Parking Management Area Plan

Green Park Metro Station

C-SEC
Centre for Sustainable and Equitable Cities

Executive Summary

2022

Parking Management Area Plan

Green Park Metro Station

C-SEC
Centre for Sustainable and Equitable Cities

Team Leader	Sonal Shah
Project Team	Rithvika Rajiv, Amal Jose
Advisor	Midhun Sankar
	We thank Nishant Agarwal for his support in primary data collection and research. We are also deeply grateful to Appurva Chauhan and Muskaan Sharma, fellows with the Youth Leaders for Active Citizenship for assisting us in this project.
Surveys	GMDA Associates LLP
Graphics & Layout	Mareena Thomas
Cover photograph	C-SEC

Recommended citation

Shah, S; Rajiv, R; Jose, A. 2022. Parking Management Area Plan: Green Park Metro Station. C-SEC: New Delhi.


ALL INDIA PERMIT
CNG

Executive Summary

EXECUTIVE SUMMARY

Delhi has the highest number of vehicles in India (119 lakhs). In 2019-2020, there were 643 vehicles per 1000 population. This, despite private motor vehicles (PMVs) constituting only one-third of work trips in Delhi and with close to half the trips (48%) being less than 5km. While the public transport system of Delhi includes 6100 buses and a metro-rail network of 391 km and 286 stations; metro-rail ridership achieved only 52% of the estimated daily ridership (53.47 lakh passengers) in 2019-20. Further, the transport sector contributes to 51% of PM 2.5 emissions in Delhi.

Delhi Maintenance and Management of Parking Places Rules, 2019

In 2019, the Delhi government formulated the Delhi Maintenance and Management of Parking Places Rules, 2019 (DMMPPR) to regulate on-street parking and promote sustainable modes of transport. The rules are to be implemented through Parking Management Area Plans (PMAPs) – local area plans prepared in consultation with stakeholders. The rules recommend higher pricing for on-street parking, Intelligent Transport Management System (ITMS) for enforcement, and reinvestment of parking revenue into the neighbourhood.

Parking Management Area Plan

To demonstrate a process and make a case for implementing PMAPs around mass rapid transit stations in Indian cities, the Centre for Sustainable and Equitable Cities (C-SEC) prepared a PMAP around one metro-rail station in Delhi. Green Park metro station in South Delhi was selected based on its diverse land use, proximity to markets, educational and religious institutions, and presence of a multi-level car park (MLCP). The research observed that 70% of metro users walked to and from the metro station. Yet, the area was characterized by poor quality pedestrian infrastructure with 80% of the road space allocated for motor vehicle travel and parking. Simultaneously, 87% of PMV drivers reported average cruising times of less than 2 minutes to find on-street parking spaces; and 74% of drivers parked within 100m walking distance of their destination.

Need for on-street parking management

Currently, only 4 out of 12 major road stretches are priced, and fees increase incrementally by the hour. These locations are managed by private operators through parking contracts tendered by the Municipal Corporation of Delhi. Our research found that on-street parking is predominately short-term, with 82% of equivalent car units (ECS) parked for 2 hours or less, and 51% for less than 30 minutes. The parking turnover ranges between 0.27 and 1.07.

Strategies, proposals & contracting

Our strategies aim to leverage the presence of the metro station and parking fees are designed to encourage on-street parking for short-term users (<2 hours), and nudge long-term users to shift to off-street parking locations and multi-level car parking. On-street parking is priced at half-hour intervals for the first two hours to encourage higher efficiency and turnover. We propose bundled contracts based on spatial locations, and separate contracts for ITMS and parking management. This would result in generating parking revenues of INR 10-19 crores per annum, compared to INR 13 lakhs per annum from the current parking management system. A revenue-sharing system is proposed whereby 25% of the revenue is invested back into the area to improve and maintain pedestrian facilities.

Outcomes

Parking management plans around metro-rail stations can achieve multiple objectives – strategic implementation of the DMMPPR 2019, prioritize road space, improve convenience for pedestrians, metro-rail and public transport users, and encourage low carbon transport.


इंडियनऑयल ग्रीनपार्क
IndianOil GreenPark
Salute to the pioneers
of our glorious history
IndianOil

THE CONTEXT: GREEN PARK METRO STATION

Land use and street infrastructure

The Green Park metro station is located on the yellow line of the Delhi metro[1]. There are bus stops in the vicinity, and last-mile connectivity is in the form of auto-rickshaw stands near the metro station. The area is characterised by predominantly residential (47%) and commercial (21%) uses (Figure 1).

