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Title	RB 94/00009 Soils, stratigraphy and engineering geology of near surface materials of the Adelaide Plains.
Topic	Geoscientific Information
Type of Resource	Document
Category Type	Artificial Intelligence And Image Processing;Biological Sciences;Built Environment And Design;Civil Engineering;Drilling Engineering;Earth Sciences;Ecology;Energy;Energy Exploration;Engineering;Environmental Management;Environmental Science And Management;Environmental Sciences;Geochemistry;Geochronology;Geology;Geomatic Engineering;Geomechanics And Resources Geotechnical Engineering;Geomorphology And Regolith And Landscape Evolution;Geophysics;Geospatial Information Systems;Historical Geology;Information And Computing Sciences;Land Use And Environmental Planning;Mineral Exploration;Mineral Resources (Excl. Energy Resources);Mineralogy And Crystallography;Natural Hazards;Petrology;Physical Geography;Regional Geology;Resources Engineering;Sedimentology;Seismology And Seismic Exploration;Soil Physics;Soil Science;Stratigraphy;Surface Geology;Urban And Regional Planning
Document Type	Engineering Geology Publication
Author	Sheard, M.J.;Bowman, G.M.
Contributor	CSIRO Division of Soils
Sponsor	
Abstract	Metropolitan Adelaide is founded on a wide variety of soils that overlie sediments and rocks. Some of the soils and sediments react to seasonal and human-induced changes in water content with marked changes in volume. The black earths and smectite-illite rich gley clays are the most reactive materials, and pose the greatest geomechanical problems. Two previous studies concentrated only on the upper 1 to 2 m of soil, but subsequent investigations indicate deeper clays are equally reactive and are responsible for many building cracks and footing failures. This study, jointly sponsored by MESA and CSIRO Division of Soils, has established a series of 170 cored holes (benchmark sites) drilled to 10 m depth where possible. Samples from the cores have undergone geomechanical and soil tests which include: Atterberg limits, particle size analysis, solute electrical conductivity, and a new swell-shrink test (SST). This new test has yielded: strains (vertical, horizontal, volume), water contents at fixed suctions (pF 3.0 and sorption limit pF 6.34) and wet bulk density. A series of derived parameters from the SST are also presented and include: water content and suction at the shrinkage limit, and an instability index (Ip t - based on total suction). A limited number of reactive soils and clays were examined using powder X-ray diffraction techniques to determine their mineralogy. More than 1500 m of core from this study have been retained for future reference at the MESA Core

	Library, Glenside. The results of the investigation are presented in tabular and graphical forms, with discussion and analysis provided within 8 Chapters and 4 Appendices. Direct observations and measurements from each cored hole are presented on multi-disciplinary Composite Log Sheets that display groundwater intersections plus textural, pedological, geological, and engineering descriptions as parallel logs, together with core sample test results. The derived values and indices are separately tabulated. Soil and geological units are individually described, then placed into context within the main geomorphic zones of the study area. Key geomechanical features are indicated for each unit and geomorphic zone. Testing has demonstrated that the majority of Adelaide's reactive soils are composed of clays with a high affinity for water (smectite, illite, randomly interstratified illite-smectite, and occasional vermiculite), and contain much less kaolin than less reactive soils. Black earth soils are only half as reactive as the substrate Keswick Clay. The instability index Ip t is a useful indicator for evaluating the potential reactivity of a site, and some rapid methods are presented for obtaining this value from conventional testing. However, Ip t values should be used cautiously where high clay solute concentrations are involved. A limited statistical analysis of the data is provided for each test parameter. Geomechanical problems are presented that are relevant to building footing design. These are associated with substrate defects, gilgai, trees, changes to site environment, and seismicity.
Publication Date	01/07/1996
Tenement	
Tenement Holder	
Operator	
Geological Province	Adelaide Geosyncline
Status	
Maintenance and Update Frequency	
Geographic Reference	GDA2020 (EPSG:7844)
Bounding Box Extent in GeoJSON	{"type":"Polygon","coordinates":[[[138,-35],[139.5,-35],[139.5,-34],[138,-34],[138,-35]]]}
Purpose	
Lineage	
Mine Name	
Stratigraphy	Blanche Point Formation;Burnham Limestone;Carisbrooke Sand;Chinaman Gully Formation;Fulham Sand;Glanville Formation;Hallett Cove Sandstone;Hindmarsh Clay;Keswick Clay;Kilburn Sand;North Maslin Sand;Pooraka Formation;Port Willunga Formation;Saddleworth Formation;Saint Kilda Formation;South Maslin Sand;Tapley Hill Formation
Commodity	

Notes	Geographic Locality: Adelaide metropolitan;Coastal Zone;Torrens River Valley;Lower Alluvial Plain;Upper Alluvial Plain;Eden - Burnside Fault;Eden Block;Golden Grove Embayment;Para Fault;Para Block;Lower Hills Face Zone Doc No: RB 94/00009
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Distributor Contact	Department for Energy and Mining Level 4, 11 Waymouth Street Adelaide, South Australia 5000 Geological Survey of South Australia Custodian: [dem.sarig@sa.gov.au](mailto:dem.sarig@sa.gov.au?subject=SARIG catalogue)

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