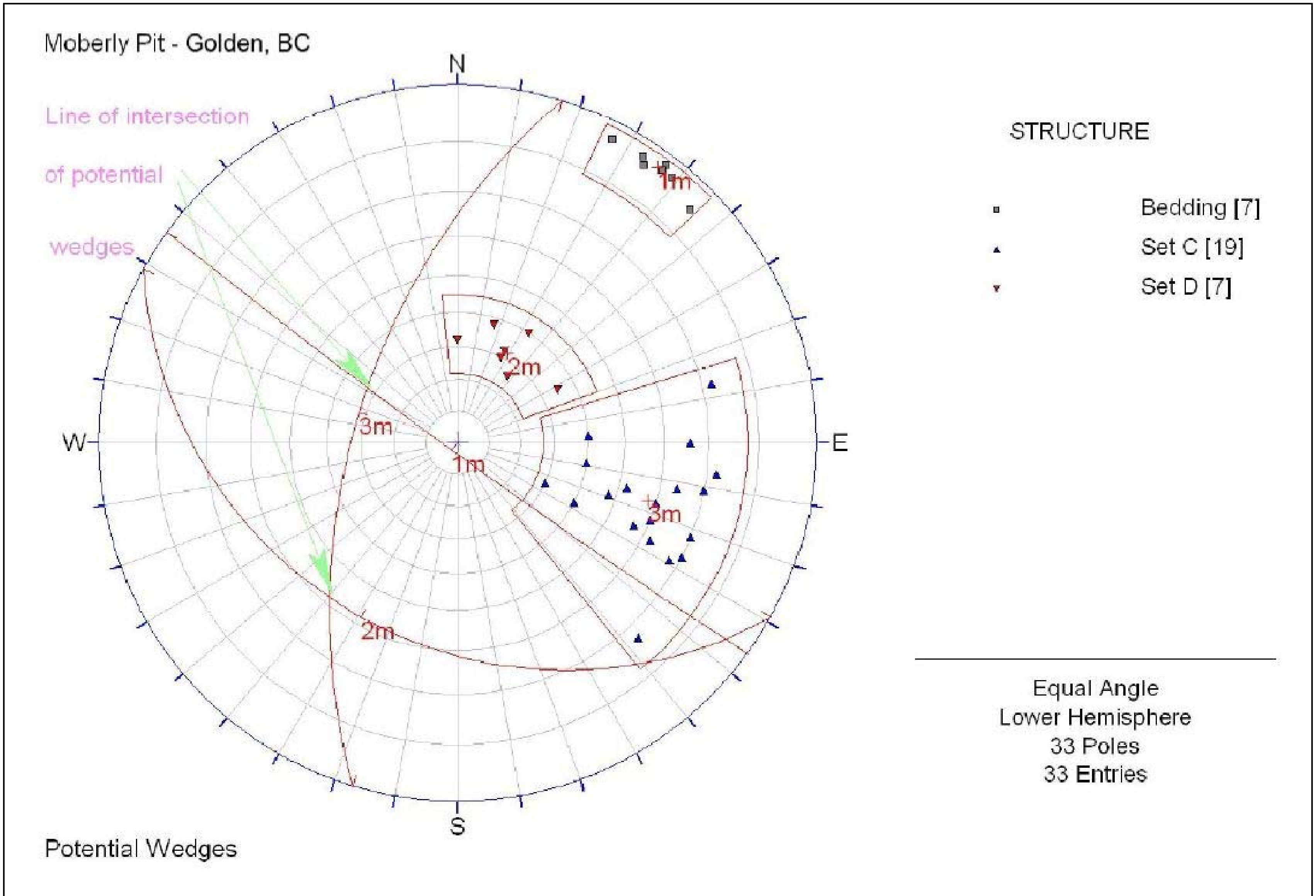


Figure 5: Potential Wedge Mechanisms

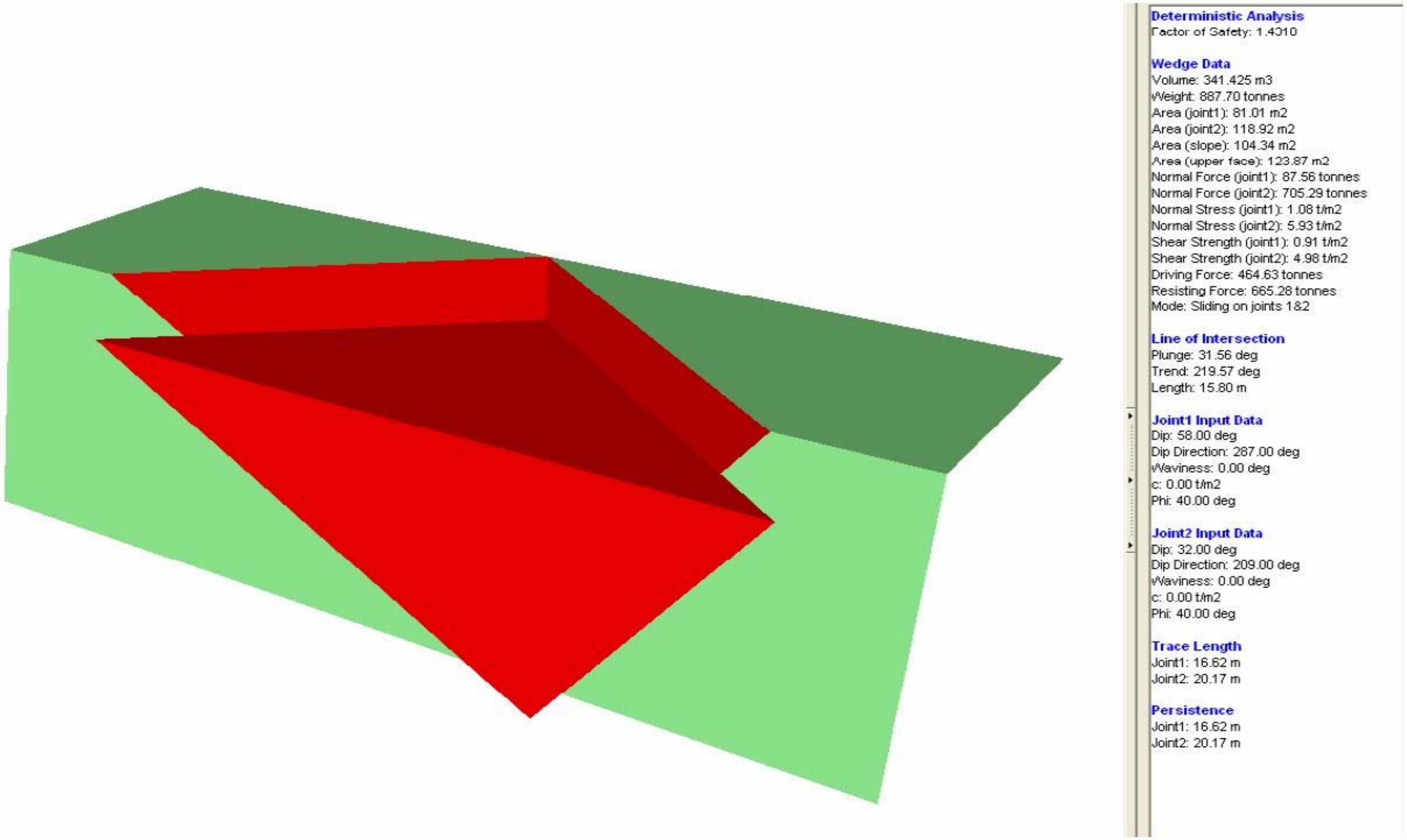


Figure 6: Bench Wedge Analysis Sets C and D - Deterministic

3.5. Mine Design

The pit wall design profile, which is based on Golder Associates 2008 geotechnical inspection and open pit slope stability assessment, is shown in attached drawing C200-X-006.

The mine is designed with:

- 12 metre high benches,
- 78 degree face angle,
- 48.7 degree inter-ramp angle
- 8 metre wide catchment berms,
- 15 metre wide ramps and
- 12 percent ramp grade

These criteria were chosen in consultation with Heemskirk Canada to comply with existing regulations as well as accommodate the specified mining equipment and existing infrastructure.

Drilling of blast holes will be done with self contained diesel hydraulic drills. As illustrated in table 1, blast patterns have been calculated for several vertical holes sizes using ammonium nitrate and fuel oil (AN/FO) as the explosive. An illustration of the blast hole terminology is shown in Figure 7. The explosive powder factor has been increased to maximize fragmentation and reduce handling and crushing costs. Of the alternative hole sizes, 140mm diameter hole on a 3.99m burden by 4.39m spacing pattern is recommended as being most cost effective. However if finer fragmentation is required then the 114mm diameter hole on a 3.254m square pattern is recommended.

To maximize fragmentation as well as reduce blast noise and vibration holes should be delayed to fire individually. The minimum in-hole delay of the opening hole should not be less than the total surface delay time in order to prevent surface cutoffs. In addition the surface initiation should run to each hole from at least two directions.

Table 1: Blast Pattern Calculations

		Range	k value	Solving	Blast Hole Diameter (m)			
					0.114	0.127	0.140	0.152
Bench Height (m) =	12							
Burden Ratio (kB)	= B/De	24 - 35	28.5	B	3.25	3.62	3.99	4.33
Hole Depth Ratio (kH)	= H/B	1.5 - 4.0		kH	3.94	3.57	3.26	3.02
Subgrade Ratio (kJ)	= J/B	0.2 - 0.3	0.25	J	0.81	0.90	1.00	1.08
Stemming Ratio (kT)	= T/B	0.6 - 0.8	0.7	T	2.27	2.53	2.79	3.03
Spacing Ratio (kS)	=S/B	1.0 - 1.2	1.1	S	3.57	3.98	4.39	4.77
Expl. Load per Hole (Kg)				Kg	91.4	111.7	133.5	155.0
Vol. per Hole (m3)				m3	139.3	172.9	210.1	247.7
Powder Factor (Pf)	(Kg/m3)	0.47 - 0.89		Pf	0.66	0.65	0.64	0.63
Powder Factor (Pf)	(lbs/yd3)	0.80 - 1.50		Pf	1.11	1.09	1.07	1.06
Pattern Summary:								
Burden (m)					3.25	3.6195	3.99	4.332
Spacing (m)					3.57	3.9815	4.389	4.7652
Subgrade (m)					0.81	0.9049	0.9975	1.083
Hole Depth (m)					12.81	12.905	12.998	13.083

Ramps are designed for single lane traffic with passing pullouts located at bench entrances. A shoulder barrier, at least ¾ of the height of the largest tire on any vehicle hauling on the road, is to be built and maintained along the edge of ramp wherever a drop-off greater than 3 metres exists.

The down ramp entrances to the catchment berms are to be maintained for runaway lanes. Where unconsolidated material accumulates on the catchment berms, it is to be removed before it endangers any person working on a lower bench.

All unconsolidated material lying within 2 m of the edge of a working face or wall is to be removed beyond this distance unless it is sloped to an angle less than the natural angle of repose.

Water or other dust suppression means is to be used at every dusty place where work is carried out. Where this is not possible, respiratory personal protective equipment shall be used by all persons working in the area

Rock drilling is to be done with suitable equipment that includes dust suppression.

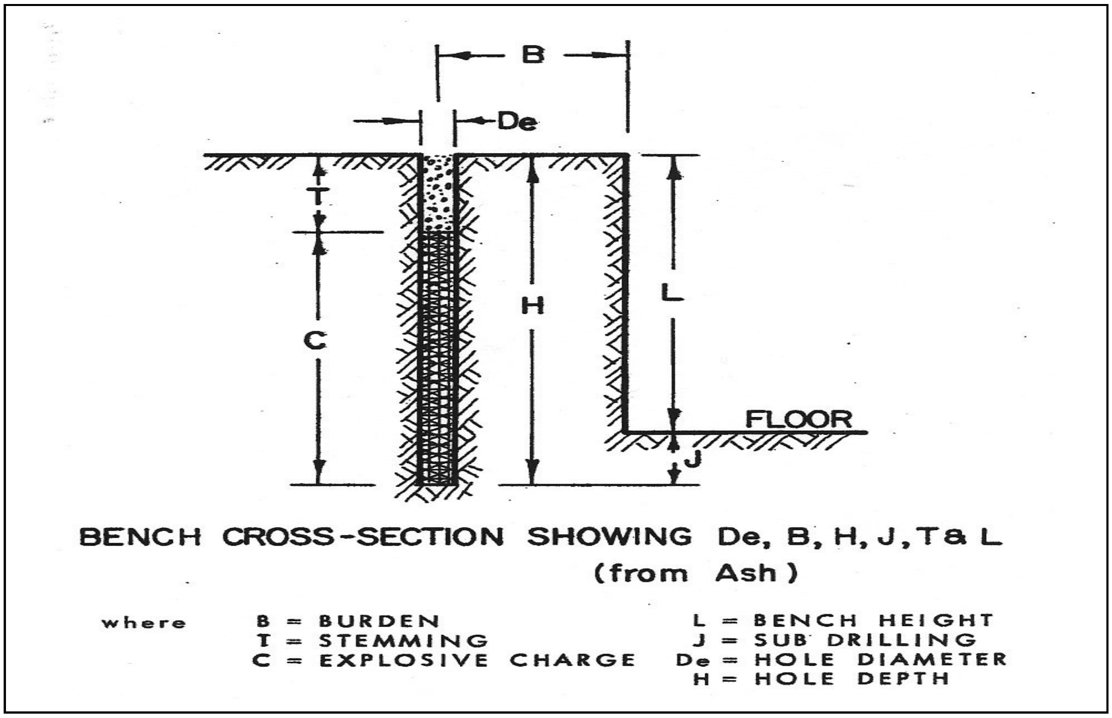


Figure 7: Bench Cross Section with Blast Hole Terminology

4. PIT STOCKPILE MANAGEMENT

An in-pit run of mine (ROM) ore stockpile is to be constructed between the 1421 existing pit bottom and 1439 elevation. This stockpile has an approximate overall volume of 126,500 cubic metres of which approximately 11,900 cubic metres will form a safety berm leaving an active stockpile volume of about 114,600 cubic metres or 203,700 tonnes of ROM ore.