The parking management area plan is delineated within a 5-minute walking distance of the Green Park metro station. The PMAP area is characterised by planned residential areas alongside urban villages, markets, and religious and educational institutions. Major landmarks include the National Institute of Fashion Technology, Delhi, Action for Ability Development and Inclusion (AADI), and the Gurudwara on Aurobindo Marg (Figure 2). Aurobindo Marg is a major arterial road running north-south, along with nine other collector and local roads in the area, adding up to 4.40km.

Figure 1: Land use

[1]*The Delhi metro network cover over 391 km with 286 stations (including 28 interchange stations). It is spread across 12 lines and 15 depots in the National Capital Region (NCR)-of Delhi.*

Figure 2: Major landmarks in and around the site

Methodology

The action-oriented research includes a detailed review of planning documents, legislation and standards relevant to street design, on-street parking context in Delhi and local and global case studies. This is followed by extensive surveys to understand the existing parking situation within the study area. This includes:

• An inventory of pedestrian facilities and street infrastructure.

• A survey with 200 metro-rail users to understand their travel distances and first and last-mile mode uses.

• A survey of 400 PMV users who park at on-street and off-street locations in the neighbourhood. The intent is to understand ease of parking and behaviour.

• The parking counts compare capacity and volume on weekdays and weekends.

• The license plate survey (LPS) provides insights into parking behaviour, through indicators such as accumulation, occupancy, parking turnover, and duration.

The principles of parking management and recommendations are developed, based on the literature review and analysis of the primary data. Stakeholder interviews were conducted during the existing situation analysis to receive feedback on the Green Park PMAP.

KEY FINDINGS FROM THE SITE STUDY

Poor pedestrian access to metro station

The footpaths in the area range from 1.5m to 5.5m. However, the pedestrian infrastructure is discontinuous, encroached by parking, and spills over from commercial establishments. Additionally, continuous on-street parking impedes access to footpaths (Figure 3).

Vehicles occupy 80% of road space, despite walking being the main mode of access and egress to the metro station

While metro users predominantly walk (70%) or use intermediate public transport (IPT) (25%) as their mode of first and last-mile connectivity, only 20% of road space is allocated for pedestrian infrastructure.

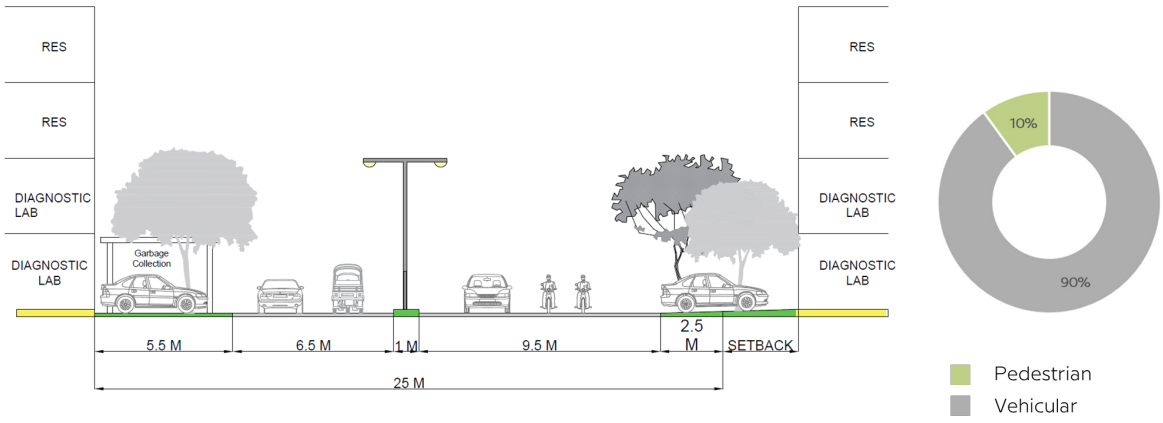
Parking is very convenient for PMV users

The survey among PMV users revealed that the average cruising time[2] is less than 2 minutes for 87% of them. About 74% of the users reported parking within 100m walking distance of their destination. Furthermore, on-street and off-street parking locations are priced similarly and only 4 out of 12 road stretches are priced (including Uphaar Cinema Complex). This implies that on-street parking is inadvertently prioritised.

