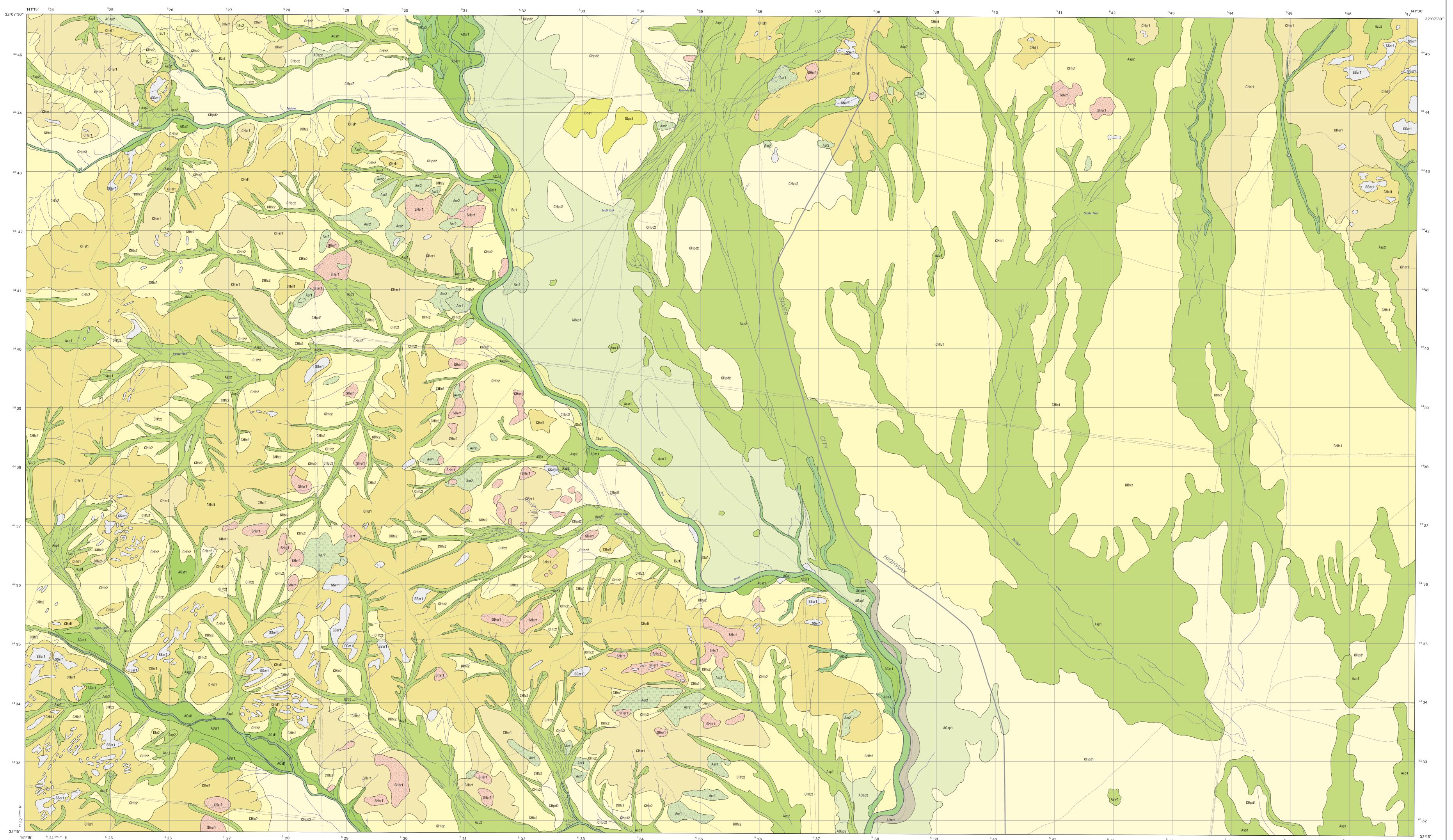
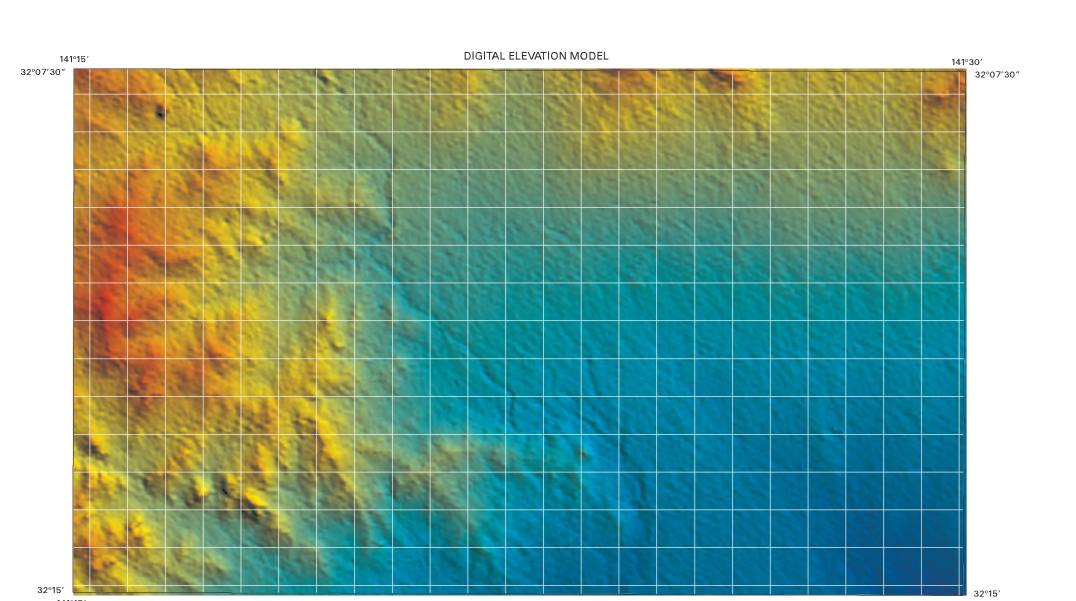
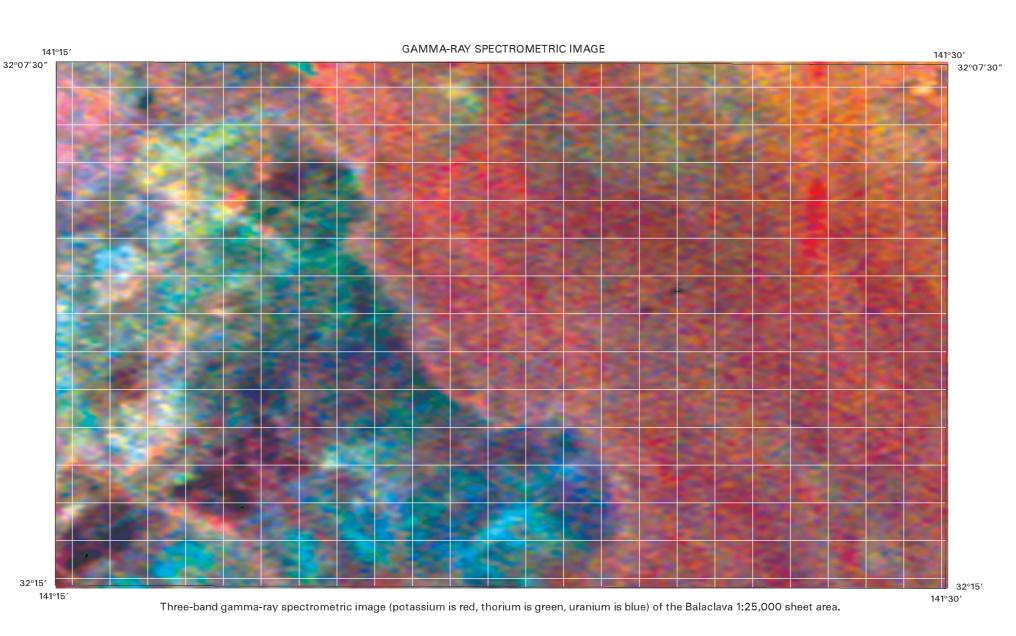
BALACLAVA NEW SOUTH WALES SCALE 1:25 000 BROKEN HILL 1:25,000 REGOLITH-LANDFORM SERIES

