

PRESS BRIEF

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SHIV VIHAR – TRILOKपुरI SANJAY LAKE SECTION OF LINE-7 (PINK LINE) READY FOR OPERATIONS

The 17.8 km long Shiv Vihar - TrilokपुरI Sanjay Lake section of the 59 km long Majlis Park - Shiv Vihar corridor (Line 7) of Phase 3, also known as the Pink Line is now ready for passenger operations.

This stretch will be a major boon for the eastern and northern fringes of the national capital. Three interchange facilities at Welcome (With Red Line), Karkarduma and Anand Vihar ISBT (with Blue Line) will tremendously boost the connectivity of areas such as Shiv Vihar, Gokul Puri, Maujpur, Jaffrabad etc. In the future, this stretch will get connected with the presently operational Majlis Park – Lajpat Nagar section of Pink Line.

With the opening of this section, the Delhi Metro network will become 314 kilometres long with 229 Metro stations. After the inauguration of this section, Delhi Metro will have opened over 80 kilometres of new lines this year. All the major corridors under Delhi Metro's Phase 3 are expected to be opened for passengers by the end of the year.

The main highlights of this section are as follows:

- Route Length: 17.8 Km
- Number of Stations : 15 (All Elevated)
- Names of Stations: TriolokपुरI Sanjay Lake, East Vinod Nagar-Mayur Vihar II, Mandawali-West Vinod Nagar, I.P. Extension, Anand Vihar ISBT, Karkarduma, Karkarduma Court, Krishna Nagar, East Azad Nagar, Welcome, Jaffrabad, Maujpur-Badarpur, Gokulpuri, Johri Enclave and Shiv Vihar
- Colour Code: Pink Line
- Gauge: Standard Gauge
- Pink Line section yet to be opened: Lajpat Nagar – Mayur Vihar Pocket -1 (9.7 kms) Total length of the Majlis Park – Shiv Vihar section is 59 kms.
- Interchange facilities: Welcome (With Red Line), Karkarduma and Anand Vihar ISBT (with Blue Line)
- Depot: Vinod Nagar Depot

Interchange Facility on this Section

This section has three interchange stations at Anand Vihar ISBT, Karkarduma and Welcome. The facility of interchange of Metro trains between line 7 (Pink Line) & line 3/4 (Blue Line) is available at Anand Vihar ISBT and Karkarduma Station and between line7 & line 1 (Red Line) at Welcome Station. The Maujpur Station is a four

(4) track station having provision of connection from Maujpur to Mukundpur, a corridor proposed in Phase-IV of the Delhi Metro project.

Interchange Station	Connectivity	Length of FOB / Ramps
Anand Vihar ISBT	With Line 3/4 (Dwarka Sector 21 – Noida City Centre / Vaishali)	Integrated Station
Karkarduma	With Line 3/4 (Dwarka Sector 21 – Noida City Centre / Vaishali)	85 M
Welcome	With Line-1 (Dilshad Garden –Rithala)	110 M

Special Spans

The elevated section between I.P Extension and Maujpur consists of Special Spans including two Steel Spans over the existing DMRC Red line (Line 1) and Northern Railway track between Welcome & Shahdara.

Cantilever Construction (CLC) Spans of lengths 255 mtrs over Anand Vihar Railway Yard and Main line tracks were constructed over running track with 25 KVA OHE System.

Sharp Curves

Due to uneven twist and turns in this alignment, Delhi Metro had to construct as many as 10 curves on this stretch that passes through very congested areas like I.P. Extension, Anand Vihar, Welcome, Seelampur, Jaffrabad and Maujpur.