The stockpile is to be constructed by first developing the ramp from 1431 to the 1437 bench as shown in drawing M200-X-013 Sheet 2/5. Build the stockpile to this elevation before extending it to 1439 elevation as shown in drawing M200-X-013 Sheet 3/5. Stockpile sections are shown in drawings M200-X-013 Sheet 4/5 and 5/5.

The stockpiled “safety berm” is not to be reclaimed until mining of west expansion 1431 bench is extended 8 metres beyond its current toe line above the in-pit stockpile.

Reclaim of the in-pit run of mine (ROM) ore stockpile is to be done with appropriately sized equipment and loaded into highway haulage equipment at the stockpile base for transportation to the processing plant.

5. PLANNED MINING SEQUENCE

The following is the planned mining sequence:

1. A 200,000 tonne (approx. 102,000 LCM) mined ore stockpile is to be built on the 1421 bench pit bottom from the development ramps and berms immediately above and east of it. The top elevation of this stockpile being 1439. A catchment berm, of approximately 12,000 m^3 or 21,200 tonnes of ore, is built below the west high wall. This can be recovered in 2017 when the west expansion 1443 bench is completed and mining progresses to the 1431 bench.

2. Reclaim from this stockpile will require a wheel loader and track dozer.

3. Establish the permanent ramp from 1479 toe to 1491 elevation.

4. Cut the 1491 remediation bench into the NE high wall face. This will give a degree of protection to the 1479 loading area.

5. Mine the west expansion 1503 bench and establish the permanent ramp to its 1503 crest.

6. Cut the 1503 remediation bench into the NE high wall face. Periodically clean the 1491 remediation bench as it fills up from this development activity.

7. Mine the west expansion 1491 bench.

8. Concurrent with the mining of the 1491 bench establish the ramp from 1503 to 1527 and mine both the 1515 and 1527 remediation benches into the NE

high wall face. Periodically clean the lower remediation benches as they fill up from this development activity.

9. Mine the remaining west expansion benches successively from top (1479) to bottom (1419).

10. Use the existing ramp system, upgrading these where required to the design specifications, for development and mining access, mine the east expansion top down establishing the permanent ramp as mining proceeds to the lower benches.

Note: When establishing the remediation benches in the NE high wall it is very important to set the crest in competent or un-blasted rock. It may be necessary to adjust the design to satisfy this requirement. Secondly, the toe to crest distance cannot be less than 8 metres. When developing the remediation benches ensure that loose material above these benches is removed by scaling with dragged chains (or cat rails) or other suitable technique.

Table 2: Moberly Pit 2012 Mine Plan Resource Depletion Schedule

	West Expansion	2012/13 Mining	2014 Mining	2015 Mining	2016 Mining	2017 Mining	2018 Mining	2019 Mining	2020 Mining	2021 Mining
Tonnes		120,000	320,000	400,000	400,000	400,000	400,000	400,000	400,000	224,318
BCM		47,244	125,984	157,480	157,480	157,480	157,480	157,480	157,480	88,314
Bench										
1623										
1611										
1599										
1587										
1575										
1563										
1551										
1539										
1527										
1515										
1503	7,798									
1491	75,810	4,867								
1479	138,297	138,297								
1467	171,520	171,520	157,204							
1455	181,303	181,303	181,303	181,207	23,727					
1443	202,976	202,976	202,976	202,976	202,976	69,222				
1431	224,599	224,599	224,599	224,599	224,599	224,599	136,341			
1419	266,933	266,933	266,933	266,933	266,933	266,933	266,933	245,794	88,314	
	1,269,236									

Table 2: cont'd

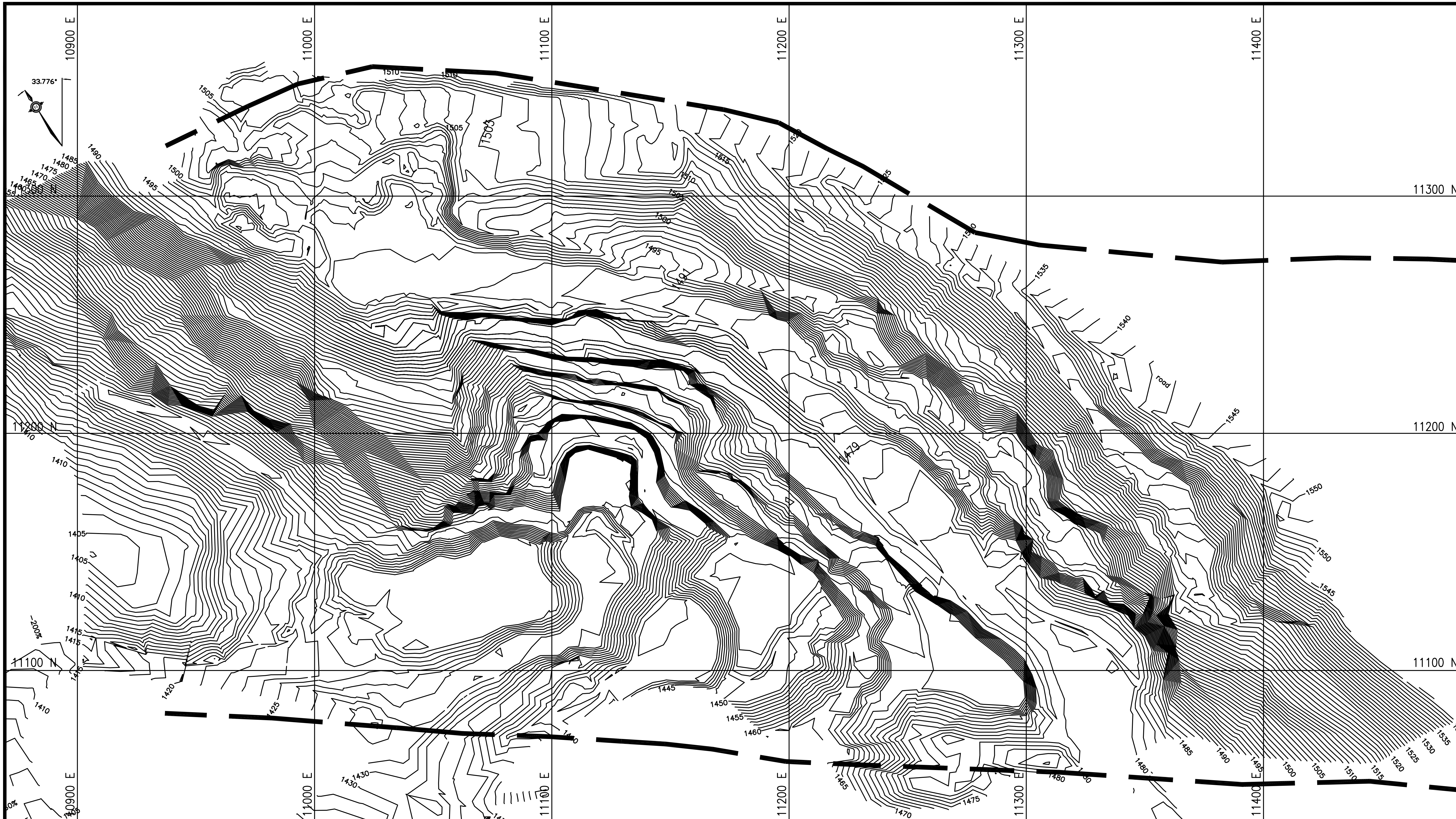
	East Expansion	2021 Mining	2022 Mining	2023 Mining	2024 Mining	2025 Mining	2026 Mining	2027 Mining	2028 Mining	2029 Mining
Tonnes		175,682	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
BCM		69,166	157,480	157,480	157,480	157,480	157,480	157,480	157,480	157,480
Bench										
1623	34,653									
1611	78,706	44,192								
1599	128,139	128,139	14,850							
1587	179,899	179,899	179,899	37,268						
1575	240,221	240,221	240,221	240,221	120,009					
1563	268,343	268,343	268,343	268,343	268,343	230,872	73,392			
1551	266,373	266,373	266,373	266,373	266,373	266,373	266,373	182,284	24,804	
1539	261,155	261,155	261,155	261,155	261,155	261,155	261,155	261,155	261,155	128,479
1527	240,939	240,939	240,939	240,939	240,939	240,939	240,939	240,939	240,939	240,939
1515	256,275	256,275	256,275	256,275	256,275	256,275	256,275	256,275	256,275	256,275
1503	297,444	297,444	297,444	297,444	297,444	297,444	297,444	297,444	297,444	297,444
1491	297,462	297,462	297,462	297,462	297,462	297,462	297,462	297,462	297,462	297,462
1479	305,893	305,893	305,893	305,893	305,893	305,893	305,893	305,893	305,893	305,893
1467	333,001	333,001	333,001	333,001	333,001	333,001	333,001	333,001	333,001	333,001
1455	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152
1443	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977
1431	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306
1419	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836
	4,138,772									

Table 2: cont'd

	2030 Mining	2031 Mining	2032 Mining	2033 Mining	2034 Mining	2035 Mining	2036 Mining	2037 Mining	2038 Mining	2039 Mining
Tonnes	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
BCM	157,480	157,480	157,480	157,480	157,480	157,480	157,480	157,480	157,480	157,480
Bench										
1623										
1611										
1599										
1587										
1575										
1563										
1551										
1539										
1527	211,938	54,458								
1515	256,275	256,275	153,252							
1503	297,444	297,444	297,444	293,215	135,735					
1491	297,462	297,462	297,462	297,462	297,462	275,717	118,236			
1479	305,893	305,893	305,893	305,893	305,893	305,893	305,893	266,649	109,168	
1467	333,001	333,001	333,001	333,001	333,001	333,001	333,001	333,001	333,001	284,689
1455	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152	305,152
1443	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977	261,977
1431	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306	215,306
1419	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836	167,836

Table 2: cont'd

	2040 Mining	2041 Mining	2042 Mining	2043 Mining	2044 Mining	2045 Mining	2046 Mining	2047 Mining
Tonnes	400,000	400,000	400,000	400,000	400,000	400,000	400,000	336,801
BCM	157,480	157,480	157,480	157,480	157,480	157,480	157,480	132,599
Bench								
1623								
1611								
1599								
1587								
1575								
1563								
1551								
1539								
1527								
1515								
1503								
1491								
1479								
1467	127,209							
1455	305,152	274,881	117,401					
1443	261,977	261,977	261,977	221,898	64,417			
1431	215,306	215,306	215,306	215,306	215,306	122,243		
1419	167,836	167,836	167,836	167,836	167,836	167,836	132,599	



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DWG No.	DESCRIPTION

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1	07/10/12	RENAME DRAWING	CL		
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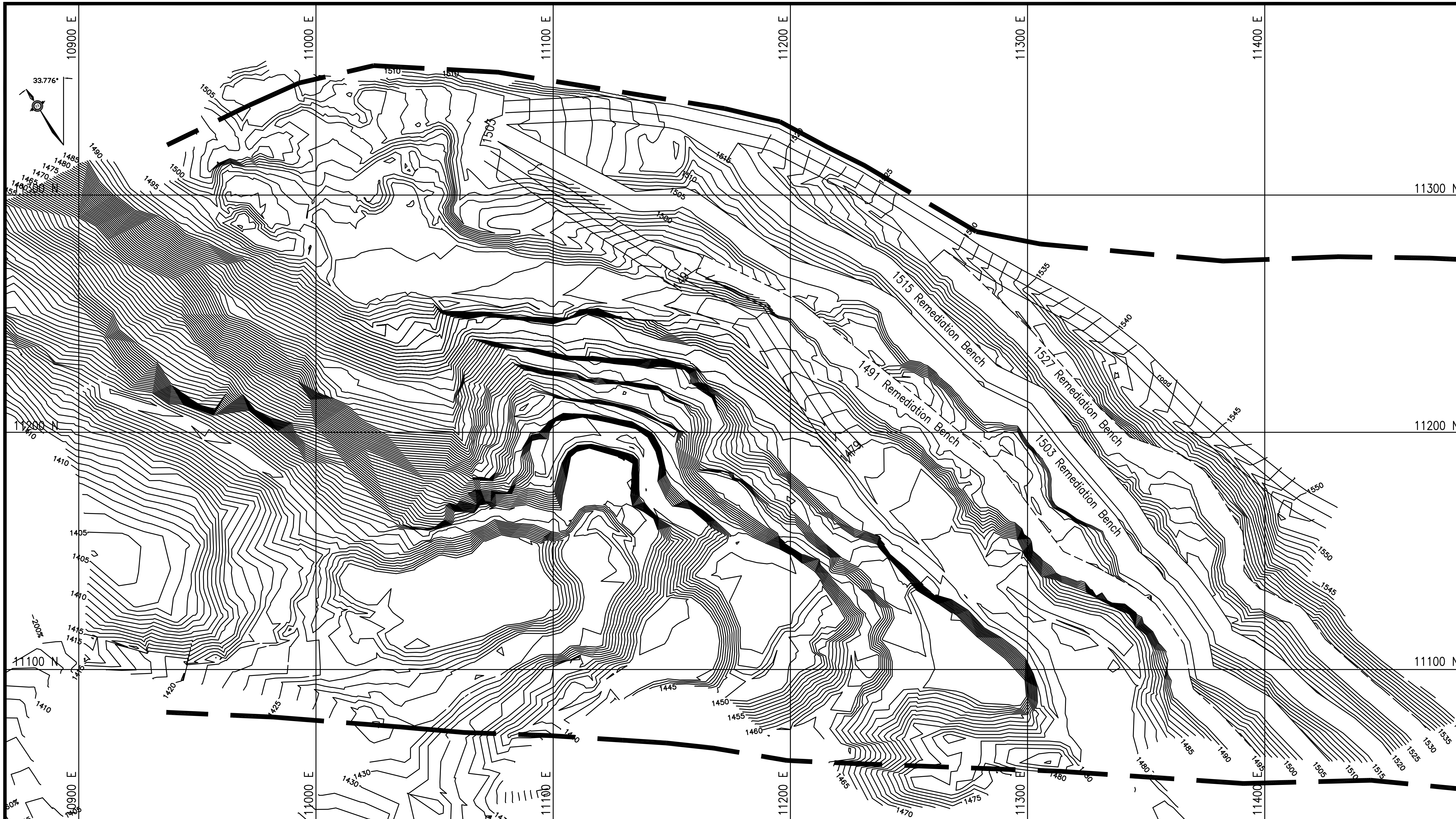
LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2012/13 - 35 Year Mine Plan West Expansion Development Area (2)
DWG. No.	M200-X-012 Sheet 1/8
REV	2



