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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

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BRICK SHALE AT FYSHWICK CANBERRA. A.C.T.

by

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ILLUSTRATIONS:

BRICK SHALE AT FYSHWICK.

SUMMARY.

Brief descriptions are given of three possible brick shale deposits at Fyshwick outside the boundaries of the industrial area. The deposits occur in slaty shale and mudstone of the Middle Silurian Mahon Formation and Molonglo River Formation. Fairly extensive areas are occupied by these Formations but because of the presence of limestone and volcanic rocks the areas that could be utilized as sources of brick shale are fairly small.

To test each deposit, a trial bulk sample should be sent to the brickworks. The thickness of suitably weathered shale should be determined, and the deposit examined carefully to ensure that it is free from limestone.

INTRODUCTION.

An investigation of the brick shale resources of Canberra, undertaken by the Bureau of Mineral Resources in 1958 when the Deakin brick pit was almost mined out, revealed that the only large available reserves are situated in two areas north of the City, in the Districts of Gungahlin and Belconnen. A fairly large deposit is known at Queanbeyan. Smaller deposits which are likely to present difficulties in working because of the presence of beds of limestone and of tuff have been mapped at Mt. Ainslie, Mt. Majura, and at Fyshwick.

Large scale testing of the Gungahlin shale at the Canberra Brickworks showed that good quality bricks cannot be made without modifications to the existing brickmaking process. The Belconnen shale has not been tested at the brickworks, but laboratory work carried out by the Bureau of Mineral Resources indicates that its brickmaking properties are similar to those of the Gungahlin shale.

High-quality bricks were made from a bulk sample of Queanbeyan shale, and since the beginning of March 1960 the brickworks has been obtaining its total requirements of shale from this source. The quarrying and carting is being done under contract by private operators.

With the aim of obtaining an alternative source of supply, an investigation has been made of the Fyshwick deposits.

FYSHWICK DEPOSITS.

Possible brick shale deposits at Fyshwick, outside the boundaries of the developing industrial area, include the "Gravel Pit Deposit" at the southern edge of an old gravel pit, the Lloyd's Crossing Deposit, 1/3 mile south-east of Lloyd's Crossing (a ford of the Molonglo River) and the Mahon Hill Deposit, ¼ mile south of Mahon Trig. The localities are shown on Plates 1 and 2. A deposit that underlies almost the whole length of Newcastle Street in the new industrial area is not available for quarrying.

GRAVEL PIT DEPOSIT

Description

The surface of the deposit is covered by a foot or so of soil and fine red sand, probably overlying gravel, that may be expected to extend southwards from the old gravelpit shown on the map. The bedrock beneath the gravel probably consists of mudstone and shale of the Molonglo River Formation, similar to that exposed in trenches along Newcastle Street 1500 feet to the south east.

However the depth of gravel is likely to be a critical factor. Gravel is at least 4 feet thick in old pits to the north, north-west and south; it probably varies in thickness owing to deposition on an uneven surface of the underlying shale.

Exploration will need to be thorough to ensure that variations in the depth of overburden are known. During investigations the possible value of the gravel as aggregate should be kept in mind.

Testing the Deposit

The thickness of overburden could be determined, and a bulk sample of the underlying shale obtained, by pitting or bulldozing. However if the gravel is several feet thick both methods would be costly. Exploration should be extended to the base of material suitable for brickmaking.

Possible Reserves.

The area available for working is about 500 feet square. Reserves would be approximately 10,000 cubic yards per vertical foot.

LLOYD'S CROSSING DEPOSIT

Description

The Lloyd's Crossing Deposit consists of weathered slaty shale and mudstone of the Molonglo River Formation. On the west it is bounded by the flaggy Molonglo Sandstone. The boundary is covered by soil and rubble and has not been accurately mapped; it is probably farther west than is shown in Plate 1. To the south-east, across a minor depression, the shale and mudstone is highly calcareous and contains numerous thin beds of limestone.

The deposit rises steeply from the river flat and could be worked at all times without drainage difficulties. Overburden consists of a few inches of soil and ferruginous concretions formed by surface weathering.

Nodules of limestone, probably derived from a lenticular band, are scattered on the surface near river flat level but these were not seen elsewhere within the deposit.

