

# ENGINEERING APPLICATION OF NEW RECLAMATION TECHNOLOGY AT SEMAKAU LANDFILL

## Project Scope

### Objective and Synopsis

To demonstrate the effectiveness and practicability of the proposed novel Chemical-Physical Combined Method (CPCM) of using Incineration Bottom Ash (IBA) and Marine Clay (MC) as filled material for land reclamation. The IBA-MC Matrix is chemically stabilized to control and minimize heavy metals leaching. The CPCM would significantly improve the geophysical and engineering performances of the reclaimed land. This project will be test-bedded at the offshore Semakau Landfill.

### Value Propositions

- To demonstrate the safe use of the stabilized IBA-MC matrix through the integrated CPCM engineering approach is feasible compared to the conventional land reclamation method of using sand;
- To showcase the innovative use of IBA and MC to be "Singapore NewSoil" as a cost-effective and sustainable solution for the creation of new land space; and
- To enhance Singapore's position as a hub for environmentally sustainable solutions and enhance our reputation for sustainable development.

### Description

|          |                                                                                                                                      |
|----------|--------------------------------------------------------------------------------------------------------------------------------------|
| Module 1 | Developing separation dykes using chemically-stabilized MC filled geo-textile tubes                                                  |
| Module 2 | Reclaiming land using IBA-MC matrix as filled materials                                                                              |
| Module 3 | Employing CPCM to chemically stabilize and physically consolidate the IBA-MC matrix in the reclaimed land                            |
| Module 4 | Creating the liner and capping layers using chemically stabilized MC                                                                 |
| Module 5 | Studying the long-term engineering performances and monitoring the environmental impacts of the reclaimed land and surrounding areas |