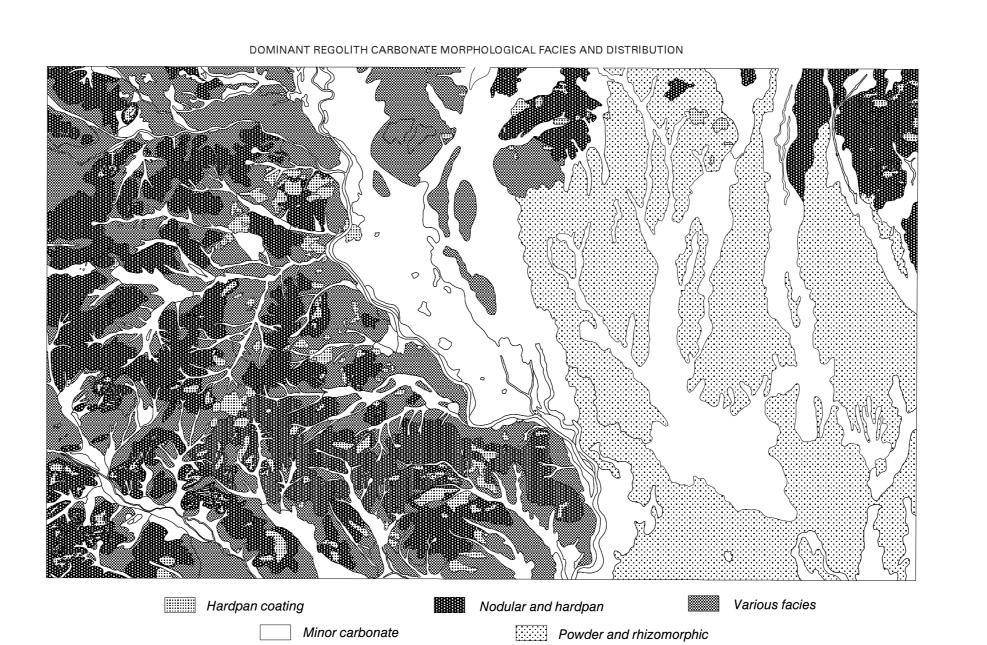


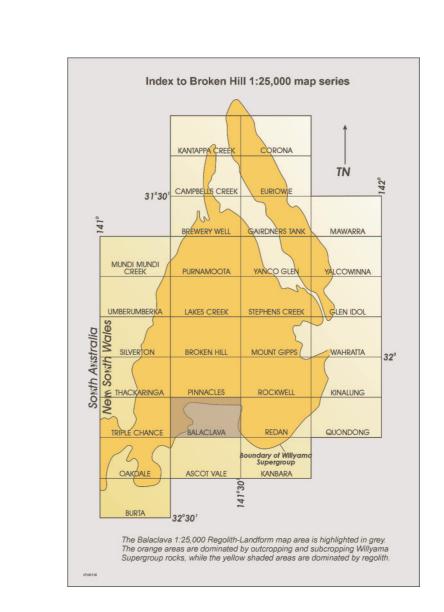




False colour Digital Elevation Model of the Balaclava sheet area. Maximum elevations exceed 240 m (red areas) and lowest areas are less than 180 m (blue).







TRANSPORTED REGOLITH Alluvial sediments Alluvial sediments Silts and fine sands in broad, shallow drainage depressions + or - minor incised, meandering and braided channels, interrupted drainage. Vegetation communities typically feature an open chenopod shrubland dominated by Atriplex vesicaria. Fine sands, silts and clays on an alluvial plain and minor intersection point fans with a fine sub-angular quartz sand cover, locally dissected by networks of shallow anastomosing channels. Vegetation communities typically feature and open chenopod shrubland dominated by Atriplex vesicaria and minor Maireana pyramidata. Silts and clays within ephemeral. swampy depressions. Vegetation is typically dominated by forbs and grasses including Muehlenbeckia cunninghamii and Astebla spp. with occasional trees including Acacia victoriae. Rounded and angular sands and gravels with clays and silts of mostly quartzose composition with minor lithic fragments, indurated by secondary ferruginisation and cropping out on erosional rises. Surface lags are dominated by ferruginous boulders to fine sands with some red-brown aeolian fine sand. Vegetation communities typically feature an open chenopod shrubland dominated by Atriplex vesicaria with minor Maireana spp. Rounded and angular, quartzose sands with minor silts and gravels mostly indurated by secondary silica with minor ferruginous and anatase-rich secondary accumulations, cropping out on erosional rises. Surface lags are dominated by silica indurated materials with some red-brown aeolian fine sand. Vegetation communities typically feature an open chenopod shrubland dominated by Atriplex vesicaria and Maireana spp. Sub-rounded to sub-angular, quartzose, coarse sands with quartzose and lithic gravels within major (> 1.5 m wide), ephemeral, meandering to braided alluvial channels. Vegetation typically features an Eucalyptus camaldulensis riparian woodland.