82% of on-street parking is 2 hours or less in duration

More than half the vehicles (51%, 2726 ECS) park for less than half an hour while being charged at a flat rate per hour. According to local stakeholders, this has resulted in arguments between PMV users and parking management contractors.

Figure 3: Existing road space allocation for pedestrians and vehicles



[2] *Time required to find a parking space*

Further, 18% (985 ECS) of the parking demand is currently long-term (more than 2 hours).

Parking pricing is the same on-street and off-street

There are four off-street paid parking locations on the site, including a multi-level car parking facility. Together, they can accommodate 640-645 ECS per day. The occupancy of the MLCP is 32%. This may be attributed to a lack of differential pricing in parking rates for both on-street and off-street parking, and providing free parking along the major roads in the area.

No parking zones are inadequately enforced

Stretches along Balbir Saxena Marg have been notified as no parking zones. However, cars continue to park here illegally (Figure 4). Vehicles are generally towed infrequently and one at a time. Further heavy commercial vehicle (HCV) parking is rampant along this stretch.

Parking turnover ranges from 0.27 to 1.07

The parking turnover ranges from 0.27-1.07 indicating a demand for shorter-term on-street parking and a potential for higher revenues.

Figure 4: Parking on Balbir Saxena Marg, a no-parking zone

LEARNINGS FROM GLOBAL CITIES AND TAKEAWAYS FROM INDIAN CITIES

Prioritize road space for pedestrian/ NMT infrastructure

Paris observed an excess in the supply of parking spaces, and began to remove its on-street parking to create cycling infrastructure, such as bicycle stands, etc (Figure 5). On-street pricing is priced significantly higher, to facilitate the shift to off-street parking locations. In Tokyo, parking is almost entirely off-street; on-street parking is prohibited, with few exceptions. Enforcement is through private agencies. In Odisha and Chennai in India, bicycle parking is free.

Revise on-street parking rates periodically

In some cities, parking rates are revised periodically based on occupancy rates. Higher occupancy (80%) generally results in upwards revision of prices and correspondingly, lower occupancy (50%), a decrease in prices. This revision may take place at regular intervals. In Taiwan, revisions take place bi-annually, whereas, in Chennai, a quarterly system of revision is in place.

Institute differential parking rates based on demand

Parking rates in different cities are determined by various factors such as location (on-street/off-street), land use, demand, type of vehicle and peak hours. For example, in Barcelona, parking fees are decided based on demand and land use. Paris, on the other hand, has higher parking fees in the core of the city.

Figure 5: Pedestrian space in Paris

Define parking typology through land-use /parking demand

In Paris, parking is based on land use, with roads having distinct pricing and parking duration regulations. This is communicated to drivers through marking on parking meters. In Barcelona too, parking typology is based on demand and land use. Coloured road markings are used to denote the typology. For example, green markings denote residential parking (Figure 6). In Odisha, India, parking duration is defined by land use, for instance, short-term parking is provided for visitors near retail areas, whereas near recreational areas, medium duration parking is provided.

Regulate parking rights to disincentivise PMV

In Tokyo, vehicle registration is dependent on demonstrating proof of parking. Whereas in Paris, a user is permitted one paid parking space; a second vehicle will command visitor rates, which are much higher.

Intelligent traffic management system (ITMS) for parking management

Digital parking management systems have been adopted by a number of cities. They allow users to book and pay for parking slots digitally, while also providing real-time data. In addition, ITMS systems help reduce payment leakages. In Bhubaneshwar, a sensor-based parking facility has been implemented that allows users to pre-book parking spaces. It is managed by a central smart parking system installed at the Integrated City Operations and Management Centre.

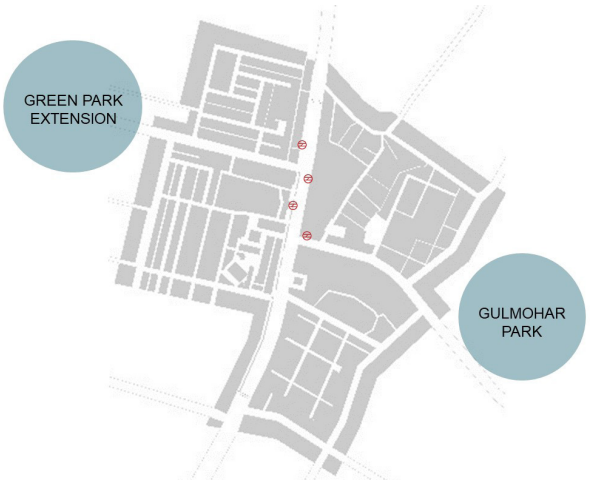
Figure 6: Land use-based parking marking in Barcelona

