

## **PRESS RELEASE**

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### **JANAKPURI WEST – KALKAJI MANDIR METRO CORRIDOR READY FOR OPERATIONS**

The Janakpuri West – Kalkaji Mandir section of the Magenta line will be the longest stretch opened so far in Delhi Metro's Phase 3. The 24.82 kilometre long section comprises of 16 stations including interchange facilities at Hauz Khas (with yellow line) and Janakpuri West (With Blue Line) and is part of the Magenta Line from Janakpuri West to Botanical Garden in NOIDA. The entire Delhi Metro network will then increase to 277 kilometres with 202 Metro stations after this section opens.

#### **The main features of this corridor are:**

1. Length: 24.82 kms  
(Underground: 21.8 kms, Elevated: 2.9 kms)
2. Stations: 16 (14 underground, 2 elevated)
3. Names of stations: Janakpuri West, Dabri Mor, Dashrathpuri, Palam, Sadar Bazar Cantonment, Terminal 1 – IGI Airport, Shankar Vihar, Vasant Vihar, Munirka, RK Puram, Hauz Khas, IIT, Panchsheel Park, Chirag Delhi, Greater Kailash, Nehru Enclave.
4. Colour Code: Magenta
5. Depot: Kalindi Kunj
6. Interchange Stations: Janakpuri West (With the Dwarka – NOIDA/ Vaishali Blue Line) and Hauz Khas (With the Samaypur Badli – HUDA City Centre Yellow Line).
7. Three stations of this corridor have been taken up for co-branding. These are Terminal 1 – IGI Airport, IIT and GK Enclave.

#### **Phase 3 progress details:**

- Phase 3 network opened so far: 62 kilometres

<b>Sl. No.</b>	<b>Corridors opened</b>	<b>Kilometres</b>
1.	Central Secretariat – Kashmere Gate	9.37
2.	Badarpur – Escorts Mujesar	13.975
3.	Jahangirpuri – Samaypur Badli	4.489
4.	Durgabai Deshmukh South Campus – Majlis Park	21.56
5.	Botanical Garden – Kalkaji Mandir	12.64

- Phase 3 kilometres after the opening of this section: 87 kilometres
- Phase 3 network yet to be opened after the opening of this section: 72 kilometres (excluding NOIDA – Greater NOIDA section)

Sl. No.	Corridors to be opened	Kilometres
1.	Durgabai Deshmukh South Campus – Shiv Vihar	37.036
2.	Mundka – Bahadurgarh	11.182
3.	Noida City Centre – Electronic City	6.8
4.	Dwarka – Najafgarh	4.295
5.	Escorts Mujesar – Ballabhgarh	3.2
6.	Dilshad garden – New Bus Adda	9.41

### **Connectivity highlights:**

The opening of the Janakpuri West – Kalkaji Mandir section of the Delhi Metro will immensely improve the connectivity of the national capital. With the opening of this corridor west Delhi, south Delhi and the satellite city of NOIDA will get interconnected like never before. The entire Magenta Line from Janakpuri West to Botanical Garden will be served by four interchange stations – Janakpuri West (with Blue Line), Hauz Khas (With Yellow Line), Kalkaji Mandir (with Violet Line) and Botanical Garden (with Blue Line). The main connectivity highlights will be as follows:

- **Hauz Khas to emerge as vital Metro hub**

The Hauz Khas Metro station has been turned into an interchange station to facilitate inter-connectivity between the HUDA City Centre – Samaypur Badli (Line 2) and the Janakpuri West – Botanical Garden Metro corridors.

The passengers coming from Gurugram on Line 2 will be able to get down at Hauz Khas and take a direct train to Botanical Garden in NOIDA. Through this connectivity, the travelling time between Gurugram and NOIDA will be brought down by at least half an hour.

After the inauguration of this vital link, the approximate time to commute between HUDA City Centre and Botanical Garden will be about 50 minutes. Presently, a Metro journey from HUDA City Centre to Botanical Garden in NOIDA takes about one and a half hours with the interchange at Rajiv Chowk. There will be paid area to paid area connectivity between the new and the old Hauz Khas stations.

- **West Delhi Connect**

The Janakpuri West Metro station on the Dwarka - NOIDA Metro corridor (Line 3) has also been converted into an interchange station to provide additional connectivity to areas in south Delhi and NOIDA from west Delhi.

The interchange station will be the first station of the Janakpuri West – Botanical Garden corridor of Phase 3 which will connect Line 3 with important locations such as the Terminal 1 of the IGI Airport, Munirka, Hauz Khas, Nehru Place and Botanical Garden in NOIDA.

