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GREAT ORME COPPER MINES
WATCHING BRIEF
JAN - MAR 1992



Gwynedd Archaeological Trust Ltd

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By L.A. Dutton

for Gwynedd Archaeological Trust

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Between January and March 1992 the Gwynedd Archaeological Trust was commissioned by Great Orme Mines Ltd to carry out a watching brief as part of the WDA land reclamation scheme of the Rofft Quarry. This involved further landscaping and spoil moving operations on the site of the copper mines located in the Pyllau Valley on the Great Orme, and recording at Rofft Quarry, Llandudno.

The majority of work was carried out by mechanical excavator and much of the area had remained undisturbed since the closure of the nineteenth century mining complex.

During the scheme a number of features of archaeological interest were revealed and recorded. The Trust also advised on the possibility of preserving such features, where appropriate, either as a short term measure to allow more detailed recording and / or for their integration with the landscape being created. Such features are an intrinsic part of the history of the site as a mine and are suitable for presentation and interpretation to the public.

All spoil removed from the site was transported to the Rofft Quarry, some 0.5km to the east of the site at NGR SH 7755 8320. GAT undertook a photographic survey of the quarry site prior to this operation commencing.

METHODOLOGY

Archaeological recording has been by way of monochrome photographs and colour slides, supplemented by annotated field sketches forming a key to the photographs and additional, interpretive field notes. Where applicable, existing records have been updated and all additional data will be incorporated into the Great Orme recording system.

OBJECTIVES AND FINDINGS

The objectives of the landscaping programme have been to reveal areas of stable bedrock underneath mine waste and any natural deposits undisturbed by earlier activity. The purpose of this was threefold;

- 1) to establish solid boundaries to the site,
- 2) to reveal the nature of the underlying physical controls on copper mineralogy and
- 3) to locate the position of any mine workings in the resulting exposures.

Features revealed during the scheme were either preserved *in situ* or recorded. Large quantities of spoil and/or natural deposits were removed from three distinct locations and these are designated Areas F, G and H. Archaeological features recorded in these areas are listed separately by area below.

RESULTS

Area F : Summary

Much of the ground on the eastern side of the site (east of Area C, the Prehistoric Opencast) was turf covered and hummocky. The eastern boundary of the site provided a section through the deposits down to bedrock. The uppermost deposits represented activity associated with modern mining and contained dateable artefactual evidence. The sequence indicated the presence of broadly contemporary ground surfaces established over natural clay and bedrock exposures. Associated with these were the remains of several stone and brick masonry structures. Deposits of building rubble were spread sporadically throughout the layers above indicating the subsequent destruction and levelling of these features. These surface features are presumably associated with three partially infilled, vertical shafts and a horizontal level also uncovered in this area.

Below surface deposits of glacially derived clays, the uppermost rock stratum had been heavily fractured and weathered making it both highly unstable and difficult to assess the possibility of any subsequent disturbance by mining. One single location, identified by the presence of a hammerstone, may have been part of a collapsed prehistoric working.

Area F : Features

400 : Mortar bonded brick and dressed limestone building foundations, associated with 19th century mine complex.

These covered an L shaped area some 6.0m x 4.0m, the long axis orientated NW - SE, situated approximately 16.0m south of the reservoir, below the summit road. Machine clearance revealed about half of the building, under 1.0m - 1.5m of demolition debris. The rest was not excavated. At the north end of the structure was the base of a stone chimney, 2.5m diameter with a brick lined, D-shaped flue. Three metres south-east were the remains of a square, brick lined hearth, 401, approximately 2.0m square.

It is estimated that as much as 80% of the original ground plan of the structure and associated features may have survived. It is proposed to clean and fully excavate the remains of the feature at a later date. The structure is currently fenced off.

Discussion: Documentary evidence indicates the presence of an Engine or Boiler House in this area, built in 1823. It is not possible to say at present to what purpose or period of modern development the structure relates.

If the structure was an engine house it would be unusual for it not to be located immediately adjacent to a major shaft. No such shaft is apparent in this area.

414 : The high ground west of structure 400 and the east side of the opencast was composed mainly of weathered dolomite interbedded with shale. These upper strata are unstable and prone to collapse. Part of what may have been a shallow level, 414, orientated NW - SE, was identified in longitudinal section within this strata. Some 2.30m length of this working were revealed and although its actual dimensions are unknown, did not appear to exceed 0.50m in height. At the north end of the working, where it appeared to terminate, calcite cemented spoil was recorded to a depth of 0.30m. A single hammerstone was recovered from disturbed contexts some 2.0m west of 414.

