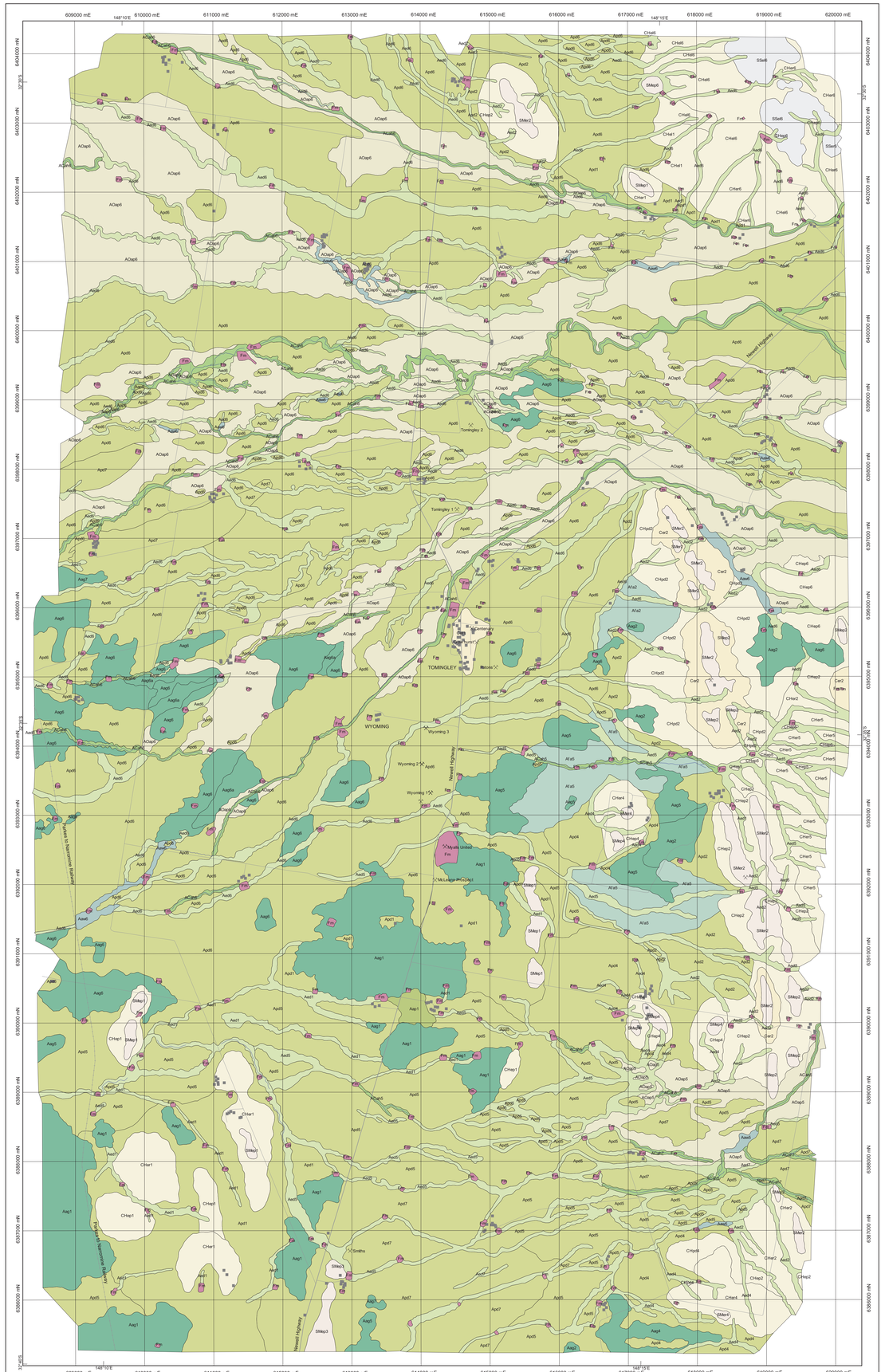
TOMINGLEY REGOLITH-LANDFORMS
INCORPORATING THE WYOMING GOLD DEPOSIT

SCALE 1:25,000

FIRST EDITION
Subject to revision



TRANSPORTED REGOLITH

Alluvial sediments

Aag Plains with poorly to well developed gilgai with depressions up to 10 m diameter and 1 m deep. Depressions contain dark organic-rich clays in small swamps. The surrounding plains dominantly contain:
(1) red-brown fine sand and silt with subangular coarse sand to small pebbles of quartz; or,
(2) light to dark grey subangular to subrounded quartzose coarse sand granules and weakly ferruginised fine sandstone and shale lithic fragments and minor subrounded maghemite granules; or,
(3) rhyolite porphyry lithic fragments; or, vein quartz and weakly ferruginised chert lithic fragments; or,
(5) rhyolite porphyry lithic fragments; or,
(6, 6a, 7) dominantly subangular to subrounded granules to small pebbles of weathered granite lithics with minor red-brown fine sand and silt and minor subrounded maghemite granules.
Colonised by sedges and other water-tolerant grasses and forbs in the depressions and surrounded by an open woodland of *Eucalyptus microcarpa, Allocasuarina verticillata, Alectryon oleifolius, Gejera parviflora, Eremophila* sp., *Acacia* sp., rare *Pittosporum phillirareoides*, rare *Apophyllum anomalum*, grasses, forbs and exotic weeds, major species varying depending on location, water availability and substrate.

Aap A low relief plain with anastomosing drainage depressions with:
(1) subangular to subrounded quartz, weakly ferruginised weathered siltstone and fine sandstone lithic sand and granules and red-brown fine sand and silt with minor subrounded maghemite granules; or,
(2) light grey coloured subangular to subrounded quartz and weathered granite lithic coarse sand and granules with rare lithic pebbles and grey clays and minor red-brown fine sand and silt with minor subrounded maghemite granules.
Colonised principally by:
(5, 6) *Eucalyptus microcarpa* and scattered *Eucalyptus microcarpa, Callitris glaucophylla, Allocasuarina luehmannii* and *Gejera parviflora*; or,
