

UR1973_28

Report on an examination of the K-Mart site, New Town.

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The site was examined on 12 March 1973 at the request of Messrs. Hansen and Yuncken. The purpose of the examination was to determine the presence and nature of the hard rock that had caused difficulties in excavation.

The site lies in a gently sloping area where natural outcrops are not common and housing and gardens add to the difficulties of geological mapping. Previous to the excavation, the information given with reservations on the Hobart Engineering Geology Map (Leaman, 1972) was that a mass of dolerite existed to the east, beyond the line of Park St, with a doubtful boundary to the north, and that the area now occupied by the site consisted of sandstone.

Now that excavation has taken place, it is apparent that much of the site and particularly the south-west corner is occupied by dolerite, in general not more than one metre below the surface, and moderately to deeply weathered.

The present exposures are limited by the building activities, retaining walls, fill and general ground cover, but the following observations were made, with reference to the numbered investigation auger holes (fig.). The rock weathering scale (Fookes *et al.*, 1971) is described in Table 1.

Near B.H. 9. Face 4.5 m high; slabby dolerite in 15-100 cm slabs mostly with Grade III weathering (Grade IV near surface).

South of B.H. 8. Face 3 m high; dolerite slabs 15-30 cm thick, dipping north at about 35°; weathering Grade III.

North of B.H. 7. Trench one metre deep; 60 cm of 7-20 cm dolerite slabs, Grade IV, overlying 40 cm of more massive Grade II dolerite.

South of B.H. 7. Face 3.5 m high; deeply weathered dolerite (Grade IV), transitional to Grade III with 30 cm dolerite slabs at depth.

South of B.H. 3A. Pit 1.3 m deep; dolerite (Grade IV) transitional to Grade III in depth, 20 cm x 1 m dolerite blocks.

North of D6. Rock surface level with ground; dolerite (Grade IV).

Pit to NW of D6. Face 1.7 m deep; dolerite (Grade IV) with Grade III at base.

North-west of B.H. 6. Pit, 1.7 m deep; 7-35 cm blocks in Grade III dolerite.

South of B.H. 6. Trench, 0.3 m deep; 5-20 cm dolerite blocks in Grade III dolerite.

The full depth of excavations was not seen but it was apparent from spoil that some Grade II dolerite was excavated from them.

The weathering of the dolerite is known in Tasmania to be very irregular, in that deep zones following vertical joint planes can be converted to clay, but will be surrounded by only moderately weathered rock. In these circumstances, an adequate site investigation requires the use of a seismic survey to support the results of an auger or drill programme.

