

METRO CUBE

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ADDING NEW DIMENSIONS

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Compensatory Tree Plantation



MD SPEAKS

Ms. Ashwini Bhide, IAS

MMRC initiated compensatory tree plantation at designated locations in Aarey Colony through civil contractors, as a critical step towards an intended sustainable development goal.

To take this ahead, our Project Neighbourhood, has been launched in collaboration with the citizens to enhance the green cover.

MCGM Planning Committee recently notified change of land use at Parjapur Village (Aarey Colony) for metro car shed, as the approval is already granted by the State Government. MCGM has invited suggestions-objections from the public regarding change of land use which will be followed by a hearing with the Planning Committee.

The National Green Tribunal(NGT) has issued clearance to proceed with the use of 3Ha land at Aarey Colony (Parjapur village) for the casting yard for Metro 3.

Completion of secant pile construction at Nayanagar and Pali Ground TBM launching shaft and initiation of segment casting at casting yard in Wadala are the key accomplishments this month.



KNOW YOUR STATION

CST



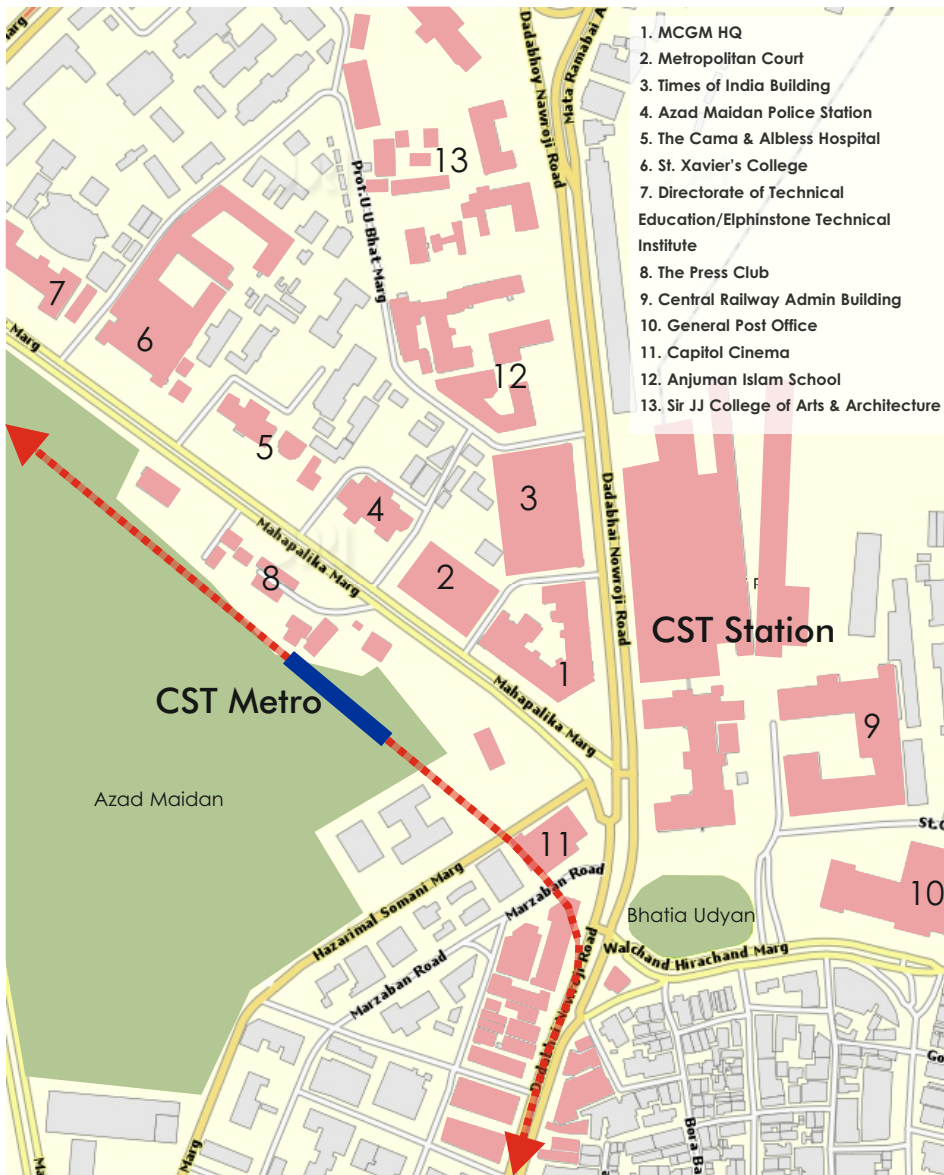
CST has experienced drastic increase in commuter volumes in the past. A growth in commuter volume needs simultaneous infrastructure support. The metro station will serve for a safe and comfortable commute and provide connectivity to important areas in the city.