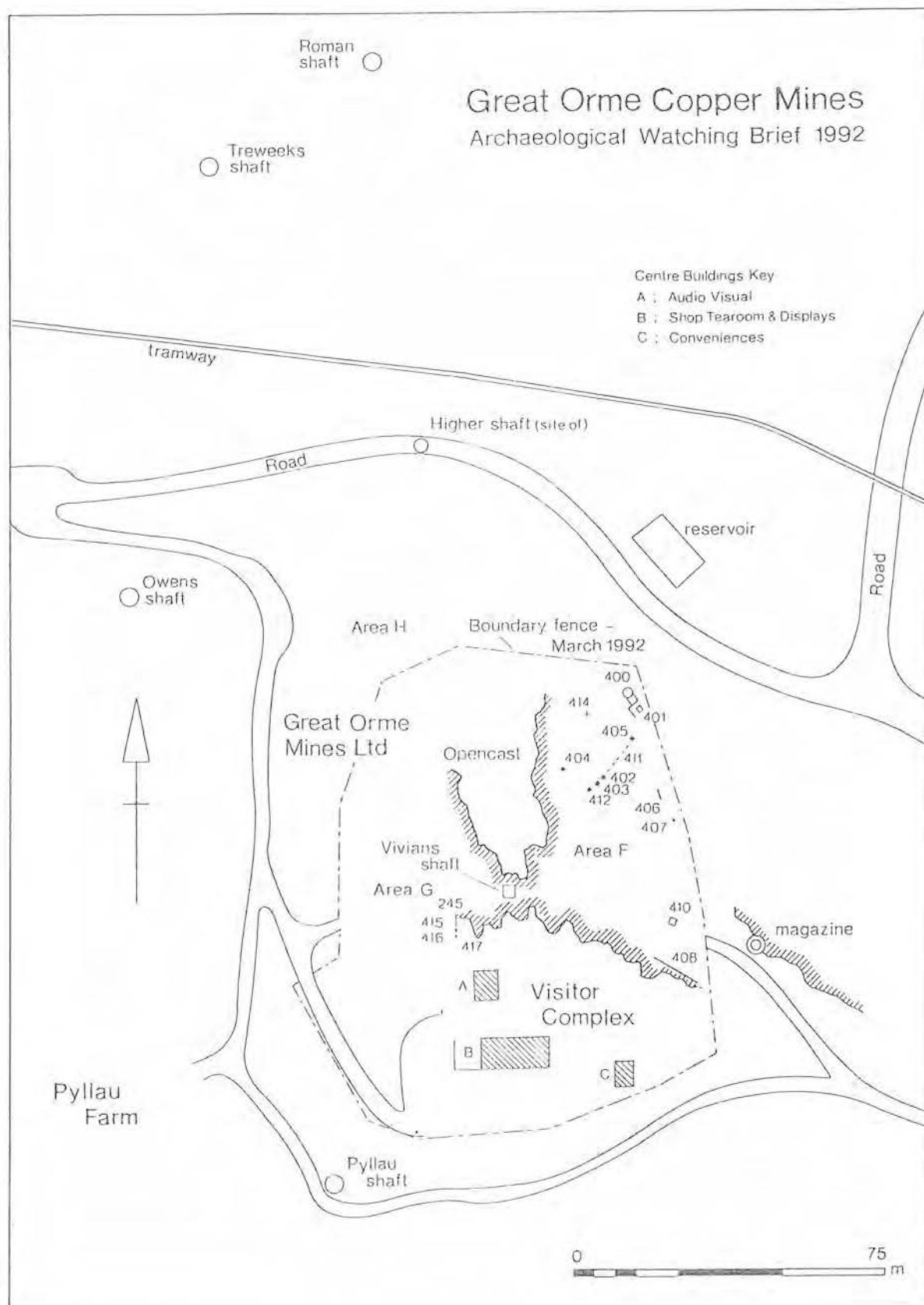


Fig.1 Site location plan and features

Discussion: The natural deposits above the level in which 414 was recorded appeared undisturbed. It is possible that 414 represents limited early working in the side of the established opencast. Copper mineralisation in this area appeared to consist solely of weak lenses of azurite in the shales.

411 : 19th century horizontal development in shale band, east side of opencast. Associated with vertical shafts 402, 403 405 and sub-vertical shaft 412.