Table 1. ENGINEERING GRADE CLASSIFICATION OF WEATHERED ROCK

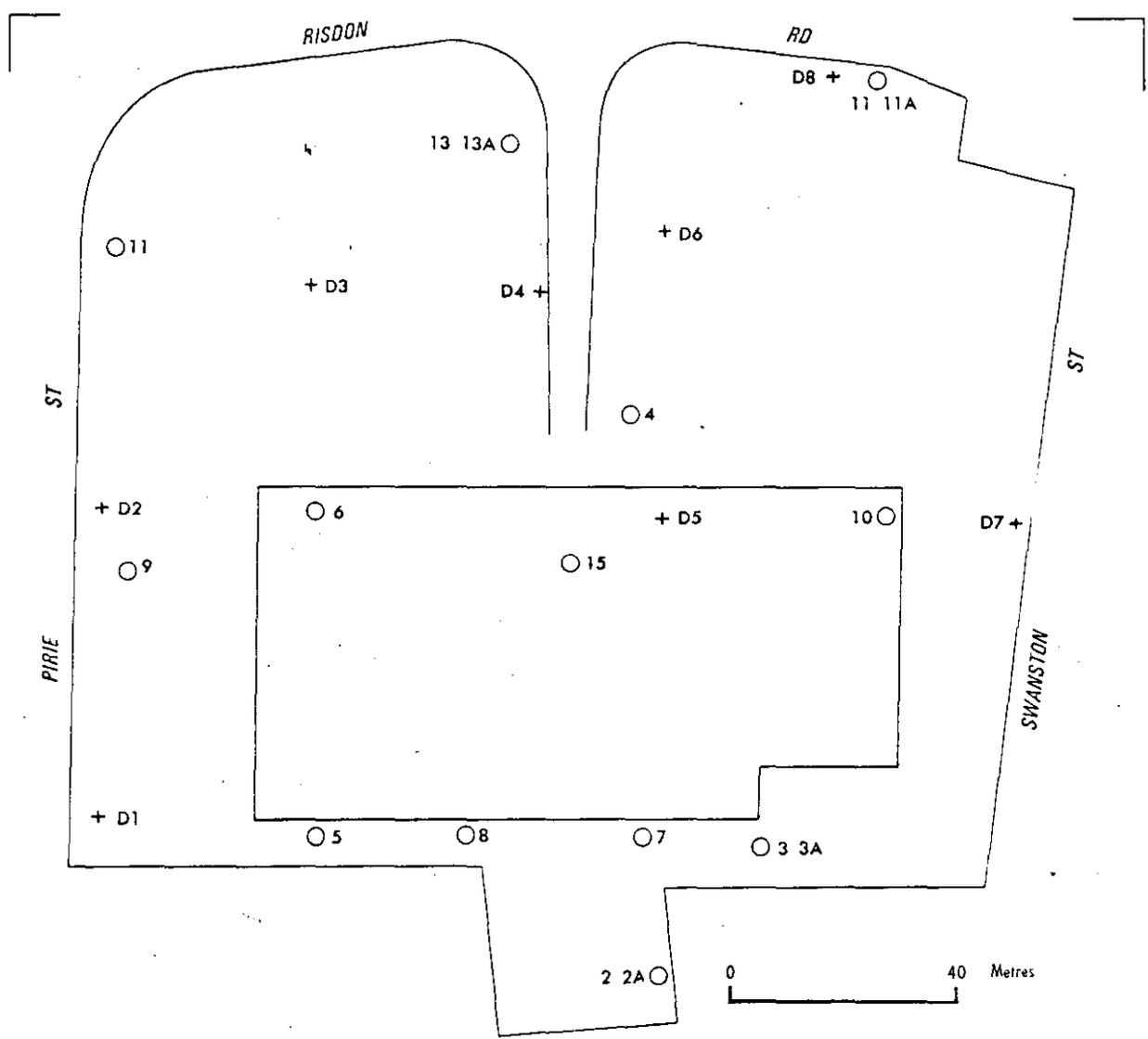
Degree of Grade	Composition	Field recognition		Engineering properties
		Soils (i.e. soft rocks)	Rocks (i.e. hard rocks)	
VI	Soil	The original soil is completely changed to one of new structure and composition in harmony with existing ground surface conditions.	The rock is discoloured and is completely changed to a soil in which the original fabric of the rock is completely destroyed. There is a large volume change.	Unsuitable for important foundations. Unstable on slopes when vegetation cover is destroyed, and may erode easily unless a hard cap present. Requires selection before use as fill.
V	Completely weathered	The soil is discoloured and altered with no trace of original structures.	The rock is discoloured and is changed to a soil, but the original fabric is mainly preserved. The properties of the soil depend in part on the nature of the parent rock.	Can be excavated by hand or ripping without use of explosives. unsuitable for foundations of concrete dams or large structures. May be suitable for foundations of earth dams and for fill. Unstable in high cuttings at steep angles. New joint patterns may have formed. Requires erosion protection.
IV	Highly weathered	The soil is mainly altered with occasional small lithorelicts of original soil. Little or no trace of original structures.	The rock is discoloured; discontinuities may be open and have discoloured surfaces and the original fabric of the rock near the discontinuities is altered; alteration penetrates deeply inwards, but corestones are still present.	Similar to grade V. Unlikely to be suitable for foundations of concrete dams. Erratic presence of boulders makes it an unreliable foundation for large structures.
III	Moderately weathered	The soil is composed of large discoloured lithorelicts of original soil separated by altered material. Alteration penetrates inwards from the surfaces of discontinuities.	The rock is discoloured; discontinuities may be open and surfaces will have greater discoloration with the alteration penetrating inwards; the intact rock is noticeably weaker, as determined in the field, than the fresh rock.	Excavated with difficulty without use of explosives. Mostly crushes under bulldozer tracks. Suitable for foundations of small concrete structures and rock-fill dams. May be suitable for semi-pervious fill. Stability in cuttings depends on structural features, especially joint attitudes.
II	Slightly weathered	The material is composed of angular blocks of fresh soil, which may or may not be discoloured. Some altered material starting to penetrate inwards from discontinuities separating blocks.	The rock may be slightly discoloured, particularly adjacent to discontinuities which may be open and have slightly discoloured surfaces; the intact rock is not noticeably weaker than the fresh rock.	Requires explosives for excavation. Suitable for concrete dam foundations. Highly permeable through open joints. Often more permeable than the zones above or below. Questionable as concrete aggregate.
I	Fresh rock	The parent soil shows no discoloration, loss of strength or other effects due to weathering.	The parent rock shows no discoloration, loss of strength or any other effects due to weathering.	Staining indicates water percolation along joints; individual pieces may be loosened by blasting or stress relief and support may be required in tunnels and shafts.

REFERENCES

FOOKES, P.G.; DEARMAN, W.R.; FRANKLIN, J.A. 1971. Some engineering aspects of rock weathering with field examples from Dartmoor and elsewhere. *Q.J.engng Geol.* 4:139-185.

LEAMAN, D.E. 1972. *Hobart engineering geology map series.* Department of Mines, Tasmania.

[16 March 1973]



LOCATION OF BOREHOLES, K MART SITE NEW TOWN

- BORE HOLES
- + DYNAMIC CONE PENETROMETER TEST LOCATION

Department of Mines Tasmania 1973

Figure 1.

