RESEARCH ROADMAP ON GEOTECHNICAL WITH MORE EMPHASIS ON PEAT AND ORGANIC SOILS IN MALAYSIAN CONSTRUCTION INDUSTRY 2018-2023

PROPOSAL

Date: 24/7/2018

Prepared for

CONSTRUCTION RESEARCH INSTITUTE

OF MALAYSIA (CREAM)

Prepared by

GEOMAPPING TECHNOLOGY SDN. BHD.

(Company No.: 593061-U)

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1.0 PROJECT TITLE

Research Roadmap on Geotechnical with more Emphasis on Peat and Organic Soils in Malaysian Construction Industry 2018-2023

2.0 INTRODUCTION

This paper is jointly prepared by Geomapping Technology Sdn. Bhd. and associated Consultants to present the technical proposal, quoted fees and costs of consultancy services to carry out research works related to "Research Roadmap on Geotechnical with More Emphasis in Peat and Organic Soils in Malaysian Construction Industry 2018-2023".

The project is offered by CREAM (Construction Research Institute of Malaysia), a subsidiary of CIDB Malaysia.

Geotechnical engineering is one of the areas in civil engineering that includes soil mechanics (soil properties) and geology (rocks). This geotechnical issue is closely related to construction projects especially in risky areas such as road projects, dam construction, earth retention structures, deep-earth excavations, soil structure repairs, slope stability and basic building construction.

Hence, a research action plan will be developed by CREAM together with the construction industry to provide a scope of research and long-term action to address these geotechnical issues within the country. This action plan is important to ensure that all industries involved in geotechnical engineering in Malaysia can make it a comprehensive research strategy.

2.1 OBJECTIVES

i. To identify critical issues and challenges of construction engineering in problematic peat and organic soil in Malaysia environment.
ii. To establish research implementation roadmap for geotechnical engineering and problematic peat and organic soils in construction.

3.0 BACKGROUND OF PROJECT

Peat can be defined as a material with an organic content greater than 75%, whereas values of 65% has been used in the latter (JMG,2010). In Malaysia, about 2,457,730 ha of the total country land area 32,975,800 ha is covered by peat. The distribution of peat areas in Malaysia is summarised in **Table 1**.

Table 1: The distribution areas (ha) of peat soil in Peninsula Malaysia, Sabah, Sarawak (Wetlands International,2010)

Region	Total Area of Peat (ha)	Percentage (%)
Peninsular Malaysia	642,918	26.16
Sabah	116,965	4.76
Sarawak	1,697,847	69.08
Total	**2,457,730**	

The state of Sarawak has the largest area of peat soils that amounted to 1,697,847 ha, followed by Peninsular Malaysia amounted 642,918 ha then Sabah (116,965 ha) which are 69.08%, 26.16% and 4.76% of total area in Malaysia respectively.

Most of the tropical peat in Malaysia is predominantly peat swamp forest, whereas natural vegetation of sedges, grasses and shrubs can only be found on the inundated areas. The extent of peat swamp forest by state in Peninsular Malaysia is summarised in **Table 2.**

Table 2. Extent of peat swamp forest in Peninsular Malaysia (Wetlands International, 2010)

State	Total Area of Peat (ha)
Johor	143,974
Pahang	164,113
Selangor	164,708
Perak	69,597
Terengganu	84,693
Kelantan	9,146
Negeri Sembilan	6,245
Federal Territory	381
Total	**642,857**

Geotechnical engineering is a sub-specilization of civil engineering which is a specialist fields related to soil and rock mechanics, geophysics, hydrogeology and associated disciplines such as geology. Geotechnical engineering and engineering geology are a branch of civil engineering. From a scientific perspective, geotechnical engineering in peat and organis soils involve defining the peat and organic soils' strength, deformation properties and settlement behaviour in man-made structures. The specialism involves using scientific methods and principles of engineering to collect and interpret the physical properties of the peat and organic soil for use in building and construction. Its

practical application, e.g. foundation engineering, it require a scientific approach of problem identification, analysis and design to come up with the best construction technology and engineering practices for any infrastructure development in peat and organic soil area for safe design and optimum construction cost. Among few major geotechnical enginnering contribution in infrastructure development such as;

i. Landfills
ii. Land reclaimation
iii. Deep Foundations
iv. Highway and rail foundation
v. Deep Excavations
vi. Underground Infrastructure
vii. Offshore

However, geotechnics in peat and organis soil has its own challenges in construction since these earth materials are known as problematic soil with unique inherent characteristics. To date there are still pertaining issues and challenges encountered by construction industries, developers, property owners globally. To certain extend, the geotechnical engineering problem related to peat and organic soils were encountered years during post-construction and/or serviceability stage of the infrastructure.

Therefore, the research and development in geotechnical engineering of peat and organics soils is for the purpose of improvement and enhancement of the material and techniques for construction engineering in these ground. The name the few related focusare:

- equipment and methods for testing of peat and organics soil in a laboratory study,
- methods for calculating and analysing the behaviour and bearing capacity of peat and organics soul when planning structures (buildings, bridges, dams etc.), offshore installations, tunnels and subterranean spaces, roads, railways etc.,
- methods for measuring, instrumenting and subsequently documenting whether buildings and other structures build in peat and organic soils behave the way they were designed to.

