



## THE INSTITUTION OF ENGINEERS, MALAYSIA

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### Technical Visit to Langat 2 Sungai Besi Tunnel Site

Organised by: Tunnelling & Underground Space Technical Division, IEM  
BEM Approved CPD/PDP Hours: 3 Ref No: IEM19/HQ/263/V

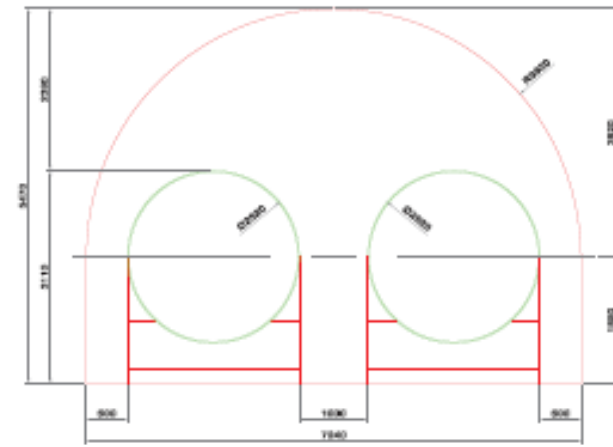
**Date** : 29<sup>th</sup> June 2019 (Saturday)  
**Time** : 8.00am – 1.30pm  
**Venue** : Near Sungai Besi Army Camp, Kuala Lumpur  
**Transport** : Coach will be provided. (Coach will depart at 8.30am sharp)

#### BACKGROUND

The Langat 2 Water Supply Scheme is being implemented by *Pengurusan Aset Air Berhad (PAAB)*, a Government-owned company under the Ministry of Finance Incorporated. The scheme is to overcome the current water shortages in the State of Selangor and *Wilayah Persekutuan*, Kuala Lumpur. Package 10, which is part of the scheme under Phase 1, encompasses the laying of a single length of 2500mm dia. mild steel concrete-lined (MSCL) pipeline from the proposed Bukit Enggang balancing reservoir to Sungai Besi Expressway covering a total length of 14 km. The route of the pipeline alignment would pass through a proposed Sungai Besi tunnel of approximately 527m long which is being constructed. The tunnel will cross a hill located in between Taman Desa Cheras and Sungai Besi Army Camp from east to west. It is to note that the surrounding areas of the proposed tunnel are under rapid development. Rock is exposed at the hilltop as a result of earlier uncontrolled earthworks.

#### TUNNEL SIZE & SECTION

In order to house a twin bulk distribution pipelines, a tunnel with horizontal invert would be most preferable, and hence a modified horseshoe with vertical legs or D-shaped tunnel of 3770mm radius was adopted. The tunnel was sized for housing the twin pipelines for both Phase 1 and Phase 2 of the Langat 2 Water Supply Scheme and space allowance was adequately provided for pipelaying works as well as for future maintenance of the completed twin pipelines. A typical diagrammatical cross-section of the tunnel (**Figure 1**) is as shown below.



**Figure 1 – Diagrammatical Cross-Section of Tunnel**

#### TUNNEL CONSTRUCTION

The excavation for the tunnel is being carried out by 'drill & blast' method. This is further classified into bench-cut method for soil section and full-face method for rock section.

The tunnel portal support consisting of forepole umbrella as pre-lining support techniques used in soil section for stabilising roof and carrying boundary formation on roof itself then follow by installation of the steel ribs and friction bolts. Q-system, which is an empirical method, is used for classification of the rock mass and thereby, the evaluation of support requirements.

Generally, the primary tunnel support for soil section comprises of steel ribs, friction bolts and 300mm thick fibre reinforced shortcrete. Whilst that for rock section, it comprises of rock dowels and 100mm thick fibre reinforced shortcrete.

Drainage holes are provided at specific intervals to release any built-up pore water pressure surrounding the tunnel.

**SAFETY REMINDER:** Participants shall be well equipped with their own PPE equipment, i.e. safety helmet, high visibility safety vest and safety boots in order to be allowed access into the site.

**TENTATIVE ITINERARY – (subject to change without prior notice)**

Time	Itinerary
8.00am	Gather and registration at IEM Building
8.30am	Group departing from IEM Building to site
9.15am	Arrival of participants at site
9.30am-10.15am	Project/HSSE briefing
10.30am-12.30pm	Site visit
12.30pm-1.30pm	Back to IEM Building

Commitment Fees (Non refundable & non transferrable)	
IEM Member	: RM 50.00
Non Member	: RM 80.00

- The visit is strictly limited to **30 participants** registered on a first-come, first-served basis.
- Participants must be physically and mentally fit as stated in the requirements of 'Industrial Code of Practice for Safe Working in a Confined Space (2010)'.
- Interested participants are to register and pay online at [www.myiem.org.my](http://www.myiem.org.my) or register by returning the appended registration form before or by **22<sup>nd</sup> June 2019** together with payment.
- Cheques are to be made payable to The Institution of Engineers, Malaysia.
- Please note that the commitment fee must be settled prior to the visit.
- After the closing date, IEM reserves the right to allocate seats to other registrants on a first-come first-pay basis.
- Intended participants are also reminded that IEM may cancel the reservation if payment is not received before the closing date.
- Please observe the 'NO Photography Allowed' policy at the tunnel construction site.

**REPLY SLIP**

Chairman  
Tunnelling & Underground Space Technical Division  
The Institution of Engineers, Malaysia  
PO Box 223 (Jalan Sultan),  
46720 Petaling Jaya, Selangor

**TECHNICAL VISIT TO LANGAT 2 SUNGAI BESI TUNNEL SITE**

I wish to participate in the above visit. I enclosed herewith a cheque no. .... for the amount of RM..... as my commitment fee for the visit.

Name of Member : ..... M'ship No.: .....  
 Address : ..... Grade : .....  
 ..... Tel (Office): .....  
 ..... Tel (Mobile): .....  
 Company's Name : ..... Email : .....

**PERSONAL DATA PROTECTION ACT:**

*I have read and understood the IEM's Personal Data Protection Notice published on IEM's website at <http://www.myiem.org.my> and I agree to IEM's use and processing of my personal data as set out in the said notice.*

*I will be participating in the visit at my own risk and hereby indemnify fully The IEM from all claims arising from any injury, damage or loss that may be sustained by me.*

.....  
(Date)

.....  
(Signature)

- Please bring along this flyer for confirmation of attendance - -Photocopies are acceptable -