



ACT Heritage Council

BACKGROUND INFORMATION

PINE ISLAND AGGLOMERATE

(part Block 1 Section 47 and part Block 16 Section 46, GREENWAY)

At its meeting of 8 February 2018 the ACT Heritage Council decided that the Pine Island Agglomerate was not eligible for provisional registration.

The information contained in this report was considered by the ACT Heritage Council in assessing the nomination for the Pine Island Agglomerate against the heritage significance criteria outlined in s10 of the *Heritage Act 2004*.

HISTORY

The Pine Island Agglomerate (the Agglomerate) is a localised rock formation but has many unusual features that make identifying its origin difficult. An agglomerate consists of rounded volcanic rocks, usually formed by liquid flying through the air, embedded in a volcanic ash matrix. However, the most likely explanation is that it is a volcanic mudslide, or a lahar, that occurred during the formation of the Laidlaw Volcanics; however it is very localised, not as well sorted as would be expected and has a larger variety of rock types than would be expected for a typical lahar (Finlayson, 2012).

Finlayson (2012) in the *Significant Geological Features in the Australian Capital Territory* describes the Agglomerate:

“The agglomerate exposed at this locality shows several puzzling features, and interpretation of its origin remains problematic at present. The rock occurs within the Laidlaw Volcanics, an ignimbrite unit noted for its extreme uniformity over tens of kilometres, and appears to represent a very localized deposit during a lull in the ignimbritic activity.

A feature of the deposit is the variety of clasts present, which include chert, granite, quartzite, and volcanic porphyry in a medium-grained crystal and lithic matrix. The size of clasts is variable, ranging up to 11 cm, and they range from angular to quite well rounded. A poorly defined bedding is present, which locally becomes fairly well defined, and bedding thicknesses range from less than 1 cm to up to 1 m. Sorting is always poor.”

The volcanic rocks along the Murrumbidgee were mapped out as part of the Yarralumla Formation in 1964, but a later description of the Agglomerate from the *Geology of the Canberra 1:100 000 Sheet Area* (Abell, 1991:38) has it as a part of the Laidlaw Volcanics:

“On the right bank of the Murrumbidgee, 1 km downstream from the picnic area at Pine Island (MR 8621776), a rhyodacitic mudflow deposit is well exposed (Pl. 6), consisting of a poorly sorted assemblage of angular to rounded clasts of mainly chert (muddy ashstone) and dacitic porphyry up to 10cm across in a medium-grained tuffaceous matrix. Local stratification results from grainsize variation in the matrix and from the concentration of coarse-grained clasts into 'agglomerate' layers.”

There is evidence of several geological drill holes in the Agglomerate, however who conducted the tests and the results of this testing is unknown.

BACKGROUND INFORMATION – PINE ISLAND AGGLOMERATE

Goldsmith (1980) notes the Pine Island Agglomerate during a nearby geological drilling program. Two holes were drilled ~150m and ~320m away from the area of the Pine Island Agglomerate, but do not record of the feature extending beyond its current boundary.

The 1832 Hoddle survey of the Limestone Plains shows the area being a part of Thomas Macquoid's 2560acre primary grant called 'Waniassa', but also a smaller note to the right of 'Togronor'; it is also located on the 'Isabella Plains'. The same map as well as the portion plan note that the landscape is 'open forest' with no note of the geological features of the area.

The Geological Society of Australia (GSA) is the peak body representing the earth sciences in Australia. In 1987 the ACT Division of the GSA prepared a report on the geological monuments of the ACT, i.e. places they considered to be of geological significance in the ACT. This was updated in 2012 with the publication of *Significant Geological Features in the Australian Capital Territory, 2012*, which now refers to geological monuments as 'Significant Geological Features'. The current nomination stems from these GSA reports and relies heavily on the updated 2012 report as well as the Australian Stratigraphic Units Database from Geoscience Australia (© Commonwealth of Australia (Geoscience Australia) 2016). The 2012 GSA assessment of the Pine Island Agglomerate assigned the place a 'Local Significance' level due to its local level of interest to tourists and students, but it did not meet the 'Regional Significance' level which would be assigned to places that are important in the context of developing an understanding of the geological and geomorphological development of the Australian Capital Territory and surrounding region.

