Foundation Specialists Group

Name:
Dr. David Lacey

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Areas of expertise:
Slope risk analysis, slope stability and deformation modelling, ground improvement, residual soils, *insitu* testing of materials, Light Falling Weight Deflectometers (LFWDs), Plate Load Tests (PLTs), pile and retaining structure design, geotechnical and geophysical site investigation and interpretation, contract administration, site geotechnical assessor and construction support.

Post Nominals
B.Eng, B. Sc. (Hons), Ph.D., MIEAust, NPER, CPENG, RPEQ

Qualifications:
- Ph.D., 2016, The University of Queensland
- B. Sc. (Geophysics) (Honours Class 1), 2004, University of Sydney
- B. Eng. (Civil Engineering (Geotechnical), 2008, University of Sydney
- Certified Site Assessor - RMS Slope Risk Analysis Version 4

Professional Memberships and Affiliations:
- Registered Professional Engineer of Queensland (RPEQ)
- Chartered Professional Engineer (CPENG)
- Member of the Institution of Engineers of Australia (MIEAust)
- QLD Executive Committee (Vice Chair) of the Australian Geomechanics Society (AGS);
- Member of the International Society for Soil Mechanics and Foundation Engineering (ISSMGE)

Awards:
- Young Professional Engineer of the Year - Engineers Australia (National), 2016
- Young Professional Engineer of the Year - Engineers Australia (QLD), 2016
- John Winton Medal for technical excellence and innovation, 2013 (awarded for best technical publication)
- Don Douglas Youth Fellowship, 2012 (best paper at 9th ANZ Young Geotechnical Professionals Conference)

Career Summary:
David is a senior geotechnical engineer with over 10 years of South East Queensland based industry experience. He has extensive knowledge in site characterisation, interpretation and design components of geotechnical engineering, and has worked as the lead geotechncal engineer on a number of major infrastructure and commercial developments. David has significant experience in pile design, slope stability asessments (both onsite and numerical modelleing), deformation assessment, the design of ground improvement of soft soils and embankment design.

During his QLD based career, David has worked in various roles including periods engaged as lead design engineer, site engineer and site superintendent on major infrastructure construction and rehabilitation projects throughout Queensland. David recently completed his part-time PhD candidature in which he investigated appropriate testing methods to assess insitu material parameters of residual soil profiles present within Queensland, and has been named “Young Professional Engineer of the Year” for 2016 by Engineers Australia (QLD).

David also has a passion for research and the ongoing extension of geotechncial knowledge. He is the author of 16 technical publications that consider various aspects of foundation design, quantifying the effectiveness of ground improvement and innovative testing techniques. David has also been the chair of the organising committee for multi-national geotechncial conferences, and holds the position of vice-chair on the executive committee of the QLD chapter of the Australian Geomechanics Society (AGS).

Selected Major Project Experience:

Toowoomba Second Range Crossing (TSRC) – Trial earthworks embankment

Client: NEXUS

Designer of trial embankment project to facilitate a project- and site-specific earthworks specification for the bulk earthworks component of the TSRC project. Due to the significant size of the fill embankments to be incorporated into the project (up to 50m vertical height) the existing Client specification was identified to be potentially inadequate. David developed and detailed the requirements for an instrumented trial embankment project through which alternative methods of compaction QA/QC will be assessed, such the bulk earthworks production rate may be increased without additional risk / loss of quality to the Client.

Confidential Site – Expert Review Services

Client: Crawford Global Technical Services

David reviewed all existing geotechnical data and detailed design documents relating to the foundation of a major international development (multiple 47 storey buildings). During the construction phase of the project significant settlement magnitudes were observed, which exceeded the original designer’s expectations by over 500%. David re-assessed the foundation design and expected settlements via a number of modelling methods, and made recommendations to the Client regarding the cause of the difference between the expected and observed settlement magnitudes.

Kingsford Smith Drive (KSD) Upgrade Project

Client: Brisbane City Council

Member of geotechnical team within Tender Design consortium for major D&C project. Role included assessment of site and sub-surface conditions along riverbank, and design of suitable retaining structures to allow construction of 100 year design life (maintenance free) structures. Role included design and validation of significant regions of ground improvement, retaining structures that would survive significant flood events and pile design of viaduct structure.