(2) *Eucalyptus populnea* with *Eucalyptus microcarpa*, forbs and grasses.

Aaw Water-saturated low-lying swampy tracts of alluvial systems with dark grey to black organic-rich clay and silt with subangular to subrounded quartz sand and granules and:
(5) rhyolite porphyry lithic sand and granules; or,
(6) weathered granite lithic sand and granules.
Colonised by sedges and other water-tolerant forbs and grasses.

ACah Stream channels < 10 m wide and < 3 m deep with stream bank deposits of grey clay and lithic gravel and channel deposits of minor red-brown fine sand and silt with:
(5) subrounded to rounded silt to cobbles of quartz and weathered rhyolite porphyry, chert, mudstone, siltstone and sandstone lithics; or,
(6) subrounded to rounded silt to cobbles of quartz and weathered granite lithics; or,
(7) subrounded to rounded silt to cobbles of quartz and weakly ferruginised sandstone lithics.
Colonised principally by:
(5, 7) *Eucalyptus camaldulensis* with minor *Acacia sp., Eremophila sp.*, forbs and grasses; or,
(6) *Eucalyptus camaldulensis* with minor *Eucalyptus populnea; Eucalyptus microcarpa, Acacia sp.*, forbs and grasses, depending on location.

Aed Dark red to brown organic-rich materials in broad shallow alluvial tracts with clay and quartz silt and minor subrounded maghemite granules with:
(1) minor subangular to subrounded quartz and weakly ferruginised siltstone and sandstone lithic sand and granules; or,
(2) minor subangular to subrounded quartz and chert lithic sand and granules; or,
(4) minor subangular to subrounded quart and weakly ferruginised mudstone, siltstone and sandstone lithic sand and granules; or,
(5) minor subangular to subrounded rhyolite porphyry lithic sand and granules; or,
(6) minor subangular to subrounded quartz and weathered granite lithic sand and granules; or,
(7) minor subangular to subrounded quartz and sandstone lithic sand and granules.
Colonised principally by forbs and grasses with *Eucalyptus microcarpa, Eucalyptus populnea, Eucalyptus sideroxylon, Acacia sp.* and *Eremophila sp.* depending on location.