Victoria Terminus (VT), now known as Chhatrapati Shivaji Terminus (CST), inscribed in the UNESCO World Heritage list is a historic railway terminus in South Mumbai. CST is also the second most photographed monument in India after the Taj. Built in 1888, the station is a grand reminder of the British Raj in India and still one of the most historical landmarks within the Central Business District of Mumbai representing the heart of mercantile facet of the city.

Designed by British architect F.W. Stevens, CST is an outstanding example of Victorian Gothic Revival architecture in India, blended with themes deriving from Indian traditional architecture. The complete construction of the building took ten years. It was opened to the Queen on her Golden Jubilee in 1887 and was the most expensive building in Bombay, which then cost about 260,000 Sterling Pounds (21,134,600 INR). The terminus station for both suburban and long distance trains on Central Railway is used by more than three million commuters every day.

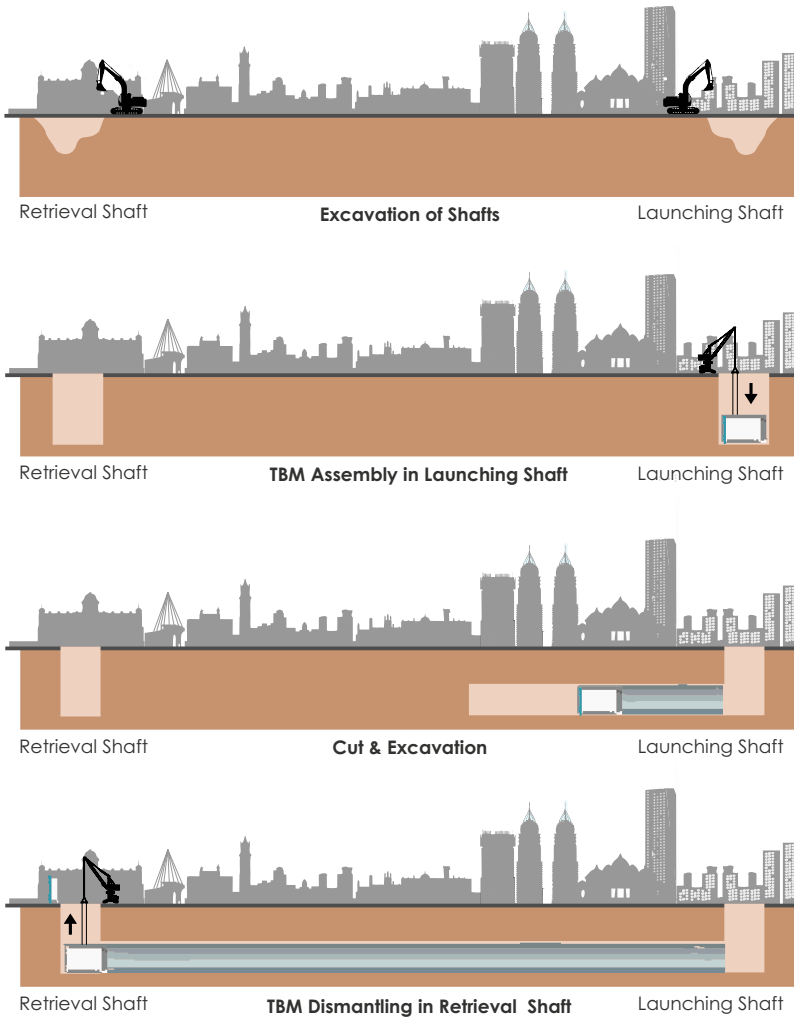
Most visited places like Crawford Market, Fashion Street, Sterling Cinema, Ballard Estate and other important locations will be easily accessible from all parts of the city.