The entire Janakpuri West – Botanical Garden corridor will also act as a feeder for the presently operational Line 3 as both the originating stations of this corridor – Janakpuri West and Botanical Garden are important stations of Line 3.

This new line will, therefore, significantly help in reducing congestion on Line 3 as well as the Rajiv Chowk Metro station as the journey from Janakpuri West to Botanical Garden by both the corridors will almost take the same time.

- **Improved connectivity for IT Hub Nehru Place**

Nehru Place, a locality in south Delhi, which houses one of India's largest information technology markets, already has a Metro station, on the Kashmere Gate – Escorts Mujesar corridor of the Delhi Metro network.

Now, Nehru Enclave, the new Metro station, on the Janakpuri West – Botanical Garden corridor will directly connect the area with the satellite town of NOIDA in Uttar Pradesh, the domestic terminal of the Indira Gandhi International Airport as well as tremendously reduce travel time to other prominent locations of NCR such as Gurgaon.

- **Domestic Airport to be on the Metro Network**

The domestic terminals of the Indira Gandhi Airport are also going to get Metro connectivity in Phase 3.

The presently operational Airport Express Link provides Metro connectivity to the new T3 terminal of the Airport from which all international carriers and all premium domestic airlines fly. However, there is no Metro connectivity for the domestic terminals from which the low cost operators fly. The station will help the domestic passengers in a major way. Let us take a look:

·From South Delhi : Direct connectivity from Kalkaji, Nehru Place, Hauz Khas, Munirka etc.

·From East Delhi: Passengers coming from Vaishali (Ghaziabad), Anand Vihar, Lakshmi Nagar etc can take Line 3 and 4 and change at Janakpuri West.

· From West Delhi: Passengers coming from Punjabi Bagh, NS Place etc can take the new Majlis Park – Durgabai Deshmukh South Campus corridor, change at Rajouri Garden, then take Line 3 and reach Janakpuri West to avail the services on this corridor.

·From North and Central Delhi: Passengers coming from Vishwavidyalaya and Central Delhi areas can take Line 2, reach Hauz Khas and board the train to the Terminal 1 – IGI Airport.

·From NOIDA: Direct connectivity from Botanical Garden in NOIDA (Approx 35 minutes from Botanical Garden).

- **Delhi Metro to provide connectivity to four universities of Delhi for the first time**

The Magenta line will be a boon for the student community of the city in a major way and can be called the Delhi Metro's '**Knowledge Corridor**'. The new corridor will connect four major universities of the National Capital Region (NCR), which were not connected by the Metro so far.

The Jawaharlal Nehru University (JNU) and Indian Institute of Technology (IIT) are the institutions which will get Metro connectivity. Jamia Milia Islamia University and Amity University in NOIDA have already got Metro connectivity with the opening of the Botanical Garden – Kalkaji Mandir section in December last year.

While IIT will have a dedicated station by the same name, the Munirka station will cater to JNU which will be within a distance of about two kilometres. The Jamia Milia Islamia station caters to the Jamia Milia Islamia University and Amity University has a station adjacent known as Okhla Bird Sanctuary.

### **Commuter amenities:**

Besides the above mentioned connectivity benefits, this section will also have many facilities for the convenience of the passengers.

- **9 Subways on Outer Ring Road for pedestrian movement**

Delhi Metro has constructed nine subways on the Outer Ring Road - Munirka, R.K.Puram, IIT, Panchsheel Park, Chirag Delhi, Greater Kailash, Nehru Enclave (2 subways)

These subways will work as entry/exit structures and also as independent free subways for the pedestrians. All subways will have stairs, escalators and lifts for commuters.

To make such subways Delhi Metro has used Box Pushing technology instead of conventional cut and cover to avoid traffic diversion and disruption on the road during construction.

- **Multi Modal Integration (MMI) at stations**

On all the upcoming stations of the Magenta Line from Vasant Vihar to Nehru Enclave, which will be located in the vicinity of the Outer Ring Road, adequate arrangements have been made for traffic management at the entry and exit points of the stations as per UTTIPEC guidelines and availability of space. Separate auto and car drop off points have been created at the entry points. All the stations also have bus stands within 100 metres of the entry/exit points.

At Vasant Vihar, Panchsheel Park and Nehru Enclave, auto stand facilities have also been created while at IIT, cycle paths have been created so that the students from IIT can cycle to the station. At all stations, there will be provision for the parking of vehicles of handicapped passengers near the lifts which will be connected with the help of a ramp. Adequate signage will be put up at all drop off points, auto parking stands, handicapped parking spaces for the convenience of the passengers.