Afa Red-brown fine sand and silt with minor angular to subangular coarse sand to pebbles of quartz in low-relief plains with:
(2) weakly ferruginised chert and minor subrounded maghemite granules; or,
(5) possibly weathered rhyolite porphyry granules and pebbles on a low relief plain.
Colonised principally by forbs and grasses with rare *Eucalyptus microcarpa, Allocasuarina luehmannii, Callitris glaucophylla* and *Acacia sp.*

AOap Light red coloured subangular to subrounded quartz silt and sand on low-relief plains with numerous anastomosing drainage depressions with:
(5) possibly weathered rhyolite porphyry lithic sand and granules with red-brown fine sand and silt and minor subrounded maghemite granules; or,
(6) light grey coloured subangular to subrounded quartz and weathered granite lithic coarse sand and granules with rare pebbles and grey clay and minor red-brown fine sand and silt and minor subrounded maghemite granules,
Colonised by forbs and grasses with:
(5) *Eucalyptus microcarpa, Callitris glaucophylla, Allocasuarina luehmannii, Gejera parviflora*, rare *Eucalyptus sideroxylon, Acacia sp., Eremophila sp.*, forbs and grasses; or,
(6) *Eucalyptus populnea* with *Eucalyptus microcarpa*, rare *Eucalyptus melliodora, Callitris glaucophylla, Allocasuarina luehmannii, Gejera parviflora, Eremophila mitchelli, Senna artemisioides ssp. Zygophylla* and *Dodonea cuneata*.

Apd Red-brown fine sand and silt with minor angular to subangular sand to pebbles of quartz and minor subrounded maghemite granules on broad plains with extremely subdued relief with coarse sand to pebbles of:
(1) weakly ferruginised sandstone and siltstone; or,
(2) weakly ferruginised chert; or,
(4) weakly ferruginised mudstone, siltstone and sandstone; or,
(5) possibly weathered rhyolite porphyry; or,
(6) weathered granite lithics and minor red-brown fine sand and silt; or,
(7) no lithic fragments.
Colonised by forbs and grasses with:
(1, 5) *Eucalyptus microcarpa, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp., Pittosporum phillireaoides* and *Gejera parviflora*; or,
(2, 4) *Eucalyptus microcarpa, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp., Gejera parviflora* and minor *Eucalyptus sideroxylon*; or,
(6, 7) *Eucalyptus microcarpa, Eucalyptus populnea, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp., Gejera parviflora* and minor *Pittospotum phillireaoides*.

Colluvial sediments

Cer Low hills with brown fine sand and silt and minor subrounded maghemite granules on rises flanking saprolith ridges with:
(1) angular to subangular coarse sand to pebbles of quartz and weakly ferruginised siltstone and sandstone lithics over minor outcrop of the same with joints opening on an undulating rise; or,
(2) Angular coarse sand to pebbles of quartz and weakly ferruginised chert lithics.
Colonised by forbs and grasses with:
(1) *Eucalyptus microcarpa, Eucalyptus populnea, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp., Gejera parviflora* and minor *Pittospotum phillireaoides*; or,
(2) *Eucalyptus microcarpa, Callitris glaucophylla, Acacia sp.* and *Gejera parviflora*.

CHel Low hills flanking granite saprolith ridges with:
(1) angular to subangular coarse sand to pebbles of quartz and weakly ferruginised sandstone and siltstone lithics mixed with grey coloured angular to subangular coarse sand to pebbles of quartz and weathered granite lithics and minor red-brown fine sand and silt and grey clay; or,
(6) angular to subangular sand and granules of quartz and weathered granite with grey clay and minor red-brown fine sand and silt.
Colonised principally by forbs and grasses with:
(1) sparse *Eucalyptus microcarpa*, or (6) *Eucalyptus microcarpa, Eucalyptus populnea, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp.* and other shrubs.

CHep Low relief, round-topped undulating plains slightly elevated above surrounding alluvial plains or flanking saprolith plains with angular to subangular coarse sand to pebbles of quartz and:
(1) weakly ferruginised sandstone and siltsone; or,
(2) weakly ferruginised chert lithics; or,
(4) weakly ferruginised mudstone, siltstone and sandstone lithics; or,
(5) possibly weathered rhyolite porphyry lithics, all with red-brown fine sand and silt and minor subrounded maghemite granules; or,
(6) angular to subangular coarse sand to pebbles of quartz and weathered granite lithics with grey clay and minor red-brown fine sand and silt.
Colonised by:
(5) forbs and grasses with:
(1) minor *Eucalyptus microcarpa, Eucalyptus viridis, Callitris glaucophylla, Allocasuarina luehmannii* and *Gejera parviflora*; or,
(2) *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Acacia sp., Gejera parviflora*, shrubs and minor *Eucalyptus populnea*; or,
(4) *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Acacia sp., Gejera parviflora* and shrubs; or,
(6) *Eucalyptus microcarpa*.

