



# A case study on the risk of developing in the vicinity of the dolomite compartment

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L.J MTEKWANA

# AGENDA

- 1. Intro*
  - 2. Overview*
  - 3. Geology*
  - 4. Geotechnical properties*
  - 5. Conclusion and recommendations*
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# Overview

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(Masimthebe shaft) is an underground gold mining operation found in the Witwatersrand basin mining at 1900m below surface.

This operation is located in the (West rand) 48km from Johannesburg next to N12 along the way to Potchefstroom

The shaft mines the secondary reef Kloof reef also has Ventersdorp contact reef VCR, Main reef and Libanon reef.

# GEOLOGY COMPOSITION

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The Footwall drive

The quartzite in the FWD is greenish grey, medium grained, semi-mature and horizontally bedded dipping at 35°.

There is shale infilling on the bedding planes, resulting in weak cohesion between the beds.

The quartzite has got minor quartz veining.



The fault was first intersected in the haulage on the cover hole **(A)**, this position which ties up with the fault mapped on KL14-43 FWDS.

Borehole **(A)** also intersected Black reef 23.5m from the first contact of the fault so therefore the black reef on the footwall drive was expected to be intersected 34m from peg **(B)**

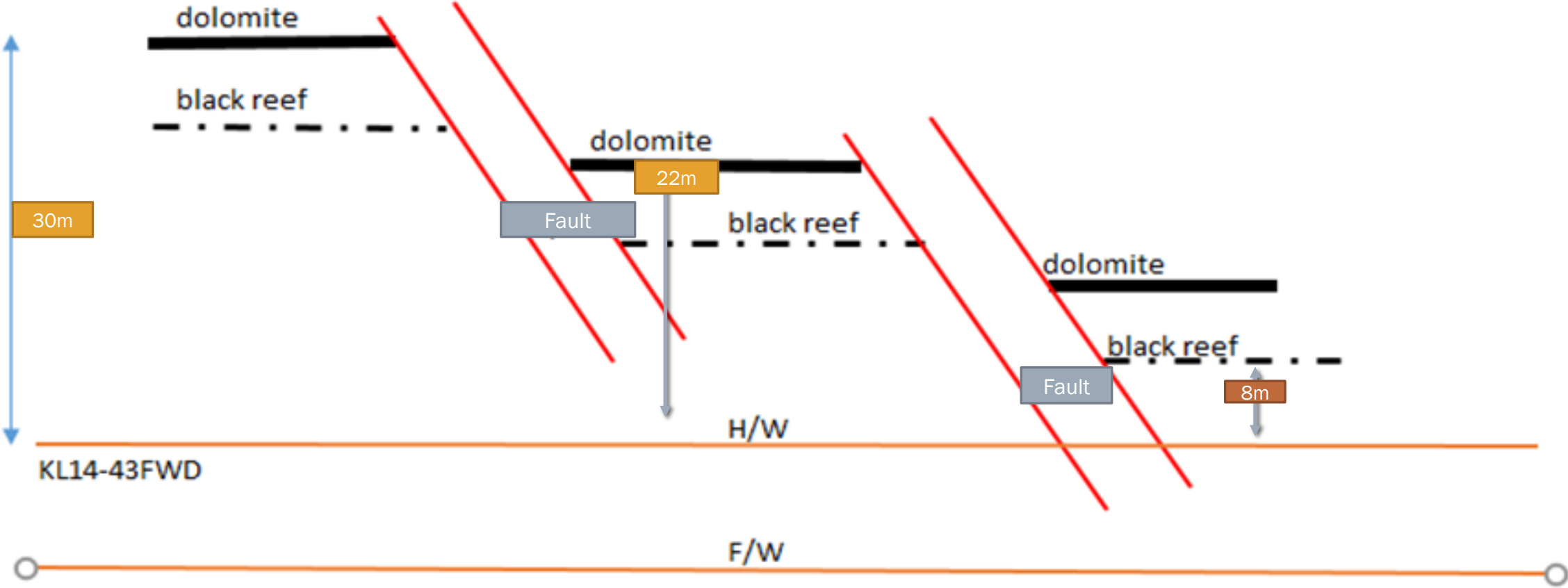
The Black reef was projected to be  $\pm 8\text{m}$  above the tunnel , this was before the borehole **(A)** intersected the fault and Black reef, this suggests that the fault has a downthrow of about 11m.