CST Metro Station Precinct



TBM LAUNCHING SHAFT



For each package in the Metro Line 3, excavation is done for launching and retrieval shafts. In launching shaft, TBM is assembled while in retrieval shaft TBM is dismantled.



TBM launching shaft construction in progress at Nayanagar



TBM Elizabeth being lowered into launching shaft for London Crossrail (2012)
Image Source: www.tunnellingjournal.com

Launching shaft is an important element in tunneling, that serves multiple purposes such as launching of equipments (TBM), ventilation systems and transport of muck/spoil (excavated rock fragments).

A TBM launch shaft will typically require a relatively larger shaft area to cater for the thrust frame (resist thrust given by TBM), surveying equipment (guides the tunnel alignment), ventilation plant, spoil/muck handling equipments, services and extra safety equipments. The common shapes of launching shaft are circular, oval or rectangular in plan. Circular shaft will transfer the forces in the form of developing compression in the lining installed at the outer periphery. These shafts require less lateral bracing and reinforcement. Oval shapes are typically adopted for deep shafts in order to save excavation time, spoil disposal costs and backfill costs. Rectangular shafts are typically adopted when the length to width ratio makes the option of circular or oval unfeasible or uneconomical. The anticipated geo-technical and hydro-geological conditions are the most significantly influential factors on the selection of the temporary ground support method.



MMRC FABRICATED FIRST TUNNEL RING

MMRC fabricated first tunnel ring for the project at Wadala casting yard, a major step towards implementation of Mumbai's first underground Metro corridor. About 40,000 segment rings are required for the entire project which will be assembled using TBM and will be casted in 65 moulds brought from France, Korea and Delhi Metro Project. The segments rings will be manufactured in six casting yards of which four have been set up at Wadala, one at Darga - Mahulgaon and one at JVLR. TBMs from several international suppliers will be delivered by July, 2017 onwards and tunnelling activity will take off from October, 2017 onwards.

Commenting on the same, MD, Ms. Ashwini Bhide said, "Tunnelling in Mumbai is full of challenges. However, with the help of advanced technology and team of experts, we will successfully complete this gigantic task. MMRC will embark upon huge tunnelling activity and we will ensure that there is minimum inconvenience to Mumbaikars during our work".

Mr S.K.Gupta, Director (Projects) stated that this is an important milestone for the project and we have been able to fabricate the first segment ring before schedule. Present on the occasion were Mr. A. A Bhatt, Director (Systems), Mr. R. Ramana, Executive Director (Planning) and other senior officials of MMRC.



Pouring of first segment ring at Wadala casting yard



Imported segment ring casting mould from Korea

Segment rings are essential components as far as tunnelling is concerned. It is used as tunnel lining in tunnelling operations and are installed using TBMs.



CRZ PERMISSIONS

CRZ (Coastal Regulation Zone) notification published by MOEF, Gol on 6th Jan, 2011 under Environment Protection Act, 1986 by superseding the earlier CRZ notification, 1991 has made it mandatory to obtain prior CRZ clearance for activities proposed in various CRZ categories (CRZ I,II,III and IV) with an objective to conserve and protect the coastal areas, its unique environment, marine areas and to promote development through sustainable manner.