S.no	Location /Area	Radius of curvature (Curve) In meters
1	Over Jogger's Park (I P Extension)	225
2	Over TD I Nallah Crossing	202
3	Patparganj Industrial Area (over TDII Nallah crossing)	252
4	Anand vihar Crossing (Road no 56 from EDM Mall to Anand Vihar Interchange Metro Station)	200
5	Anand Vihar Railway Track Crossing	308
6	Near Karkarduma Metro Station	302
7	Maharaja Surajmal Marg (near MTNL office)	200
8	Swami Dayanand Marg	237
9	Before Welcome Metro Station	252
10	Seelampur Cornor (towards Maujpur)	235

Curves of less than 300 meters of radius are considered “Sharp Curves” in Urban Rail Construction. The work of building sharp curves requires great deal of engineering skills and several factors have to be kept in mind while designing special segments/spans at the concerned turn/juncture. DMRC had to form especially dedicated beds in its casting yard for casting of special segments. The segments were constructed according to the already defined “radius of curvature” and then put on the viaduct.

Cantilever piers and portals were constructed at appropriate places to provide smooth transition for the curves, wherever required to take care of the shifted alignment due to curvature.

Earlier DMRC had constructed sharpest broad gauge curve on its elevated section in Gurgaon near IFFCO Chowk with at radius of 282.05 meters in Phase II and 242 meters curve on standard gauge between Okhla and Jamia in Phase 3.

Crossing the Railway Station at Anand Vihar Site

Another major engineering challenge was encountered when the viaduct had to cross the Anand Vihar Railway Station of the Indian Railways, one of the busiest stations in terms of ridership and number of trains. In fact, two piers had to be erected on the Anand Vihar Railway platform itself and large spans (around 70 mts) had to be erected to avoid any kind of disturbance to the Railway station. DMRC engineers had to ensure that the train schedule of the Indian Railways was not disturbed during the DMRC’s construction. Despite this difficult challenge, DMRC successfully completed this stretch in a planned manner, without affecting the routine working of the Indian Railways.

For crossing this area of Indian Railways, six piers were erected in the railway compound in such a way that there was no infringement of the Metro line with the railways. Provision of future development plans of the Railways was also kept in mind so that the Metro piers would pose no problem to any such plans in the future. Two piers were placed on the running platforms where it was difficult to work with round-the-clock train and passenger movement.

Due to the peculiar placement of piers in the railways land, the spans are quite large. One of the spans which is designed between pier no. 235 and 236 is almost 70 metres long. In order to cater to the requirement of special spans, cellular lightweight concrete (CLC) construction has been done with the help of bridge builders. This construction methodology has helped in continuous construction without interfering in the movement of trains to and from the Anand Vihar Rail terminal.

The detailed length of the spans between pier no. 234 to 239 are as follows:

Pier No.	Length (metres)
234-235	37
235-236	69.820
236-237	67
237-238	55
238-239	34

These piers are located in the periphery of the Anand Vihar Railway station. Two of the piers are located on the platforms of the Anand Vihar Railway station of Indian Railways.

DMRC has crossed the railway lines in a very safe and systematic manner with all safety precautions in place and without affecting the daily train movement on the section in coordination with the Indian Railways. The work was done only after obtaining the necessary approval from the Commissioner for Metro Rail Safety (CMRS).

DMRC's Rare Feat at Karkarduma Metro Station

The Delhi Metro has achieved a rare feat in Metro construction by crossing over its existing operational line at the Karkarduma Metro Station at a record height of 21 metres above the ground.

Construction for crossing over of Metro viaduct at the existing Karkarduma Metro station was never an easy task for the Metro engineers. It posed numerous challenges to the civil engineers throughout the project, as this is one of the highest crossings of the Metro project. The Majlis Park – Shiv Vihar Corridor is crossing the existing Vaishali- Dwarka elevated line (Line-4) 21 metres above the ground and is 10 metres above the existing Metro line. The work was done without disrupting the normal daily Metro train/passenger services for even a single day.

This new alignment of Line-7 is crossing the existing Vaishali – Dwarka Metro alignment at Karkarduma just before the existing Karkarduma station at an angle of 114 degrees. DMRC had to carry out segmental erection for putting a special span of 37 metres between pier no. 254 and pier no. 255.

Delhi Metro has crossed the existing Metro line at such a height in a very safe and systematic manner with all safety precautions in place. The launching of the girder and erection of the span was carried out with extra precaution.