> Sub-rounded to subangular quartzose and maghemite-rich sand with minor lithic clasts and silts, within intermediate (< 1.5 m wide) ephemeral, meandering to braided channels. Vegetation cover is typically sparse with occasional Acacia victoriae. Silts, clays and sands within discontinuous channels elevated above the main channel in the valley system, experiencing infrequent stream flow or complete abandonment. Many channel depressions are partly infilled by aeolian sands. Vegetation typically consists of forbs with occasional thickets of Acacia victoriae shrubs to small trees. Silts and clays with occasional lithic and quartzose coarse sands conforming to broad, ephemeral, swampy plain with a range of terraced surfaces. Minor surficial reworking by sheetwash and overbank deposition during periods of stream discharge. Vegetation communities typically feature a chenopod shrubland with Atriplex vesicaria and occasional Maireana spp. Coarse channel sands with some silts, clays and sub-rounded to angular lithic and quartzose gravels within depositional terraces and point bars, most typically on the S-SW margins of ACa1. Vegetation typically features Eucalyptus camaldulansis and rare Callitris columellaris. Silts and fine sands within ephemeral, elongate, meandering, swampy depressions. Vegetation typically conforms to a closed scrub, dominated by Acacia victoriae and Myoporum platycarpum.

Overbank deposits Silts and clays with minor quartz sand within broard alluvial plains that include melon-hole gilgai, clay pans. Minor surficial reworking by sheetwash and alluvial processes. Vegetation communities feature a chenopod shrubland dominated by Atriplex vesicaria. Silts and fine sands within broad alluvial plains. Some surface reworking by sheetwash. Vegetation communities feature a chenopod shrubland dominated by Atriplex vesicaria, grasses (Stipa spp. and Astebla spp.) with occasional Alectryon oleifolias. Silts, sands and clays on an eroded slope between an elevated plain and an entrenched channel system. Some aeolian sands and minor sheetwash surficial modifications. Vegetation typically features a chenopod scrubland with occasional Callitris columellaris and Alectryon oleifolias trees.

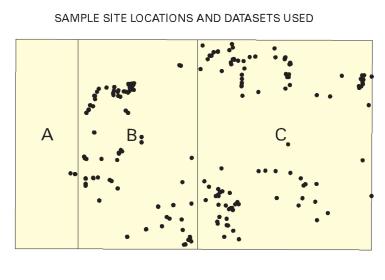
Aeolian sediments Aeolian sand Clayey silt to fine sand within sandsheets and low (< 1 m) hummocky dunes. Typically overlying sheetflow or overbank deposits. Vegetation typically features a chenopod scrubland containing Atriplex vesicaria and Maireana spp. + or - open woodland typically dominated by Casuarina cristata. Rounded quartzose sands within transverse dunes typically restricted to the E margins of sandy channel deposits. Vegetation typically includes grasses (e.g. Stipa spp. and Astebla spp.) with Alectryon oleifolias and occasional chenopods (e.g. Atriplex spp. and Maireana spp.). Quartzose sands and silts forming subdued dune forms flanking rises and hills. Vegetation typically includes grasses (e.g. Stipa spp. and Astebla spp.) with Alectryon oleifolias and occasional chenopods (e.g. Atriplex spp. and Maireana spp.).

Colluvial sediments Sheet flow deposit Gravels composed of lithic and indurated debris with red-brown silts and fine sands on low hills with moderate slopes (~ 10 degrees). Vegetation communities feature an open chenopod shrubland typically dominated by Atriplex vesicaria. Angular to sub-rounded gravels composed of lithic and indurated debris on erosional rises. Vegetation communities consist of chenopod shrublands typically dominated by Atriplex vesicaria conforming to a contour band pattern. Fine sub-angular quartz sand with some maghemite and other ferruginous sands within fans with low gradients (< 2 degrees). Vegetation communities feature chenopod shrublands typically dominated by Atriplex vesicaria and Maireana pyramidata conforming to a prominent contour band Lithic clast dominated sheet flow deposit, consisting of lithic and iron indurated material, on colluvial fans off a fault scarp. Vegetation? CHpd1 Medium to fine, angular quartz sand with some lithic, ferruginised and quartzose sub-rounded coarse sands and gravels, mantling a red-brown clay loam within a depositional plain. Vegetation communities feature chenopod shrublands typically dominated by Atriplex vesicaria and Maireana pyramidata. Fine sands and silts with a mixed lithic gravel and quartzose sand surface lag on broad plains, featuring minor clay pans and accumulations of aeolian sands. Vegetation communities typically feature an open chenopod shrubland with Atriplex vesicaria and Maireana spp.

