Steve Parry
Independent Consulting Engineering Geologist

Date of Birth: 16 August 1960
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Academic and Professional Qualifications

Post Graduate Certificate in GIS, Penn State University, USA	2004
Fellow of the Institution of Materials, Minerals and Mining	2004
Chartered Engineer	2003
Chartered Geologist	1991
Member of the International Association of Engineering Geologists	1990
Member of the Institution of Materials, Minerals and Mining	1988
Fellow of the Geological Society of London	1981
Master of Science in Engineering Geology, Imperial College, London, UK	1986
Bachelor of Science (Hons), Geology & Geography, Derby University, UK	1981

Key Experience

Parry Engineering Geological Services Ltd, UK, Consulting Engineering Geologist	2013 – present
GeoRisk Solutions Ltd, Hong Kong, Owner & Consulting Engineering Geologist	2007 – 2013
Geotechnical Engineering Office, Hong Kong Government	1990 – 2006
Sir Owen Williams and Partners, UK, Consulting Engineers	1990 – 1990
Allott and Lomax, UK, Consulting Engineers	1987 – 1990
M. J. Carter Associates, UK, Landfill & Bulk Mineral Extraction Consultants	1986 – 1987
Imperial College, Royal School of Mines, London, UK	1985 – 1986
Geological Survey of South Africa	1981 – 1985

Professional Groups & Activities

Geological Society of London, Chartered Geologist, Professional Assessor	2003 – Present
IMMM (Hong Kong Branch), Chartered Engineer, Professional Assessor	2003 – 2012
Chair (2010-2020) and member, IAEG C25, Engineering Geological Models	2010 – Present
European Federation of Geologists, Natural Hazard Working Group	2010 – Present
Engineering Group Committee, Geological Society of London	2014 - 2016

Summary

Steve is both a Chartered Engineer and Chartered Geologist with over 40 years' experience. He is a co-author of the CIRIA Report "Natural slopes – condition, appraisal and remedial treatment" (RP1096), co-author of "Guidelines for the Development and Application of Engineering Geological Models" produced by the IAEG, co-author of the Hong Kong Governments 2003 guidelines for natural terrain landslide assessments and lead the review of that document resulting in the current Hong Kong Guidelines (2016). He was a technical reviewer of the Hong Kong Government commissioned publication "Engineering Geological Practice in Hong Kong" and a contributing author to the book, Geomorphological Mapping; Methods and Applications.

Steve has considerable experience in the application of engineering geology to a wide variety of civil engineer projects including caverns, foundations, hydro power projects and quarrying. This has involved projects in Brunei, Malaysia, Solomon Islands, Papua New Guinea, Fiji, Laos, China, Hong Kong, New Zealand, South Africa, Dubai, Qatar and the UK. Steve has also acted as Expert Witness.

Steve is on the committee of the European Federation of Geologists' "Group of Experts on Natural Hazards", the IAEG commission on engineering geological models and is a guest lecturer on the MSc in Engineering Geology at Leeds University focusing on engineering geomorphological mapping and landslide hazard and risk assessments.

Expert Witness and Independent Review

2020- Present. Expert witness on geology and geotechnics. Passenger Train derailment, UK. Ongoing claim. Client Confidential.

2022. Expert witness for an infrastructure construction claim, Southern Africa. Client Confidential.

2022. Expert advice for housing foundation issues, Brunei. Client Confidential.

2015-2017 Expert witness for a successful £2 million claim arising from landslide impact on infrastructure. Client Confidential.

Provision of engineering geological advice on settlement affecting warehouses. UK. Client Envireau Water.

Provision of engineering geological advice for a tunnelling claim, UK. Geo-Design.

Peer Review, Landslide Assessment Report, South Wales. ESP.

Peer Review of Peat Landslide Hazard and Risk Assessment for a Scottish Windfarm, Client Envireau Water.

Review of potential improvements to the UK's landslide hazard and risk assessment methodology. Client British Geological Survey.

Independent assessment of a major rock slope support design in Hong Kong. Client: Leighton Contractors (Asia) Ltd.