An extensive round the clock CCTV monitoring was done adjacent to the rail track to avoid any sign of electrocution and fall of material during crossing. The monitoring consisted of earthing provided to the launching girder, pre-stressing beam, erected segments or any other loose item kept on the span. The work was carried out during the shadow block of the existing system during non-operating hours after getting all the clearances from the competent authorities.

It was in all likelihood that the engineering challenges would have compelled the engineers to compulsorily to disrupt the passenger/Metro train services on some crucial days. Given the fact that the Dwarka-Noida/Vaishali (Line 3/4) corridor of the Delhi Metro Network is the busiest corridor in terms of ridership, a small disruption in the services would have created a lot of passenger unrest. Thus, the engineers planned the execution of this technical feat so meticulously that everything was completed silently and successfully without disrupting the existing passenger traffic on Line-4.

Vinod Nagar depot, the new hub of Phase 3 Trains

The Vinod Nagar Metro depot will primarily cater to the services on the Pink line (Majlis Park – Shiv Vihar). The Depot at Vinod Nagar is located near National Highway 24 and is one of two depots of Pink line of Phase 3. Due to scarcity of land, the Depot functions are divided into two pieces of land on either sides of the Ghazipur Nala i.e. Site- 1 & 2.

The area of the depot is approx. 18.2 hectares. It has a number of hi-tech features to ensure round the clock maintenance of the trains. The following are the main highlights of this depot:

The Depot has a total of 32 Stabling Lines out of which 12 nos. are open stabling and 20 nos. are covered stabling.

The unique feature in the Depot is the Double Deck Stabling Shed where stabling of trains has been planned at 2 levels which is the first in India. Trains which enter the Depot from the main line shall be stabled in either of the 2 decks i.e. upper or the lower deck.

This building has also been planned for 3-4 office floors above train stabling lines which may be constructed in near future. The entire ground floor of this building has been planned for car parking required for the office floors.

The Depot is well equipped with a Workshop housing the latest train maintenance equipment and machinery. 3 Inspection Lines for underframe maintenance and service have been provided. Blow down Plant and Interior Cleaning Shed for upkeep and cleanliness of interiors of trains has been provided.

Solar panels have been provided on the entire roof of mostly all buildings in the Depot which would generate 1.1 MW of electric power. This would enable the Depot to generate its own energy and partially self-sufficient.

About 20KLD of sewage and 60 KLD of effluent is expected to be generated at Vinod Nagar Depot. The waste water would be treated in Sewage cum Effluent Treatment Plant and completely reused for horticulture in Depot and for flushing for Staff Quarters toilets. In addition compost pits have been provided for using organic waste for horticulture. Rain water harvesting have been provided at both the sites.

Additional details:

Phase 3 progress details:

- Phase 3 network opened so far: 106 (105.92) kilometres

Sl. No.	Corridors opened	Kilometres
1.	Central Secretariat – Kashmere Gate	9.37

2.	Badarpur – Escorts Mujesar	13.875
3.	Jahangirpuri – Samaypur Badli	4.373
4.	Durgabai Deshmukh South Campus – Majlis Park	21.56
5.	Botanical Garden – Kalkaji Mandir	12.64
6.	Kalkaji Mandir – Janakpuri West	24.82
7.	Mundka – City Park (Bahadurgarh)	11.183
8.	Durgabai Deshmukh South Campus – Lajpat Nagar	8.10

- Phase 3 network after the opening of Shiv Vihar – Trilokpuri Sanjay Lake section: 124 kms (123.78 kms)
- Phase 3 network yet to be opened after the opening of this section: 34 (33.47) kilometres (excluding NOIDA – Greater NOIDA section)

Sl. No.	Corridors to be opened	Kilometres
1.	Lajpat Nagar – Mayur Vihar Pocket 1	9.7
2.	Noida City Centre – Electronic City	6.675
3.	Dwarka – Najafgarh	4.295
4.	Escorts Mujesar – Ballabgarh	3.2
5.	Dilshad garden – New Bus Adda	9.60

AD/ED/CC/DMRC