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Building the North West Rail Link

About this fact sheet

This fact sheet provides a general overview of the likely methods of construction that will be used to build the North West Rail Link.

Further environmental assessment and detailed engineering studies will be completed before the actual construction methodologies which will be used can be confirmed.

A Concept Plan for the project was approved in 2008.

About the project

The NSW Government is fast tracking the design and delivery of the 23 kilometre North West Rail Link.

This is the biggest rail tunnelling project ever undertaken in Sydney.

When completed it will connect communities in the growing North West with key centres of business in the Global Economic Corridor from Macquarie Park, across to Chatswood, down to St Leonards and North Sydney and onto the CBD.

It will also make busy centres like the Norwest Business Park and major retail and entertainment areas in Rouse Hill and Castle Hill more accessible by public transport.

As would be expected of a project of this scale and size, it has already attracted a great deal of interest from leading rail, construction and tunnelling groups both nationally and internationally.

A project team has been established within the Department of Transport to expedite the design task.



Although the project has Concept Approval, more detailed design and engineering work will be required before a full *Environmental Impact Statement* into the project can be developed and exhibited.

Construction work can only begin after the community and other stakeholders have been consulted and after the *Environmental Impact Statement* has been on public display.

The new rail link will feature at least six new stations, and will be underground for the first 15 kilometres from Epping to Kellyville.

Tunnels and underground station construction

Most of the work required to build the North West Rail Link will occur deep underground.

The preferred excavation method for tunnels and stations is largely driven by the geology and ground conditions encountered during construction.

It is expected that for this project, the 15 kilometres of tunnels will be excavated using a number of tunnel boring machines – equipment which provides a comparatively fast rate of excavation.

“Single line” tunnels will be constructed in each direction, linked by emergency cross passages. The actual length of tunnelling required is about 33 kilometres.



Working underground

The tunnels will be the deepest rail tunnels to be built in Sydney – up to 65 metres below ground level – the equivalent of a 25-storey building.

A typical average rate of advancement for a tunnel boring machine in ideal conditions is about 175 metres per week.

Approximately 60 per cent of the material to be mined is expected to be sandstone. The rest will be shale.

Each tunnel boring machine will typically excavate an average of 12,000 cubic metres of rock a week – the equivalent of five Olympic swimming pools. The rock will be carried by conveyor belts to construction compounds from where it will be transported by truck for disposal.

The total amount of rock to be removed is estimated to be about 5 million tonnes. Excavated rock is re-used in other construction projects.

Machines known as road headers as well as rock breakers and other excavators will be used to excavate underground station “caverns”, and also to build access shafts, ventilation tunnels and cross passages.

At this stage, it is proposed that stations be largely “mined”. This means that construction will occur from the “inside out”, rather than from the surface down, while access shafts would still need to be sunk from the surface. This construction method helps to minimise the overall impact on local communities.

While the tunnels do not need to be lined in all locations for structural stability, lining the tunnels with concrete is likely to be required to minimise water seepage into the tunnels.

Lining will be either undertaken using precast concrete segments placed immediately behind the tunnel boring machines or placed into position by travelling working platforms after excavation is completed along the length of the tunnels.

Station caverns will be lined with shotcrete, largely delivered by



specialised concrete spraying equipment. Station platforms and concourses will be built in-situ with concrete or pre-cast concrete elements.

Track slabs and the railway tracks will be installed at the completion of excavation.

Following the installation of tracks, tunnel services including ventilation, power supply, signalling and communications will be installed.

Cut-and-cover construction

Cut-and-cover construction will be used where the rail line is still underground but close to the surface. Essentially, a cut-and-cover tunnel is a shallow tunnel just below the surface of the ground.

A pit is excavated and the floor and walls installed before a roof is added and earth placed on top.

In areas where cut-and-cover construction might be required (eg west of Kellyville) the following method will most likely be employed:

- Site clearance
- Driving of piles to support the limits of excavation
- Excavation using rock breakers or excavators
- Base slabs poured
- Roof slabs installed
- Roof slabs covered by soil and vegetation

Above ground construction

For above ground works, the following procedures will most likely apply:

- Site clearing
- Bulk earthworks and site drainage
- Construct any viaducts or bridges as required
- Construct capping layer, lay ballast and tracks
- Place foundations for buildings or platforms
- Construct platforms and buildings using conventional building methods

Work hours

Tunnelling work, including tunnelling construction sites, will be expected to operate 24 hours a day.

Surface works will in general be carried out between 7am and 6pm Monday to Friday and from 8am to 1pm Saturdays.

However, at times works will be required out of hours, including at night and on weekends. Local residents will be consulted before any out of hours work commences.

Further information

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