Planning For Multi-level Car Parking Facilities In Metropolitan City Of Delhi

By:
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Increasing trends of Motorization

Linked to economic growth and increasing purchasing power

Car sales in the country are growing at an average rate of 10 per cent

Two-wheeler sales are expected to grow 14-15 per cent

Roads getting clogged, open areas coming under severe pressure to create space for parking

Parking has taken the proportion of full blown mobility and social crisis in Indian cities

- Each parking space requires valuable land, which is uneconomically utilized by personal vehicles. There is no realization of the fact that there is an opportunity cost of the land, which is devoted for parking.
- With time the demand increases & supply of land for provision of the parking facilities decreases.
**Multi Level Car Parking**

It is a building (or part there hereof) which is designed specifically to be for Automobile Parking and where there are a number of floors or levels on which parking takes place.

Is essentially a Stacked Car Park

“Multilevel Car Park” - Term Originated in UK, in US it is called a “Parking Structure”

**Types:**
- Manually operated (non mechanized-with ramps)
- Mechanized (Classified in different type based on technology)

- Mini
- Puzzle
- Tower

In order to accommodate the large volume of vehicles, small cities and towns must develop their infrastructure.

One solution may be a multi-level car parking system to maximize car parking capacity by utilizing vertical space, rather than expand horizontally.

With land in metros and 'a' grade cities becoming scarce and dearer, and plots getting smaller, conventional parking is proving infeasible.
Multi Level Car Parking: Types

Mini System: Mechanical car park system with/without a pit

Mechanical car park system without a pit: The MCPS without pit is specifically designed to use the same footprint of one car parking space especially in the existing facilities (where space is a premium requirement) such as offices, hotels and residences.

The MCPS with a pit is a simple mechanical hydraulic system with horizontal platforms designed for vertical stacking and storage of both sedan and SUV types. The system can be conveniently arranged for indoor and outdoor use to allow the access of parking spaces independently.
The FACPS extends the existing parking space vertically up to 6 levels; resulting in multi-layer parking solution with a single drive lane. It is designed to allow multi-level storage spaces above or below ground with user friendly operation and ease of maintenance. It can be fully covered especially for extreme hot and cold areas and designed according to the user requirements with parking positions for full SUVs and sedans. The storage and retrieval of cars within the system is done on the ground floor with a user friendly control panel to retrieve the stored cars from higher levels.
Multi Level Car Parking: Types

Tower System: Fully Automated Car Parking Systems (FACPS)

FACPS is ultimately designed for maximum space utilization for the vertical and horizontal storage of cars where space is not available. FACPS structure can be included within the building structure or built separately as a dedicated parking tower. This system is mainly installed in high rise commercial business towers and residential areas where safety and speed are a must.
Case Study: Nehru Place

The first business district in Delhi under the master plan of 1962.

Planned as an 82 acre site that would include: commercial centre including service industries (57 acres), work cum industrial centers (15 acres) & govt. offices (10 acres).

Planned for a population of 1.5 -2.5 lakhs & about 200-350 shops

It today holds about 4000 offices & 1500 shops, 3, 48,412 sq.m of commercial built up area

- Inadequate circulation space, congestion at the entry & exits & long vehicle retrieval time are the key issues in all parking lots.
- Parking lots are open from 0800hrs to 2200hrs
Nehru Place: Overview

Eros Multi-level Parking –
Supply – 1000 ECS

- seven-storied parking
- ramp based multilevel parking with a capacity of 1,000 ECS.
- the total built up area (including basement) is 60,550 sq m. of the total built up area, 18,165 sq m (nearly 30 per cent) is allowed to be used for other commercial activities and the remaining 42,385 sq m is parking services.

Off & On-street Parking –
Supply – 2967 & 750 ECS

Nehru Place - Metro Station, Proposed Metro Line

Proposed Multi-level Car Parking by DDA-

DTC Bus Depot, facing the Outer ring road
Nehru Place: On & Off-Street Parking

**Nehru Place On Street Parking**

- **Parking Characteristics**
  - Total Accumulation: 14094
  - Peak Accumulation: 1721
  - Peak Hour: 15-16
  - Parking Supply: 750
  - Parking Index: 2.29
  - Parking Turnover: 18.79

- **Parking Accumulation**
  - Graphs showing peak accumulation and time.

