

CIRCEA

ANNUAL RISK MANAGEMENT SEMINAR 2018
FORENSIC ENGINEERING: Expert Evidence

Geotechnical Issues to be Considered in Conjunction with Dilapidation Reports

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and Remedial Consulting
Engineers of Australia

The Institution of
Engineers Australia
(Sydney Division)



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Affiliation and Accreditation:

- Board Member of CIRCEA (College of Remedial and Consulting Engineers of Australia)
- Member of Engineers Australia Civil and Structural Panel
- The Hills Shire Council Independent Geotechnical Review Panel
- Roads & Maritime Service (RMS) Accredited for Slope Risk Assessment

RMS publication GTD 2012/001 *“Excavation adjacent to RMS infrastructure”*

Australian Geomechanics Society (AGS 2007) *“Practice Note Guidelines for Landslide Risk Management”*



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GEOTECHNICAL ISSUES

Geology

Regional geological setting?

Groundwater table or seepage?

Topography

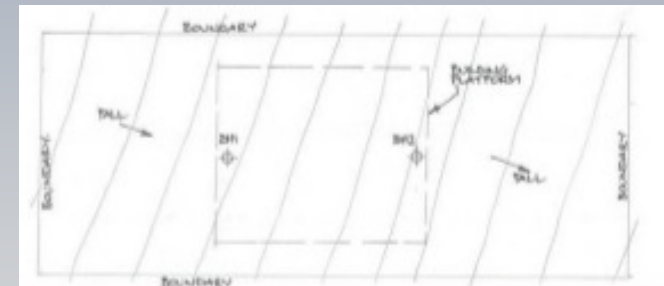
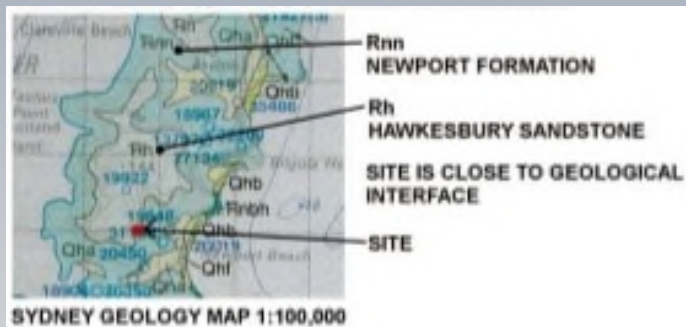
Sloping land?

Change in slope?

Preliminary Desktop Study

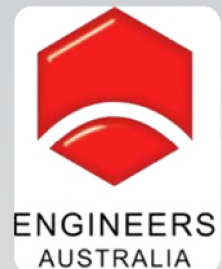
Site location, aerial photos and topographic land survey

Existing boreholes or site testing records (incl. nearby)



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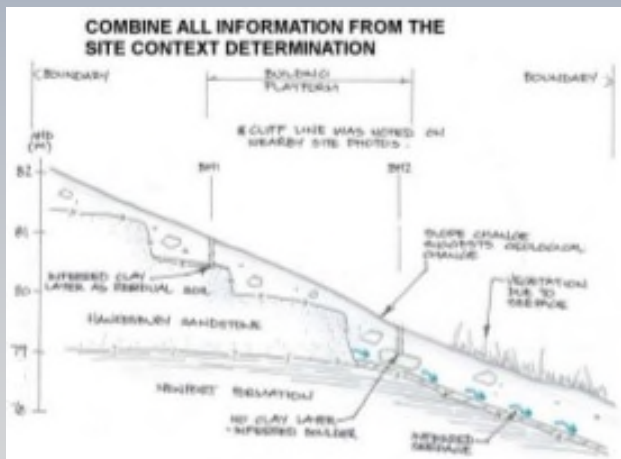


PRELIMINARY DESKTOP STUDY

Geotechnical Model

Available borehole data?

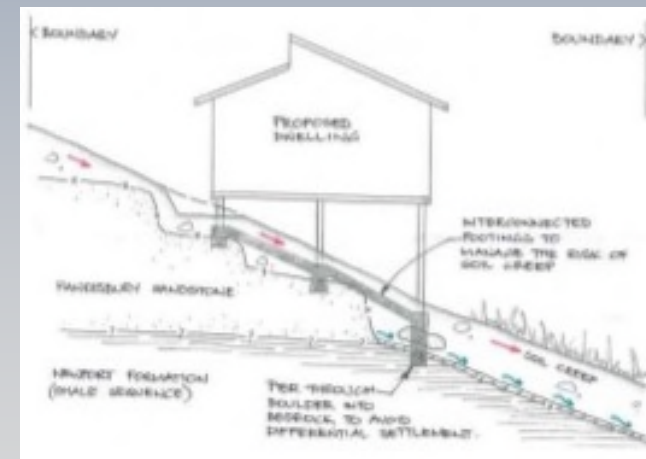
Inferred subsurface profile?