Testing the Deposit

Further investigation and testing of the deposit can be done by excavating a trench or costean across the deposit: the boundary with the Molonglo Sandstone would be exposed, the removal of overburden would permit inspection for nodular limestone, and the material excavated would provide a bulk sample.

Possible Reserves.

The superficial dimensions of the deposit are not well known. The length is approximately 600 feet but the width will not be known until the boundary with the Molonglo Sandstone is exposed. The surface of the deposit rises to at least 35 feet above the river flat; suitably weathered shale is therefore probably at least 12 feet thick. The thickness will have to be ascertained by excavation.

MAHON HILL DEPOSIT

Description

South of Canberra Avenue (Plate 2) fairly extensive areas are occupied by slaty beds of the Mahon Formation. The succession consists of mudstone, silty mudstone, fine sandstone, thin limestone lenses, mudstone with nodular limestone, and tuff. The beds are well exposed in a road-cutting along Canberra Avenue north of Mahon Trig., and, where free from limestone, may provide satisfactory brick-making material. Two fairly extensive areas of the formation in the north-west (Plate 2), immediately east and west of the alluvium along Jerrabomberra Creek, are not likely to provide suitable material: their northern parts are adjacent to the developed area of Narrabundah and not available for mining or quarrying, and their southern parts are covered by deep alluvium. Another area in the south, ½ mile west of Railway Trig., is covered by deep overburden.

A possible brick shale deposit, the Mahon Hill Deposit, is situated on the southern side of a fenced road site, ¼ mile south of Mahon Trig. The boundary between the Mahon Formation and the Devonian volcanics at this locality has not been mapped in detail and the eastern end of the deposit is considerably wider than is shown in Plate 2.

One part of the deposit, an area about 500 feet square (Plate 3), appears on the surface to be free of limestone bands and nodules, and may be worth sampling as a possible source of brick shale. It is flat lying and to obtain effective drainage for a brick pit a channel would need to be cut eastwards or south-eastwards between two remnants of Devonian volcanics that rise as low hills. The slaty material excavated from the drain could probably be used as brick shale. On either side of the proposed drain, masses of very hard, slaty calcareous mudstone restrict the width of material that can be excavated easily. Possibly the weathered beds of the Mahon Formation in this area are too hard at a shallow depth to work economically.

Testing the Deposit.

Preliminary testing could be restricted to a pit excavated with a bulldozer, to obtain a bulk sample. A suggested site is shown in Plate 3. This would test both the brickmaking potential of the beds, and the depth to which a pit could be worked. If results were satisfactory, the extension of the deposit to the east could be tested. A search would have to be made for limestone beds and nodules.

Possible Reserves.

The proposed initial pit shown in Plate 3 occupies a rectangular area about 400 feet wide, by 500 feet long, and has reserves of 7,000 cubic yards per vertical foot.

The slaty beds of the Mahon Formation extend farther east than shown in Plate 3. If shallow auger holes were put down to the eastern boundary, potential reserves would probably be increased considerably. The depth to which a pit could be worked depends on the depth of weathering of the beds and would need to be ascertained by pitting. Some of the beds are highly calcareous; similar calcareous beds in other localities in the Canberra area are hard and little-weathered at depths of two or three feet.

The reserves in the area would be greatly increased by opening a pit on the northern side of the "Eastern Road Site".

Drainage could be provided by tunnelling beneath the road and water main into the initial pit on the southern side of the road.

CONCLUSIONS.