GUIDING STRATEGIES OF PARKING

Implement DMMPPR 2019 by initiating on-street parking management around metro rail stations and mass rapid transport

On-street parking management can be initiated around metro-rail stations to reprioritize road space for public transport and non-motorized transport uses (Figure 7). This can achieve multiple purposes – create a lively public realm oriented around public transport and enable a modal shift to public transport.

Figure 7: Higher parking pricing near metro rail and mass rapid transport



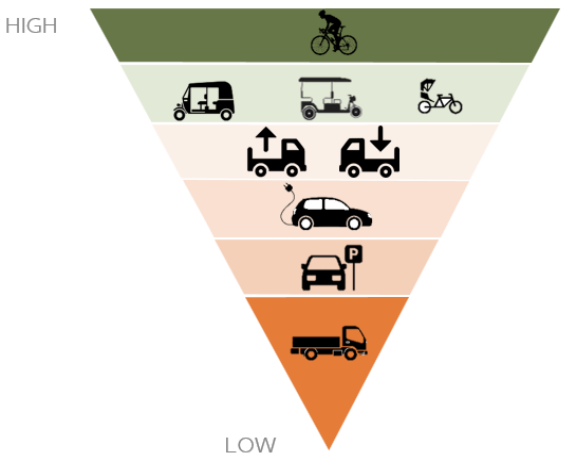
Prioritise road space for pedestrian access

A larger percentage of road space must be prioritised for pedestrian and NMT movement. Road space can be reclaimed from parking by changing the orientation of parking from perpendicular to parallel, removal of parking encroachment and rationalising lane widths.

Prioritise on-street parking for NMT and shared vehicles

The highest priority of parking must be assigned to NMT modes such as bicycles, followed by ensuring the presence of universally accessible parking spaces. Cycle parking requires to be free of cost. The next in priority are IPT and loading/unloading respectively. Parking for PMVs and HCVs should be least prioritised (Figure 8).

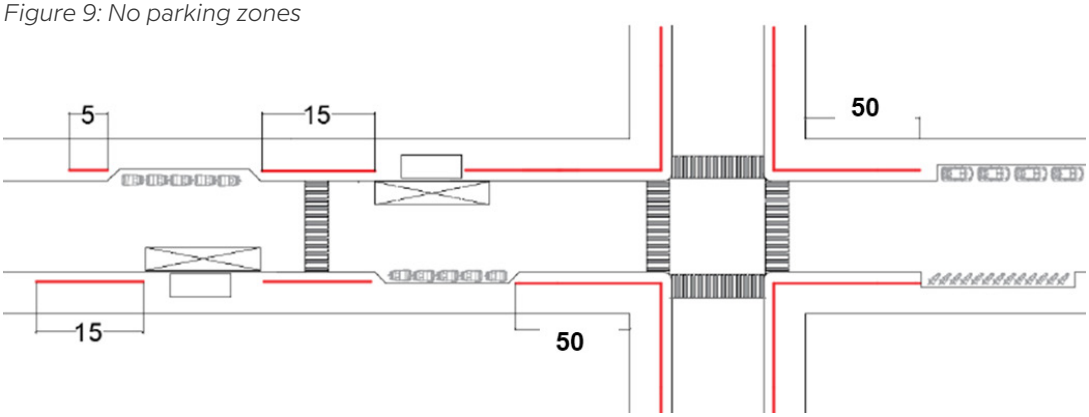
Figure 8: Parking priority



Define no parking zones

Parking is prohibited on arterial roads within 50 metres from an intersection, and near pick-up and drop-off zones, zebra crossings, bus stops, and para-transit stands (Figure 9).

