DELHI METRO RAIL CORPORATION – CC32

DELHI METRO RAIL CORPORATION LINE-8 (Janakpuri to Botanical Garden) PHASE-III

Palam to Shankar Vihar: Package-CC 32

DMRC Line-8 is 38.235km long, connecting Janakpuri to Botanical Garden. The construction of this line was aimed to decongest the existing traffic situation in Delhi. Package CC 32 is 4.97km long and is a part of Line-8. It lies between Palam to Shankar Vihar, passing through a high security area. The package was divided in two parts by an elevated metro stretch.

Scope

Design and Execution support for the construction of bored tunnels between Palam and IGD underground Metro stations constructed by cut-n-cover method, upto Shankar Vihar (excluding). The total length of twin bored tube tunnel is 6.936km with 5.8m finished diameter. The tunnels are connected through 5 cross passages constructed by NATM.

Challenges

- Working through brown field and high security area
- Restricted work space
- Sensitivity for security, ground settlement , buildings, noise and pollution
- Site logistics

Amberg Services

- Work Planning,
- Execution support
- Geotechnical evaluation
- Detail design

for tunnel segment lining, cross passages, interface with station/ other package/ services.

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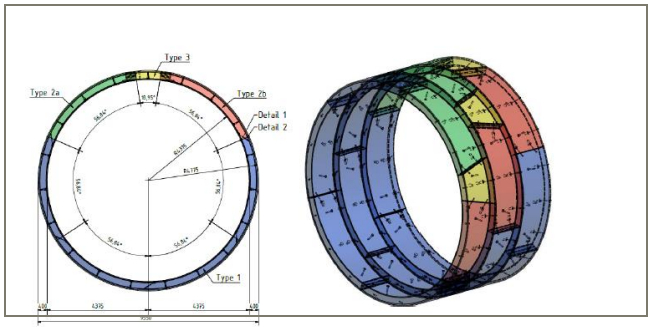

- Segment Lining

- Segmental lining in tunnels with bolts in place

- TBM Breakthrough

AMBERG FACTS

Contracted value Amberg

- Total: 1,544,000SGD

Project Duration

- Design works Jan.,2013 to Aug.,2018

Project Details

Tunnels

- Project lies in a high security area
- 2 single track tunnel tubes of total length approx. 6.936km, passing beneath airport
- Mix Cutter Single Shield TBM with diameter as 6.68m used for boring
- Segmental lining for rings of 5.8m dia, 275mm thick, each ring having 5+1 configuration
- Both tunnels connected through cross passages
- Cross passages constructed by NATM method under mix soil condition
- Package divided into two parts by another package CC 29 which was an elevated stretch.

Metro stations

- Technical solutions for Interface services with 2 cut-n-cover underground metro stations and other packages
- Each station had a launching shaft and a retrieval shaft as a part of station to facilitate TBM lowering and retrieval
- Inputs in site planning at proposed station location to carry out TBM operations

CLIENT FACTS

Overall costs

- Total cost – 752.6 Cr

Overview Project

- Metro tunnel, length approx. 6.936km
- 2 single-track tunnel tubes
- 2 Underground Metro stations
- Ramp to elevated sections

Geology

The geology is mainly composed of the following ground formations:

- sandy silty clay
- sandstone

PROJECT OFFICE

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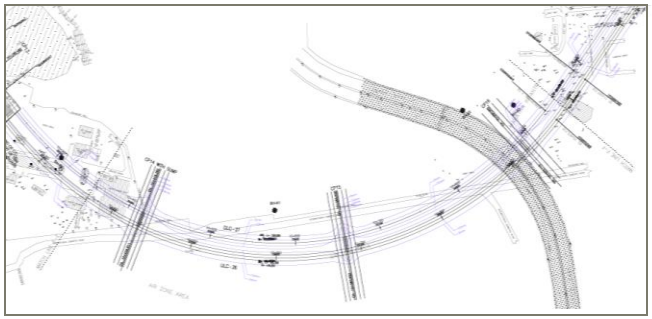
CHALLENGES

Package CC 27

Sensitive urban area

- Traverses between Densely populated to restricted entry area
- Sensitivity for security, ground settlement, noise and pollution,
- Located beneath arterial road and New Delhi Airport
- Complex site logistics

ENGINEERING APPROACH

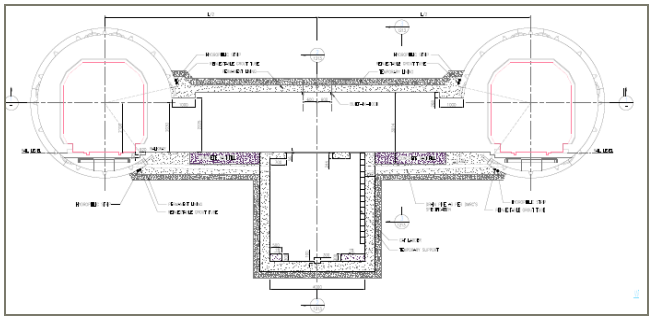


Sharp Manoeuvring Radius for TBM

Complex work phasing

- TBM launching, retrieval and operations through a dense urban area
- Complexity in making arrangement for TBM Operation at site
- Logistics planning and its regular review to ensure uninterrupted TBM operations
- Safety requirements extremely high
- Continuous monitoring for settlement if any in the surrounding dwellings

TECHNICAL SOLUTIONS



Cross Passage with Sump connecting the Tunnel tubes

Work schedule

- Working simultaneously at different sites
- Tight schedule for project completion
- Round the clock settlement monitoring
- Timely address to interface issues

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