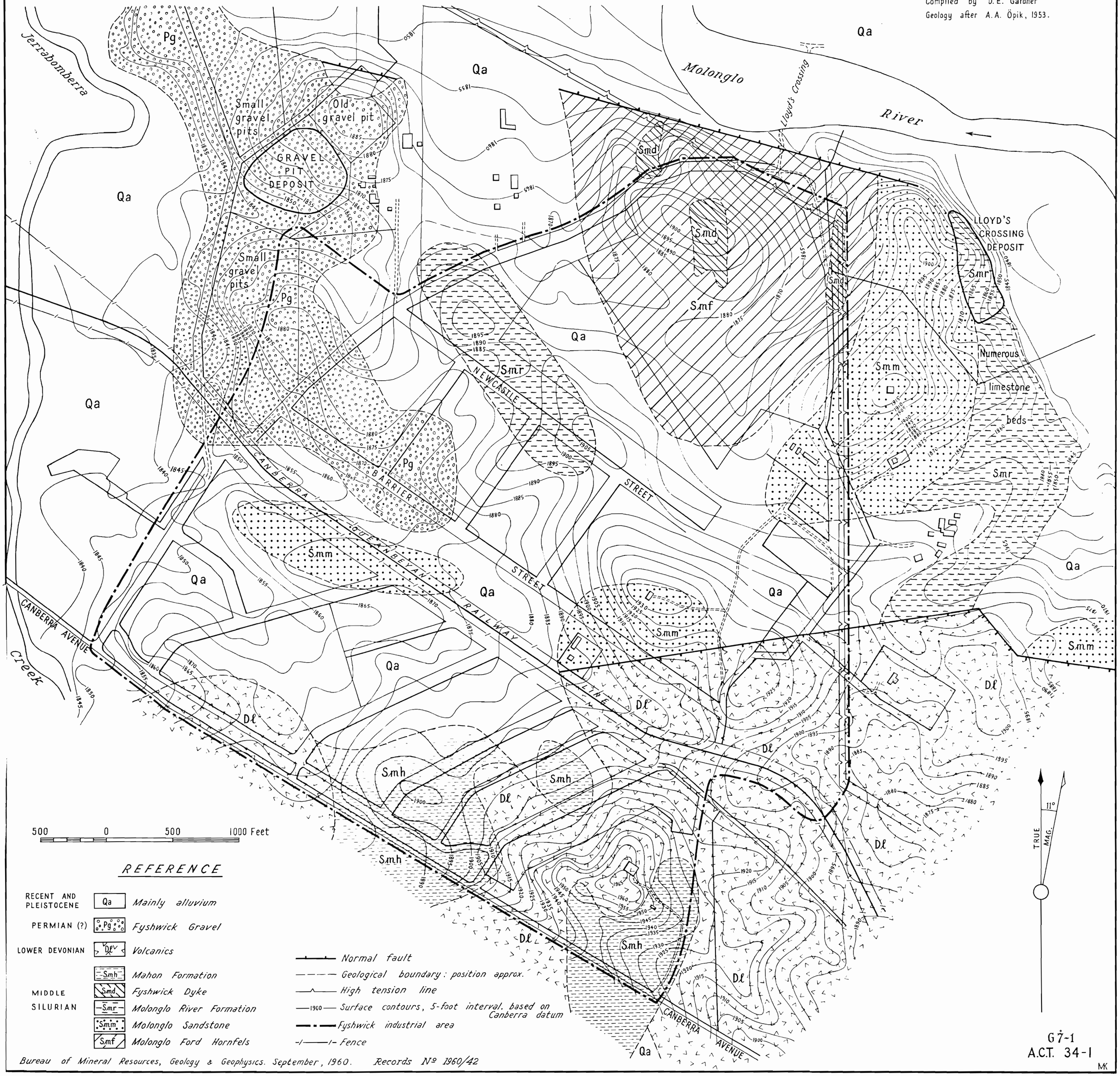
The Lloyds Crossing Deposit is the most promising source of brick shale in the Fyshwick area. It is readily accessible, can be easily worked, and probably has a considerable thickness of suitably weathered shale. The Mahon Hill deposit has larger probable reserves, and access is good, but it would present some difficulties in drainage, and the material may be too hard to work at a shallow depth. The deposit can be readily tested. The Gravel Pit deposit is probably covered by gravel, at least 4 feet in thickness.

GEOLOGICAL MAP

PROSPECTIVE BRICK SHALE DEPOSITS

FYSHWICK A.C.T.

Compiled by D.E. Gardner
Geology after A.A. Öpik, 1953.