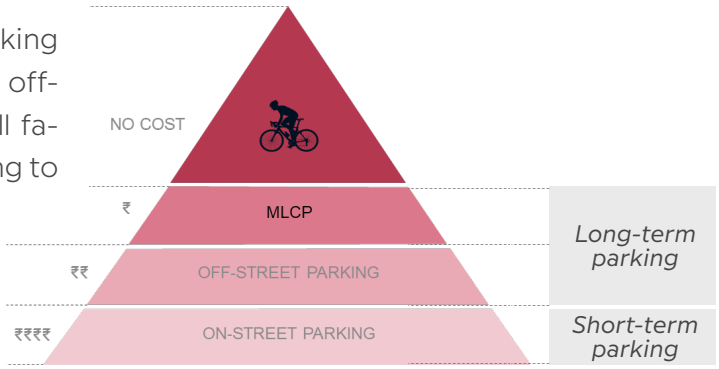
Figure 9: No parking zones



Price on-street parking higher than off-street parking spaces

As per DMMPPR, on-street parking must be priced atleast twice as off-street parking (Figure 10). This will facilitate the shift of long-term parking to off-street facilities.

Figure 10: Proposed parking pricing



PARKING PROPOSALS

No parking zones and pick up and drop off points

No parking zones are designated near intersections, crossings and public transport stops, and along narrow roads. Pick-up and drop-off points will be designated on every road and near PT stops/gates, MLCP market areas and educational institutions.

Proposed parking pricing

The proposed pricing structure is designed taking into consideration mode and demand. Based on our data, which indicates that a majority of drivers park for less than 30 minutes, a seven-slab structure is proposed. The fee is charged for half-hour slots for up to two hours (82% of demand) and hourly thereafter. After 4 hours, a flat rate is proposed (Figure 11).

Figure 11: Proposed pricing structure

0-60 (MIN)		60-120 (MIN)		2-3 (Hrs)	3-4 (Hrs)	> 4 (Hrs)
0-30	30-60	60-90	90-120	2-3 (Hrs)	3-4 (Hrs)	> 4 (Hrs)

Roads are categorised based on parking demand per day as high demand (volume of more than 600 vehicles per day) and low demand (Figure 12). A separate category is instituted for Aurobindo Marg as it is an arterial road. Base parking fee is estimated in terms of price per ECS per hour (INR / ECS / Hr.) Parking pricing is halved for electric vehicles.

Figure 12: Parking pricing

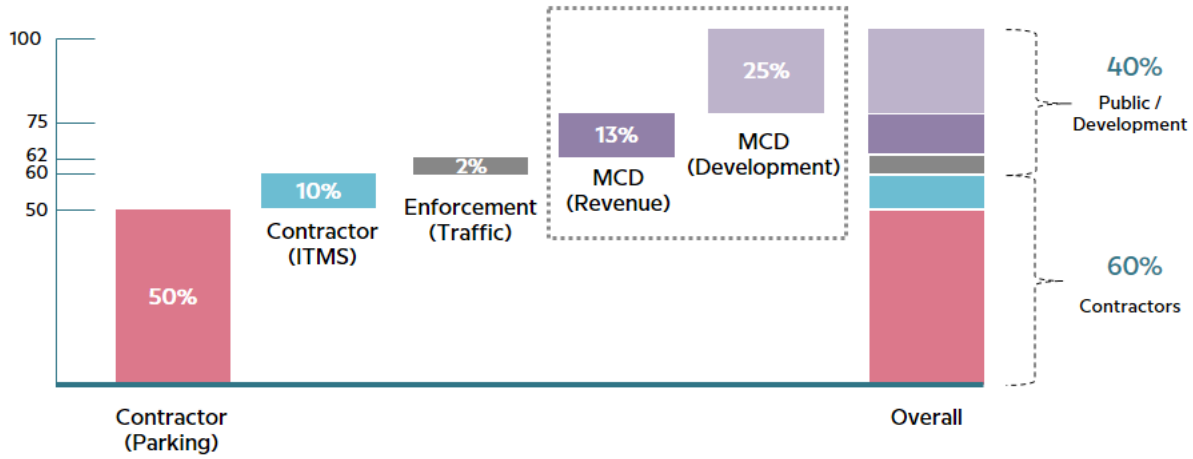
Existing Parking	Mode	0 - 30 (min)	30 - 60 (min)	60-90 (min)	90-120 (min)	2 - 3 (Hrs)	3 - 4 (Hrs)	> 4 (Hrs)
On-street	Car	20	20	40	40	60	80	100
Aurobindo Marg	Car	40	40	80	80	120	160	200
Proposed Parking	**Mode**	**0 - 30 (min)**	**30 - 60 (min)**	**60-90 (min)**	**90-120 (min)**	**2 - 3 (Hrs)**	**3 - 4 (Hrs)**	**> 4 (Hrs)**
Lower Demand	Car	20	40	60	80	120	160	200
Higher Demand	Car	30	60	90	120	180	240	300
Aurobindo Marg	Car	40	80	120	160	240	320	400

Proposed revenue generation and sharing model

Currently, MCD earns an estimated INR 13.0 lakhs per year through tendering. If all the roads were priced based on the PT-PMAP model derived from the DM-MPPR, a revenue of INR 3.45-6.05 lakhs could be generated per day. This considers a shift in demand to off-street parking locations, MLCP and other locations.