## Principal Investigator (PI) & Public Agency Collaborator:

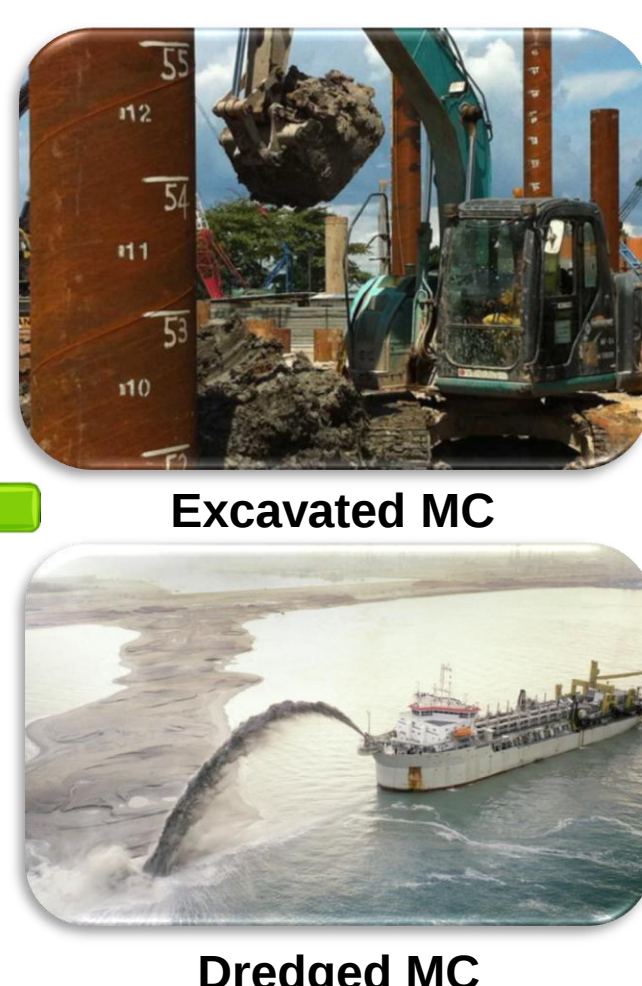
### Dr Wu Dong Qing

Principal Investigator  
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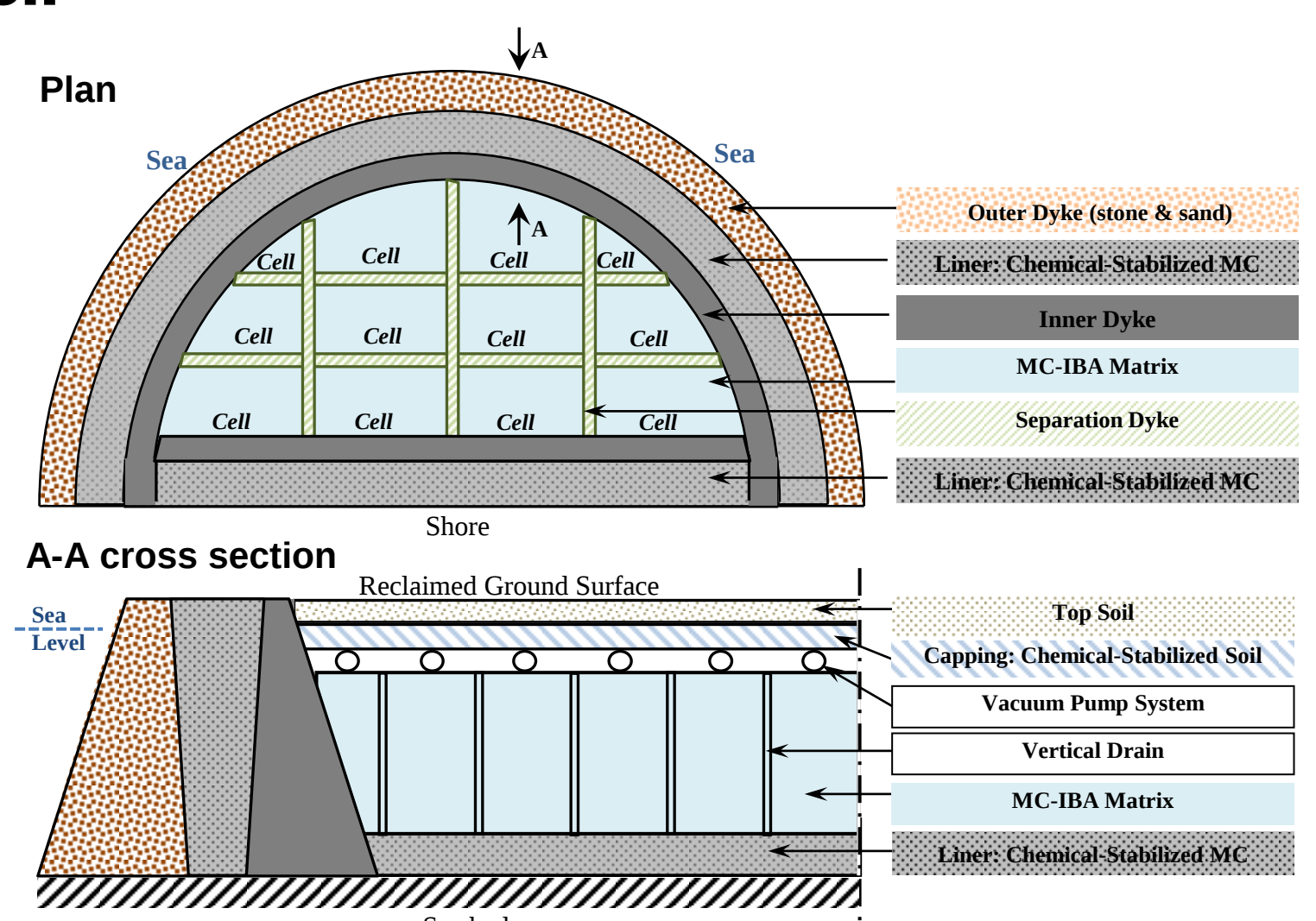
### Mr Lim Siak Heng

Public Agency Collaborator  
Principal Engineer  
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### Brief Background