411 was first revealed by access from surface through shaft 403, now destroyed. The passage is orientated ENE and runs diagonally from the east side of the opencast for some 20.0m, ending below shaft 405. The passage is approximately 2.30m square and where it survives was originally intersected from the surface by three shafts, 405, 402 and 403. It is likely that a portal to 411 may have existed in the east side of the opencast although no evidence for this was recorded. The present, west entrance to 411 marks the presence of an infilled, originally sub-vertical shaft, 412, below the floor of the passage, depth unknown.

The precise level from which shafts 402, 403 and 405 had been cut was not apparent although the remains of ginging in all three indicates that they were most probably cut from the same level as that upon which the Engine/Boiler House was built. Shaft 405 was the best preserved and the ginging survives to a depth of 0.9m below the present ground surface. Shaft 405 is situated approximately 5.0m south of the Engine/Boiler House and appears to continue below the floor of passage 411, although it is infilled to that level. Part of shaft 402 survives as a surface feature some 11.0m SW of 405. West of this point the bedrock was cut away by machine for the construction of a new section of walkway, removing all surface traces of shaft 403.

404 : Shaft 404, first revealed in the west side of the opencast during 1990. is located some 5.0m NW of Shaft 412. It now seems likely that 404 was a part of the same development as that represented by the 411 complex and cut from a far higher level than is apparent now. An isolated trial level, 410, was uncovered, cut through dolomite, 28.0m SSE of shaft 405. Although partly destroyed by machine before being recorded, this was originally less than 5.0m long. The entrance was roughly arched being 1.4m high at its apex and 1.3m wide. There were drill marks at the back of the level.

408 : Part of a retaining wall survived for a length of 7.0m, running below the Magazine and trial level 410, located approximately 7.0m to the north-east. The wall, orientated NW-SE, is likely to have retained part of the original trackway to the mine from the east side of the site.

406 : A short length of wall, 1.2m long, and once part of a considerably longer feature, was recorded on the east side of the excavation, some 11.0 SSE of the Engine/Boiler House (400), with which it is associated. Two courses of the wall survived to total a height of 0.45m.

407 : At a comparable level, 4.0m south of wall 406, a section through a culverted drain was exposed in the edge of the excavation. The sides of the drain were of stone up to three courses, 0.30m high. The top of the drain was capped by a limestone slab 0.13m thick. The base of the drain was originally of natural clay although a thin layer of calcite <3mm thick had formed over it.

The drain is aligned with the location of Higher Shaft which it most probably served.

Discussion: There is no known documentary evidence relating to the existence of either the shafts or the passage. The morphology of the features, drill holes and iron fittings indicate that they are of recent date. Passage 411 is of spacious dimensions and is reminiscent of travelling ways or tramming levels seen in other areas of the 19th century workings and development.

No mineralisation was present in the shafts or passageway and they are not, therefore, workings, as such.

The reason for the close proximity of the shafts is puzzling, especially if the passage could be entered from the western end. The passage (411) appears to be aligned between the Engine/Boiler House (400) and Vivians Shaft and the two areas may have been directly related in some way.

Prehistoric and later workings presently only accessed via an opening in the side of the opencast, located some 3.0m NW of Shaft 404, are probably interlinked with passage 411 and the shafts that intersect it.

Several possibilities exist for the presence of the shafts and passageway, all of which seem to be of recent origin. The discovery of areas of earlier working may have prompted prospecting on the east side of the opencast, making the most of the easily worked shale beds, that were abandoned when no viable ores were discovered. The passageway may have served as a tramway for the disposal of waste into the pre-existing opencast.

Area G : Summary

The intention to extend the western and southern boundaries of the archaeological tourist excavation, Area E, involved the removal of a considerable depth of spoil, to the present level of the pathway to Vivians Shaft. This operation also necessitated the re-routing of the pathway forming the boundary to Area E, to a location immediately north of the present Audio-Visual building.

Excavation at the south-western corner of Area E in 1991 had exposed part of a 19th century wall, 245, apparently truncating and revetting prehistoric spoil within vein W6. The complete remains of this wall and two incomplete sections of an associated stretch of walling to the west were uncovered in the south part of Area G.

The site of the archaeological excavations (Area E) was extended westward for 10.0m to a level below 19th century overburden estimated to be within 0.5m above bedrock and/or early deposits.

To the south, the continuation of the alignment of the cliff forming the north side of the Pyllau Valley was revealed. Entrances to veins W6 - W2 were exposed in the cliff, infilled with early deposits containing bone and stone artefacts.