CHer Rises flanking saprolith low hills or round-topped rises elevated above surrounding alluvial plains or flanking saprolith plains. Angular to subangular coarse sand to pebbles of quartz and red-brown fine sand and silt and minor subrounded maghemite granules with:
(1) weakly ferruginised sandstone and siltstone with red-brown fine sand; or,
(2) weakly ferruginised chert lithics; or,
(4) weakly ferruginised mudstone, siltstone and sandstone lithics; or,
(6) angular to subangular sand and granules of quartz and weathered granite with grey clay and minor red-brown fine sand and silt.
Colonised by forbs and grasses with:
(1) minor *Eucalyptus microcarpa, Eucalyptus viridis, Callitris glaucophylla* and *Allocasuarina luehmannii*; or,
(2, 4) minor *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Gejera parviflora* and *Acacia sp.*; or,
(5) minor *Eucalyptus microcarpa, Eucalyptus sideroxylon* and *Acacia sp.*; or,
(6) *Eucalyptus microcarpa, Eucalyptus populnea, Allocasuarina luehmannii, Callitris glaucophylla, Acacia sp.* and *Gejera parviflora*.

CHpd Low relief undulating plains flanking colluvial and saprolith plains and rises. Subangular to subrounded coarse sand to pebbles of quartz with:
(2) weakly ferruginised chert lithics; or,
(4) weakly ferruginised mudstone, siltstone and sandstone lithics, with red-brown fine sand and silt and minor subrounded maghemite granules.
Colonised by forbs and grasses with:
(2) minor *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla* and *Acacia sp.*; or,
(4) with *Eucalyptus microcarpa* and *Eucalyptus sideroxylon,*

Fill

Fm Principally bulldozed or graded regolith in and surrounding farm dams. Also includes mullock dumps composed of unweathered bedrock and saprolith of Goonumbla Volcanics at the Myalls United mine site.

IN SITU REGOLITH

Saprolite

SMep (1) Moderately weathered and slightly to moderately ferruginised outcrop with a discontinuous cover of angular to subangular sand to pebbles of quartz and weakly ferruginised sandstone and siltstone with red-brown fine sand and silt and minor subrounded maghemite granules filling opening joints and bedding planes in round-topped plains slightly elevated above surrounding alluvial plains; or,
(2) slightly to moderately ferruginised saprolite consisting of outcrop and angular to subangular sand to pebbles of quartz and weakly ferruginised chert with red-brown fine sand and silt and minor subrounded maghemite granules filling opening joints and bedding planes in undulating plains flanked by colluvial plains and rises; or,
(3) slightly to moderately ferruginised saprolite consisting of outcrop and angular to subangular sand to pebbles of quartz and weakly ferruginised chert with red-brown fine sand and silt and minor subrounded maghemite granules filling opening joints and bedding planes in undulating plains flanked by colluvial plains and rises; or,
(4) Slightly to moderately ferruginised saprolite consisting of outcrop and angular to subangular sand to pebbles of quartz and weakly ferruginised chert with red-brown fine sand and silt and minor subrounded maghemite granules filling opening joints and bedding planes in undulating plains flanked by colluvial plains and rises; or,
(6) Weakly ferruginised granite saprolite outcrop consisting of grey clay and angular quartz and lithic coarse sand to pebbles with minor red-brown fine sand and silt.
Colonised by forbs and grasses with:
(1) *Eucalyptus viridis* in the west and *Eucalyptus microcarpa, Allocasuarina luehmannii, Callitris glaucophylla, Gejera parviflora* and *Acacia sp.* in the east; or,
(2) *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Acacia sp., Gejera parviflora* and shrubs; or,
(3) *Eucalyptus microcarpa, Callitris glaucophylla, Allocasuarina luehmannii, Acacia sp.* and *Gejera parviflora*; or,
(4) *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Gejera parviflora* and *Acacia sp.*; or,
(6) minor *Eucalyptus microcarpa* and *Callitris glaucophylla*

SMer (2) Moderately weathered and slightly to moderately ferruginised saprolite outcrop and angular to subangular coarse sand to pebbles of quartz and weakly ferruginised chert with red-brown fine sand and silt and minor subrounded maghemite granules filling opening joints and bedding planes in rises flanked by colluvial plains and rises; or,
(4) Slightly to moderately ferruginised saprolite outcrop and angular to subangular pebbles to cobbles of quartz and weakly ferruginised mudstone, siltstone and sandstone with opening bedding planes and joints filled with red-brown fine sand and silt and minor subrounded maghemite granules in undulating plains.
Colonised by:
(2) *Eucalyptus microcarpa, Eucalyptus sideroxylon, Callitris glaucophylla, Acacia sp., Gejera parviflora*, shrubs, forbs and grasses; or,
(4) forbs and grasses.