Intersection of the Black reef on the BH **(A)** on/almost at grade elevation further suggest that the Dolomites projected to be  $\pm 30\text{m}$  above the tunnel , have also been displaced down and now are  $\pm 22\text{m}$  above the tunnel

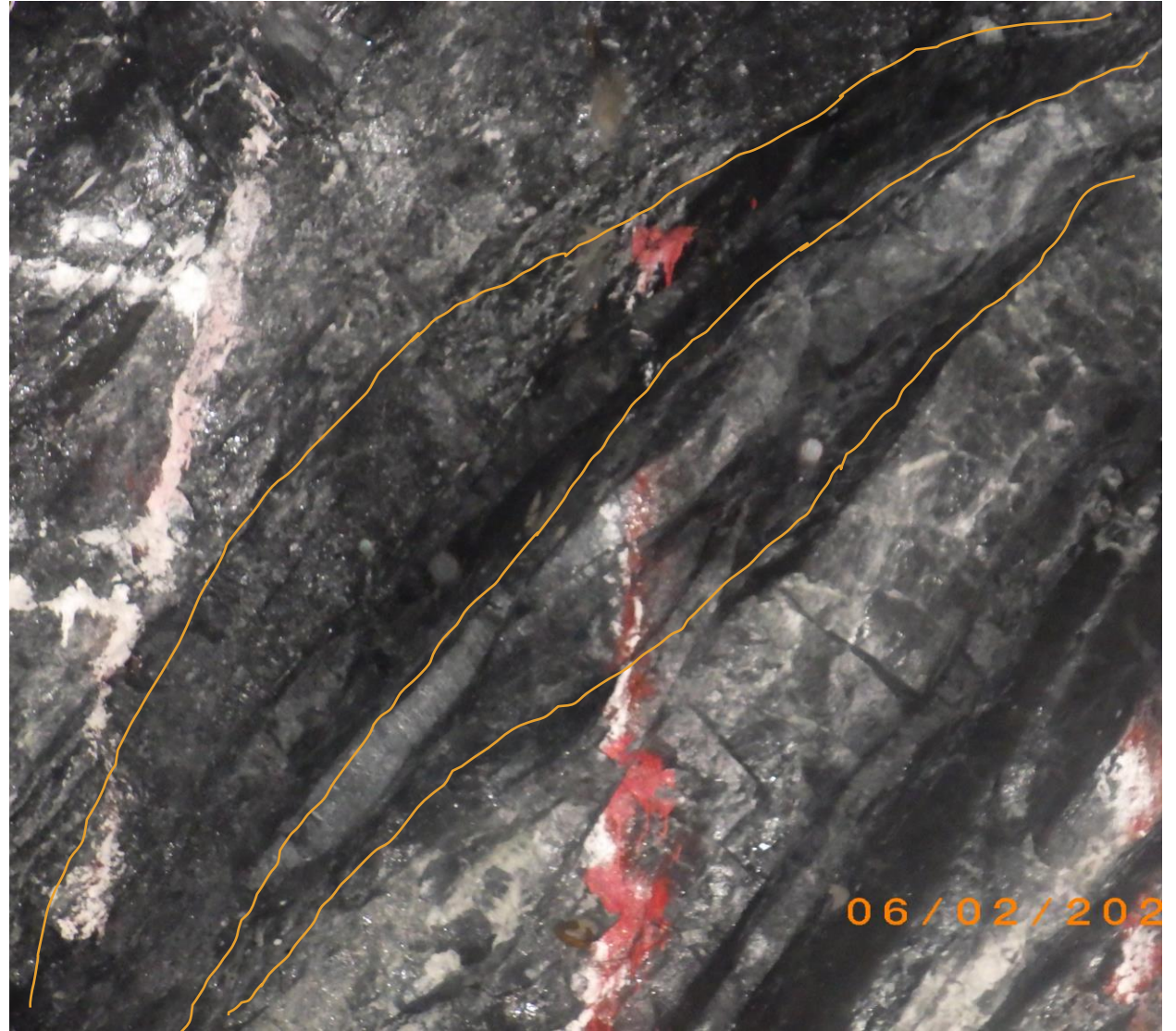
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## 14 LEVEL FWD BEFORE THE STRUCTURES AND SHALES