REFERENCE	
DWG No.	DESCRIPTION

No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
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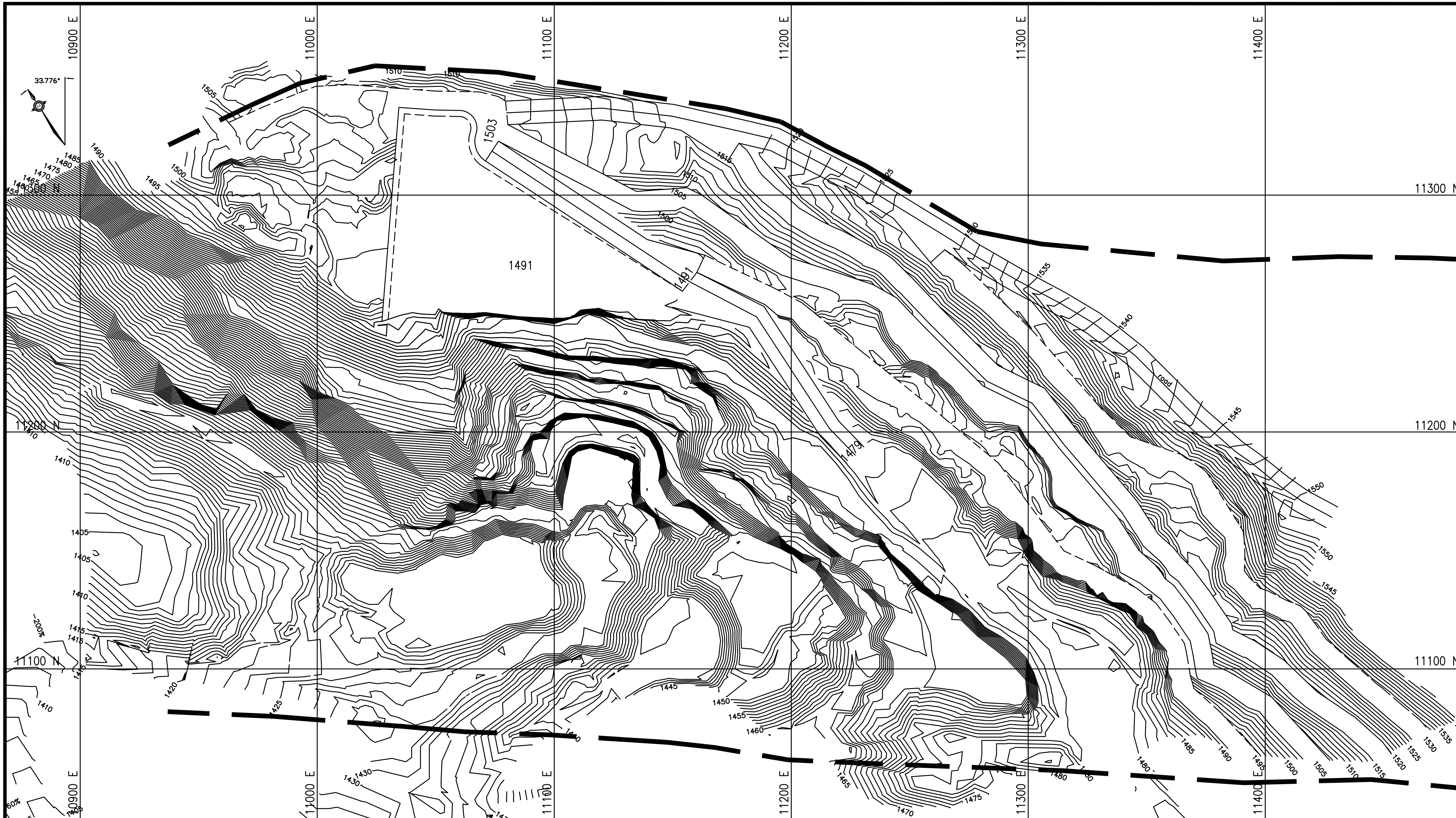
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan**
NE High Wall Remediation (2)

DWG. No. **M200-X-012 Sheet 2/8** REV 2



REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
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1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		
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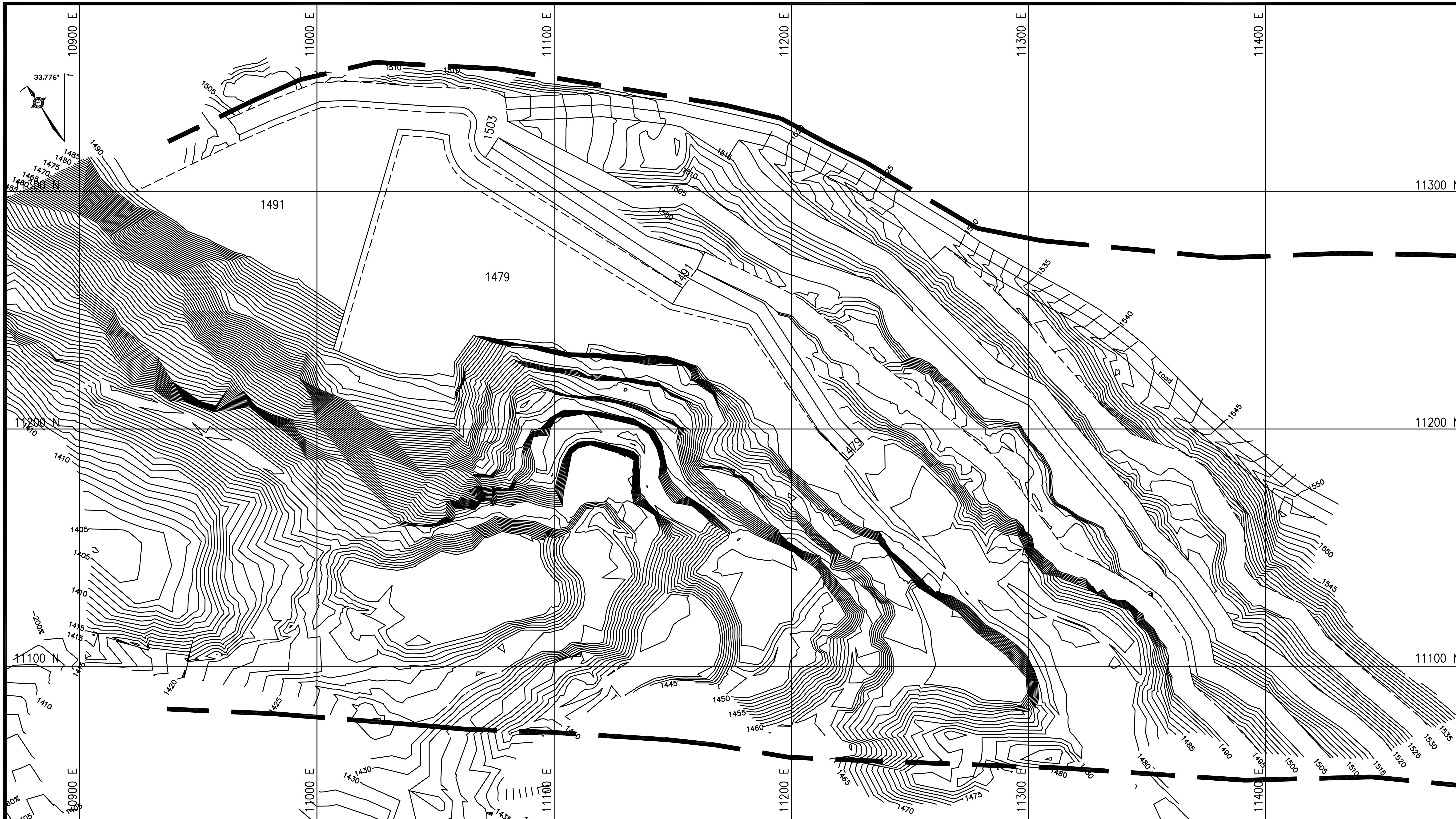
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2012/13 - 35 Year Mine Plan West Expansion Year End 2013 (rev 2)
DWG. No.	M200-X-012 Sheet 3/8
REV	2



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DWG No.	DESCRIPTION

REVISIONS No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
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1	07/10/12	RENAME DRAWING	CL		
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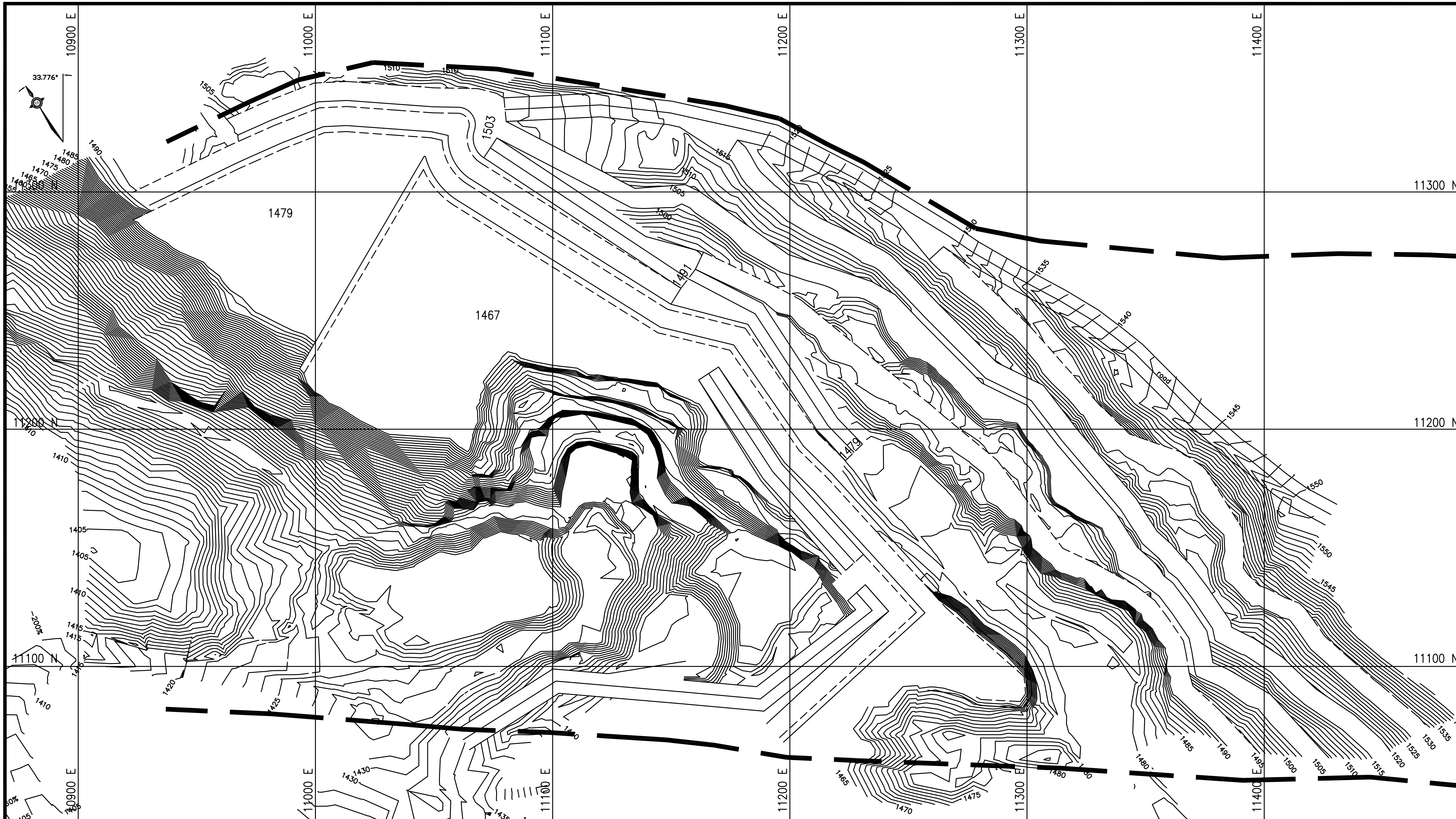
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan West Expansion Year End 2014** (2)

DWG. No. **M200-X-012 Sheet 4/8** REV 2



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REVISIONS					
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1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		
No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.