DMRC is committed to ensuring that the opening of these stations does not cause any impact on the flow of traffic on Outer Ring Road. All necessary design changes despite space constraints have been brought to make space for drop off points for autos, cars, intermediate public transport etc. In order to reduce the chaos and congestion near station entry/exit points, it is planned to install railing judiciously at the venerable locations.

- **Green Building Certification**

- All Underground & Elevated stations of Janakpuri West – Nehru Enclave section of DMRC Line-8 are “**Platinum**” rated by Indian Green Building Council (IGBC).

- More than **65** stations & **3** Receiving Sub Stations (RSS) of DMRC Phase-III commissioned so far are also “**Platinum**” rated by IGBC.
- All these platinum rated buildings are designed with specific provisions for the conservation of energy as well as better CO2 saving, water saving, waste management, energy management and optimized building design to reduce the size of station box and hence lesser use of construction materials.

### **Engineering Challenges:**

On this section, DMRC’s engineers encountered a number of engineering challenges as well. The alignment from Janakpuri West to Palam was converted from elevated to underground because elevated construction would have entailed a lot of road diversions and demolitions. Similarly, the Hauz Khas station was constructed 29 metres below the surface. Some of the engineering challenges are as follows:

- **Janakpuri West – Palam stretch made underground**

The stretch from Janakpuri West to Palam was originally conceived as an elevated corridor. The stretch, roughly six kilometres in length was designed to pass through extremely congested residential as well as commercial areas of west Delhi. In addition, the construction of an elevated interchange facility at Janakpuri West on the busy Najafgarh Road would have been another major challenge for the Delhi Metro team.

The initially proposed elevated Metro stretch from Janakpuri West to Palam was converted into an underground stretch keeping in view the following constraints:

- The elevated alignment included construction of five sharp curves of radius 223 mtrs between Dashrathpuri and Janakpuri West involving permanent speed restrictions at these locations.
- The proposed elevated alignment between Dashrathpuri and Palam required construction of a ramp in the middle of a 20 mtr wide road and there was no alternative space left to compensate for the loss of width of the busy road.
- There were a large number of properties involved in the elevated alignment which would have been demolished and rehabilitated.
- The elevated stations at Dabri Mor and Janakpuri West were proposed to be constructed at a height of nearly 16 mtrs and 23 mtrs respectively. Construction of station structures at such height without hampering road traffic below and the operational station at Janakpuri West would have been difficult.
- Construction of an elevated Janakpuri West interchange station would have been a massive challenge without obstructing traffic on the busy and congested Najafgarh Road below. In addition, it would have been very difficult to block any of the entry/exit points of the currently operational station there since the station on the blue line is one of the main Metro stations of that area.

The tunnelling on the stretch was also fraught with many challenges. At Janakpuri West, two 676 metre long tunnels for up and down movement were proposed to be constructed up to Vikaspuri for the reversal facility of trains using Tunnel Boring Machines (TBMs). The tunnels were to pass below the operational Janakpuri West Metro station as well as about 50 structurally sensitive labour hutments in the area which were of very weak built.

To counter this challenge and ensure the safety of the station and the hutments above, a detailed building condition survey of the elevated station and hutments were carried out. Subsequently, a monitoring plan was prepared. Building settlement markers, Inclinometers, Surface settlement markers were installed to monitor the condition of the buildings and ground, during boring. The Tunnelling team was also constantly monitoring the Earth Pressure, quantity of Grouting and Muck Disposal quantity during tunnelling to ensure that boring was completed without any adverse effect to the structures.

As a result, there was no requirement to hamper the services on the busy blue line, which is one of the arterial corridors of the Delhi Metro network and carries about eight lakh people every day. The stretch also included a Crossover Tunnel Section of 100 metres which was to be constructed using conventional methods. Therefore, in order to transfer the TBM from one end of the Crossover to the other, 2 no. push ram cylinders were used to push the TBM shield (approx wt. 400 MT) for the stretch of 100 m.

This was another engineering landmark since the TBM shield was dragged from one point to the other. Generally, TBMs are retrieved through custom made retrieval shafts and then re-inserted through launching shafts in the new location. But such conventional engineering would have involved construction of separate retrieval and launching shafts, which would have required more land and displacement of properties above. In addition, the process would have required a month each approximately for the retrieval and then the launching of the TBM. To avoid these hassles, the TBM shield was dragged using push ram cylinders.