Saprock

SSel Slightly weathered and ferruginised granite outcrop consisting of tors and pavements with a discontinuous cover of grey clay, angular quartz and granite lithic coarse sand to boulders in a low hill of rugged well-forested landscape. Colonised by *Eucalyptus microcarpa, Eucalyptus populnea, Callitris glaucophylla, Gejera parviflora, Acacia sp.*, shrubs, forbs and grasses.

SSet Slightly weathered and ferruginised granite outcrop consisting of tors and pavements with a discontinuous cover of minor grey clay, angular quartz and granite lithic coarse sand to boulders in a rise of rugged well-forested landscape. Colonised by *Eucalyptus microcarpa, Eucalyptus populnea, Callitris glaucophylla, Gejera parviflora, Acacia sp.*, shrubs, forbs and grasses.

Major road
Minor road
Railway
Building or other construction
Drainage line
MinView mineral occurrence (named)

Grid North

0 1 2
km

Tomingley 1:25,000 regolith-landforms map. Australian Map Grid coordinates using the Australian Geodetic Datum of 1966 (AGD66), Universal Transverse Mercator projection Zone 55S (UTM 55S).

RLU key descriptions for the Tomingley regolith-landforms map

The alphanumeric regolith-landform unit (RLU) polygon codes provide a framework to present regolith materials, landforms and associated vegetation on the map sheet. RLU codes are designed to first list the broad regolith lithology in capital letter codes, then landforms in lower case codes. The modifier number following each alphabetic RLU code allows for discrimination of variations of the broader regolith-landform assemblages, in this case due to differing bedrock lithology based on the Narromine 1:250,000 geological map sheet of Sherwin (1996). The RLU codes are based largely on the interpretation of the dominant regolith-landform process responsible for their formation (i.e., genetic process) and follow the RTMAP scheme of Pain *et al.* (2000). Lithological and other RLU attributes are described in the attached legend and accompanying map report.

RLU codes for regolith materials depicted here are:

A	Alluvial sediments
AC	Alluvial channel sediments
AO	Alluvial overbank sediments
C	Colluvial sediments
CH	Colluvial sheetflow sediments
F	Fill
SM	Moderately weathered bedrock (saprolite)
SS	Slighlty weathered bedrock (saprock)

RLU codes for landforms used here are:

ag	alluvial gilgai depressions
ah	alluvial channel
ap	alluvial plain (with numerous small drainage depressions)
aw	alluvial swamp
ed	erosional drainage depression
ep	erosional plain (0-9 m relief)
er	erosional rise (9-30 m relief)
el	erosional low hill (30-90 m relief)
fa	alluvial fan
m	man-made
pd	depositional plain (with no significant drainage depressions)

RLU modifier codes used here reflect bedrock lithologies of Sherwin (1996) or regolith material sources are:

1	Cotton Formation (O-Sc) sandstones and siltstones
2	Mugincoble Chert (Ohr)
3	Goonumbla Volcanics (Obv) mafic lava and flow breccia
4	Mumbidgle Formation (Slm, Sfv) mudstone, siltstone and minor sandstone
5	Dulladerry Volcanics (Dds, Ddr, Ddc) rhyolite and quartz porphyry
6	Obley Granite (Dog)
7	Henery Group (Dh) quartz sandstones

Tomingley 1:25,000 regolith-landforms map

Compiled by and cartography by Ian C. Roach (MTEC Lecturer in Regolith Geoscience, CRC LEME/Australian National University).

It is recommended that this map be referred to as:

Roach I.C. 2006. Tomingley 1:25,000 regolith-landforms map. Cooperative Research Centre for Landscape Environments and Mineral Exploration (CRC LEME), Perth.