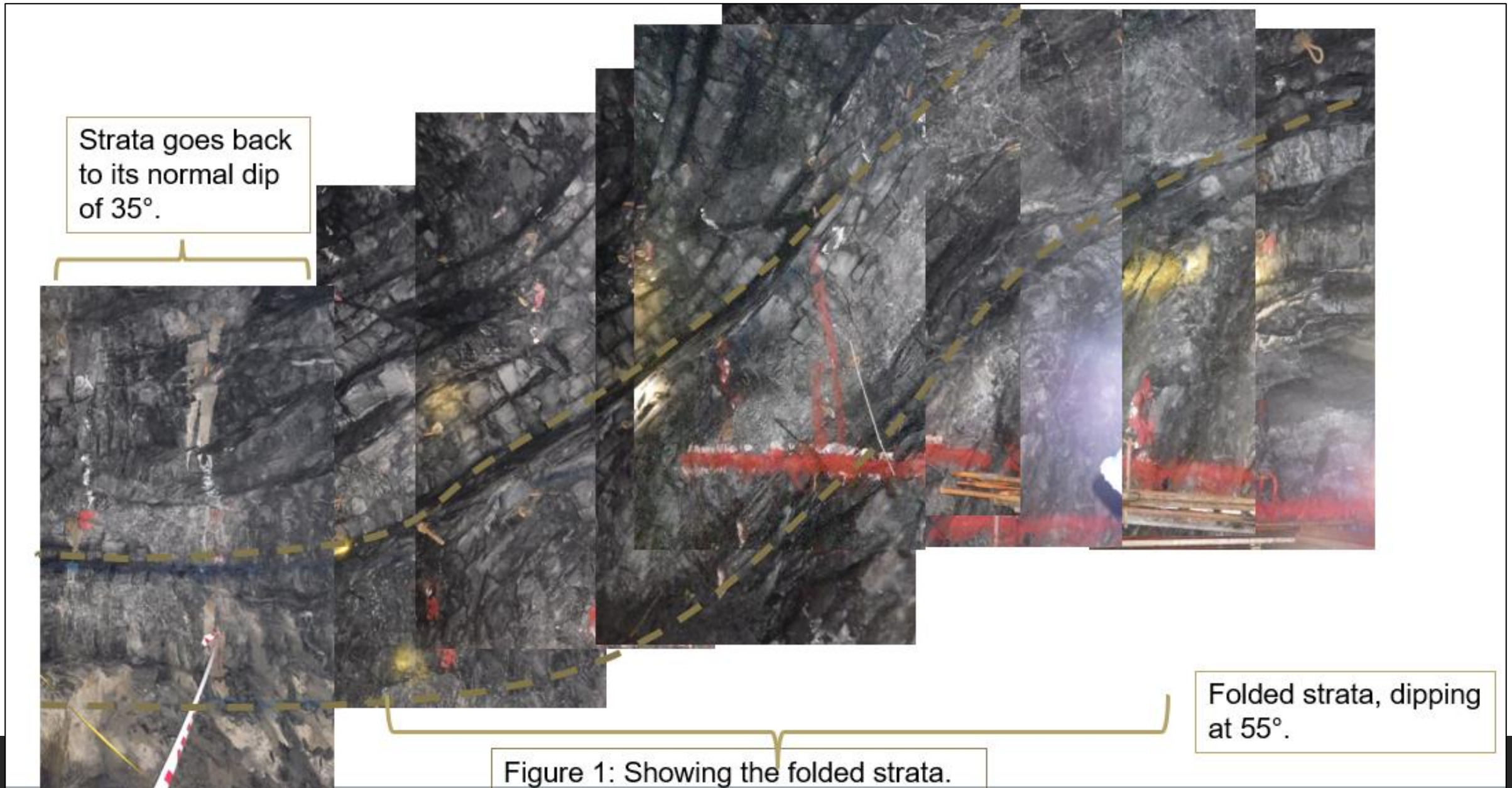
# SECTION VIEW



Geological  
Composition  
Overturned  
bedding planes



# KL14 43 FWDS SYNCLINE, INCLINE





## **Bedding planes dipping 55 degrees after the fault**

On the current face there is a fault which is dipping at 55° and striking in a NW-SE direction.

The Rock on the face and the hanging wall scale along this weak structure due to low cohesion when exposed to water.

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# Cause and distributing factors

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Mining towards the  
sub-crop

Sub-crop is  
changing directions  
and starts to be  
near where mining  
takes place

