

Sturdier Twin Tunnels To Be Built Underneath Waterbodies; Soil Test Almost Complete

Metro rail 2.0 to zip through tunnels under Adyar river, Chetpet lake



B A Ralu

IN PROGRESS: A metro rail team carrying out a soil test in the Adyar river near Theosophical Society

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In another six years, when metro rail begins operation on phase-2 corridors, trains will plunge into the dark depths of the city and dart under the Adyar river and Chetpet lake at a depth of nearly 20m to link Madhavaram in the north with Sholinganallur in the south.

Twin tunnels will be built under these waterbodies for nearly a kilometre to link four stations at Adyar and Chetpet. Soil tests are underway in the Adyar river near Theosophical Society and construction for the tunnels will begin by 2019-end or next January.

Two tunnels will be built under Adyar river to link Adyar junction station expected to come up near Thiru Vi Ka Bridge with Adyar depot station planned on LB Road. Another pair of tunnels will be built under Chetpet lake to link KMC station on Barnaby Road with Chetpet station.

The four stations are part of the 45.8km corridor of the 118.9km phase-2 from Madhavaram to SIPCOT. A portion of this corridor covering 36km will be part of the 52km priority corridor, for which Chennai Metro Rail Ltd (CMRL) has received funding. Tenders for the construction of the priority corridor is expected to be floated in June. Earlier, CMRL managing director Pankaj Kumar Bansal told TOI that the 52km priority corridor would be ready by 2024-25.

"We have completed soil tests in Chetpet lake. Much of the work to collect soil samples in Adyar river is over. Only 3% of the work is pending which we are expecting to complete in three days," a metro rail

official said.

In phase-1, CMRL built twin tunnels under the Cooum between Central Metro and Government Estate and under Buckingham Canal near Central Metro, with reinforced tunnel rings to hold the soil above and prevent water seepage.

Unlike phase-1, where soil samples were collected for every 100m, in phase-2 samples are being collected and tested for every 25m to 50m. During tests, a 150mm-sized borehole is drilled at a depth of 15m to 18m for every 25m to 30m distance to collect soil. The samples are sent to laboratories for analysis.

Soil tests decide the tunnelling methodology — the type of tunnel boring machines and cutters to be used as well as the deadline for the construction.

While the methodology followed to build tunnels under the road and water may be the same, additional care is taken when soil is excavated under waterbodies. When twin tunnels were built through a rocky soil strata under Cooum, measures were taken to monitor the water table of the Buckingham Canal and the Cooum riverbed. The pressure applied by the machine was calculated and carefully maintained till the tunnels were built.

"Special tunnel rings with heavy reinforcement were designed and installed to counter the load from the top crust and canal water. Under Buckingham Canal, tunnelling was carried out nearly 11m below its bed. Certain provisions were incorporated for extensive grouting around the tunnel below the canal," an official said.

UNDERWATER, UNDERGROUND

The tunnels are part of the priority corridor for which metro rail has got funding. Tenders will be floated in June and construction could begin by the year-end

THE PLAN

> Chennai metro rail is building tunnels in two places under the Adyar river and Chetpet lake

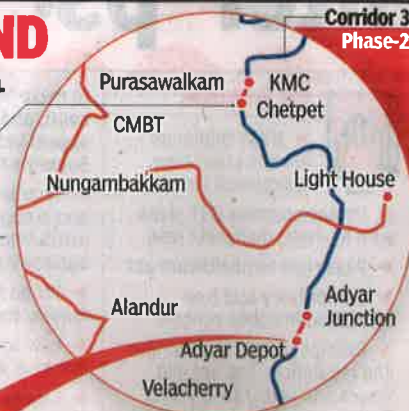
> At Adyar, a tunnel will be built under the river to link Adyar junction and Adyar depot stations

Tunnels will be built at a depth of 8m to 20m

> At Chetpet, a tunnel will be built under Chetpet lake to link KMC and Chetpet station

> Both locations are part of corridor 3 of phase-2 between Madhavaram and Sholinganallur

> Construction will begin by 2019-end or next January



HOW TUNNELS ARE BUILT

> Cutters of tunnel boring machine drills through soil and holds it up against the surface

> Machine sprays grout (a combination of cement and chemicals) against the surface

> Grout acts as an additional sealing agent for the soil

> Once it is sprayed, machine installs reinforced concrete segments against the surface

> Segments form a ring and many such rings form the tunnel

UNDER WATERBODIES

> In phase 1, to build tunnels under waterbodies heavy reinforced concrete slabs and special tunnel rings designed for the purpose were used to counter the load from the top

> Additional grouting was used to seal the surface to prevent water seepage

> Pressure of the tunnel boring machine and the water bed was continuously monitored during construction

IN OPERATION

> A 28m-deep twin-tunnel measuring 270m was built under Cooum to link Central Metro with Government Estate station

> Tunnels were built across Buckingham Canal under Poonamallee High Road to link Central to Koyambedu at a depth of 11m



SOIL TESTS

Soil test is underway at Adyar | Soil test at Chetpet is over | Samples are collected for every 25m to 50m