Technical review of the Hong Kong Government's "Guidelines for Natural Terrain Hazard Studies" which forms the basis of landslide risk assessments in Hong Kong. Client Hong Kong Government.

Technical reviewer of the Hong Kong Government commissioned publication "Engineering Geological Practice in Hong Kong.

Landslide Hazard and Risk
Co-author of the UK CIRIA guidelines on Landslide Hazard and Risk Assessments. Atkins/CIRIA UK.

Landslide Hazard and Risk Assessment, Ty Gywn Landslide Complex, South Wales. ESP.

Landslide Hazard and Risk Assessment, Godergraig, South Wales. ESP.

Specialist Advisor, Two-year (2018-2020) Landslide Investigation Consultancy. Hong Kong Government Agreement CE28/2018 (the Hong Kong Island and Outlying Islands). Fugro Hong Kong.

Qualitative hazard assessment of gypsum subsidence, Client Envireau Water UK

Landslide Hazard and Risk Assessment, Panteg, South Wales. ESP/Neath & Port Talbot Council.

Evaluation of landslide hazard and risk. Various Sites throughout South Island, New Zealand. Opus International/NCTIR, Christchurch New Zealand.

Initial evaluation of earthquake induced landslides in Nepal from satellite imagery. Client BGS.

Evaluation of geohazards to the west coast railway main line UK, Client British Geological Survey.

Specialist Advisor (Engineering Geology) Geotechnical Engineering Office, Hong Kong Government. CE45/2015 LIC (Hong Kong Island and Outlying Islands). Two-year (2015-17) Landslide Investigation Consultancy. Client Fugro Hong Kong.

Landslide Hazard Assessment, Papua New Guinea: Evaluation of landslide hazards to a hydro-electric power scheme in the Central Highlands. Client: Tasmanian Hydro.

Co-author of the report "Guidelines for Natural Terrain Hazard Studies" which forms the basis of landslide risk assessment in Hong Kong. Client Hong Kong Government.

Author of the Hong Kong Government's Technical Guidance Document TGN22 "Guidelines on Geomorphological Mapping for Natural Terrain Hazard Studies". Client Hong Kong Government.

Over thirty site-specific landslide hazard assessments in Hong Kong, including desk studies, remote sensing interpretation, detailed engineering geological and engineering geomorphological mapping, ground investigation design and the development of landslide susceptibility and landslide hazard models and the development of site specific mitigation measures. Clients included Arup, Atkins, Fugro, Halcrow and Mott Macdonald.

Lead Engineering Geologist for the West Lantau Landslide Hazard Study, Hong Kong. During a severe rainstorm on 7 June 2008, over 2,400 landslides were recorded on Lantau Island, the largest island in Hong Kong. Numerous road links were severed and many landslides affected villages. The Study involved undertaking a review of 18.5 km² to assess landslide hazard from all natural hillsides potentially affecting existing villages and selected transportation routes. This review included developing a methodology for prioritisation and selection of the thirty natural hillside catchments for detailed assessment. Client Arup-Fugro JV.

Client manager for the US$1.3M Natural Terrain Hazard Study for the Tsing Shan Foothill Area, Hong Kong. The study covered an area of 6.5km2 and contained a swarm of over 100 landslides related to a single rainstorm event. The project included detailed API, field mapping of solid and superficial deposits, detailed mapping of 118 landslides, GIS analysis to evaluate landslide susceptibility, examination of landslide magnitude and frequency, assessment of debris mobility and the production of susceptibility, facility, hazard and risk maps. Client Hong Kong Government.

Client Manager for the US$0.5M Natural Terrain Hazard Studies at North Lantau Expressway and Luk Keng Village, Hong Kong. Client Hong Kong Government.

Nominated Hong Kong Government Engineering Geologist for forensic landslide studies. Involved in the technical review of most major landslide incidents in Hong Kong from 1999 to 2007.