It is proposed that 50% of the revenue be allocated to the parking contractors, and 10% to the ITMS contractors. The Traffic Police could receive 2% of the revenue in consideration of their patrolling, and enforcement of parking violation penalties in priority. The MCD could retain 38% of all the revenue, of which 25% should be reinvested back into the neighbourhood for the upgradation of transport infrastructure (Figure 13).

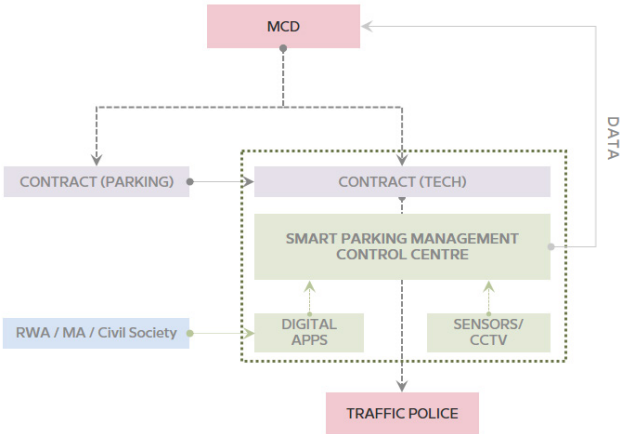
Figure 13: Revenue distribution model



Parking management and ITMS contracts

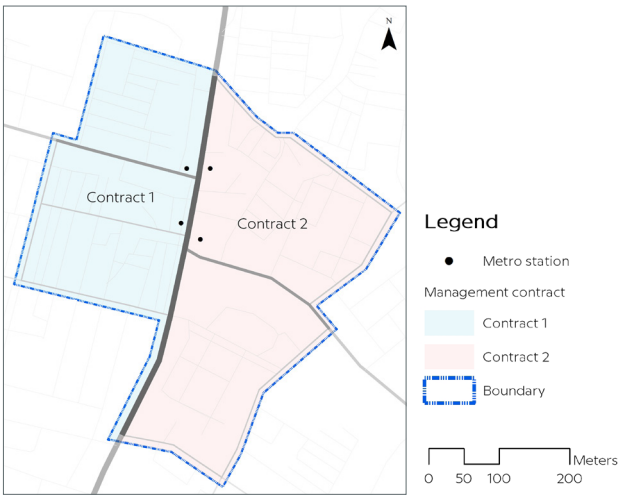
A dual contracting system is proposed, where one contract deals with technology and the other with parking management. The ITMS contract will include setting up and operating an application-based parking management system and a Smart Parking Management Control Center (SPMCC). The SPMCC, with assistance from the parking agents, will monitor the utilization of parking bays and inform the Traffic Police of any parking violations (Figure 14).

Figure 14: Parking management system



A bundled contracting system is proposed where multiple locations – both on street and off street are awarded to one contractor. This will help spatially distribute demand and encourage the contractor to shift long term parking (which has lower turnover) to the less expensive off-street locations. Therefore, two parking contracts are proposed for the Green Park PMAP (Figure 15).

Figure 15: Bundled contracting system



There is an urgency to start acting **NOW.**

CONCLUSION

Delhi has taken a significant step in investing in public transport infrastructure and in adopting progressive parking management rules. Prioritising their implementation around metro-rail stations can create multiple benefits – create vibrant, liveable people-oriented streets around transit, and encourage a modal shift to public transport.

Figure 16: Existing condition of Aurobindo Marg

Figure 17: An artist's rendering of Aurobindo Marg with rationalized on-street parking

For further communication

Sonal Shah
Executive Director
Centre for Sustainable and Equitable Cities

Email: sonal.csec@gmail.com
Website: www.c-sec.org

C-SEC

Centre for Sustainable and Equitable Cities

www.c-sec.org