**Nehru Place Off Street Parking**

- **Parking Characteristics**
  - Total Accumulation: 33950
  - Peak Accumulation: 4787
  - Peak Hour: 12-13
  - Parking Supply: 2967
  - Parking Index: 1.61
  - Parking Turnover: 11.44

- **Parking Accumulation**
  - Graphs showing peak accumulation and time.

**Duration of Cars**

- Off Street:
  - 0-2 HRS: 27%
  - 2-4 HRS: 21%
  - 4-6 HRS: 21%
  - 6-8 HRS: 13%
  - 8 HRS+: 6%

- On Street:
  - 0-2 HRS: 11%
  - 2-4 HRS: 25%
  - 4-6 HRS: 21%
  - 6-8 HRS: 21%
  - 8 HRS+: 3%
Nehru Place: Parker’s Opinion

- The regular workers & irregular visitors at Nehru Place were 80% & 20% respectively.
- Almost 40% users have an income ranging from Rs 30,000 – Rs 60,000.
- The purpose of trip generally is work.
- The parking lots are located all round Nehru Place but still the average walking distance between parking lot & destination place is about 200m, and this consumes about 7-8 min.
- Nearly 5-7 min are spent in searching for a bay & about 3 min in processing for parking ticket.
- As far as technology is concerned, about 52% uses prefer driving up to six levels of parking.
Eros Group: Multi Level Car Parking

**EROS PARKING**

**PARKING CHARACTERISTICS**
- **Total Accumulation**: 4210
- **Peak Accumulation**: 614
- **Peak Hour**: 15-16
- **Parking Supply**: 1000
- **Parking Index**: 0.614
- **Parking Turnover**: 4.21

**Revision of Rates in Eros Parking Lot**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 2 Hrs</td>
<td>50</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Upto 3 1/2 Hrs</td>
<td>80</td>
<td>30</td>
<td>63</td>
</tr>
<tr>
<td>Upto 4 Hrs</td>
<td>80</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Upto 8 Hrs</td>
<td>120</td>
<td>80</td>
<td>33</td>
</tr>
<tr>
<td>24 Hrs</td>
<td>300</td>
<td>250</td>
<td>17</td>
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</table>
Eros Parking Users are willing to pay almost twice the amount paid by them in today’s context for a Multi Storied Parking facility, but on the other hand, the regular Nehru Place users do not consider paying more than the current charges. The most popular choice in terms of technology preferred is automated (lift based) selected by nearly 70% of the users.
## Other Commercial Areas of Delhi

### SUMMARY OF PARKING CHARACTERISTICS OF VARIOUS PARKING LOTS IN SELECTED COMMERCIAL AREAS OF NEW DELHI

<table>
<thead>
<tr>
<th>Parking Type &amp; Name</th>
<th>Total Accumulation</th>
<th>Peak Accumulation</th>
<th>Supply ECS</th>
<th>Gap Between Supply &amp; Demand</th>
<th>Parking Index</th>
<th>Parking Turnover</th>
<th>Short Term Parking (%) &lt; 2 Hrs</th>
<th>Long Term Parking (%) &gt; 2 Hrs</th>
<th>Supply ECS Hrs (14 Hrs)</th>
<th>Demand ECS Hrs</th>
<th>Ratio of Demand ECS Hrs : Supply ECS Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connaught Place (On Street)</td>
<td>19320</td>
<td>2663</td>
<td>2178</td>
<td>485</td>
<td>1.22</td>
<td>8.87</td>
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<td>7.4</td>
<td>30492</td>
<td>20112</td>
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<td>Connaught Place (Off Street)</td>
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<td>3570</td>
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<td>Connaught Place (Multi Level)</td>
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<td>2273</td>
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<td>165</td>
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<td>9.36</td>
<td>21.9</td>
<td>78.1</td>
<td>29512</td>
<td>95301</td>
<td>3.23</td>
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<td>Connaught Place (Palika)</td>
<td>14141</td>
<td>1957</td>
<td>2000</td>
<td>-43</td>
<td>0.98</td>
<td>7.07</td>
<td>16.0</td>
<td>84.0</td>
<td>28000</td>
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<td>Nehru Place (On Street)</td>
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<td>1721</td>
<td>750</td>
<td>971</td>
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<td>18.79</td>
<td>78.9</td>
<td>21.1</td>
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<td>Nehru Place (Off Street)</td>
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<td>4787</td>
<td>2967</td>
<td>1820</td>
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<td>11.44</td>
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<td>New Friends Colony (On Street)</td>
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<td>98</td>
<td>70</td>
<td>28</td>
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<td>10.90</td>
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<td>380</td>
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<td>Lajpat Nagar (On Street)</td>
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<td>1.43</td>
<td>13.76</td>
<td>58.6</td>
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<td>TOTAL</td>
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<td>20518</td>
<td>17091</td>
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<td>239274</td>
<td>635343</td>
<td>2.66</td>
</tr>
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</table>