Project manager of a US$0.3M, two-year research and development project "Mineralogy and shear strength of clay-rich saprolites" in Hong Kong. Clay-rich saprolite controlled two major landslides in the 1990s. The purpose of the study was to determine the origin of this material and to provide geotechnical parameters for design purposes.

Member of the Hong Kong Governments landslide response emergency team, providing geotechnical advice at landslide incidents. Responsible for liaising with the emergency services at a variety of incidents including determining the need for road closures, advising on temporary remedial works and ordering the evacuation and/or closure of buildings where applicable.

Detailed review of the engineering geological input into the Hong Kong Government's Landslip Preventive Measures (LPM) programme.

Co-author of the report on the investigation and instrumentation of a large, slow moving, natural landslide in Tuen Mun, the first documented landslide of this type in Hong Kong.

Client manager for the US$1.3M Agreement No. CE 47/2000. Natural Terrain Hazard Study for the Tsing Shan Foothill Area, Hong Kong. The study covered an area of 6.5km^2 and contained a swarm of over 100 landslides related to a single rainstorm event.

Client Manager for the US$0.5M Agreement No. CE 89/2002(GE). Natural Terrain Hazard Studies at North Lantau Expressway and Luk Keng Village, Hong Kong.

Technical reviewer of numerous landslide hazard studies undertaken for, or submitted to, Hong Kong Government under the Building Ordinance.

Rock Engineering
Provision of an engineering geological model for the assessment of a claim involving a TBM in glacial material. Client GeoDesign UK.

Contract 901 Admiralty Station Extension Hong Kong: Assisting the Independent Checking Engineer on the rock engineering aspects. Client: AIM Group & Kier-Laing O'Rourke-Kaden JV.

Guangzhou-Shenzhen-Hong Kong XRL, Contract 824: detailed engineering geological reinterpretation and rock mass discontinuity surveys. Client: Donaldson Associates Ltd., Kier-Kaden-OSSA JV.

Rock slope assessment, above Intake Shaft C for Lai Chi Kok Drainage Transfer Tunnel: Technical Reviewer for detailed engineering geological mapping of a potentially unstable rock slope identified during construction of slopeworks above the drainage intake shaft. Recommendations made concerning potential rock block failure and overall slope failure modes and slope stabilisation measures. Client: Leighton Contractors (Asia) Ltd.

Rock quarry assessments in Laos to provide specialist engineering geological review of large slope failures affecting quarry slopes in Laos for loss adjustors.

Rock quarry assessments in Hui Dong County Quarry, Shenzhen, China to provide engineering geological review and highlight engineering geological uncertainties of a proposed quarry and aggregate processing area in Shenzhen, China.

Responsible for the feasibility investigation of a 32km long 3.6m diameter water transfer tunnel in Natal, South Africa. This included extensive geological mapping, seismic interpretation and some 2.6km of drillholes. Extensive groundwater inflows associated with dolerite sills were predicted and subsequently proved by drilling.

Undertaking a review of the hazards associated with disused wartime tunnels throughout Hong Kong. Responsible for the technical reviews of numerous tunnel geotechnical assessment reports in Hong Kong.

Dams Investigations
Engineering geological assessment of the Sovi River Dam Site and associated tunnel, Fiji. Client: Tasmanian Hydro.

Engineering geological investigation of three alterative dam sites and associated tunnels, Fiji. Client: Tasmanian Hydro.

Tina River Hydro Power Project, Solomon Islands: Evaluation of three alternative ~90m high dam site locations and associated spillways, penstocks, power station and access road. Evaluations of the geomechanical properties of the rock mass and its reuse for rockfill. Client: Tasmanian Hydro.

4 years with the Department of Water Affairs, Geological Survey of South Africa. Major projects included: the feasibility investigation for a 20m high water control weir at Levubu, Northern Transvaal; the feasibility investigation for a 45m high concrete dam at Mooi River, Natal; member of the on-site design team, involving construction trials, for a 140m high rockfill dam at Mvumase, Natal; resident engineering geologist for a feasibility investigation for a 85m high dam at Mpendle, Natal. This included investigating two potential centrelines, an alternative side spillway location and potential rock quarries.