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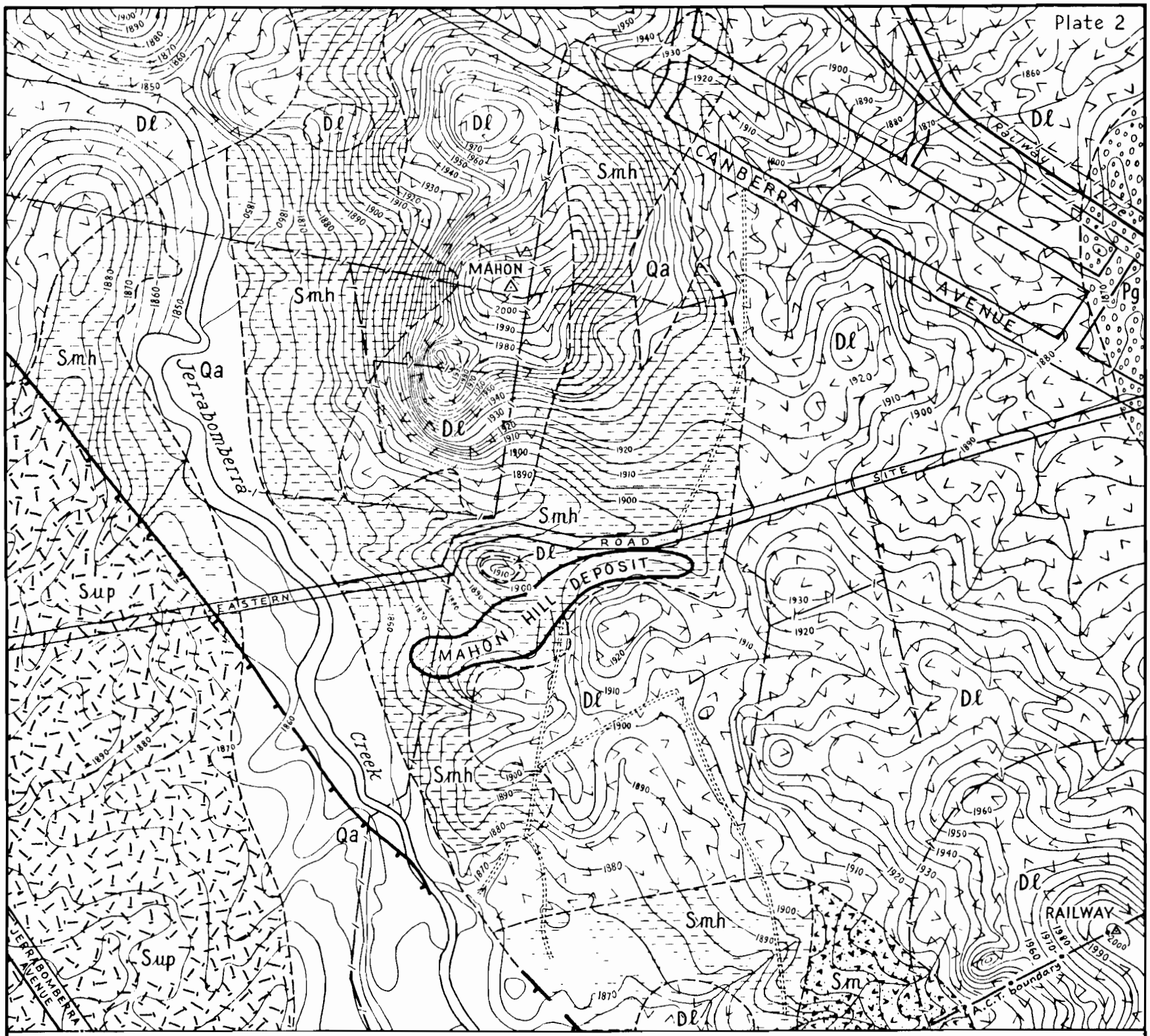

GEOLOGICAL MAP

MAHON HILL BRICK SHALE LOCALITY

FYSHWICK A.C.T.

Compiled by D.E. Gardner

Geology after A.A. Öpik, 1953.

Reference

RECENT AND PLEISTOCENE	Qa	*Mainly alluvium*
PERMIAN (?)	Pg	*Fyshwick Gravel*
LOWER DEVONIAN	Dℓ	*Volcanics*
UPPER SILURIAN	Sup	*Mount Painter Porphyry*
MIDDLE SILURIAN	Smh	*Mahon Formation*
	Sm	*Undifferentiated volcanics*

Geological boundary (position approx.)