The Agglomerate was added to the RNE on 23 September 1983 (according to public notice in the CT), however according to the RNE database on the Environment.gov.au it was added on 1 November 1983.

DESCRIPTION

Australian Stratigraphic Units Database © Commonwealth of Australia (Geoscience Australia) 2016

Pine Island "Agglomerate"

STRATNO: 28927

Current: No

Rank: Formation, beds

Status: Informal

State(s): ACT

Category: Variation of published name

Usage: Mentioned

Definition Card: No

Originator:

Entry date: 24-AUG-88

Last Update: 17-MAY-06

Replaced by:

Previously known as:

Description:

Comments:

Geological province: No province information available

Type state:

Reference section type:

Maximum thickness: m **Minimum thickness:**

Unit Age

Top of unit -

Minimum age: Ma: % from base of biozone: Age method:

Maximum age: Ma: % from base of biozone: Age method:

Base of unit -

Minimum age: Ma: % from base of biozone: Age method:

Maximum age: Ma: % from base of biozone: Age method:

Related units: Relationship: Contact Type:

First Reference:

REFID: 41356 Owen, M., Senior, D., Owen, J., Hodgson, J., 1988, Geological monuments in the Australian Capital Territory., Australian Heritage Commission, 1v

Use on maps:

Full Bibliographic Details (ordered by usage, publication year)

REFID: 41356 Owen, M. , Senior, D. , Owen, J. , Hodgson, J. 1988 Geological monuments in the Australian Capital Territory. Australian Heritage Commission 1v

Usage: Mentioned (p60)

Comments:

Glossary

Bedding – well defined layers of rock.

Chert – a type of fine-grained sedimentary rock composed of microcrystalline or cryptocrystalline silicon dioxide.

Clasts – a piece of a larger rock that has broken down.

Dacite – a type of fine-grained volcanic igneous rock.

Geological Formations – are a distinct type of rock that has formed in such a way that it can be identified as having an origin or formation process that is different from other surrounding rocks.

Granite – a type of coarse-grained plutonic rock

Igneous rock – a type of rock formed by molten rock cooling. This can be volcanic/extrusive when it is the result of an eruption, i.e. it forms above ground from lava; or it can be plutonic/intrusive when the magma cools before reaching the surface.

Ignimbrite – the material formed by a volcanic ash cloud.

Lahar – a mudslide of volcanic material.

Laidlaw Volcanics – a geological formation grouping of mostly volcanic rocks from the early Ludlow age (around 427 million years ago).

Matrix – refers to the finer grained material that makes up a rock. A crystal matrix refers to crystalline material such as quartz being the larger grains, while a lithic matrix refers to silica-based particles within a matrix that are not quartz or feldspar.

Porphyry – a descriptive term for an igneous rock that has large-grained crystals within a silica matrix.

Quartzite – a type of metamorphic rock in which the particles within sandstone have been welded together.

Rhyodacite – a type of fine-grained volcanic igneous rock.

Tuff/Tuffaceous – a type of rock formed by pyroclastic material (volcanic ash)

Yarralumla Formation – a geological formation of fine-grained calcareous and tuffaceous stone.

SITE PLAN



Figure 1 Pine Island Agglomerate boundary

IMAGES



REFERENCES

Abell, R. S. 1991. *Geology of the Canberra 1:100 000 Sheet Area, New South Wales and Australian Capital Territory*. Department of Primary Industries & Energy, Bureau of Mineral Resources, Geology & Geophysics, Canberra.

Commonwealth of Australia (Geoscience Australia) 2016. *Australian Stratigraphic Units Database*. http://dbforms.ga.gov.au/www/geodx.strat_units.int accessed 16 January 2017.

Finlayson, D. M., 2012. *Significant Geological Features in the Australian Capital Territory, 2012*. Geological Society of Australia (ACT Division), Canberra.

Goldsmith, R. C. M. 1980. *Lanyon Trunk Sewer - Pine Island and Murrumbidgee Park Drive Geology*. Bureau of Mineral Resources, Geology & Geophysics, Canberra.