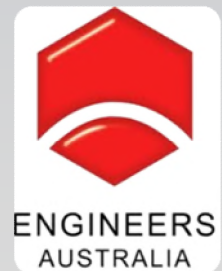
Proposed Development

Drawings

Engineering reports



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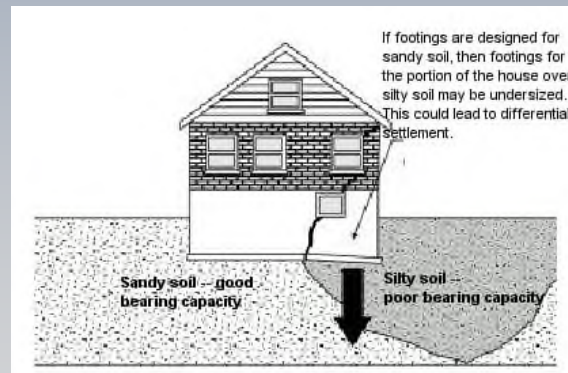
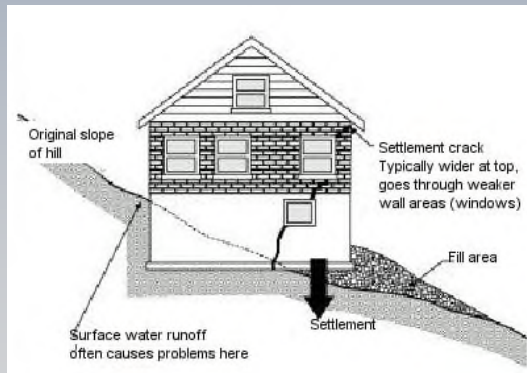


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SITE CONDITIONS

Site Development

Development type? History of building extensions?
Adequate site drainage?
Cut and fill? Has the fill been compacted?



CSIRO BTF 18
Foundation Maintenance and Footing Performance: A Homeowner's Guide

Source: <http://www.oldhouseweb.com/>

Cracking or damage in buildings?



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SITE ASSESSMENT

Site Inspection

Walkover the site and surrounding land, review the nearby buildings and footings

Site consultation with owner, builder and engineers

Document rock outcrops and soil types, trees, vegetation and landscaping

Review type and condition of structures, footings, drainage and services

Damage Assessment

Review crack patterns and locations

Determine which types of engineering issues could explain the crack pattern

Assess the foundation conditions and identify a mechanism to cause the damage

Assess and compare the foundation conditions in undamaged parts of the structure



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GEOTECHNICAL INVESTIGATION & TESTING

Often it is necessary to carry out a geotechnical investigation to assess the foundation conditions.

- Services search (Dial Before You Dig and on-site locator).
- Borehole logs of the soil and rock profile.
- Soil or rock samples for NATA laboratory testing.
- Groundwater monitoring wells and test recharge rate.
- Inclinator installation and excavation monitoring.
- Vibration assessment - trial of equipment and methods.
- Compliance with minimum scope of investigation and monitoring, as required by regulatory authorities.



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GEOTECHNICAL RECOMMENDATIONS

“Practice Note Guidelines for Landslide Risk Management” (AGS 2007)

Computing programs for stability analysis (e.g. Slope/W, Wallap, PLAXIS, etc.)

Review of structural engineering drawing details

Staging of construction notes and specification

Identify potential risks to surrounding structures

Identify construction machinery and methods to reduce risk

Geotechnical recommendations for design and construction

Construction Hold Points, for geotechnical review



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CONSTRUCTION REVIEW

Design and construction as per geotechnical recommendations

Geotechnical inspection hold points for review of work stages

Compaction and testing of fill placement

Temporary support of excavations – within zone of influence

Advice on stability and construction near boundaries

Advice on works near localised services and buried structures

Assessment and advice on unforeseen site conditions

Certification of completed structure by geotechnical engineer



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DILAPIDATION REPORTS

Photographic records of the site conditions, existing structures and damage at a specific point in time.

Usually to be obtained by the developer before construction.

Quality and detail in dilapidation reports can vary widely.

Dilapidation reports should be prepared by experienced structural engineers and include reliable measurements.

The structural engineer and builder should seek input from the geotechnical engineer on conditions and cause/s of damage.



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SUMMARY

GEOTECHNICAL ISSUES TO BE CONSIDERED IN CONJUNCTION WITH DILAPIDATION REPORTS

Geological setting and anticipated site geology

Geotechnical model, boreholes, subsurface profile

Groundwater seepage and inflow rate

Nearby structures, footings and proximity to works

Climate setting, weather and rainfall patterns

History of site development and extensions

Site and structure drainage

Assess foundation type likely to result in the damage / cracking



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QUESTIONS?

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