Area G : Features

245 : The surviving extent of wall 245 was revealed in Area G. It was built of roughly dressed, sub-rectangular blocks, average size 0.25m x 0.30m. The top surviving course was of larger blocks some 0.45m x 0.30m. The ground plan of 245 was an angular S shape, making up three sides, 245a, west facing, 245b, south facing and 245c, west facing, all of which were built directly onto bedrock. 245a and 245b formed a right angled corner whilst 245b and 245c met on a curve. The north end of 245a terminated in a straight line, suggesting that this was deliberate and hence, undisturbed. 245c was truncated and appeared to slump to the west, although both 245a and 245b were off-vertical and inclined slightly to the west and north respectively.

417 : 417 was a 0.75m long section of walling similar to and just 0.7m south of 245c, that spanned the width of an infilled crosscourse. The alignment of 245c and 417 suggests that they may be part of the same feature.

415 : Abutting the south - west corner of 245 was an arc of walling that appeared to mirror that of 245b/c. The rocks used in the construction of this feature were irregular in both size and shape, and contrasted sharply with those used in the construction of 245. The wall coursing appeared to lie at an angle of approximately 40 degrees, reflecting the angle of the bedrock over which it had been built. 415 survived for a length of 2.80m and 1.0m in height.

416 : Some 2.20m south of 415 another length of wall, 2.75m long and 1.30m high, was recorded, built over spoil of similar composition to the wall itself. Wall 416 was similar in construction to 415 although here the coursing was horizontal and even.

No connection between 415 and 416 was recorded although the two were probably a part of the same feature. The south end of 415 had been truncated and no other similar features were revealed beyond this point.

"Taken as a single feature, 415/416 was one course wide, and angled at approximately 3 degrees to the west for the purpose of retaining spoil.

Area G contexts relating to prehistoric mining activity : Wall 245, at the interface of prehistoric and later spoil deposits, appears to truncate prehistoric spoil in veins W6 and W5 and an overlying soil, 220, which separates prehistoric from modern mining deposits. South of 245 prehistoric spoil was recorded on bedrock. Immediately above, later spoil deposits abutted the south face of 245.

Veins W5 - W2 outcropped in the cliff in the north side of the Pyllau Valley. The rock close to the cliff face was fractured and loose in many places. Silty material had penetrated into the fractured areas and was sealed by soil 220. The machine clearance dislodged some of the surface blocks and in some places shattered the areas of less solid rock at the entrance to the veins. No evidence for early working in the cliff edge itself was therefore recorded. Prehistoric spoil was recorded at the entrance to all of the veins.

A number of hammerstones and animal bone fragments were recovered from prehistoric contexts south of wall 245 and from the entrance to vein W4. A number of small hammerstones, but no bone, were recovered from prehistoric context 201, below 220, immediately west of Area E.

Discussion: Prehistoric spoil infilled broadly contemporary trench working on veins W6 - W2. This material lay at an angle of rest (NE - SW) within the veins and abutted outcropping to the south. The well-consolidated spoil containing a high proportion of bone and stone artefacts was sealed in places by a soil layer equivalent to 220.

Feature 245 is a modern wall, probably built in the 19th century, utilising an area of exposed bedrock. In this process existing early spoil deposits, sealed by soil 220, were truncated and came to be retained by wall 245. Structurally later than 245, wall 415/416 retained spoil to the west of 245. Collectively, 245a & b, 415, 416 and 417 appear to form a sub rectangular enclosure. No associated surface was found within this enclosed area and there were no other clues to its purpose.

Wall 245 may be part of a foundation for one of a series of buildings known to exist between Vivians shaft and Pyllau Farm (Williams. 1980). The amount of soot, clinker and coal in recent spoil deposits west of 245 may indicate that one such building was a smithy.