In compliance to the provisions of CRZ notification, MMRC had submitted CRZ proposals of:

- Stations (Cuffe Parade, Vidhan Bhavan, Churchgate, Girgaon, Shitladevi, Dharavi, BKC, Worli and Sidhivinayak),
- Land parcels for construction storage depot,
- Traction substation/TBM shaft, worksite at Naya Nagar,
- Part of the alignment(11.5km) of Colaba - Bandra - Seepz corridor falling in CRZ I,II,III,

EIA and EMP reports have been submitted to Maharashtra Coastal Zone Management Authority (MCZMA) for CRZ clearance.

MCZMA in its various meetings have examined and recommended these proposals to concerned planning authorities or SEIAA (State Environment Impact Assessment Authority) from CRZ point of view under CRZ notification 2011,

Metro-3 is committed to comply and strictly abide by the recommendations of MCZMA and provision of CRZ Notifications.



PROJECT NEIGHBOURHOOD

Keeping in tune with its Green Policy, MMRC has decided to take up initiative to increase green cover under "Project Neighbourhood" wherein more than 25,000 saplings will be distributed among housing societies, hospitals, schools in the vicinity of the proposed 27 stations on the Metro-3 alignment. This green initiative is in addition to the compensatory plantation stipulated by the Tree Authority, MCGM, while approving the tree cutting proposal.

The Tree Authority has identified in all 3,891 trees at the proposed station locations of the Metro-3 corridor out of which 1,074 trees will be cut and 1,727 trees will be transplanted. As per the norms set by Tree Authority, the MMRC will have to plant 3 trees for each tree cut. Accordingly, MMRC will plant more than 3,000 trees as part of the compensatory plantation and in addition to this, MMRC has decided to distribute around 1,000 trees at each proposed station of the Metro-3 corridor.

All five contractors in seven civil packages will ensure that plantation of the saplings is done keeping in mind the environmental requirements. Municipal grounds and other lands taken for temporary use will be restored and returned to authority concerned along with the plantation.

Once commissioned, Metro-3 project is likely to reduce emission of carbon dioxide and other greenhouse gases to the tune of 6800 tonnes per year in the year 2021. The "Project Neighbourhood" was launched on the auspicious occasion of Gudi Padwa.

Lets make life better....
Glimpses of community participation in Project Neighbourhood



Sapling distribution under Project Neighbourhood

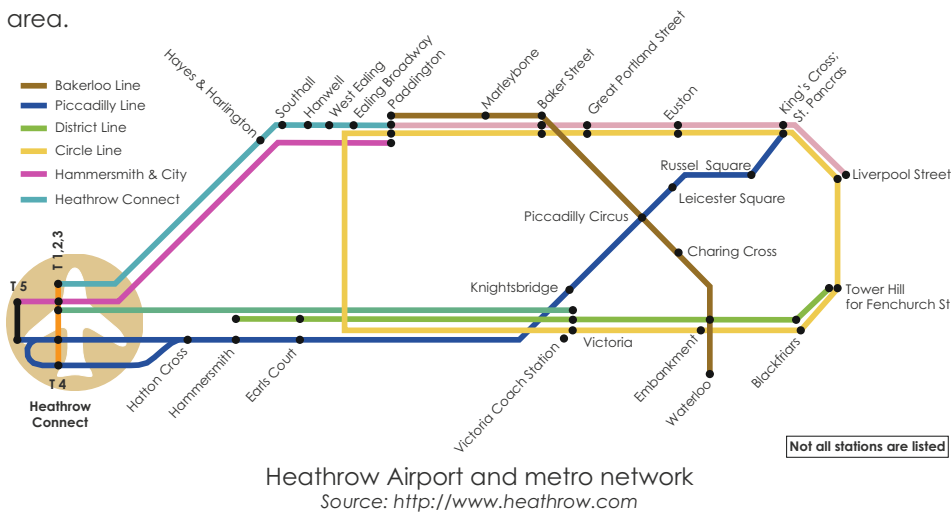


STATIONS AT MIAL

One of the driving principles in the route design of MML-3 is to connect the major transport hubs in the city. Following this principle, MML-3 route passes through strategic locations like CSI Airport, Churchgate, CST and Bombay Central.

