BUILDING THE WESTERN TUNNEL ENTRANCE: DIAPHRAGM WALL CONSTRUCTION

JULY 2019

Building the western tunnel entrance in Kensington involves construction of two, 280 metre long diaphragm walls along the rail corridor.

The installation of diaphragm walls (D-walls) acts as a large continuous, water tight retaining wall which allows for major excavation of the western tunnel entrance. D-wall construction is a technique generally used when working in soft ground conditions, and is also the technique being used to construct the new Metro Tunnel North Melbourne and ANZAC stations.

To construct the D-walls, small sections of soil are excavated. During this activity, a naturally occurring clay called bentonite is pumped into the excavation to stabilise the deep trench, preventing the trench from collapsing.

Temporary bentonite plant

To support D-wall construction, a temporary bentonite plant will be constructed in the Hobsons Road site area consisting of six, 13 metre high storage silos, a mixing pool, pumps, generators, pipes and a gantry (large scaffold) across Kensington Road.

The bentonite plant will be in place for the duration of D-wall works which are anticipated to be completed by mid-2020.
Diaphragm-wall construction and operation of the bentonite plant

1. Storage of water and bentonite
   Six silos, approximately 13 metres high, are used to store water and bentonite slurry (bentonite powder and water combined) prior to use. Bentonite powder is delivered in sealed bags.

2. Mixing and pumping
   Bentonite powder and water are mixed in a mixing pool and then stored in silos or pumped to the D-wall work area when excavation takes place. Pumps will be powered by generators and used in several locations to pump bentonite to and from the Hobsons Road and Childers Street work sites.

3. Kensington Road gantry
   A gantry across Kensington Road next to the existing rail bridge will support pipes pumping bentonite to Childers Street.

4. D-wall excavation
   We use a large crane and a grab attachment to complete three separate excavations for each D-wall panel. While this occurs, bentonite is pumped into the excavation to stabilise the ground. A separate crane with the trench cutter attached to it, is lowered into the excavation to remove harder soils towards the bottom.

5. D-wall steel reinforcement
   Steel cages are placed into the excavated panel along with connection joints to connect the next panel. This ensures a continuous water-tight wall is formed.

6. D-wall concreting
   Concrete is poured into the bottom of the excavation through a pipe. Bentonite is pumped out at the same time back to the Hobsons Road worksite.

7. De-sanding
   A de-sander, located in the Hobsons Road worksite, separates the bentonite slurry from other materials. The bentonite is pumped back into storage silos so it can be reused.

8. Commence excavation of next panel
   Excavation commences on the next panel. There are over 200 panels to be constructed. There will be three excavation machines which will be able to work on two panels at any one time.

Construction impacts

- **D-wall construction impacts**
  - Periods of low level vibration while the cutter attachment excavates firmer soils
  - Covered trucks used to remove soil from site
  - There will be times where these works need to occur outside normal construction hours. Advanced notification will be provided to residents prior to these works.

- **Bentonite operation**
  - Use of the bentonite plant will be required while D-wall construction takes place
  - Bentonite is a naturally occurring clay which serves many everyday purposes and does not pose any health or safety concerns

- **Bentonite is delivered in sealed bags, and as required, mixed with water and stored in silos**
- **Low to medium levels of noise from the use of generators, pumps and de-sanding equipment.**
D-WALL FACTS

200+ D-wall panels to be installed
5 cranes along Childers Street
Excavating up to 20 metres deep
1500 tonnes of steel to be placed

More information
To find out more about the Metro Tunnel Project and register for future email updates:
- 1800 105 105 (24 hours a day, 7 days a week)
- Press 2 and follow the prompts
- [facebook.com/metrotunnel](https://facebook.com/metrotunnel)

It should be noted that this information is current at the time of printing, however due to unforeseen circumstances, changes may occur. Please visit [metrotunnel.vic.gov.au](http://metrotunnel.vic.gov.au) for the latest updates.

Interpreter Service
(03) 9280 0700

This map shows the D-wall construction stages outlined on the previous pages.