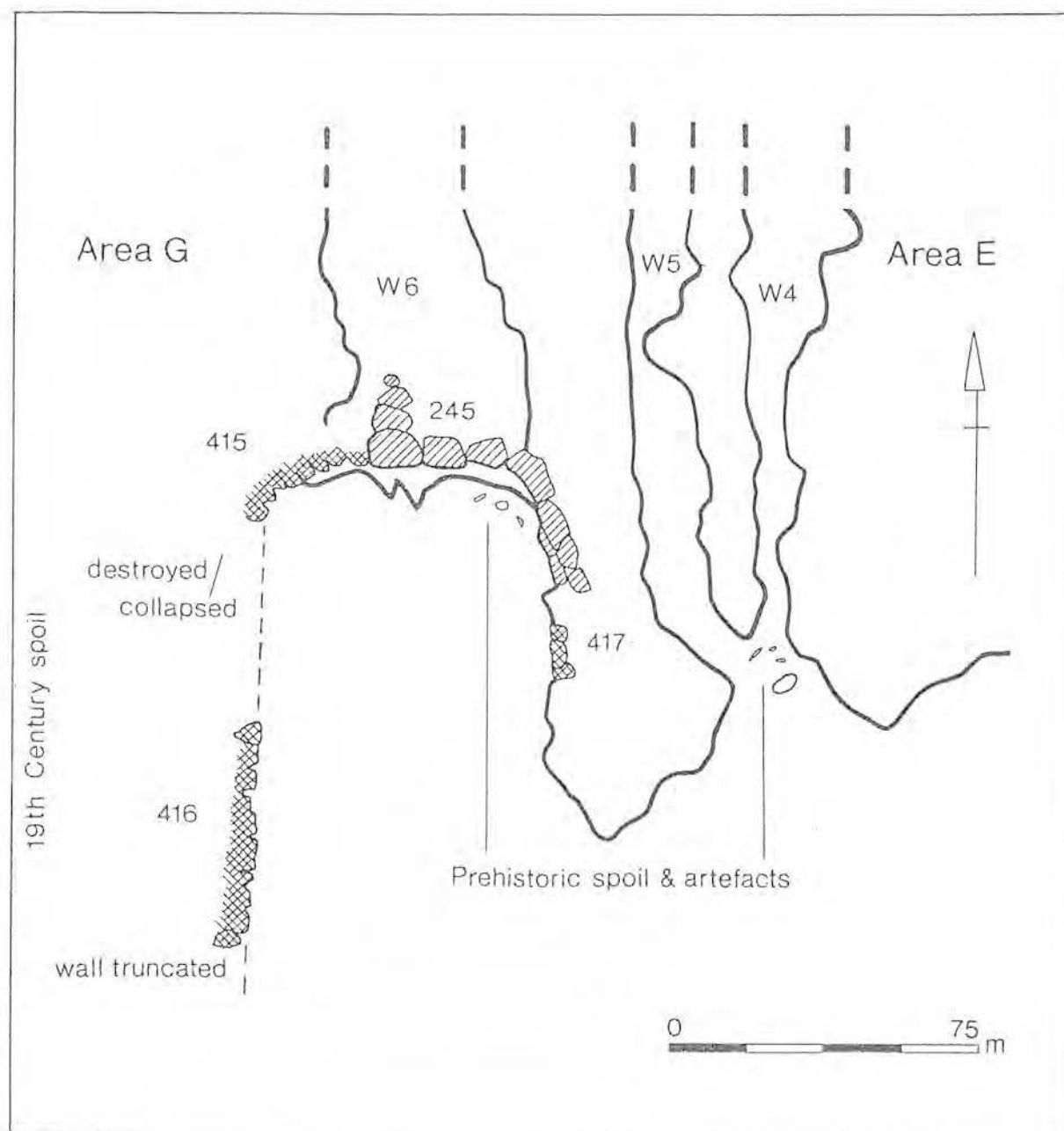


Fig.2 Structures and deposits, Area G.

Feature 415/416 was partially destroyed during landscaping. Where it did survive it was unstable and in danger of collapse at several points. There was little point in trying to consolidate and preserve the wall for display and, after thorough recording the Trust recommended that the feature be removed up to its junction with wall 245.

Wall 245, a substantial feature, is one of only a few remains associated with the surface complex of the Victorian mine. Its general appearance, location and proximity, in contrast to the Bronze Age workings, make it desirable that it is retained as a part of the current landscape and incorporated into the general interpretation of the site. It is also recommended that the wall is consolidated where necessary to prevent further damage or deterioration.

Area H: Summary and Conclusions

Slope stabilisation in Area H exposed bedrock beneath apparently natural clay deposits sealed by 19th century spoil. The bedrock appeared on the projected line of the upper, west side of the prehistoric opencast, indicating the limit of working at that point.

Two contrasting types of strata were revealed in close association, probably due to vertical faulting on an east - west alignment, that may have been mineralised. The southern exposure was stable, massive dolomite. The northern part of the exposure was heavily fractured and folded resembling the top of syncline.

An entrance to a working of unknown period was uncovered beneath the fractured rocks. The area was highly unstable and collapsed soon after being exposed. The instability of the rock precluded the opportunity to examine the working closely and the northern part of the area was immediately backfilled.

The fractured strata in part resembled the limestones revealed along the upper, western side of the opencast and those apparently removed from above ore bearing dolomite above Area E.