SOURCE: PRIMARY SURVEY 2010, CRRI STUDY 2006, RITES STUDY 2009

### SUMMARY OF PARKING CHARACTERISTICS OF VARIOUS PARKING LOTS IN SELECTED COMMERCIAL AREAS OF NEW DELHI

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<tr>
<th>Location</th>
<th>Total Accumulation</th>
<th>Peak Accumulation</th>
<th>Supply ECS</th>
<th>Gap Between Supply &amp; Demand</th>
<th>Parking Index</th>
<th>Parking Turnover</th>
<th>Short Term Parking (%)</th>
<th>Long Term Parking (%)</th>
<th>Supply ECS Hrs</th>
<th>Demand ECS Hrs</th>
<th>Ratio of Demand ECS Hrs : Supply ECS Hrs</th>
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<td>10463</td>
<td>10326</td>
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<td>641</td>
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<td>13.76</td>
<td>58.60</td>
<td>41.40</td>
<td>22372</td>
<td>62733</td>
<td>2.80</td>
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</tbody>
</table>

SOURCE: PRIMARY SURVEY 2010, CRRI STUDY 2006, RITES STUDY 2009
Financial Viability Analysis...

The most decisive indicators for the project to be financially viable are NPV & FIRR.

- Initially, a site proposed by DDA for developing Multi Level Parking at Nehru Place was taken as the base for computations.
- In detail, computations on 3 different plot sizes were also carried out. These were: 3000-6000 sq.m, 6000-9000 sq.m, 9000-12000 sq.m
- Potential of the existing site for various multi level parking technologies were assessed one by one for each of the technologies manual (ramp), semi automated, fully automated.
- Levels estimated ranged from 5-14 levels.
- Commercial area content was also taken between 20%-30% of the total F.A.R.

For the calculation of the total ECS generated in each of the scenarios, the development controls adopted were the ones prescribed in MPD 2021. These are mainly:

- 65% ground coverage with no height restriction
- F.A.R: as/per feasibility
- No limit on number of basements (subject to adequate safety)
- A fixed percentage of area under circulation ramps (21% in this case)
### ASSUMPTIONS FOR FINANCIAL VIABILITY: COST STRUCTURE