Gateway Upgrade South / South East Busway Extension (GUSBUS)

Client: Queensland Transport and Main Roads (QTMR)

Lead Geotechnical Designer of a number of temporary and permanent retaining walls associated with the underpass structures, as well as driven pile bridge foundations. Slope stability and deformation of analyses of embankment, cuttings and structure approaches, including assessment of likely deformation of bridge approach embankments on soft ground and requirement of ground improvement. Factual and interpretive geotechnical reporting incorporating all existing and current geotechnical data for the entire project alignment. This included the derivation and provision of geotechnical design parameters for full project alignment, including. Detailed design and slope stability analysis for remediation of section of failed cutting due to the presence of historical filling and instability, including options analysis and ongoing liaison with TMR technical personnel. Ongoing construction support has provided throughout construction phase, including provision of geotechnical assessor’s role during retaining wall construction, slope stability assessment for temporary and permanent works, and implementation of innovative QA testing techniques

Gold Coast Rapid Transit (GCRT) Project (Early Works Package)

Client: Gold Coast Rapid Transit (GCRT) Project / Queensland Department of Main Roads (TMR)

Provided Scope of Works (SoW) for site investigation (completed by others) and then completed the interpretation of the subsurface profiles present at the site, including the derivation of material properties.

Member of the design team for the cut and cover tunnel and station structure associated with one of the largest public transport projects currently underway in Australia. Specifically involved in detailed design of the retaining wall structures associated with the project. During construction, David managed the onsite pile supervision team for full duration of pile installation (May 2010 to February 2011) acting in the geotechnical assessor's role. In excess of 500 piles were completed, and David was responsible for both the ongoing reporting in order to ensure certification of the piles was completed to the relevant standards, and to compare of the encountered versus modelled subsurface profiles to ensure design assumptions are adequate for the encountered materials. Also provided onsite inspections, stability analysis and design notes for temporary slopes created during the construction phase of the project.

Sydney CBD Metro & West Metro Tender Teams

Client: Sydney Metro Authority

Member of the Design Tender teams for the proposed Sydney Metro (light rail) project. He worked on analysing existing geotechnical data from numerous sources and compiling and geotechnical interpretative model and report that described the expected subsurface conditions present along the proposed alignment. Geotechnical Interpretation included modelling of subsurface along full length of proposed metro alignment and derivation / provision of suitable geotechnical design parameters for each identified geotechnical domain. Models and material parameters was utilised as the basis for proposed design and costing of construction of the project, and included geotechnical interpretation and analysis of complex subsurface conditions, including environments that varied between soft soils, weak sedimentary and hard rock. Work also included preliminary estimation of settlements magnitudes likely to be experienced by surrounding structures due to construction.

Baratta Street Landfill Investigation

Client: Gold Coast Rapid Transit (GCRT) Project

Geophysics data Interpretation and modelling. Compiled historical photographs showing the development of the site over 50 year history to determine landfill extents. Interpreted this data, along with onsite drilling and geophysical survey, to estimate volume and thickness of landfill cell. Data was subsequently utilised for estimation of potential settlement of site if developed as depot for Gold Coast Rapid Transit project. Assessment of requirement of pre-loading to accelerate site settlements prior to development.

Selected Publications (16 technical papers)

- Lacey, D., Look B. and Williams, D. (2011), "Evaluation of Subgrade Stiffness using the Dynamic Cone Penetrometer" in Shahin, M.A. & Nikraz, H. (eds.), *Int. Conf. on Advances in Geotech. Eng.*, Perth, Australia
- Lacey, D., Look, B. and Williams, D. (2013) "Evaluation of borehole layout and interpolation algorithms for site characterisation," in Withiam, J.L., Phoon, K.K. & Hussein M.H. (Eds) *Geotechnical Special Publication (GSP) - Foundation Engineering in the Face of Uncertainty*, American Society of Civil Engineers (ASCE), pp. 421 – 433
- Look. B. and Lacey. D. (2013). "Characteristic values in rock socket design" *Proc. of 17th Int. Conf. on Soil Mechanics and Geotechnical Engineering (18th ICSMGE)*, Paris, France, 2 -6 September 2013, pp. 2795 – 2798
- Lacey, D.W., Look, B.G. and Marks, D. (2016). "Use of the Light Falling Weight Deflectometer (LFWD) as a site investigation tool", *Proc. of 5th Int. Conf. on Site Characterisation (ISC'5)*, Gold Coast, Australia

Editor of Conference Proceedings

- Lacey, D.W. (2014) Editor. *Proceedings of the 10th Australia - New Zealand Young Geotechnical Professionals Conference (10YGPC)*, Noosa, QLD, Australia, 10th - 12th September 2014, 225 p.
- Neeson, F.C, Lacey, D.W. Buxton, D. and Storie, L. (2016). *Proceedings of the 11th Australia - New Zealand Young Geotechnical Professionals Conference (11YGPC)*, Queenstown, New Zealand, 25th - 28th October 2016, 327 p. ISBN 978-0-473-37653-6