The regolith-landform polygons on this map are based on an interpretation of 1:50,000 scale aerial photographs, airborne geophysical imagery (principally gamma-ray spectrometrics) and extensive field mapping. It is the intention of this map to identify and characterise surface materials and landforms in a prospective area with limited exposed bedrock.

Disclaimer
The user accepts all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using any information or material contained in this map. To the maximum permitted by law, CRC LEME excludes all liability to any person arising directly or indirectly from using any information or material contained in this report.

Most information is digitised from 1:50,000 scale aerial photographs or is taken directly from digital track logs of hand-held GPS devices. A small proportion of information is taken from the New South Wales Department of Primary Industry's Northern Parkes Geophysical Dataset.

CRC LEME acknowledges the support of Alkane Exploration Ltd. in the production of this map.

CRC LEME is an unincorporated joint venture between the Australian National University, The University of Adelaide, The Curtin University of Technology, CSIRO Exploration and Mining, CSIRO Land and Water, Primary Industries and Resources South Australia, The New South Wales Department of Primary Industry and the Minerals Council of Australia, established and supported under the Australian Government's Cooperative Research Centres Program.

Copies of this map may be obtained from:

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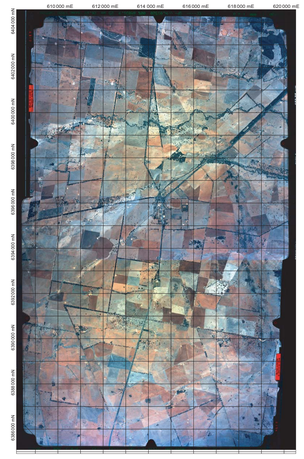
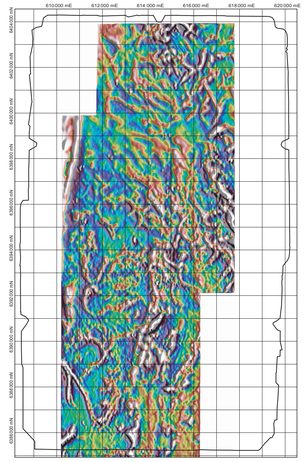
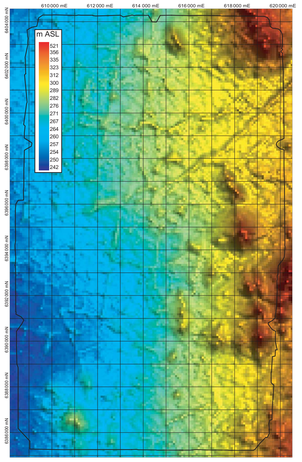


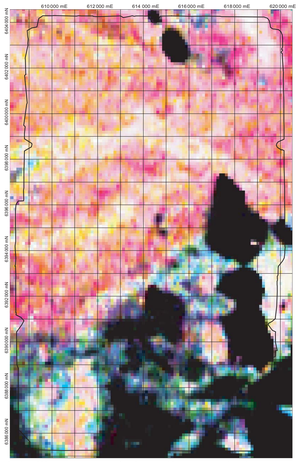
Aerial orthophoto mosaic of the Tomingley regolith-landforms map area used in the mapping program. Aerial photographs include Run 1 #0159 and Run 2 #0174 from the Peak Hill 1:100,000 topographic sheet, acquired at 1:50,000 scale by the New South Wales Department of Lands, 10th May 2004. Orthorectification was performed at CRC LEME, ANU, using ER Mapper software with camera parameters supplied by the NSW Land Information Centre, the Space Shuttle Radar Topography Mission 2nd release (SRTM2) Digital Elevation Model and ground control points collected with a hand-held GPS receiver during field work.



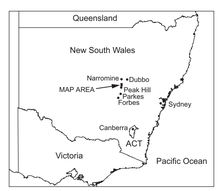
First vertical derivative (1VD) coloured and sunshaded aeromagnetic image of part of the Tomingley regolith-landforms map area from a high-resolution survey commissioned by Alkane Exploration Ltd. The image depicts broad roughly north-south striking structures related to bedrock geology and fractures that are overlain by short wavelength, high amplitude, curved and anastomosing near-surface features that have been interpreted as magnetic palaeochannels. Image courtesy of Alkane Exploration Ltd.