<table>
<thead>
<tr>
<th>S NO.</th>
<th>COMPONENT</th>
<th>UNIT</th>
<th>MANUAL (RAMP BASED)</th>
<th>SEMI AUTOMATED (RAMP + LIFT)</th>
<th>FULLY AUTOMATED (LIFT)</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>VALUE</td>
<td>VALUE</td>
<td>VALUE</td>
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<tr>
<td>A.</td>
<td>CONSTRUCTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONSTRUCTION COST FOR PARKING AREA</td>
<td>INR/sft</td>
<td>800</td>
<td>1500</td>
<td>3200</td>
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<td>2</td>
<td>CONSTRUCTION COST FOR COMMERCIAL AREA</td>
<td>INR/sft</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
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<td>B.</td>
<td>PRELIMINARY AND PREOPERATIVE EXPENSES</td>
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<tr>
<td>3</td>
<td>DESIGN EXPENSES</td>
<td>OF CONSTRUCTION COST</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
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<tr>
<td>4</td>
<td>ADMINISTRATIVE EXPENSES</td>
<td>OF CONSTRUCTION COST</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
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<td>5</td>
<td>PROJECT MANAGEMENT EXPENSES</td>
<td>OF CONSTRUCTION COST</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
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<tr>
<td>6</td>
<td>MISCELLANEOUS EXPENSES</td>
<td>OF CONSTRUCTION COST</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
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<tr>
<td>7</td>
<td>PROVISION FOR CONTINGENCIES</td>
<td>OF CONSTRUCTION COST</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
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<tr>
<td>C.</td>
<td>PHASING</td>
<td></td>
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<tr>
<td>8</td>
<td>CONSTRUCTION PERIOD</td>
<td>YEARS</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<td>D.</td>
<td>CAPITAL STRUCTURE</td>
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<td>9</td>
<td>DEBT EQUITY RATIO</td>
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<td>10</td>
<td>COST OF DEBT</td>
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<td>12%</td>
<td>12%</td>
<td>12%</td>
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<tr>
<td>11</td>
<td>COST OF EQUITY</td>
<td></td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
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<td>12</td>
<td>WEIGHTED AVERAGE COST OF CAPITAL</td>
<td></td>
<td>14.64%</td>
<td>14.64%</td>
<td>14.64%</td>
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<td>E.</td>
<td>OPERATIONS AND MAINTENANCE</td>
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<td>13</td>
<td>ASSUMED %</td>
<td>OF CONSTRUCTION COST</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
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<tr>
<td>13.1</td>
<td>ELECTRICAL (%)</td>
<td>OF CONSTRUCTION COST</td>
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<td>0.30</td>
<td>0.30</td>
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<td>13.2</td>
<td>MECHANICAL (%)</td>
<td>OF CONSTRUCTION COST</td>
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<td>0.20</td>
<td>0.20</td>
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<tr>
<td>13.3</td>
<td>SECURITY (%)</td>
<td>OF CONSTRUCTION COST</td>
<td>0.15</td>
<td>0.15</td>
<td>0.15</td>
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<tr>
<td>13.4</td>
<td>FIRE SAFETY (%)</td>
<td>OF CONSTRUCTION COST</td>
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<td>0.20</td>
<td>0.20</td>
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<tr>
<td>13.5</td>
<td>SALARY OF STAFF (%)</td>
<td>OF CONSTRUCTION COST</td>
<td>0.15</td>
<td>0.15</td>
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</table>

**SOURCE:** WOHR PARKING SOLUTIONS, BKS MARG STUDY BY IDFC, FEEDBACK VENTURES STUDY 2009

**ASSUMPTIONS FOR COST STRUCTURE**

1. CONSTRUCTION PERIOD HAS BEEN ASSUMED AS 2 YEARS FOR EACH OF THE TECHNOLOGY TYPES
2. COST PHASING: FIRST YEAR 65% & SECOND YEAR 35%
3. OPERATION & MAINTENANCE COST IS INCREMENTAL @ 5% IN EVERY 3 YEARS
4. RATES HAVE BEEN ASSUMED ON SQ.FT BASIS
5. WEIGHTED AVERAGE COST OF CAPITAL HAS BEEN USED AS THE DISCOUNTING RATE FOR CALCULATING NPV