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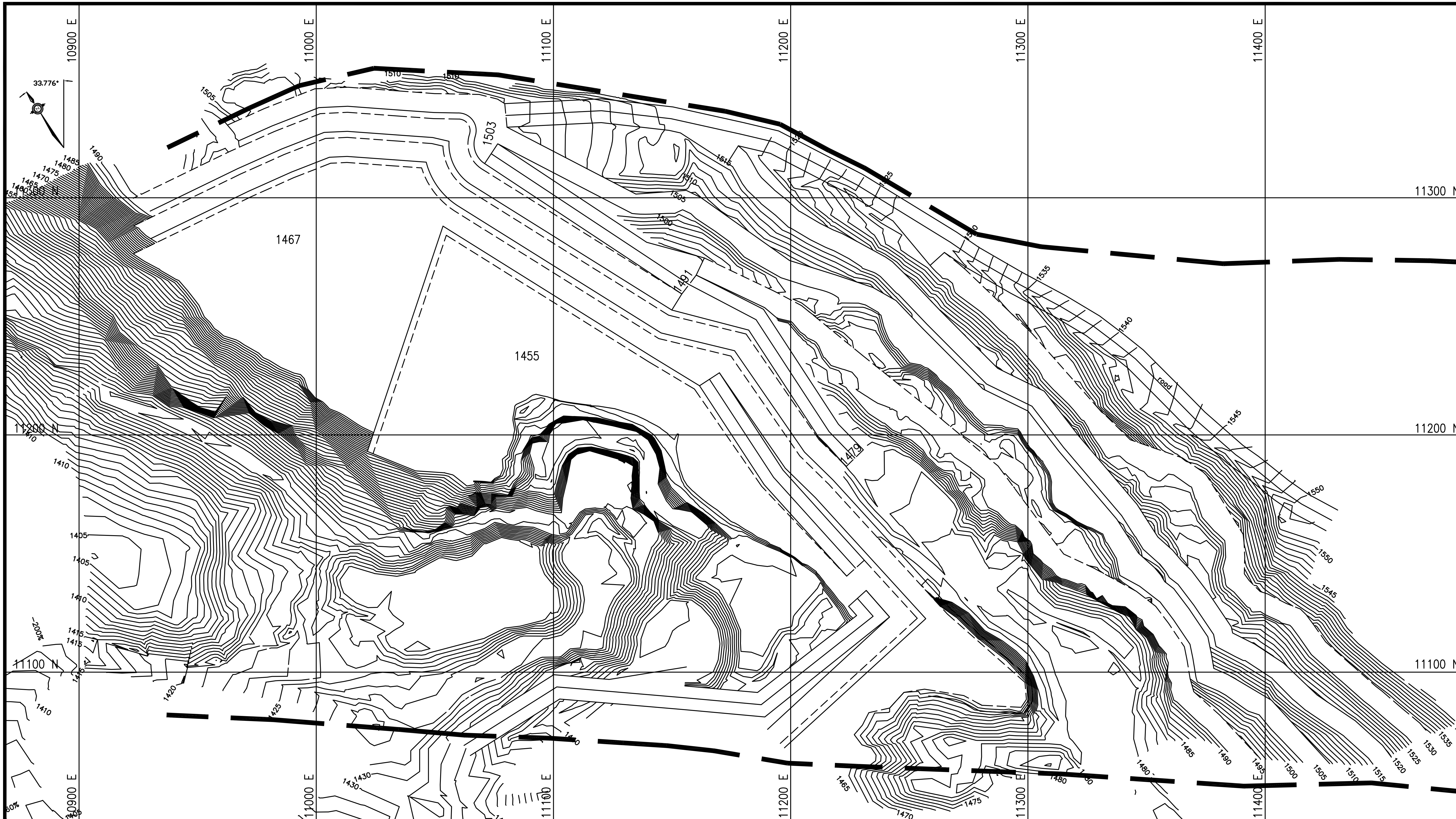
LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2 2012/13 - 35 Year Mine Plan West Expansion Year End 2015
DWG. No.	M200-X-012 Sheet 5/8
REV	2



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No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
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1	07/10/12	RENAME DRAWING	CL		
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PROVINCE OF BRITISH COLUMBIA
C. G. LUSBY
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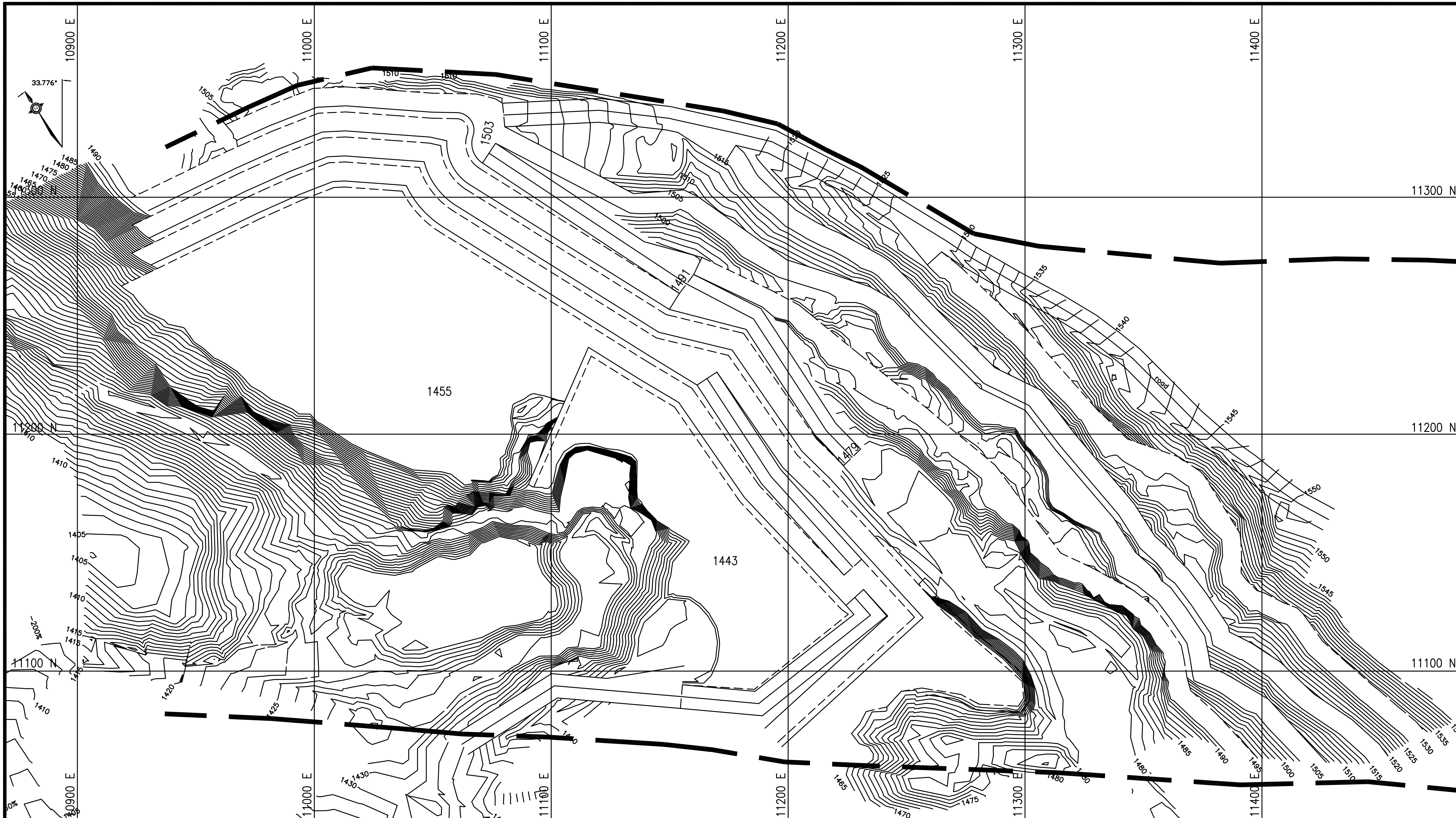
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan**
West Expansion
Year End 2016

2

DWG. No. **M200-X-012 Sheet 6/8** REV 2



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DWG No.	DESCRIPTION

REVISIONS					
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0	06/17/12	ISSUED FOR CONSTRUCTION	CL		
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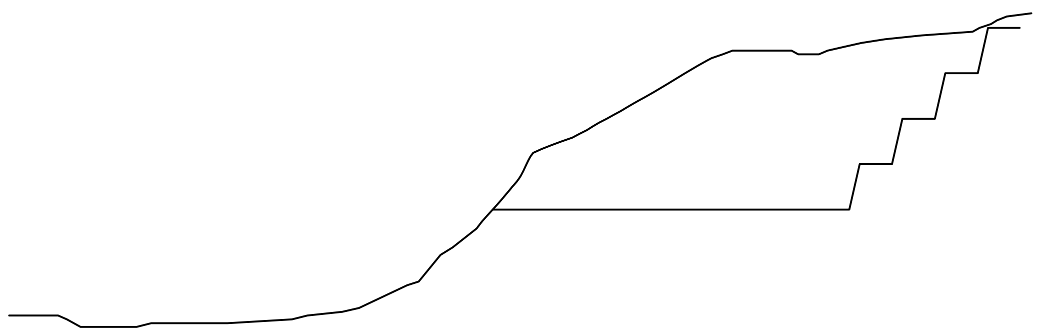
LOC. **HCA Mountain Minerals**

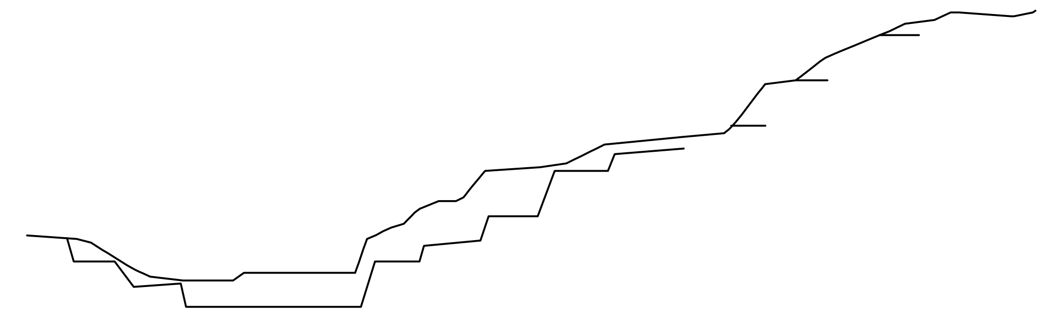
AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan West Expansion Year End 2017** (2)

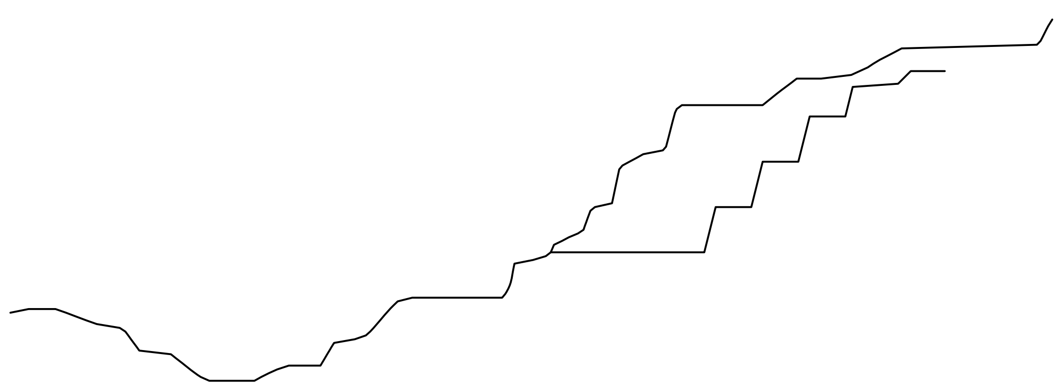
DWG. No. **M200-X-012 Sheet 7/8** REV 2



Section 11+000E



Section 11+200E



Section 11+100E

REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
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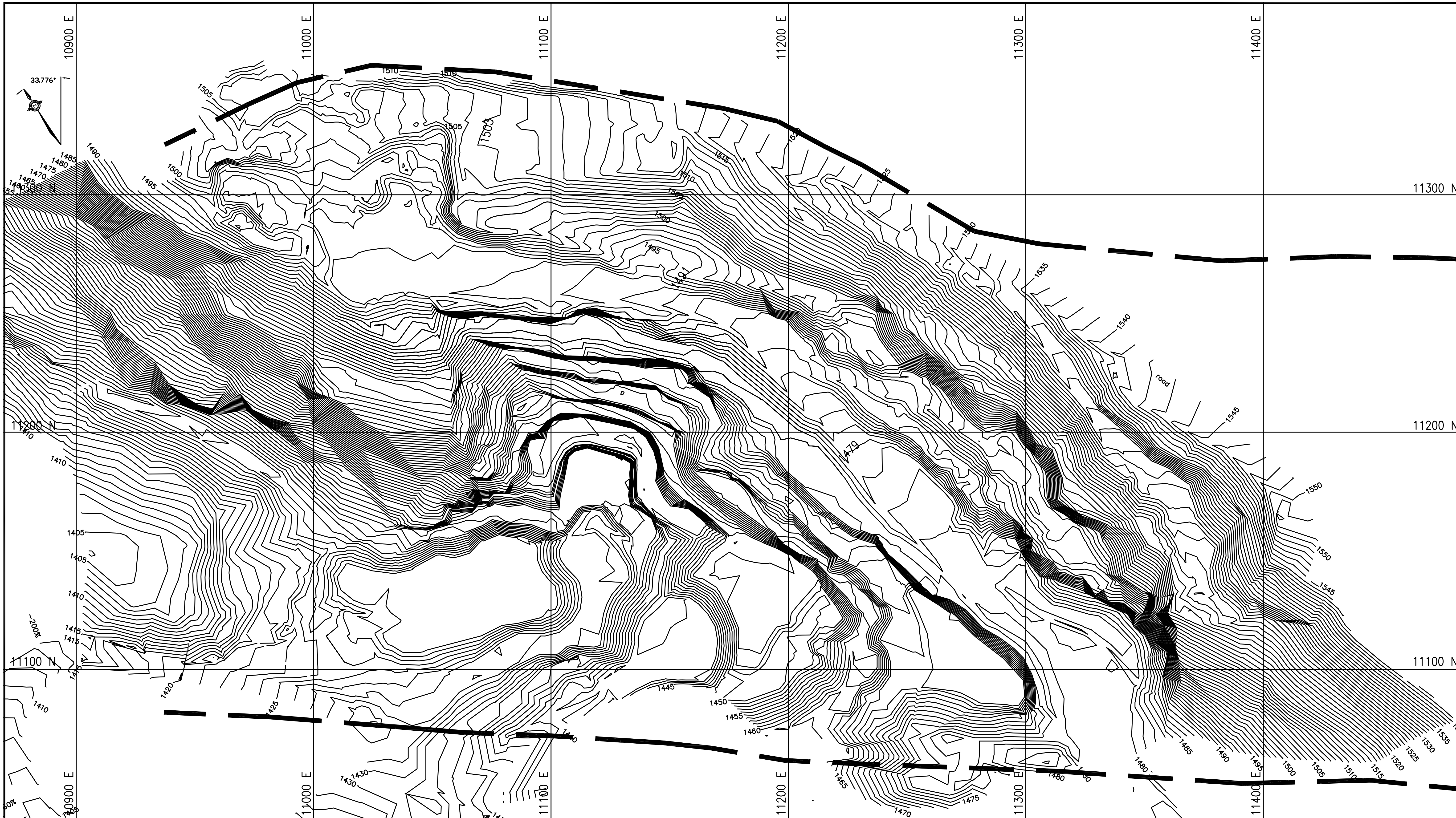
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2012/13 - 35 Year Mine Plan West Expansion Pit Sections
DWG. No.	M200-X-012 Sheet 8/8
REV	2