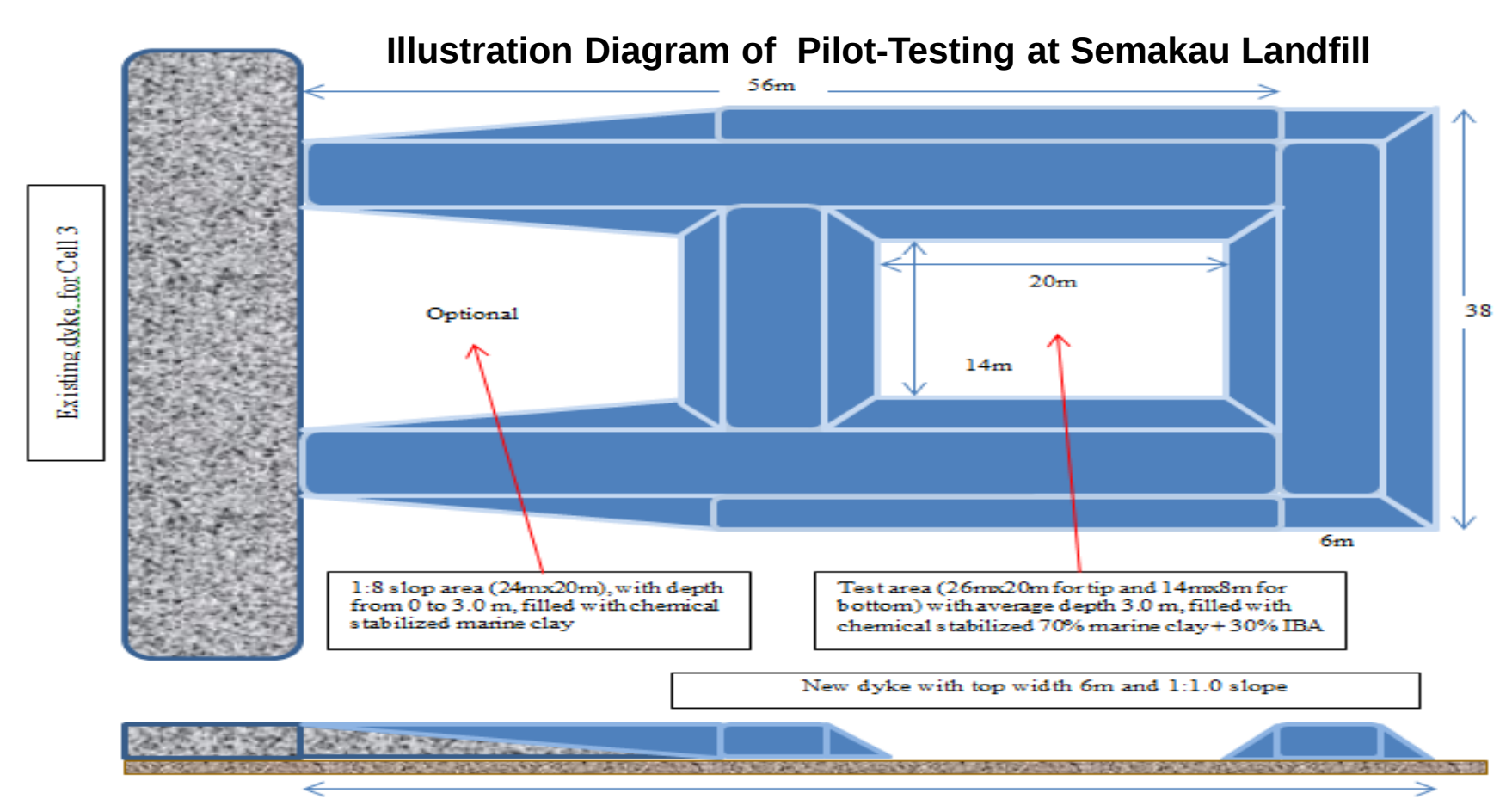
### Chemilink Land Reclamation



## Deliverables

An innovative Chemical-Physical Combined Method (CPCM) as a rapid and cost-effective engineering solution for land reclamation using IBA and MC as filled materials. The outcomes are to:

- Demonstrate the technique and feasibility of the CPCM for land reclamation;
- Gather technical, engineering and environmental data showing that the use of IBA is safe; and
- Serve as a reference project of using IBA and MC to be a cost-effective and sustainable solution for the creation of new land space for Singapore.



## Contributions to Singapore's Sustainable Urban Living

- To transform IBA and MC into "Singapore NewSoil" to enhance our resource conservation and reduce our dependence on imported sand for land reclamation.
- To demonstrate a novel engineering approach to utilize waste materials such as IBA and MC into useful and safe materials for land reclamation in Singapore and other countries.

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