Ground Investigations
Provision of a bespoke core logging course. Wardell Armstrong.

Numerous ground investigation design and supervision including:

Ground Investigation design, supervision and interpretation for Qatar New Port development for Scott Wilson Ltd. Involved onshore and offshore drillholes and offshore seismic surveys, development of an engineering geological model for the site and evaluation of material properties for re-use of engineering fill.

Ground Investigation supervision and interpretation for a port redevelopment in Dubai for Van Oord.

Engineer's Representative for various land and marine ground investigation, laboratory testing and geophysical survey term contracts for Hong Kong Government works departments with contract values of up to US$10M, including preparation of tender documents; prequalification exercises; tender appraisals; contract management; cost estimation; technical advice to client departments; settlement of claims and certification of bills.

Responsible for the term consultancy for ground investigations for the Sheffield Development Corporation. This included the environmental assessments of former industrial sites, often contaminated and underlain by shallow mine workings, and the provision of recommendations and cost estimations for site reclamations.

Ground investigation for West Burton B coal fired power station pre-application study including formulating a site-specific rock mass weathering scheme for Mercia Mudstone to assist with foundation design.

Material Assessments
Provision of technical advice, Agreement No. CE 56/2018 (GE) Technical Study on Volcanic Rock Resources for Construction Use in Hong Kong. Client Aecom (Hong Kong).

Assessment of Hong Kong offshore sand bodies, including geological modelling, drilling and geophysical surveys, dredging assessments and resource evaluations. Interpretation of seismic reflection surveys to form engineering geological models used as the basis for ground investigation and laboratory testing. This data

was synthesised to form dredging assessments and reserve evaluations. Responsible for the investigation, assessment and management of offshore sand resources, to explore for offshore sand deposits in Chinese oceanic waters with a contract value of HK$15M. This work proved reserves of 277Mm^3 of sand, sufficient for Hong Kong's reclamation requirements into the near future.

Independent review and analysis of geological and geotechnical data for a proposed open cast lignite mine in Northern Ireland. Also responsible for an alternative mine plant scheme involving a Discounted Cash Flow analysis over the proposed life of the mine.

Exploration for 145,000m^3 of concrete aggregate at Mooi River, Natal South Africa.

Hydrogeological Investigations
Responsible for the independent technical review for Northern Ireland Electric of the mine dewatering programme and proposed depressurisation system of the lignite and clay interburden for a deep open cast lignite mine in Northern Ireland. The data involved over 50 drillholes up to depths of 250m, extensive piezometric data and the analysis of three pumping tests.

Design and supervision of the hydrogeological investigation to determine the source, extent and mitigation for an oil leakage at Peel Power Station, Isle of Man, UK.

Various hydrogeological investigations for sand and gravel extraction and landfill construction in the UK including:
Design of a leachate retaining bund for a landfill in a former opencast coal mine, South Wales, UK.
Use of a geotextile membrane for the containment of leachate at a landfill site in Lincolnshire, UK.
Design of restoring to agriculture, at a level below the local groundwater table, a proposed sand and gravel quarry in Warwickshire, UK.
Detailed geotechnical and hydrogeological site investigation for a proposed landfill site in Greater Manchester, UK.

Training
Part time lecturer on the Engineering Geology MSc at Leeds University including geomorphological mapping, laboratory testing and soil and rock logging. Lecturing at undergraduate and post-graduate level in Hong Kong and numerous technical presentations, on a wide range of subjects to professional bodies. GEO training tutor for engineering and geology graduates. Mentor for the Geological Society of London and Derby University.

Publications
Baynes, F. J. and Parry, S. (2022). Guidelines for the development and application of engineering geological models on projects. International Association for Engineering Geology and the Environment (IAEG) Commission 25 Publication No. 1, 129 pp

Baynes, F., Parry, S., & Novotny, J. (2021). Engineering geological models, projects and geotechnical risk. Quarterly Journal of Engineering Geology and Hydrogeology, 54 (2).