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DWG No.	DESCRIPTION

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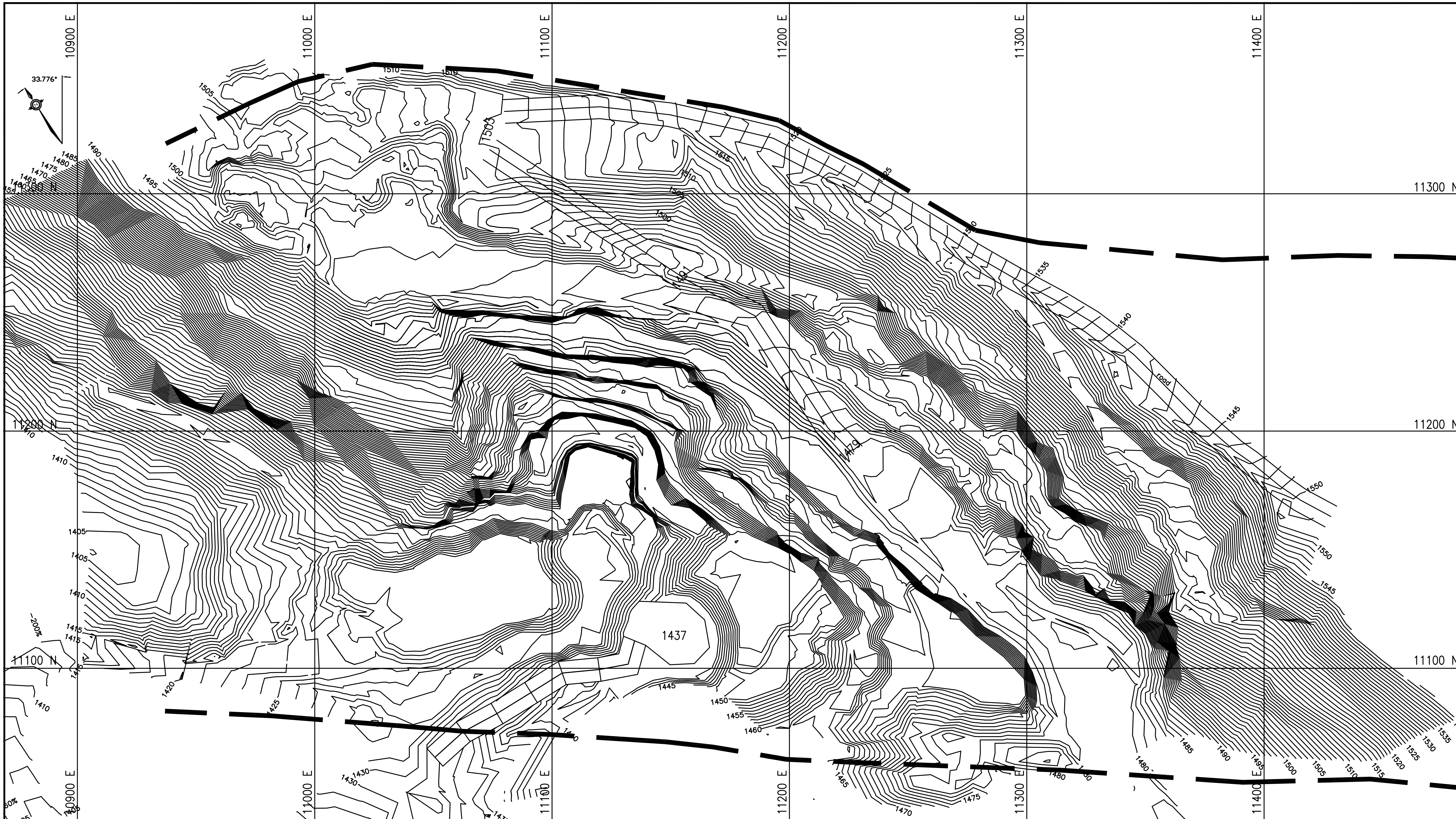
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan West Expansion Raw Ore Stockpile Area Undeveloped**

DWG. No. **M200-X-013 Sheet 1/5** REV 0



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REVISIONS					
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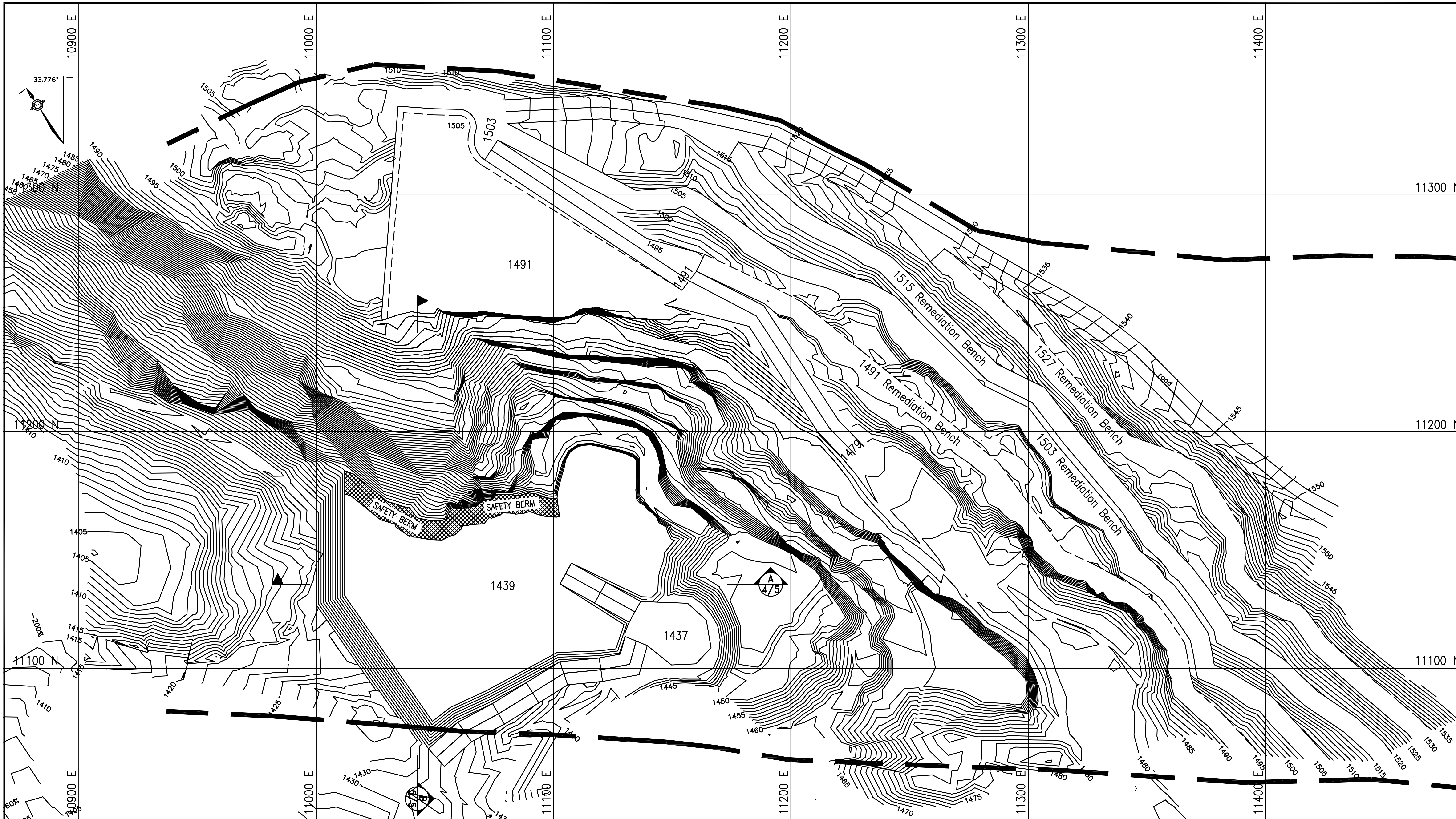
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan**
West Expansion
Raw Ore Stockpile Area
Ramp Development

DWG. No. **M200-X-013 Sheet 2/5** REV 0



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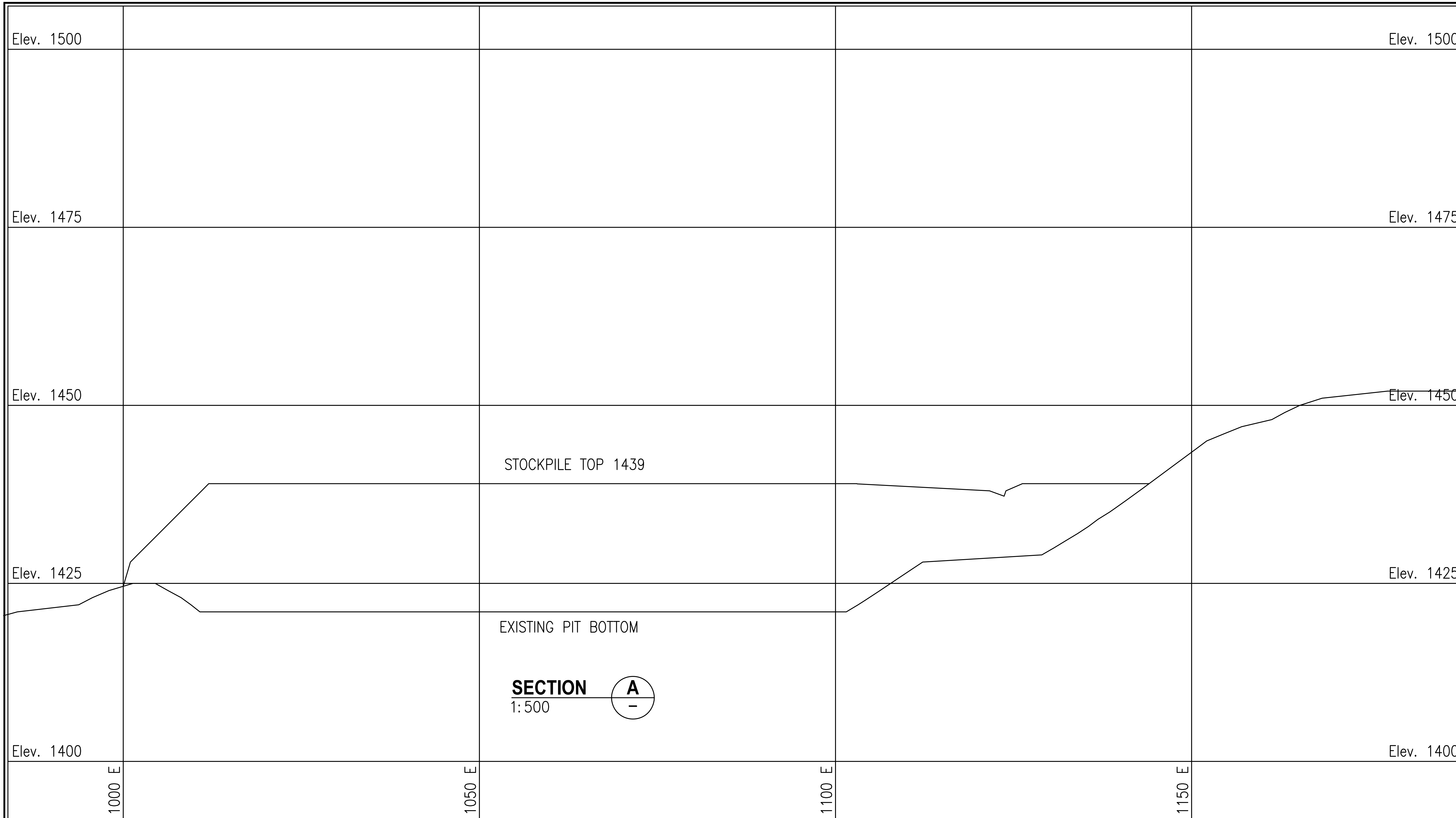
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2012/13 - 35 Year Mine Plan West Expansion Raw Ore Stockpile Area 200,000 T Stockpile
DWG. No.	M200-X-013 Sheet 3/5
REV	0