**SOURCE:** WOHR PARKING SOLUTIONS, BKS MARG STUDY BY IDFC, FEEDBACK VENTURES STUDY 2009
### Revenue Structure

#### Assumptions for Financial Viability: Revenue Structure

<table>
<thead>
<tr>
<th>S NO.</th>
<th>Component</th>
<th>Manual (Ramp Based)</th>
<th>Semi Automated (Ramp + Lift)</th>
<th>Fully Automated (Lift)</th>
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<tr>
<td></td>
<td></td>
<td>Value</td>
<td>Value</td>
<td>Value</td>
</tr>
<tr>
<td>A.</td>
<td>REVENUE FROM PARKING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ECS GENERATED</td>
<td>1/30 sq.m</td>
<td>1/22 sq.m</td>
<td>1/16 sq.m</td>
</tr>
<tr>
<td>2</td>
<td>DURATION OF PARKING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-2 HRS</td>
<td>OF TOTAL ECS 39%</td>
<td>39%</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>2-4 HRS</td>
<td>OF TOTAL ECS 12%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>4-6 HRS</td>
<td>OF TOTAL ECS 15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>6-8 HRS</td>
<td>OF TOTAL ECS 18%</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>&gt; 8 HRS</td>
<td>OF TOTAL ECS 16%</td>
<td>16%</td>
<td>16%</td>
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<tr>
<td>B.</td>
<td>REVENUE FROM COMMERCIAL AREA</td>
<td>INR/SQ FT/MONTH</td>
<td>200</td>
<td>250</td>
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<td>C.</td>
<td>REVENUE FROM ADVERTISEMENTS</td>
<td>OF TOTAL EARNINGS</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Source:** WOHR Parking Solutions, BKS Marg Study by IDFC, Feedback Ventures Study 2009

#### Assumptions for Revenue Structure

1. ECS generated have been calculated based on design standards (Neufert).
2. Duration of parking has been calculated through parking demand analysis of the current parking lots.
3. Parking rates have been fixed based on the sensitivity analysis of Eros parking lot.
4. Parking rates shall be revise @ 5% every 3 years.
5. Rental value of commercial areas based on primary survey incremental @ 5% every 3 years.
6. Revenue form advertisements incremental @ 5% every 3 years.

**Source:** WOHR Parking Solutions, BKS Marg Study by IDFC, Feedback Ventures Study 2009
Findings from Financial Analysis...

For Smaller Plot Sizes Varying From 3000-6000 Sqm:

- No. Of Levels: 5 Floor (10.5m) @ 25% Commercial Area
- Manual Technology If Feasible With A Highest FIRR & Highest NPV
- No. Of Levels : 7 Floors (14.7m) @ 25% Commercial Area
  Semi Automated Structures Are Feasible
- No. Of Levels : 10 & 12 Floors (21m & 25.2m) @ 30% Commercial
  Fully Automated Structures Are Feasible With Higher NPV.

For Medium Plot Sizes Varying From 6000-9000 Sqm:

- No. Of Levels: 7 Floor (14.7m) @ 25% Commercial Area
- Manual Technology If Feasible With A Highest FIRR & Highest NPV
- No. Of Levels : 10 Floors (21m) @ 25% Commercial Area
  Semi Automated Structures Are Feasible
- No. Of Levels : 12 & 14 Floors (25.2m & 29.4m) @ 30% Commercial
  Fully Automated Structures Are Feasible With Higher NPV.

For Large Plot Sizes Varying From 9000-12000 Sqm:

- No. Of Levels: 7 Floor (14.7m) @ 25% Commercial Area
- Manual Technology If Feasible With A Highest FIRR & Highest NPV
- No. Of Levels : 10 Floors (21m) @ 25% Commercial Area
  Semi Automated Structures Are Feasible
- No. Of Levels : 12 & 14 Floors (25.2m & 29.4m) @ 30% Commercial
  Fully Automated Structures Are Feasible With Higher NPV.
Nehru Place: Parking Strategy