Parry, S., Baynes, F & Novotny, J. (2018). Conceptual Engineering Geological Models. Proceedings of the International Association of Engineering Geology Conference. San Francisco, 2018.

Parry, S. (2016) Engineering Geological Models and Underground Construction. 13th International Conference Underground Construction Prague 2016. Invited Speaker.

Parry, S. (2016) Landslide hazard assessments: problems and limitations. Examples from Hong Kong. In Developments in Engineering Geology (2016) Editors: M. Eggers, J. S. Griffiths, S. Parry and M. G. Culshaw Engineering Geology Special Publication no. 27, Geological Society of London.

Sewell, R. J., Parry S, Millis S. W., Wang N., U. Rieser U. &. DeWitt R. (2015) Dating of debris flow fan complexes from Lantau Island, Hong Kong, China: The potential relationship between landslide activity and climate change. Geomorphology 248 205 –227.

Jack, C. D. & Parry, S. (2014) Communicating geological uncertainty – the use of the conceptual engineering geological model. Proceedings of the International Association of Engineering Geology Conference. Turin, 2014.

Miner, A.S., Paul, D.R., Parry, S., Flentje, P. (2014) What does Hazard mean? - Seeking to provide further clarification to commonly used landslide terminology. Proceedings of the International Association of Engineering Geology Conference. Turin, 2014.

Parry, S., Baynes, F. J., Baynes, Culshaw, M. G., Eggers, M., Keaton, J. F., Lentfer, K., Novotny, J., & Paul, D. (2014). Engineering Geological Models - an introduction: IAEG Commission 25. Bulletin of the International Association of Engineering Geology and the Environment. Volume 73, Issue 3, pp 689-706.

Parry, S. & Hart, J. R. (2012). Engineering geomorphological mapping for landslide hazard assessments in Hong Kong. Proceedings of the 11th International Symposium on Landslides (ISL) and the 2nd North American Symposium on Landslides.

Jack, C. D., Parry, S. & Hart, J. R. (2012). Structural geological input for a cavern project in Hong Kong. The Hong Kong Institution of Engineers Geotechnical Division 32nd Annual Seminar, 2012.

Parry, S. (2011). The Application of Geomorphological Mapping in the Assessment of Landslide Hazards in Hong Kong. Chapter 15 in Developments in Earth Surface Processes, Volume 15, Geomorphological Mapping; Methods and Applications, Edited by M. J. Smith, P. Paron & J. S. Griffiths. Elsiver.

Parry, S., Hart, J. R. & Jack, C. D. (2011). Science, Engineering Geology and the Landslip Preventative Measures Programme. The HKIE Geotechnical Division 31st Annual Seminar, 2011.

Jack, C. D., Parry, S. & Hart, J. R. (2011). Engineering Geology and Rock Engineering. Proceedings of the Joint Hong Kong Institution of Engineers – Hong Kong Institution of Planners Conference on Planning and Development of Underground Space.

Parry, S. (2010). Engineering Geological Models – definitions and use with reference to landslide hazard assessments in Hong Kong. Proceedings of the International Association of Engineering Geology Conference. Auckland, 2010.

Parry S., Millis S. W., Clahan K. B. & Krug K (2010). The importance of reading the landscape: The use of engineering geomorphology in regional landslide hazard assessments. Proceedings of the International Association of Engineering Geology Conference. Auckland, 2010.

Millis, S. W. Clahan, K. B. and Parry S. (2010). Regional Scale Natural Terrain Landside Risk assessments: An Example from West Lantau, Hong Kong. The 17th Southeast Asian Geotechnical Conference.

Parry, S. & Ng, K. C. (2010) The Assessment of Landslide Risk from Natural Slopes in Hong Kong: An Engineering Geological Perspective. Quarterly Journal of Engineering Geology and Hydrogeology. Vol 43 pp307-320.

Parry, S. & Hart, J. R. (2009) Engineering geology & the reduction of geotechnical risk: challenges facing the profession. Quarterly Journal of Engineering Geology and Hydrogeology. Vol 42 pp499-510.