4.0 METHODOLOGY

The propose project methodology can be divided into four (4) as follows;

i. Review on the issues and challeges of construction on peat and organic soils.
ii. Review on geotechnical engineering case studies related to problematic peat and organic soils in Malaysia construction industry.
iii. Identify research priority area related to construction on peat and organic soils.
iv. Development of the 5 years research roadmap on geotechnical engineering on peat and organic soils for Malaysian construction industry.

5.0 PROJECT DEVELIRABLES:

Deliverable 1 - Comprehensive review report on recent challenges of construction on peat and organic soils.

Deliverable 2 - Report on lesson learned on the case studies for mapping priority area of reasearch.

Deliverable 3 - Report of propose research priority area on peat and organics soil for construction industry.

Deliverable 4 - Research roadmap on geotechnical engineering on peat and organic soils for Malaysian construction industry 2018-2023.

6.0 WORK PROGRAM

WORK PROGRAM																								
Activity	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Objective 1																								
Literature Review/Identify issues																								
Objective 2																								
Survey/research requirement																								
Objective 3																								
Reporting/Final Draft																								

The project is estimated to finish within six months starting from 1st of August 2018 to 31st of January 2019.

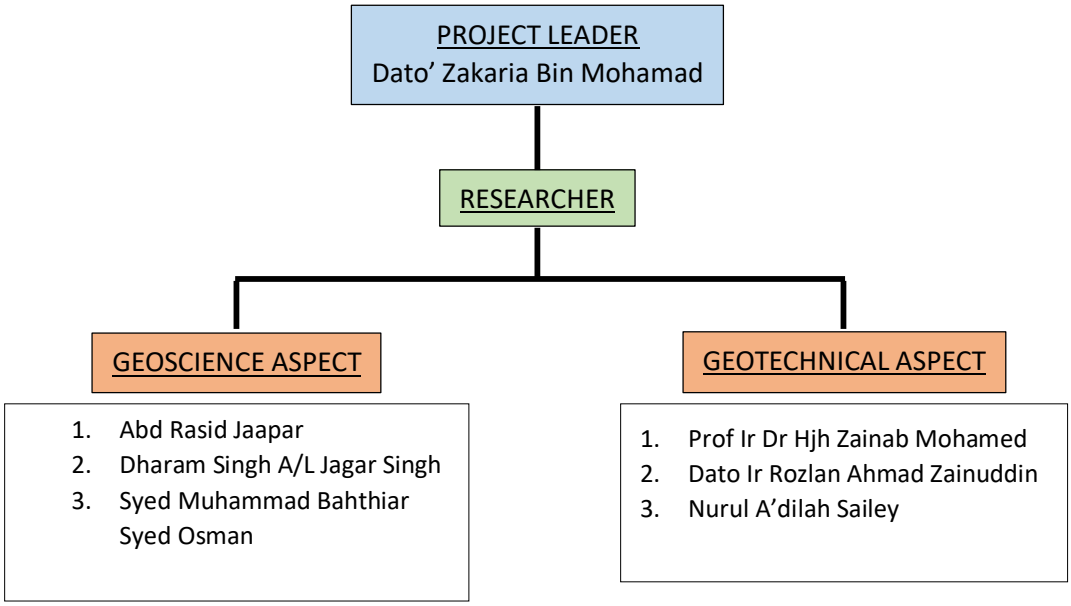
7.0 CONSULTANCY COST AND PAYMENT SCHEDULE

The terms of payment to be disbursed in accordance with the following schedule:

Content	Payment Percentage (%)	RM
Deliverable 1	20	10,000.00
Deliverable 2	20	10,000.00
Deliverable 3	20	10,000.00
Final Report	40	20,000.00

8.0 RESEARCH TEAM

All the works shall be carried out by a dedicated Project Team who will be based at our office. Based on current understanding of the scope of works, the project team shall include but not limited to the following personnel.



9.0 CLOSURE

This proposal is confidential with copyright vested in GEOMAPPING TECHNOLOGY SON BHD (GMT). Document distribution is permitted to project participants approved by the addressee. A hand-signed paper copy of this document has precedence over a digital image.

Our offer is open for your acceptance for a period of 60 days from date of issue and is subject to a mutually agreed programme for the works and availability of (personnel) resources at the time of contract award.

Progress and close-up meeting

Representatives of the Client and GMT will participate in scheduled progress meeting to follow up work progress and close-up meeting after the report has been issued to complement the written report and to support understanding of the study results.

We trust that our proposal is of interest to you. Please do not hesitate to contact us if you have any questions or require adjustment.

10.0REFERENCES

Jabatan Mineral dan Geosains Malaysia (2010). *Garis Panduan Pemetaan Geologi Kejuruteraan Kawasan Gambut dan Tanah Lembut.* JMG.GP.07.

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Wetlands International. (2010). *A quick scan of peatlands in Malaysia*. Wetlands International Malaysia: Petaling Jaya, Malaysia. 74 pp.