As a major stakeholder and beneficiary of the improved connectivity that MML-3 will provide to the airport, Mumbai International Airport Limited (MIAL) has agreed to part finance the construction cost of the above three stations.

While, MMRC will be designing, constructing, and financing these three stations, MIAL will be contributing Rs.259 crores for each station amounting to Rs.777 crores in total. To ensure smooth implementation of these stations, MIAL has released funds to MMRC amounting to Rs.55 Crore so far. Also, MIAL is extending their full support on land transfer for stations and other miscellaneous construction activities. Three of the twenty-six stations - CSIA Terminal 1, Sahar, and CSIA Terminal 2 are in the airport area.



London Underground is one of the quickest and cheapest modes to get into London City Center. The busiest airport in the United Kingdom and the third busiest in the world, Heathrow Airport has five terminals and receives 70 million visitors a year. All five terminals are connected with a tube stop and world class passenger transfer facilities.

Airport connectivity by Metro and its full integration with the other transport modes for seamless transit to other parts of the city is critical and fundamental to the larger transport planning and promotes better image of the city and its airports on the international platform.

Many examples world wide in cities like Washington DC, London, Berlin, Beijing have demonstrated that an efficient metro connectivity to the airports facilitates the city's international travellers enhancing business opportunities. The Airport Express Line of the Beijing Subway is a 28.1 km long rapid transit line connecting Beijing Capital International Airport with Beijing's city center.

The Delhi Airport Metro Express, also known as the Orange Line connects New Delhi Metro Station to Dwarka Sector 21, through Indira Gandhi International Airport. Total length of the Line is 22.7 km and takes about 20 minutes from New Delhi to the Airport Terminal.

INTERNATIONAL WOMEN'S DAY

MMRC and AAI Plant Saplings

MMRC and Airport Authority of India (AAI) jointly set start to the tree plantation programme to mark the International Women's Day on 8th of March at AAI's headquarter. The plantation was launched by Ms.Ashwini Bhide, MD, MMRC and Ms.K Hemalata, Regional Executive Director, AAI.

"Metro-3 will ensure safety of women commuters. There are dedicated metro lines all over the world that provide connectivity to airport. However, Metro-3 will perhaps be the first corridor to provide connectivity to airport along with other hot-spots in Mumbai. I am thankful to AAI for supporting the Metro-3 project", said Ms. Ashwini Bhide, MD, MMRC.

There will be three Metro stations - Sahar Road Station, Chhatrapati Shivaji Domestic Airport Station (CSIA -T2) and Chhatrapati Shivaji International Airport Station (CSIA - T1) which facilitate connectivity to airport.

Present on the occasion were Mr. S.K. Gupta, Director (Projects), MMRC and other senior officials of MMRC and AAI.



Tree plantation on International Women's Day by MMRC and AAI



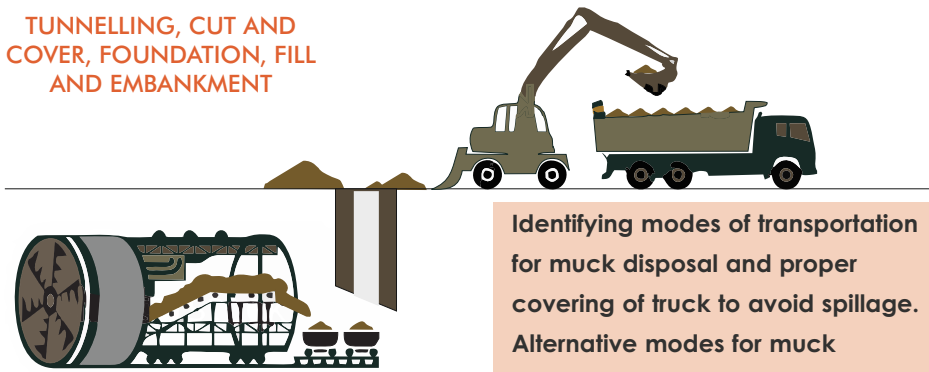
MUCK DISPOSAL

In the completely underground metro project, construction activity involves tunnelling, cut and cover, foundation, fill and embankment etc. All these activities will generate about approx. 11.1 Mm³ of muck. Owing to lack of space in busy cities and for safety reasons, elaborate actions are being adopted for collection, storage, transfer and disposal of muck.