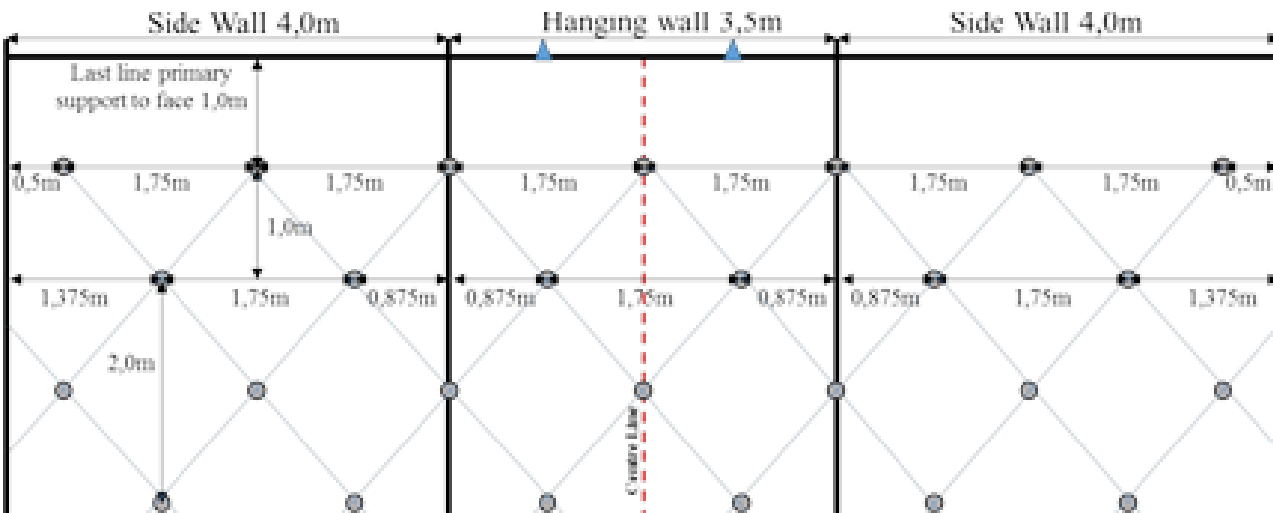
# Mapping on the western sidewall

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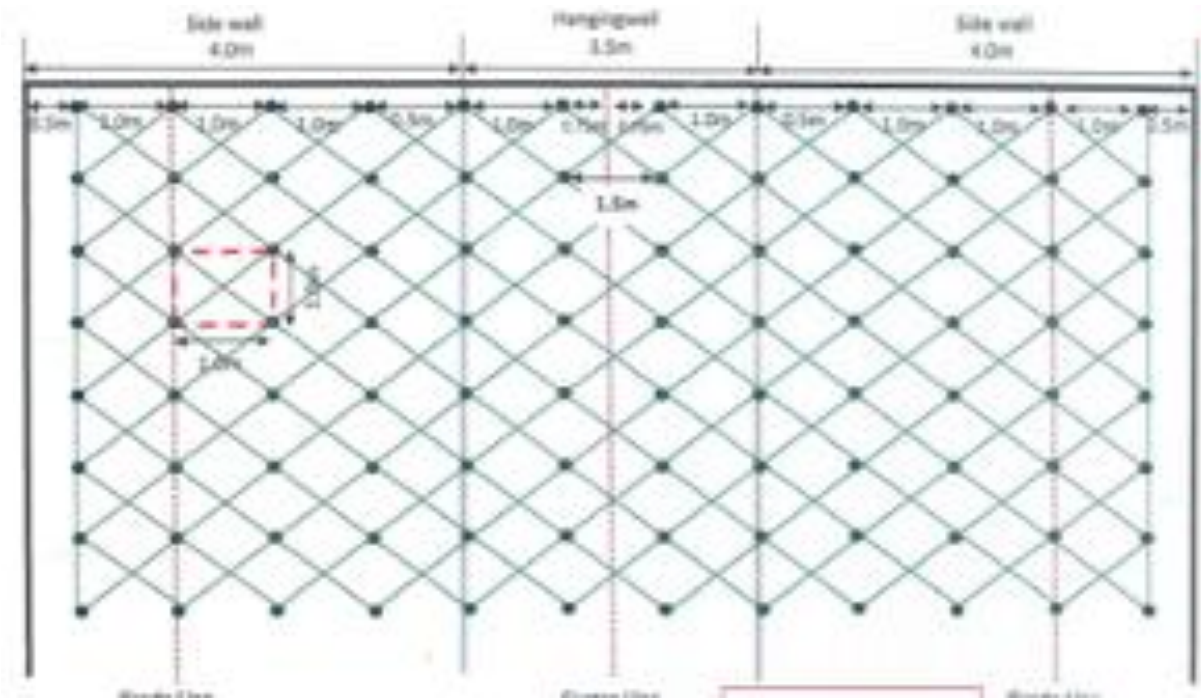
- The new layout is intended to go away from the Black reef, this put the new FDWS directly above the 15 level FWDS tunnel.
- The recent mapping by geologist show that the tunnel has intersected the Black reef sequence and still mining on it. The mapped strike (E-W) suggests that the tunnel is mining across strike and that it is mining towards the hanging wall ,which in this case is Dolomites.

# Recommendations

Normal Support standard



New support standard for 14 level



## Conclusion and recommendations

### Mitigating Factors

Due to the steep-dipping bedding planes new support standard was designed from {3:2:3 pattern on the hanging wall and 2:2 staggered pattern on the sidewalls to 4:3:4 pattern both hanging wall and sidewalls together with 45 degrees tendons.

Wire mesh and lacing diamond shape to be more than 20m from the development end followed by Mine Crete or Gunitite.

Continuously drill boreholes to determine the strike of the sub-crop and adjust to align the development parallel to the strike.



**Thank you**

Acknowledgment