

**Hazard Assessment for Parc Mine in the Gwydyr Forest**

Parc Mine consists of extensive workings on multiple levels, some of which intersect with older mines. The mine originally operated on six levels; however blockages and collapses in the lower levels mean that only levels 2 and 3 have been accessible in recent years. Level 1 has been subsumed by the stopes reaching up from level 2.

A recent surface collapse has made direct access via the level 3 portal impossible and so the normal access route is via the level 2 portal. While it is still possible to gain access to level 3 via Kneebones cutting, this not recommended due to the steep and unstable nature of the ground together with deep water. The level 2 portal leads to a junction where the principal lode is met and turning left here, it is possible to utilise a fixed ladder-way leading down to a passage near the top of Parc Shaft. The lower section of this ladder-way is missing so SRT is needed for the final section. A separate 30' pitch using a fixed rope leads to the level 3 passage via an ore chute.

The hazards in Parc Mine can be split into several classes, and different regions of the mine will present different levels of danger within each class. Note that this risk assessment only covers the main routes on level 2 and level 3 and only covered the main risks: others may be present and more may arise in the future. All abandoned mines are subject to decay and no assumptions should be made that an area which was safe a few months ago will remain so in the future. The ladder-way up Llanrwst new shaft and the two ladder-ways down to level 3 were inspected in February 2015 and found to be serviceable.

Be careful not to fall when climbing the fixed barrier on entry to the level 2 adit. Care should be taken not to get caught on fencing outside the level 2 adit and to ensure this fencing is left in a serviceable condition to prevent livestock and public access. Any problems with this should be reported promptly to CAL, as should any safety issues arising inside the mine, or pollution and litter.

Hazard	Description	Mitigation
Trip Hazards	Over the years a lot of the timberwork in the upper stopes has decayed and collapsed and this provides a trip hazard for mine explorers. When traversing areas with timber debris on the floor this may support a person's weight for a brief time and then collapse without warning. This may cause direct injury, like a twisted ankle, or pitch them off balance resulting in further injuries.	In many cases it is possible to avoid the worst of the debris by keeping to one side of the passage. Groups following the main route on level 2 should stay on footwall side (LHS as you head in, RHS as you head out) to avoid any holes in the floor.
Falling Rocks/Timber	There is still a lot of timberwork left in the upper levels and this sometimes falls down naturally due to rot, earth tremors or water flow. The timberwork may support piles of rock which can be displaced. Any timberwork or rock falling from upper levels may displace other material and this may then hit anyone who happens to be in the fall line. There are stacked deads (stone waste) in many areas in the mine.	Mine explorers should use their eyes and ears – often there will be warning signs of unstable areas. When on level 2 be careful not to accidentally kick material down any holes. Be careful in the cross cuts on level 3 which access the stopes as material can fall down these.
Structural Collapses	Some areas of the mine have broken into older workings and these can present a serious hazard. Some of the upper levels of the old workings are in a very unstable state and water percolating from the surface can cause a sudden slumping of material which may block a passage completely. This has happened in the past, including an incident some years ago where a collapse in Llanrwst Diagonal shaft blocked level 2 completely.	These incidents are likely to be very infrequent and there may be early warning signs e.g. fresh debris on the floor. Be especially aware of the risks if there has been recent heavy rain or seismic activity. Avoid the older and more unstable workings.

Acidic Pools	Several areas in the mine have deposits with high concentrations of Iron Sulphide. This can be attacked by various chemical and biological processes and tends to leave reddish pools of water which are very acidic (pH ~1-2) This liquid will damage nylon ropes and could be extremely hazardous if splashed in a person's eyes. Skin reactions are also possible.	Avoid splashing and keep safety equipment in waterproof bags. Carry some bottled water as an eye-wash.
Failure of fixed aids	The ladder-ways, ore chutes etc. are no longer maintained. Decay and inherent weaknesses may result in failure even though they appear to be superficially sound. Ropes and slings suffer in a similar way especially if subject to acidic liquids.	Use your own known safety equipment and resist the temptation to use old ropes which may be damaged or inherently weak. Examine and carefully assess ladder-ways before use.
Hidden winzes and false flooring	In many places there are holes in the floor which lead to lower levels, some of these may be covered with debris and thus not obvious. Some areas may appear to be solid rock floors but, in fact, are weak timber floors in stopes with a rubble layer on top. The timber may be unsound and collapse without warning. The level 2 passage has holes leading to down level 3 on the hanging side.	Use safety lines to protect explorers when traversing unknown or dangerous ground.
Deep water and ochre	On level 3 there is a build up of glutinous ochre and in some places where there is deep water there is a large accumulation. This adds to the hazard of trying to cross expanses of deep water. The water levels inbye (heading inwards) of the collapse in level 3 are likely to be chest to neck deep and the water is very cold. Hypothermia is a serious risk.	Avoid going in deep water unless suitable clothing is worn. For example: a wetsuit or neofleece.
Bad Air and Radon Gas	While Parc Mine has a good circulation of fresh air there may be places where there is a build up of carbon dioxide and a deficit of oxygen caused by rotting timber etc. Hydrogen sulphide gas may also be present. This may cause breathing difficulties and eventually death if the person is not removed from the area promptly. Radon gas is almost certainly present throughout the mine at low levels.	Explorers are advised to keep to well ventilated areas to minimise any risks from bad air
Flooding	Flooding on level 2 is very unlikely. Level 3 used to drain freely via the choke dam and portal, but the collapse in the latter has reduced the flow and led to pooling and a general increase in water depth on level 3. Most of the water now escapes into Kneebones cutting and thence via holes into the stream-way. It is possible that this route could become blocked and water could back up significantly in level 3.	Be aware of any sudden rise in water levels and head back to the ladder-way up to level 2.