PROJECTION OF PARKING DEMAND : NEHRU PLACE

<table>
<thead>
<tr>
<th>YEAR</th>
<th>GROWTH RATE (%)</th>
<th>PEAK DEMAND (ECS)</th>
<th>REDUCTION IN DEMAND DUE TO METRO (%)</th>
<th>PEAK DEMAND AFTER METRO (ECS)</th>
<th>SUPPLY (INCL. ON STREET) (ECS)</th>
<th>SUPPLY (EXCL. ON STREET) (ECS)</th>
<th>GAP B/W DEMAND &amp; SUPPLY (ECS)</th>
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<tbody>
<tr>
<td>2010</td>
<td>6%</td>
<td>7122</td>
<td>-</td>
<td>7122</td>
<td>4717</td>
<td>3967</td>
<td>3155</td>
</tr>
<tr>
<td>2011</td>
<td>6%</td>
<td>7549</td>
<td>-</td>
<td>7549</td>
<td>4717</td>
<td>3967</td>
<td>3582</td>
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<tr>
<td>2012</td>
<td>6%</td>
<td>8002</td>
<td>18%</td>
<td>6562</td>
<td>7672*</td>
<td>6922#</td>
<td>-360</td>
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<td>6%</td>
<td>8482</td>
<td>21%</td>
<td>6701</td>
<td>7672*</td>
<td>6922#</td>
<td>-221</td>
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<tr>
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<td>6%</td>
<td>8991</td>
<td>24%</td>
<td>6833</td>
<td>7672*</td>
<td>6922#</td>
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<td>6%</td>
<td>9531</td>
<td>27%</td>
<td>6958</td>
<td>7672*</td>
<td>6922#</td>
<td>36</td>
</tr>
</tbody>
</table>

CURRENT GENERATION RATES IN NEHRU PLACE : 2.06 ECS/100SQ.M

* PARKING SUPPLY AFTER CONSTRUCTION OF MULTI STORIED PARKING LOT
# PARKING SUPPLY EXCLUDING ON STREET SUPPLY
6% GROWTH RATE INCLUDES NATURAL INCREASE IN PARKING DEMAND & DEMAND ADDED BY NEWLY ADDED COMMERCIAL AREA
REDUCTION IN PARKING DEMAND DUE TO METRO ASSUMED BASED ON A STUDY BY DMRC ON PALIKA PARKING.

- DDA’s Proposed Site (A) at Nehru Place (Site Area: 8657 Sq.m). This plot is likely to generate 2955 ECS (including 710 ECS for commercial) if developed on fully automated technology & 30% commercial area component (financially most optimal option).
- The project time for this was taken as 2 yrs & therefore the supply from 4717 ECS (in 2010) will go up to 7672 ECS (in 2012). If the on-street supply is neglected, the total parking supply in Nehru Place in 2012 will be 6922 ECS, which is still 36 ECS short of the required mark of 6958 ECS.
- Hence, certain alternative plot locations are also proposed, in terms of strategy, which could be developed as multi storied parking lots in order to meet Nehru Place’s parking demand.
**Conclusions...**

- As the land in metropolitan cities and other higher order cities becoming scarce and dearer and plots getting smaller conventional parking is proving infeasible.

  **The solution for the parking requirements is the multi-level car parking system to maximize car parking capacity by utilizing vertical space, rather than expanding horizontally.**

- Attitudinal survey of parkers at Nehru Place revealed that about 52% users prefer driving up to six levels of parking in case of a multi-level parking facility.
- The most popular choice in terms of technology preferred is automated (lift based) selected by nearly 70% of the users.

- The financial analysis revealed that:
  - Manual technology was most appropriate option for smaller plots between 3000-6000 sq.m upto 5 levels.
  - For medium sized plots ranging between 6000-9000 sq.m the technology options could be either manual upto 7 levels or fully automated structures with 12-14 floors.
  - In case of large plots ranging between 9000-12000 sq.m fully automated structures with 12 to 14 floors are most appropriate options.
The minimum area of a plot that can be considered for the purpose will be 1000 square meters in the core city areas and 2000 sq.m in district centers and other areas.

However, specific proposal, which is technically feasible and viable, could be considered on cases by case basis for smaller plots by the local authority.

The minimum number of vehicles that have to be accommodated in a parking lot will be 50 with a minimum parking space of 700 square meters.

In addition to the permissible parking spaces (ECS) on max. FAR, 3 times additional space (ECS) has to be provided for parking component only.

The location of the parking space can be in the basement or on the ground or any other floor of a building with access through ramps or lifts or a combination of both.

Maximum ground coverage, FAR, height and setbacks to be permitted could be considered subject to technical viability and feasibility.

Ideal situation would be to have a mix of financial, economic and social indicators to achieve the practical and best possible solution to the need. Supportive regulatory framework is required for taking off the parking projects on PPP mode. Development control rules of the city should have flexibility, to make the project financially viable. PPP in parking would require delegation of certain managerial issues by the ULB to the developer (possibly an SPV).
Thank You