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DWG No.	DESCRIPTION

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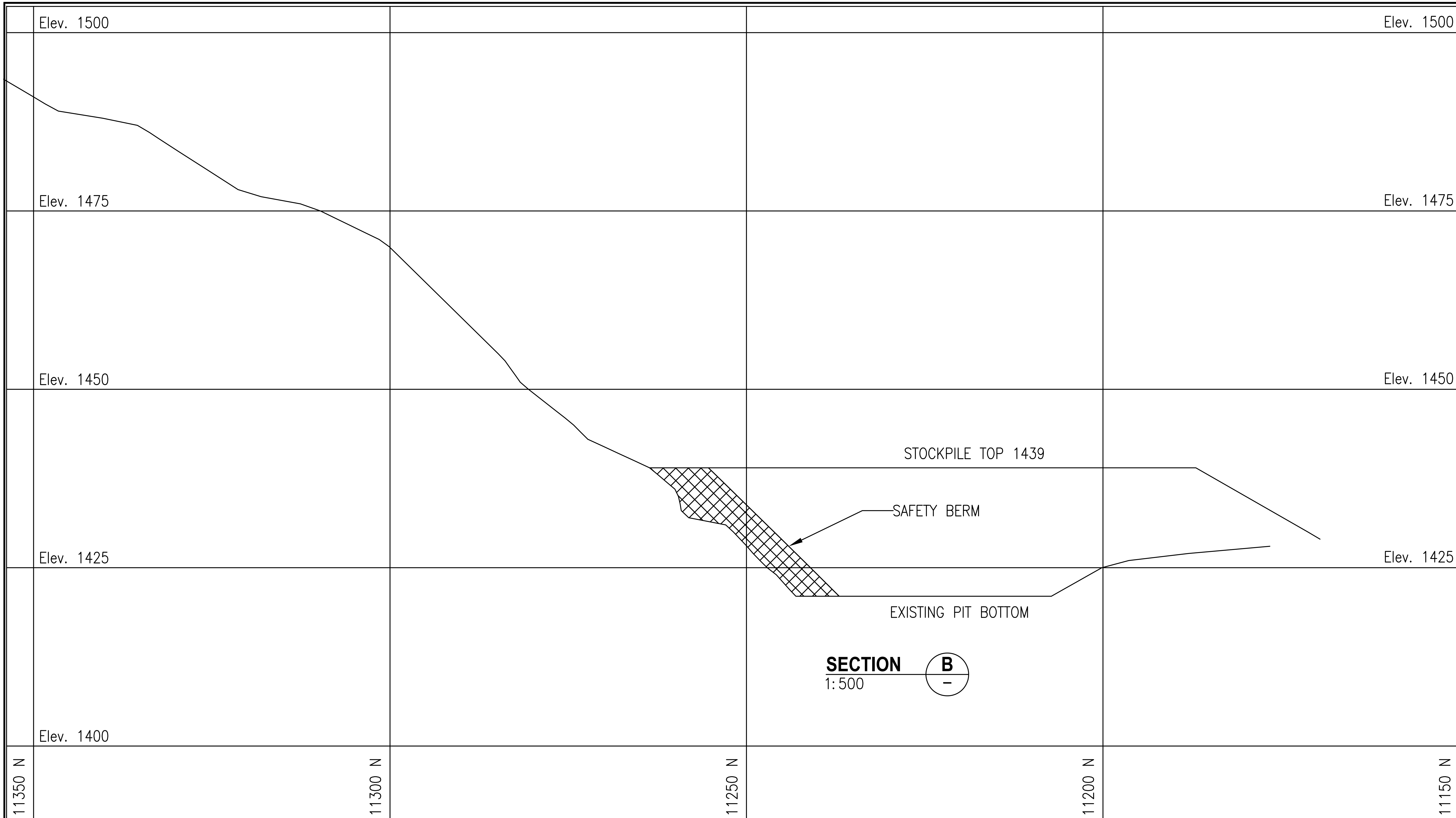
LOC.	**HCA Mountain Minerals**
AREA	**Moberly Pit**
TITLE	**2012/13 - 35 Year Mine Plan** **West Expansion** **200,000 T Stockpile** **Section Looking North**
DWG. No.	**M200-X-013 Sheet 4/5** REV 0



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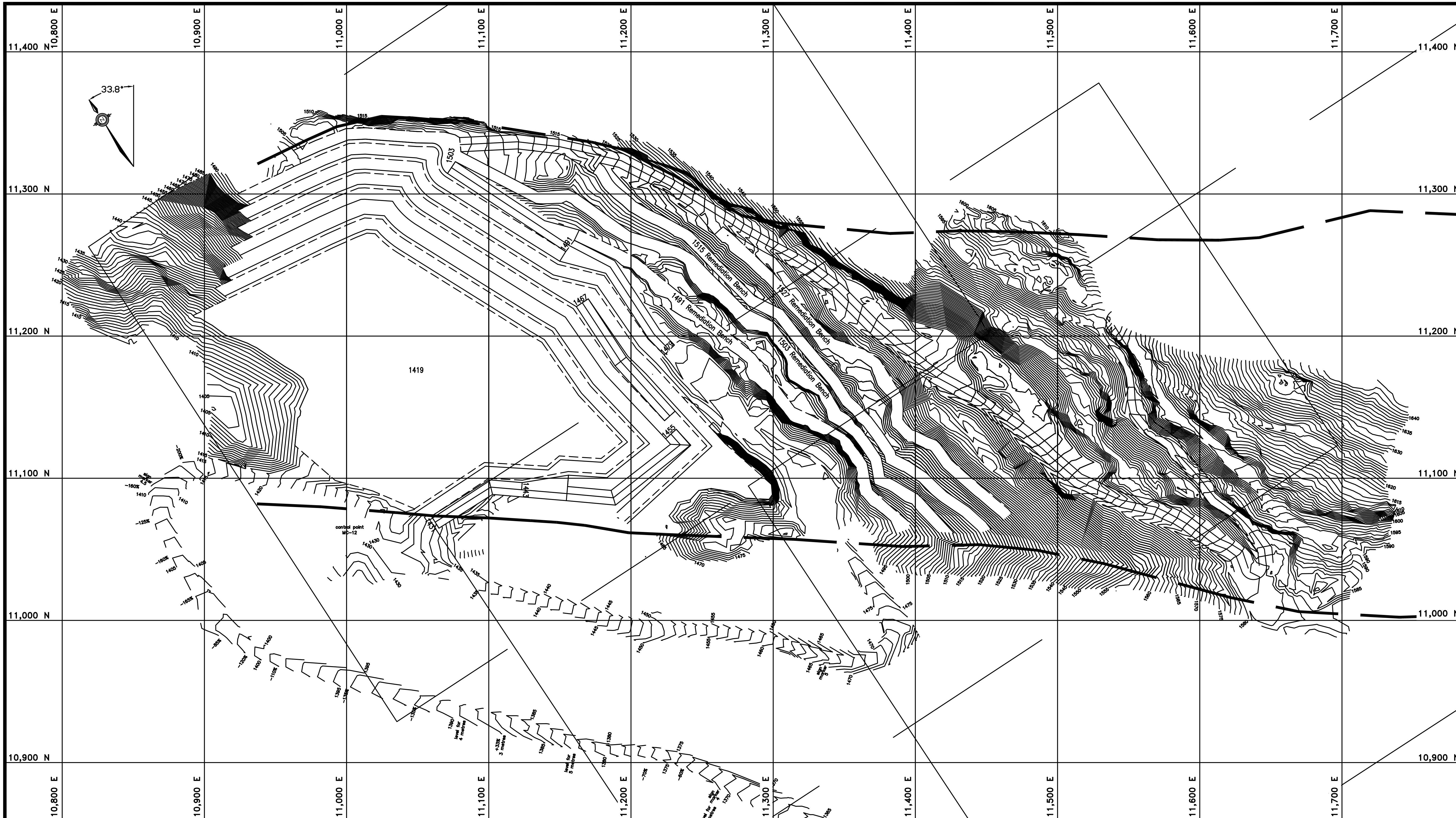
LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2012/13 - 35 Year Mine Plan West Expansion 200,000 T Stockpile Section Looking East
DWG. No.	M200-X-013 Sheet 5/5
REV	0



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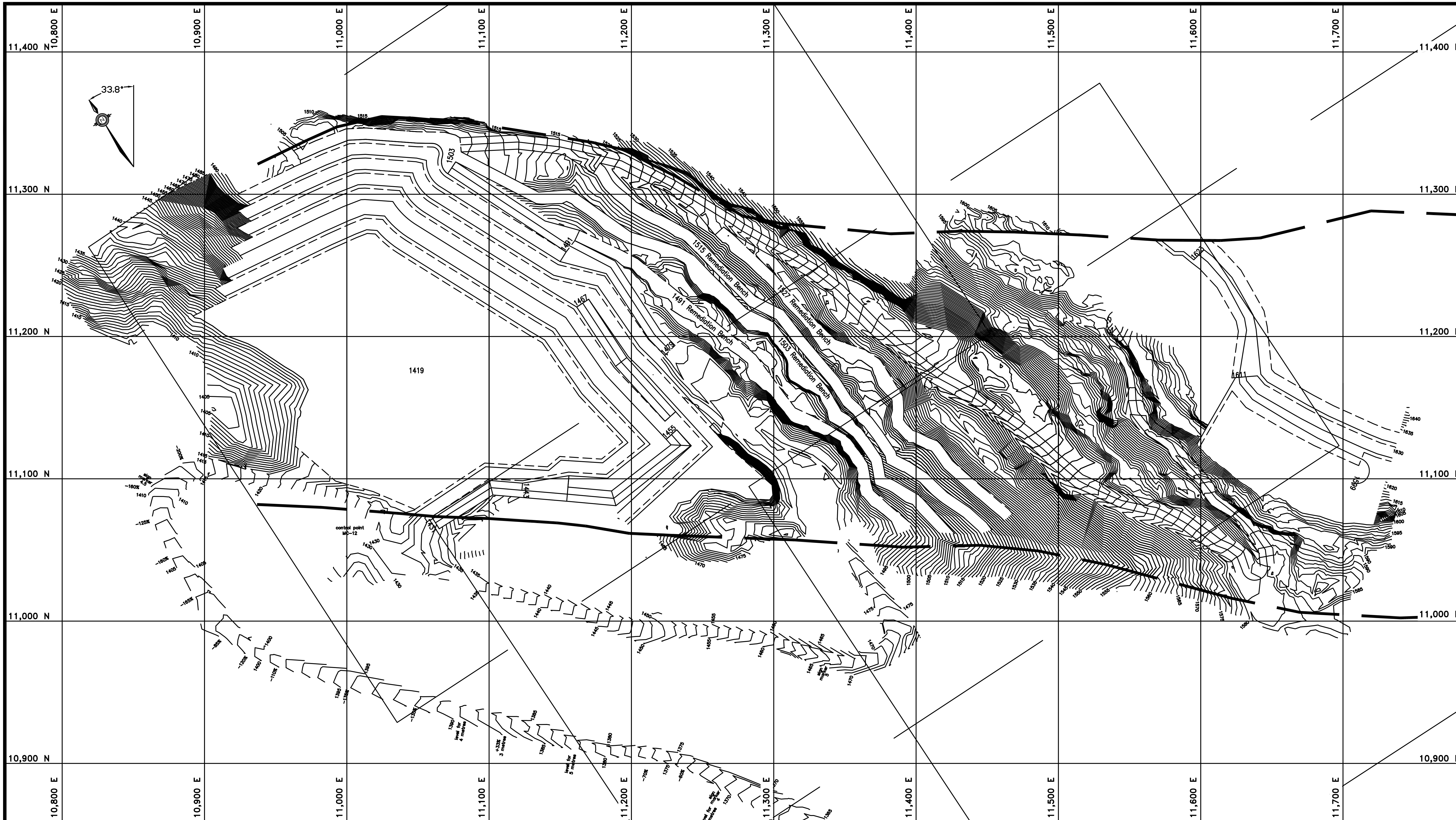
LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan East Expansion Development Area** (2)

DWG. No. **M200-X-011 Sheet 1/8** REV 2



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0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

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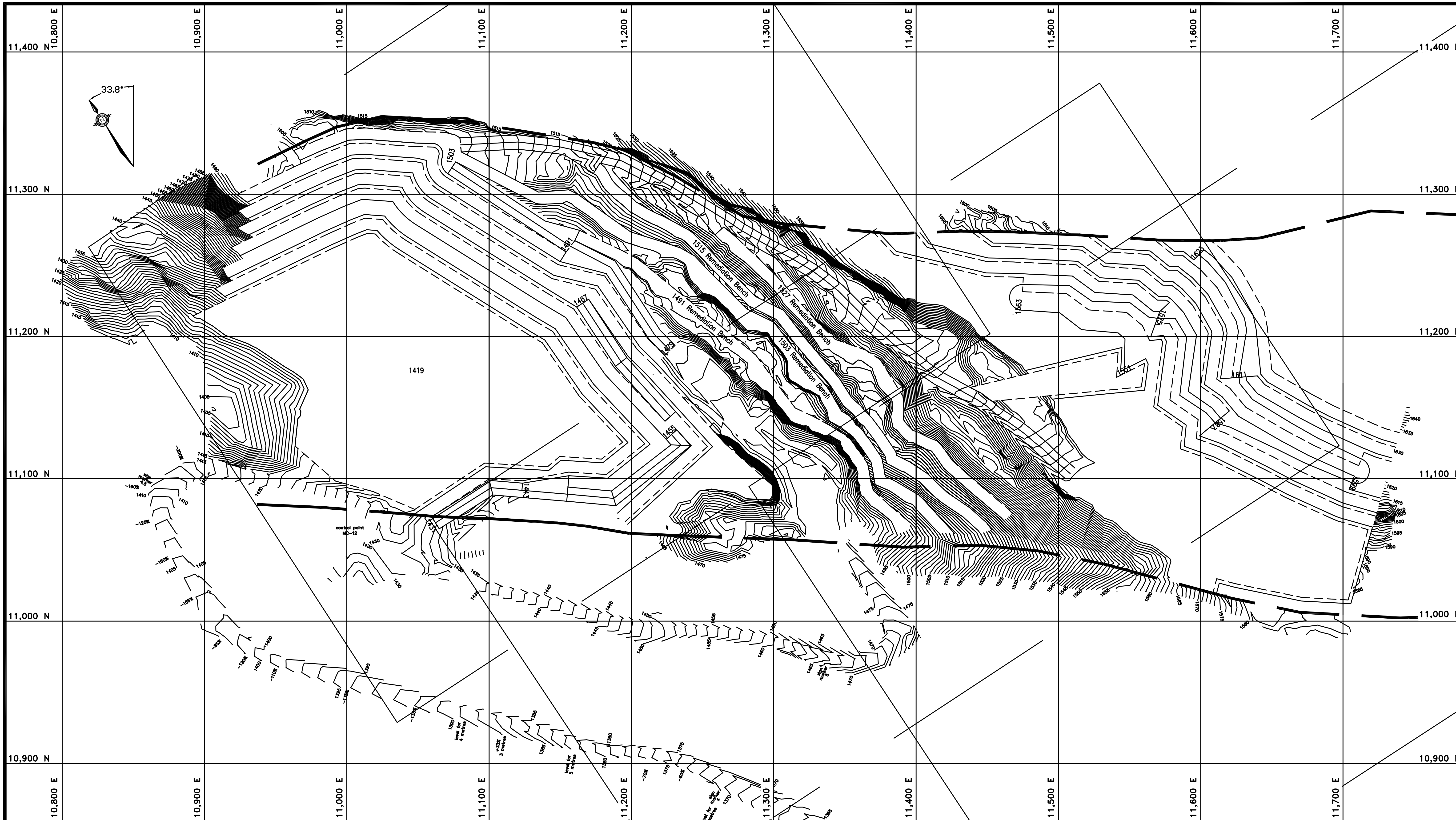
LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2 — 2012/13 - 35 Year Mine Plan East Expansion Year End 2022
DWG. No.	M200-X-011 Sheet 2/8
REV	2