Parry, S., Hart, J.R. & Moore, A.J. (2009). Reducing Uncertainty in Natural Terrain Hazard Studies: the Role of the Engineering Geologist. Proceedings of the 29th Annual Seminar, Geotechnical Division, Hong Kong Institution of Engineers. pp 61-*70.*

Parry, S. & Jonas, D. (2007) The use of LIDAR for Landslide Hazard Studies. p155-161 Proceedings of the conference *Engineering Geology in Geotechnical Risk Management*. Hong Kong.

Parry, S. & Campbell, S. D. G. (2007). A large scale, slow moving, natural terrain landslide, Tuen Mun, Hong Kong. *Bulletin of Engineering Geology and the Environment*. Volume 66 No. 2.p135-141. May 2007.

Ng, K. C., Tattersall, J. W. & Parry, S. (2007) Engineering Geological Practice in Hong Kong. Geotechnical Advancements in Hong Kong since 1970s. *Proceedings of the Hong Kong Institution of Engineers Annual Seminar*.

Parry, S, Ruse, M. E,. & Ng, K. C. (2006). Assessment of Natural Terrain Landslide Risk in Hong Kong: An Engineering Geological Perspective. Accepted Paper No. 299, *Proceedings of the International Association of Engineering Geology Conference*. Nottingham, 2006.

Parry, S., Ruse, M. J., Williamson, S. J. (2005) Discussion of Chau and Lo (2004): Hazard Assessment of Debris Flows for Leung King Estate, Hong Kong by Incorporating GIS with Numerical Simulations, Vol. 4, p103-116. *Natural Hazards and Earth Systems Science* Vol. 5, p1-2.

Parry, S, Campbell, S. D.C. & Churchman, G. J. (2004) The origin and shear strength of kaolin-rich zones in Hong Kong and their implications for slope stability. Advances in Geotechnical Engineering. *The Skempton Conference*. Volume 2 p1343 – 1353. Institute of Civil Engineers 2004.

Parry, S. (2004). Technical Guidance Document TGN22 "Guidelines on Geomorphological Mapping for Natural Terrain Hazard Studies".
http://www.cedd.gov.hk/eng/publications/guidance_notes/doc/tgn22.pdf

Ng, K. C., Parry, S. King, J. P., Franks, C. A M. & Shaw R. (2003) GEO Report No. 138 "Guidelines for Natural Terrain Hazard Studies" which forms the basis of landslide risk assessments in Hong Kong.
http://www.cedd.gov.hk/eng/publications/geo_reports/geo_rpt138.htm

Parry, S., Massey, C. I & Williamson, S. J. (2002). Landslide Susceptibility Analysis for Natural Terrain Hazard Studies - Tsing Shan Foothills Area. Proceedings of the Institution of Mining and Metallurgy, Hong Kong Branch Conference. *Natural Terrain – a constraint to development*? November 2002, p113-125.

Parry, S, (2001). Natural and anthroprogenic effects of offshore suspended sediment loads in Hong Kong: Implications for dredging . *Proceedings of the 14th South-East Asian Geotechnical Conference,* December 2001, Hong Kong. p395-399

Parry, S, Campbell, S. D. G. & Churchman G. J. (2000). Kaolin-rich Zones in Hong Kong saprolites – Their Interpretation and Engineering Significance. In *GeoEng 2000. An International Conference on Geotechnical and Geological Engineering 19-24 November 2000, Melbourne, Australia.* Technomic Publishing Company Limited, Lancaster, USA. Volume 2; Extended Abstracts p55 (complete paper on CD ROM).

Parry, S., Campbell, S. D. G. & Fletcher, C. J. N. (2000). Typical Kaolin Occurrences in Hong Kong – A Model for their Origin and Implications for Landslide Development. *Landslides in research, theory and practice* Edited by E. Bromhead, N. Dixson and M-L. Ibsen. *Proceedings of the 8th International Symposium on Landslides, Cardiff.* Volume 3: 1177 – 1181.