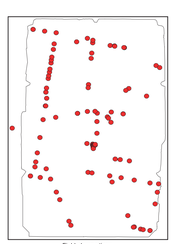


Shuttle Radar Topography Mission 2nd edition (SRTM2) Digital Elevation Model (DEM) of the Tomingley regolith-landforms map area. This model features 90 m pixels and is sunshaded from the northeast to enhance topographic features. The SRTM2 DEM is courtesy of the United States National Aeronautics and Space Administration (NASA).

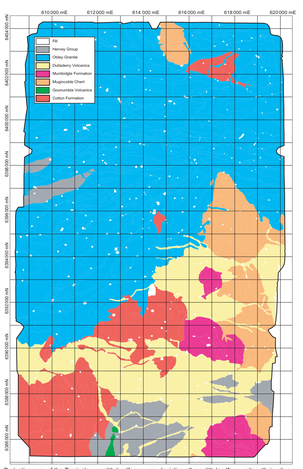


Intensified RGB airborne gamma-ray spectrometric image of the Tomingley regolith-landforms map area. Potassium (K), thorium (Th) and uranium (U) gamma-ray emissions are represented as the colours red, green and blue respectively. The image has been intensified by adding the Total Counts as an intensity layer using ER Mapper software to highlight strong and weak gamma-ray emitters as bright or dark areas as well as in situ and transported regolith types with differing proportions of K, Th and U. Original data courtesy of the NSW Department of Primary Industry from the Northern Parkes Geoscience data set.





Field observations.



Derivative map of the Tomingley regolith-landforms map depicting all regolith-landform units with *in situ* or transported materials interpreted to have the same bedrock parent. Polygons with the same modifier number (see main legend) have been selected and coloured to indicate those areas that should have similar background geochemical characteristics.

References

Pain C., Chan R., Craig M., Gibson D., Unsern P. & Wilford J. 2000. *RTMAP regolith database field book and users guide*. CRC LEME **Report No. 138**, 97 p.
Roach I.C. 2007. *Tomingley 1:25,000 regolith-landforms map, central western New South Wales*. CRC LEME **Open File Report 233**, 24 p. + map.
Sherwin L. 1996. *Explanatory notes Narromine geological sheet 1:250,000 SI/55-3, second edition*. Geological Survey of New South Wales, Sydney, 104 p.
MinView. Geological Survey of New South Wales, New South Wales Department of Primary Industries, MinView digital tenement search system. Available at http://minview.minerals.nsw.gov.au/.

Other references associated with this map

Bamford P.L.M., McQueen K.G. & Scott K.M. 2004. Geochemical dispersion and under-cover expression of gold mineralisation at the Wyoming gold deposit, Tomingley, NSW. *In*: Roach I.C. ed. *Regolith 2004*. CRC LEME, pp. 26-28.
Chalmers I, Ransted T and Kairaitis R 2003. The Tomingley gold project and the discovery of the Wyoming gold deposits, New South Wales. *In: NewGenGold 2003*. Louthean Media Pty Ltd, Perth, WA, pp. 171-184.
Roach I.C. 2004. Results of a preliminary biogeochemical survey of the Wyoming Au deposit, Tomingley, NSW. *In*: Roach I.C. ed. *Regolith 2004*. CRC LEME, pp. 306-309.
Roach I.C. & Walker S.D. 2005. Biogeochemical expression of gold in native tree leaves at Wyoming and Tomingley, NSW. *In*: Roach I.C. ed. *Regolith 2005 – Ten Years of CRC LEME*. CRC LEME, pp. 277-282.
Roach I.C. 2006. Tomingley project, central western NSW, 1: regolith-landform mapping techniques and implications for landscape evolution. *In*: Fitzpatrick R.W. & Shand P. eds. *Regolith 2006 - Consolidation and Dispersion of Ideas*. CRC LEME, pp. 296-300.
Roach I.C. 2006. Tomingley project, central western NSW, 2: regolith-landforms of the Tomingley area. *In*: Fitzpatrick R.W. & Shand P. eds. *Regolith 2006 - Consolidation and Dispersion of Ideas*. CRC LEME, pp. 301-303.
Scott K.M., Chalmers D.I., Ransted T. & Kairaitis R. 2005. Wyoming gold deposit, central western NSW. *In*: Butt C.R.M., Cornelius M., Scott K.M. & Robertson I.D.M. comps. & eds. *Regolith expression of Australian ore systems*. CRC LEME, pp. 348-350.

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