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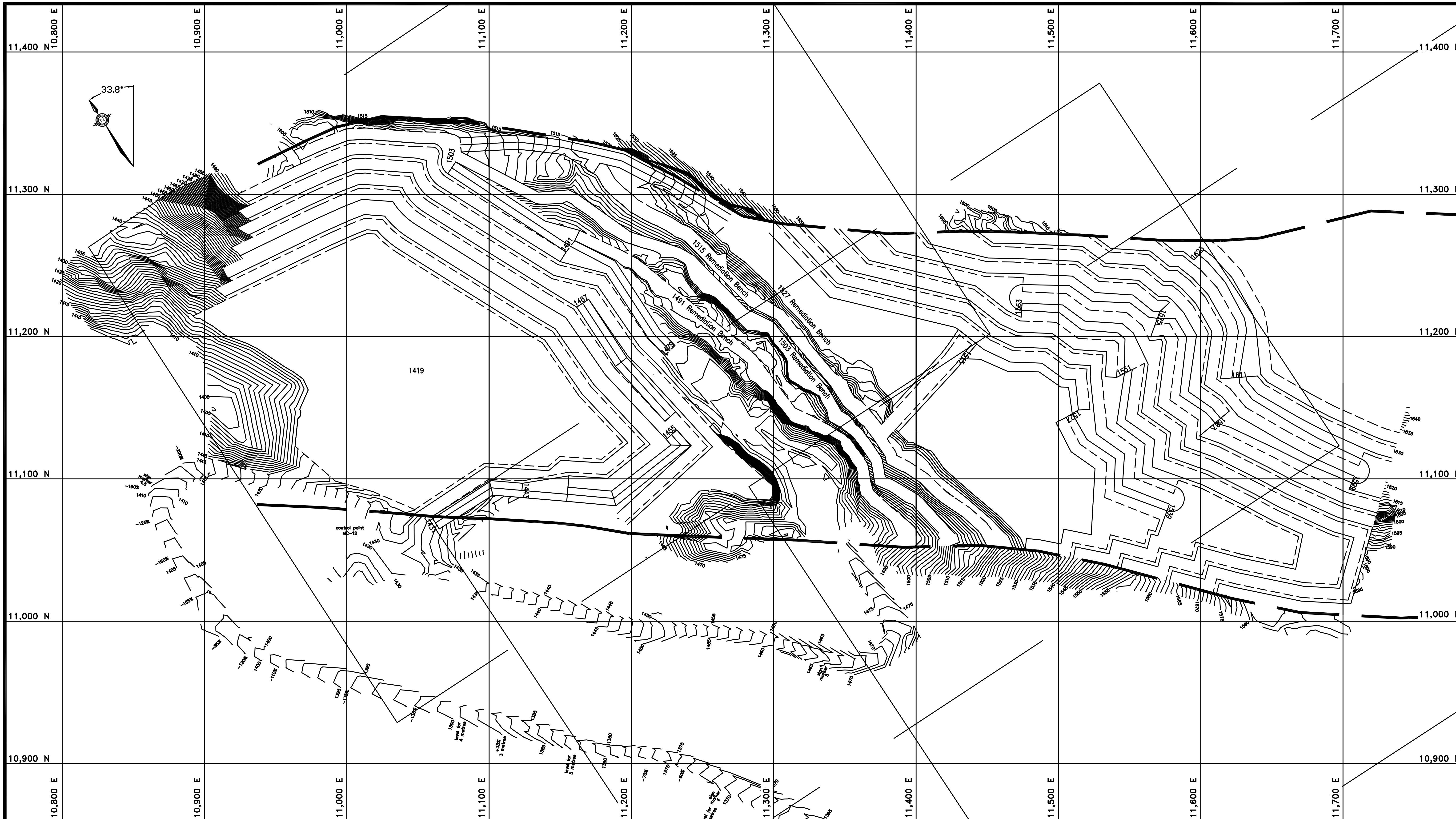
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan East Expansion Year End 2027** (2)

DWG. No. **M200-X-011 Sheet 3/8** REV 2



REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
2	09/26/12	ADJUST START YEAR & RENAME DRAWING	CL		
1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — C. G. LUSBY # 31378

MANAGEMENT RELEASE:

SCALE : 1:2500		DATE
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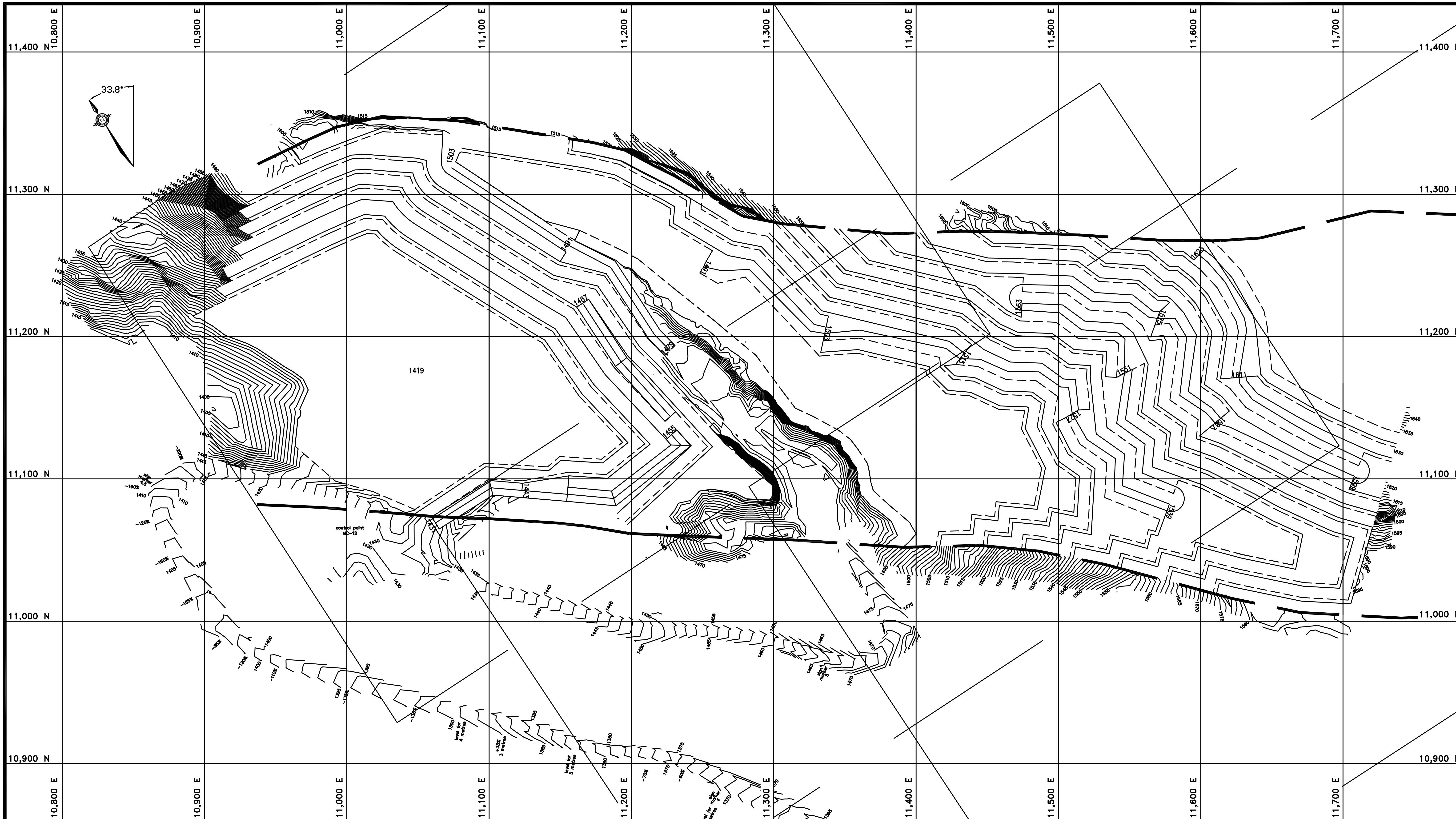
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan East Expansion Year End 2032** (2)

DWG. No. **M200-X-011 Sheet 4/8** REV 2



REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
2	09/26/12	ADJUST START YEAR & RENAME DRAWING	CL		
1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
C. G. LUSBY
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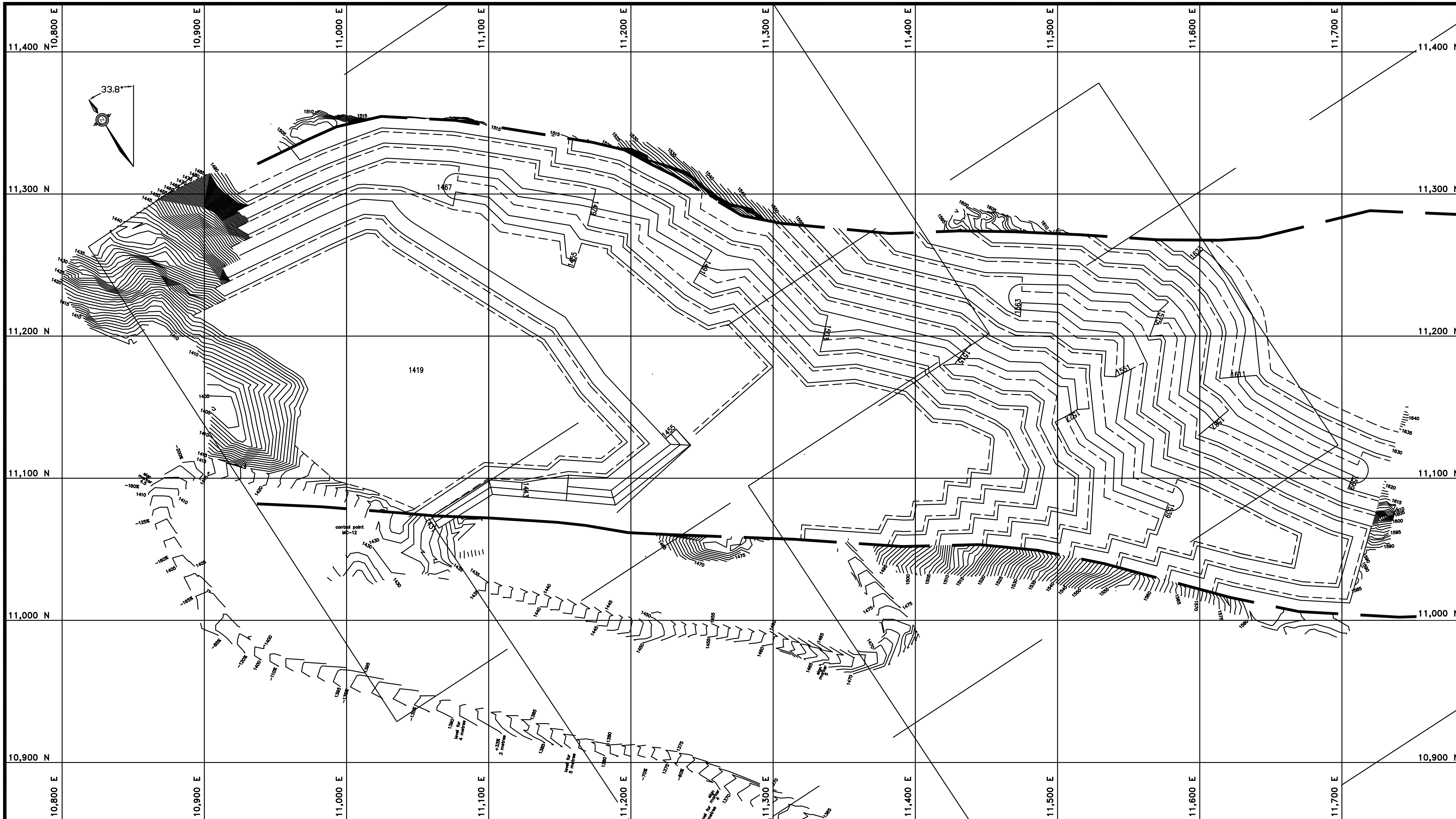
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2 2012/13 - 35 Year Mine Plan East Expansion Year End 2037
DWG. No.	M200-X-011 Sheet 5/8
REV	2



REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
2	09/26/12	ADJUST START YEAR & RENAME DRAWING	CL		
1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

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MANAGEMENT RELEASE:

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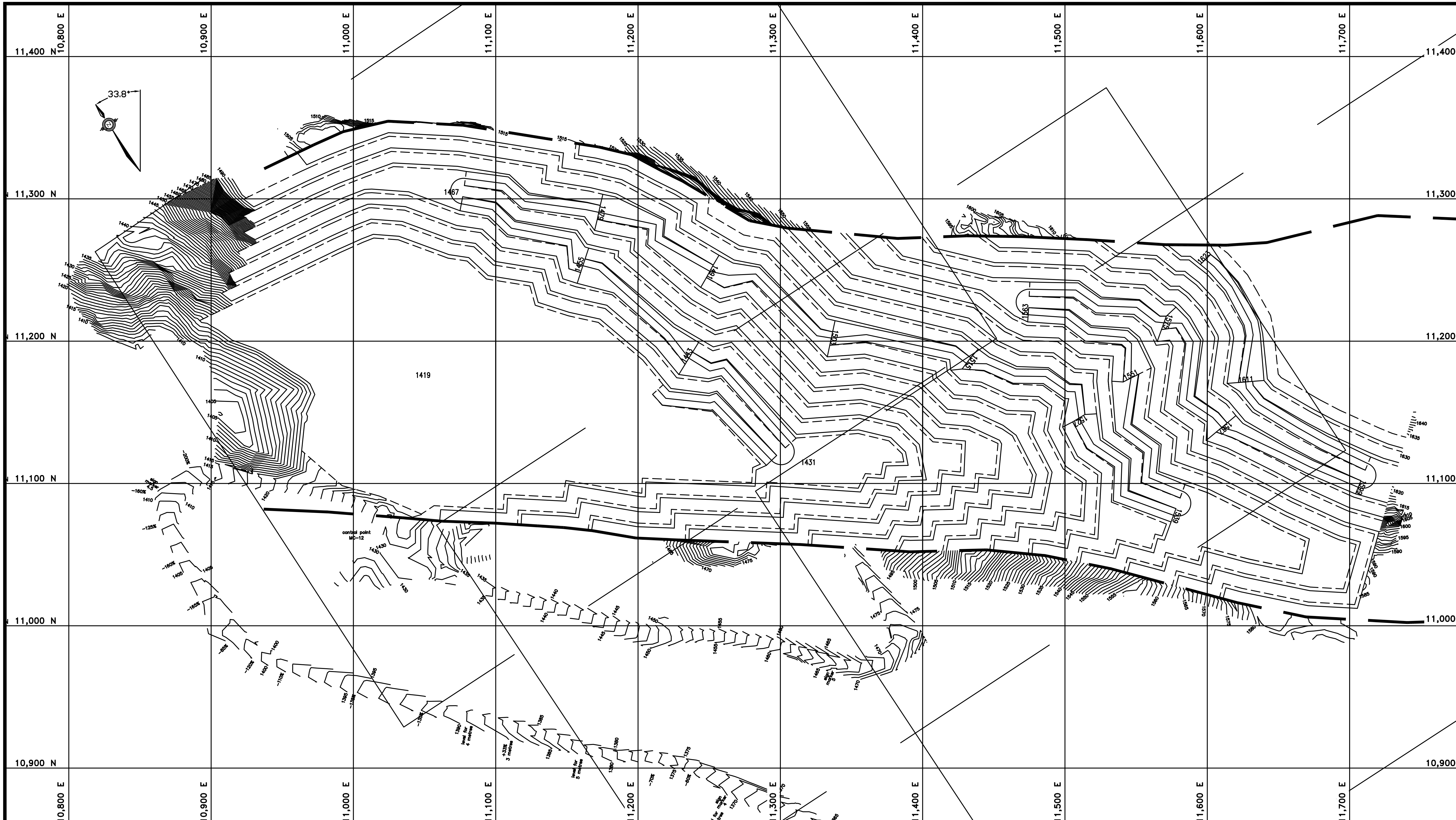
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan East Expansion Year End 2042** (2)

DWG. No. **M200-X-011 Sheet 6/8** REV 2



REFERENCE	
DWG No.	DESCRIPTION

REVISIONS					
No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
2	09/26/12	ADJUST START YEAR & RENAME DRAWING	CL		
1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

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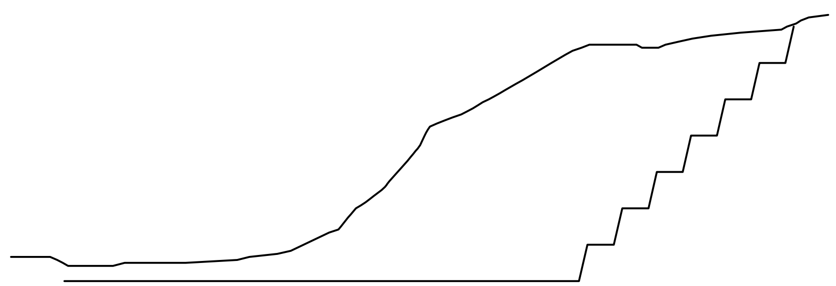
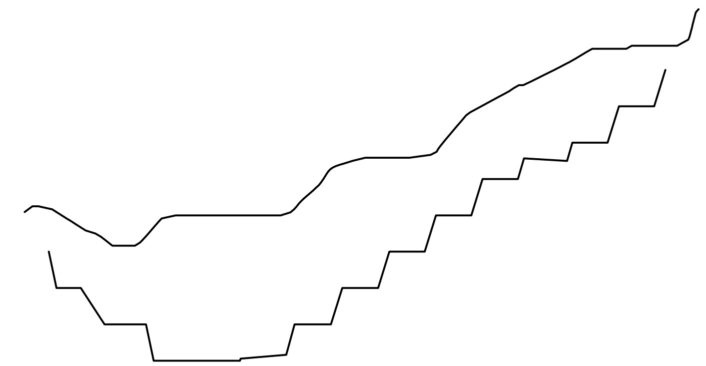
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

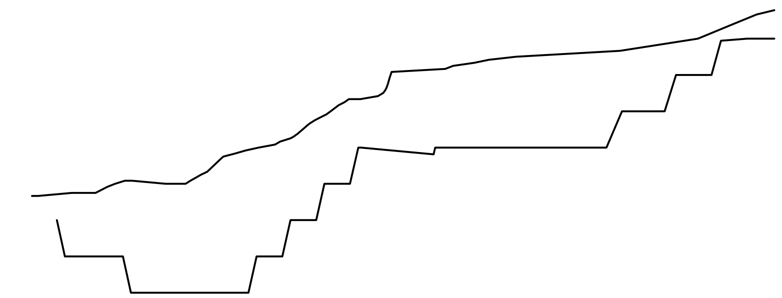
LOC.	HCA Mountain Minerals
AREA	Moberly Pit
TITLE	2 — 2012/13 - 35 Year Mine Plan East Expansion Year End 2047
DWG. No.	M200-X-011 Sheet 7/8
REV	2



Section 11+000E



Section 11+300E



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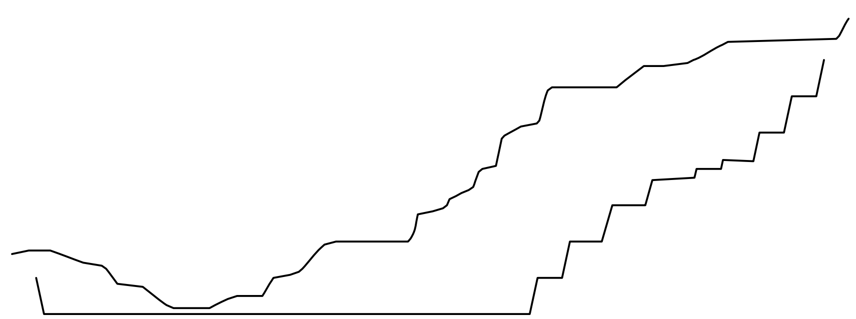

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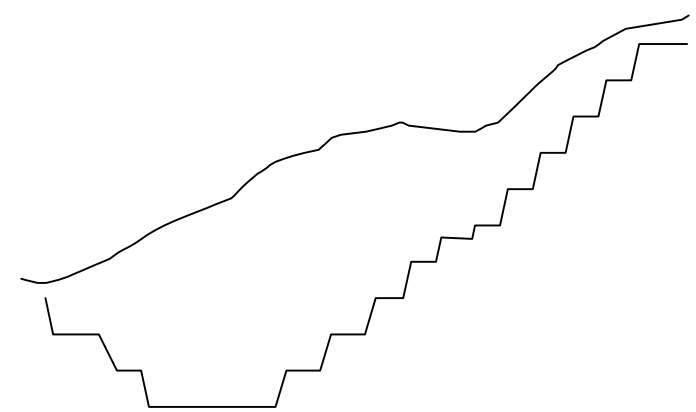
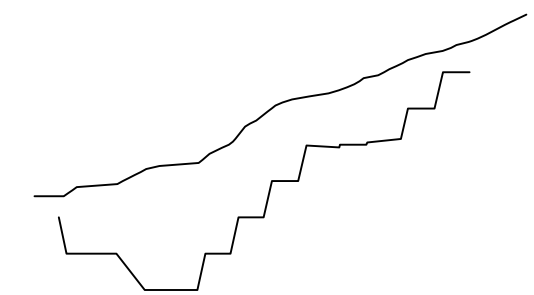
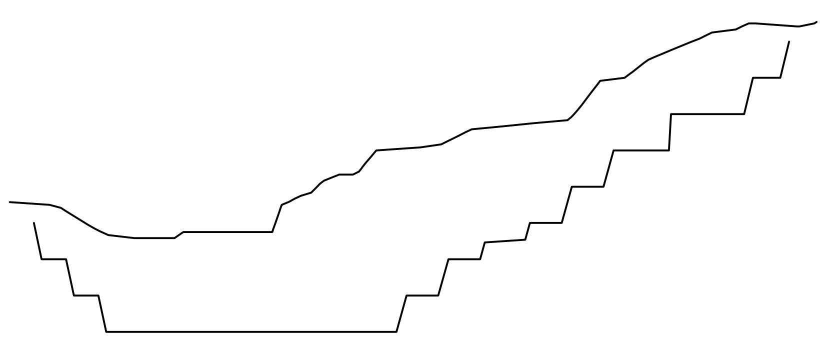


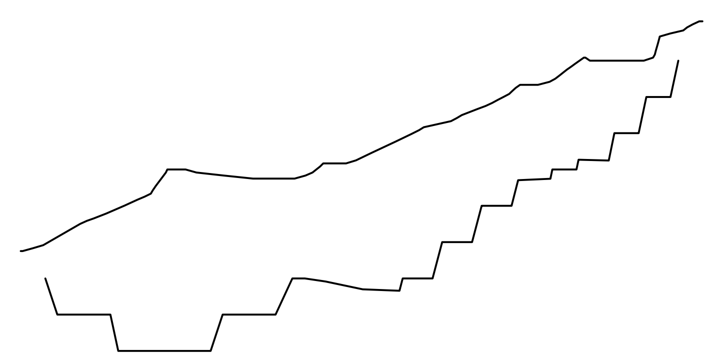
Section 11+400E



Section 11+700E



Section 11+200E



Section 11+500E

REFERENCE

DWG No.	DESCRIPTION

REVISIONS

No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
2	09/26/12	ADDED PIT SECTIONS	CL		
1	07/10/12	RENAME DRAWING	CL		
0	06/17/12	ISSUED FOR CONSTRUCTION	CL		

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
C.G. LUSBY
31378

MANAGEMENT RELEASE:

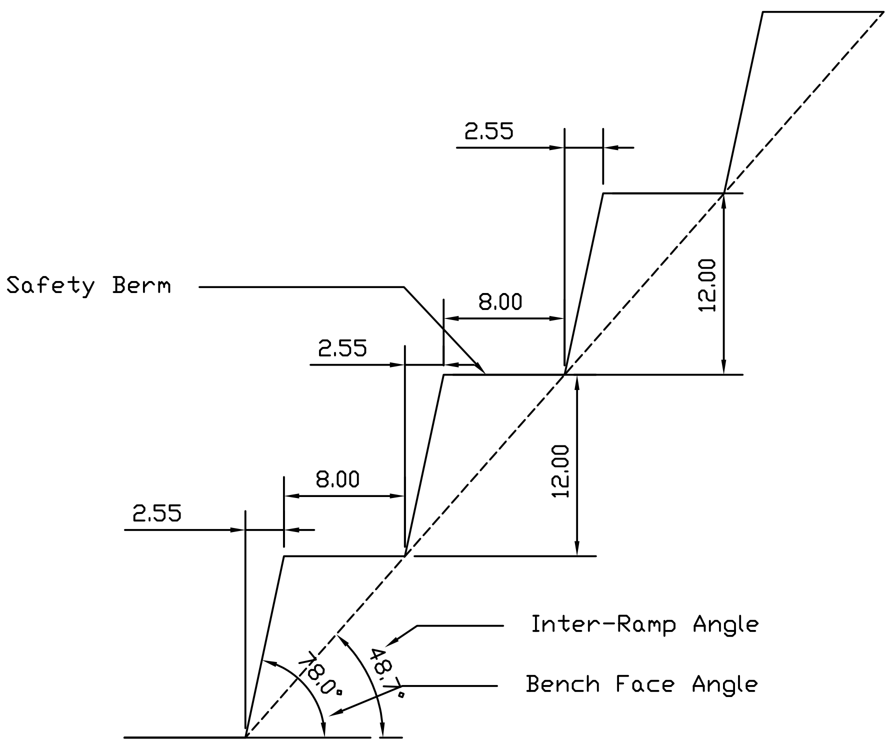
SCALE :	1:2500	DATE
DESIGNED:	C. Lusby	10/19/11
DRAWN:	C. Lusby	09/26/12
CHECKED:		MM/DD/YY
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

LOC. **HCA Mountain Minerals**

AREA **Moberly Pit**

TITLE **2012/13 - 35 Year Mine Plan**
East Expansion
Pit Sections

DWG. No. **M200-X-011 Sheet 8/8** REV 2



12m Bench Design

LOC.	HCA Mountain Minerals	
AREA	Moberly Pit	
TITLE	2012/13 - 35 Year Mine Plan 12m Bench Design	
DWG. No.	M200-X-006	REV 1

SCALE:	1:500	DATE
DESIGNED:	C. Lusby	05/22/08
DRAWN:	C. Lusby	07/21/09
CHECKED:		MM/DD/YY
DESIGN LEAD APPROVAL:		MM/DD/YY
DESIGN AUTH. APPROVAL:		MM/DD/YY

MANAGEMENT RELEASE:

REVISIONS

No.	DATE	DESCRIPTION	BY	DES. LEAD APPL.	DES. AUTH. APPL.
1	10/03/12	Revise Title & Issued for Construction	CL		
0	07/21/09	Issued Approved Mining Plans	CL		