IN-SITU REGOLITH

Highly weathered bedrock ferruginised saprolite clasts with minor vein quartz fragments and ferruginised sediments with some red-brown aeolian sands. Vegetation communities feature an open chenopod shrubland typically dominated by Maireana sedifolia, Maireana pyramidata and Atriplex vesicaria. Slightly to moderately weathered bedrock exposed on erosional rises. Minor discontinuous aeolian and sheetflow cover, and surface lag consisting of lithic fragments. Vegetation communities feature open chenopod shrubland dominated by Maireana sedifolia, Maireana pyramidata and Atriplex vesicaria shrubs and occasional Acacia aneura trees.





A Aerial photograph, airborne gamma ray spectrometry and Landsat TM imagery interpretation, with limited field mapping and characterisation B Aerial photograph, airborne gamma ray spectrometry and Landsat TM imagery interpretation, with detailed field mapping and characterisation Areas A and B were initially mapped by Greg Shirtliff as part of an Australian National University Honours thesis during 1998.
Reference: Shirtliff, G.J. Ferricretes, massive gypsum and regolith-landform mapping at Balaclava West, Broken Hill, NSW. Honours thesis, Australian National University, Canberra C Aerial photograph and airborne gamma ray spectrometric imagery interpretation and detailed field mapping and characterisation Area C was initially mapped by Kylie Foster as part of a University of Canberra Honours thesis, during 1998 Reference: Foster, K. A., 1998. Regolith Geology and Geochemistry of Balaclava East, Broken Hill, NSW. Honours thesis, University of Canberra, Canberra Areas A, B and C have also been mapped and characterised as part of a wider regional study by S.M. Hill Reference: Hill, S.M. (in prep.). Regolith and Landscape Evolution of the Broken Hill Block and adjoining area. PhD thesis, Australian National

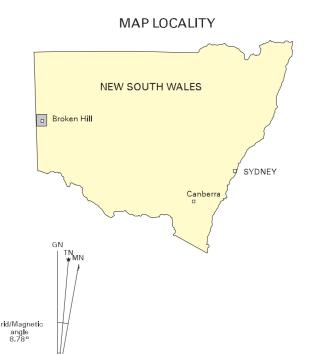
SCALE 1:25 000

UNIVERSAL TRANSVERSE MERCATOR PROJECTION LATITUDE OF ORIGIN: 0°. LONGITUDE OF ORIGIN: 141° HORIZONTAL DATUM: AGD66, UTM ZONE 54

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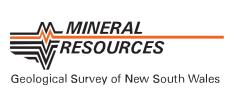
Foster, K. A., Shirtliff, G. J. & Hill, S. M., 1999, Balaclava Regolith-Landform Map (1:25,000 scale). Cooperative Research Centre for Landscape Evolution and Mineral Exploration (CRC LEME), Canberra/Perth The regolith-landform polygons on this map are based on interpretation of 1:82,000 and 1:12,500 panchromatic aerial photographs, airborne gamma-ray spectrometric imagery, Landsat TM imagery and extensive field mapping. It is the intention of this map to identify and characterise surface materials and processes in a prospective area relatively void of exposed bedrock Copies of this map may be obtained from: CRC LEME c/- CSIRO Division of Exploration and Mining Private Mail Bag Post Office, WEMBLEY W.A. 6014 Tel: (08) 9333 6272 Fax: (08) 9333 6146 http://leme.anu.edu.au/

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Digital Elevation Model (DEM) information has been derived from GEODATA DEM-9S Commonwealth of Australia 1996 by permission of the Australian Land Information Group (AUSLIG), Department of Industry, Science and Resources, CRC LEME acknowledges the collaboration of the Australian Geological Survey Organisation (BHEI Project) and the support of the New South Wales Department of Mineral Resources (Discovery 2000) in the production of this map. CRC LEME also acknowledges the support of Pasminco Exploration, Normandy Exploration, Acacia NL and Triako NL CRC LEME is an unincorporated joint venture between the Australian National University, University of Canberra, Australian Geological Survey Organisation and CSIRO Exploration and Mining, established and supported under the Australian Government's Cooperative Research Centres Program





BALACLAVA REGOLITH-LANDFORMS SHEET 7133-I-S FIRST EDITION 2000 SUBJECT TO REVISION

WARNING: Colour may deteriorate with prolonged exposure to light and moisture