- **The Hauz Khas interchange: Delhi Metro's deepest station**

Construction of the Hauz Khas station was a massive challenge for the Delhi Metro team. Since it was an interchange facility, the engineers also had to ensure that the inter connectivity between the old and the new portions of the Hauz Khas station was seamless and comfortable.

Like all other interchange stations of the Delhi Metro network, this station also has paid area to paid area connectivity between the new and the old Hauz Khas stations.

The new station has been connected with the presently operational station through a ramp. The present Hauz Khas station starts near the Laxman Public school and proceeds up to almost the median of the Outer Ring Road.

The present station at Hauz Khas is 17 mtrs deep. For the construction of the new station, it was not possible to go below the existing station, as the foundation is 32 metres and there is the foundation of the flyover on Outer Ring Road also.

Therefore, if the new station had to be constructed below the existing station, we would have to go deep up to about 42 metres, which would have been very difficult. So, the new station has been built adjacent to the existing station at a depth of 29 metres with a length of 265 metres. It

has been designed as a five level station (rail – platform – intermediate – intermediate - concourse). Generally interchange stations have three or in some cases four levels only.

A subway is connecting the new and the old stations. An old subway in the unpaid area of the station has been converted into a paid subway connecting the old and the new stations. It is about 40 metres long and 12 metres wide.

The AFC Gates, located at the concourse at the earlier station have been brought to the ground level in the new interchange station. There is a two metre level difference on the ramp between the old and the new station.

To prevent disturbance to the residents, sound barriers were installed at Hauz Khas. These sound barriers are continuing all along the station box. These barriers lead to about 32 to 35 percent reduction in noise. The adjacent residential area is Sarvapriya Vihar. As sound barriers, puff sheets, which are sound absorbing material are installed at on the inner side of the barricades. Similar barriers have also been put up at Vasant Vihar.

### **Tunnel below a tunnel: another engineering landmark**

Along with the interchange station, the underground corridor of the Janakpuri West – Botanical Garden line also crisscrossed with the already operational Yellow Line of the Delhi Metro network at Hauz Khas. Therefore, the tunnels of the new line are also passing below those of the functional line.

In Phase 2, the tunnel of the Airport Express Line had passed below the two tier Rajiv Chowk Metro station at a depth of about 45 metres. However, that apart such a feat had never ever been achieved in Delhi Metro in its first two phases. In Phase 3, apart from Hauz Khas, tunnels have been constructed below operational tunnels at three other locations.

The new Metro tunnel at Hauz Khas is about 29 metres deep at a point just after the station. We have passed three metres below the existing tunnel. Proper measures were taken to prevent any movement of the existing tunnel. Settlement chances were prevented through grouting. D Wall was constructed around the existing tunnel to provide support while the new tunnel was being created. Adequate instrumentation to monitor the movement of the existing tunnel was also done.

- **Escalators with the highest elevation in India have been installed at Janakpuri West**

The escalators installed at the new Janakpuri West Metro station have the highest elevation for any escalator in India. These escalators have a height of 15.65 metres which surpasses the escalators installed at the Kashmere Gate Metro station which have a height of 14.575 metres.

The horizontal length of the escalators are 35.32 metres. The height of these escalators are equal to a five storey building. The weight of each escalator was 26 tonnes and a 250 tonne crane was specially planted for the installation of these escalators.

### **Artwork at Metro stations**

Like the other Metro stations of the Delhi Metro network, the stations on this corridor have also been decorated with artworks and paintings. Different themes have been used at different stations and a number of artists have been roped in to execute the work. For example, at Chirag Delhi, an artwork depicting butterflies has been installed since there is a nursery in the vicinity of the station where many butter flies hover over the plants. Interestingly, the artwork at GK Enclave depicts the many trends in fashion. A special kind of print has been installed on the ceilings of some of the stations which are also contributing to their overall look and feel. For example, at Palam, the ceiling of one of the entry/exit points has been decorated with special prints which depict the blue skies. This new innovation has enhanced the beauty of the stations in a major way.

**Operational details:**

After the Magenta line fully opens, the corridor will operate with 24 trains which will gradually increase to 26 apart from the operating reserves. The frequency will be 5 minutes and 15 seconds during peak hours through the whole section and if passenger traffic demands shorter intermediate loops with higher frequency will be introduced after studying the traffic pattern. While the services will start from 6 AM on all days, on Sundays, the services will begin at 8 AM. The total running time between Botanical Garden and Janakpuri West will be one hour.

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