Muck disposal sites are identified with relevance to various factors viz; landscape planning, cost effectiveness, nearness to source of generation, ground water/blockage to surface water/relief and scope for afforestation and erosion control/sediment arrest.

To avoid impact on land due to muck disposal, required measures are being undertaken.

TUNNELLING, CUT AND COVER, FOUNDATION, FILL AND EMBANKMENT



Identifying modes of transportation for muck disposal and proper covering of truck to avoid spillage. Alternative modes for muck disposal via sea route.

MUCK DISPOSAL AT SELECTED SITES



Selection of muck disposal sites considering the quantity of muck, landscape, cost effectiveness, proximity to source of generation, absence of ground and surface water, relief and scope for afforestation works.

FURTHER TREATMENT OF DISPOSAL SITES



The area shall be restored through plantation and development of landscape around disposal sites. Compensatory afforestation done by selected species having faster growth, and helpful in stabilizing the dump sites.



Areas identified for muck disposal

Contract Package	Muck Disposal Sites	Capacity (Mm ³)
1	Kalwar, Rahnal, Narpoli, Kariwali (Bhiwandi Thane)	0.90
2	Mahape MIDC; Ambernath MIDC	0.25+
3	Dhapode (Padghe Thane)	0.73
4	Dhapode, Mankoli, Wehle, Ovale (Padghe Thane)	0.73+
5	Waliv, Dhaniv (Vasai Thane)	0.54
6	Waliv, Dhaniv & Achole (Vasai Thane)	0.54+
7	Talavali Pise (Kalyan)	1.07

7 packages will be generating 75-150 trucks of muck per day comprising of soil and rock. In order to avoid further congestion on Mumbai's road network, alternative ways of muck disposal will be undertaken. Alternative modes for muck disposal via sea route from Bandra Reclamation Dock to Dighi, and Rohini are under consideration.



WORLD WATER DAY

Metro 3 Plans Wastewater Management Strategies

World Water Day is held annually on 22 March as an international day to celebrate freshwater as recommended at the 1992 United Nations Conference on Environment and Development (UNCED). This year the theme for World Water Day's is "Water & Waste Water", which includes waste water from homes, businesses, industries, institutions and construction activities.

With reference to Metro 3 project, the contractors on board have developed site specific environmental plans which include details on water management during construction stage of the project. The source of water for construction activities of this project would be mostly tanker water supply. The contract documents for all the packages have specific conditions for water recycle and reuse within the project.

The Wheel washing facilities will be provided with efficient drainage, incorporating silt traps to prevent any excessive loss of water. These facilities would include water re-circulation apparatus to minimize fresh water consumption. The treated water shall also be used within the project as and where required.

The wastewater from concrete batching & precast concrete casting yards generated from washing down of mixer trucks and drum mixers and similar equipment shall be treated at wastewater treatment plant and the treated water shall be recycled and reused wherever practicable.

COMPENSATORY TREE PLANTATION

MMRC has begun compensatory tree plantation through civil contractors at the land designated at Aarey Colony. As per MCGM Tree Authority norms, MMRC will plant 3 new trees to compensate a tree being cut.



Compensatory tree plantation at Package 7

WHY WASTE WATER?

Over 80% of our waste water flows back into nature untreated

REUSE: treat and use wastewater for general washing, irrigation or production

REDUCE: use water efficiently and decrease pollutants entering the water cycle



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