Normal fault

Vechicle track

1900 *Surface contour, based on Canberra datum*

Fence

Trig. station

400 0 800 1600 Feet

TRUE MAG. 11°

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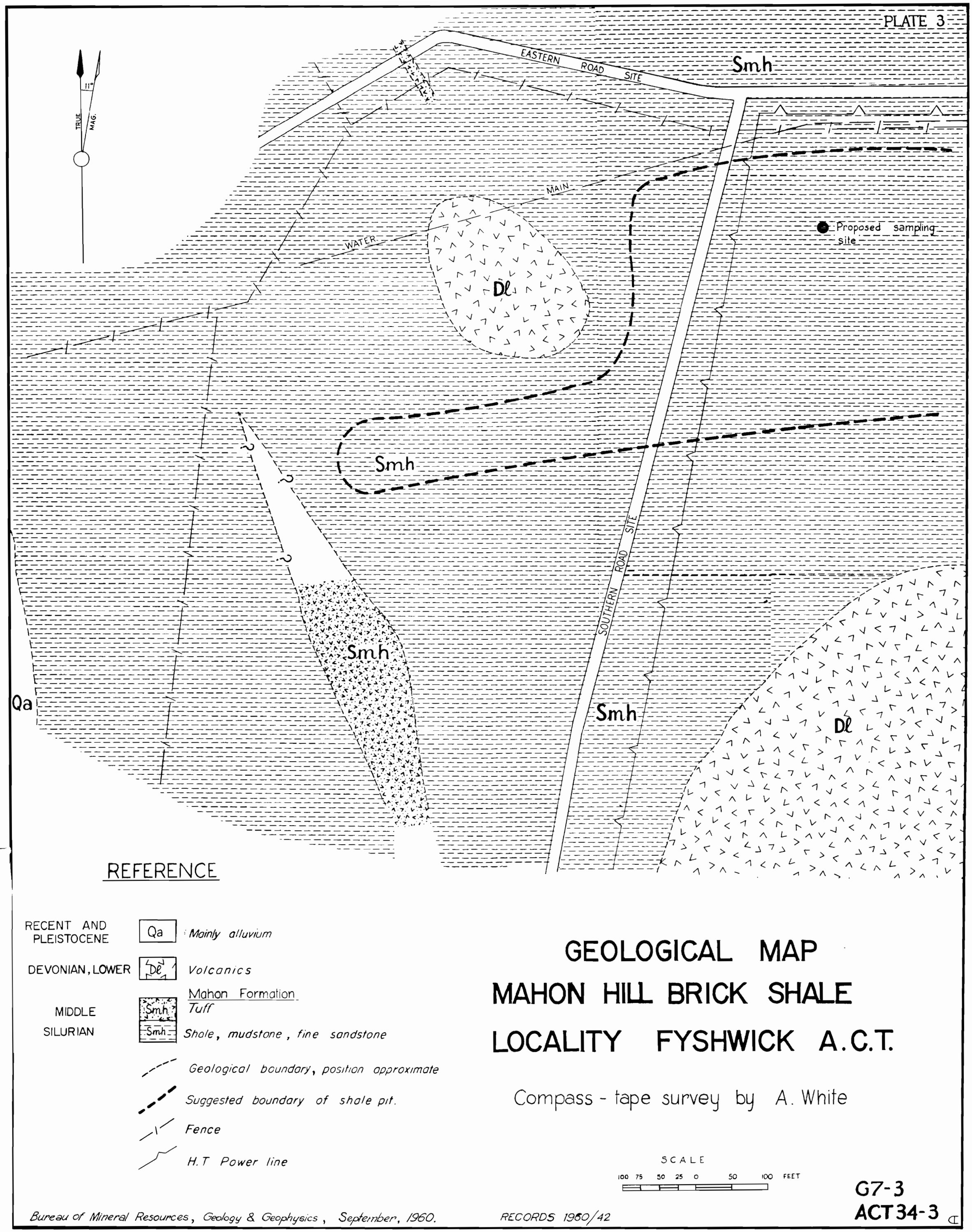

GEOLOGICAL MAP
MAHON HILL BRICK SHALE
LOCALITY FYSHWICK A.C.T.

Compass - tape survey by A. White

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