PIMPRI CHINCHWAD MUNICIPAL CORPORATION

IMPLEMENTATION OF PCMC ON-STREET PARKING PROJECT

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City Introduction

Pimpri Chinchwad is major industrial town in Maharashtra. The twin towns of Pimpri and Chinchwad along with other rural suburbs are governed by Pimpri Chinchwad Municipal Corporation

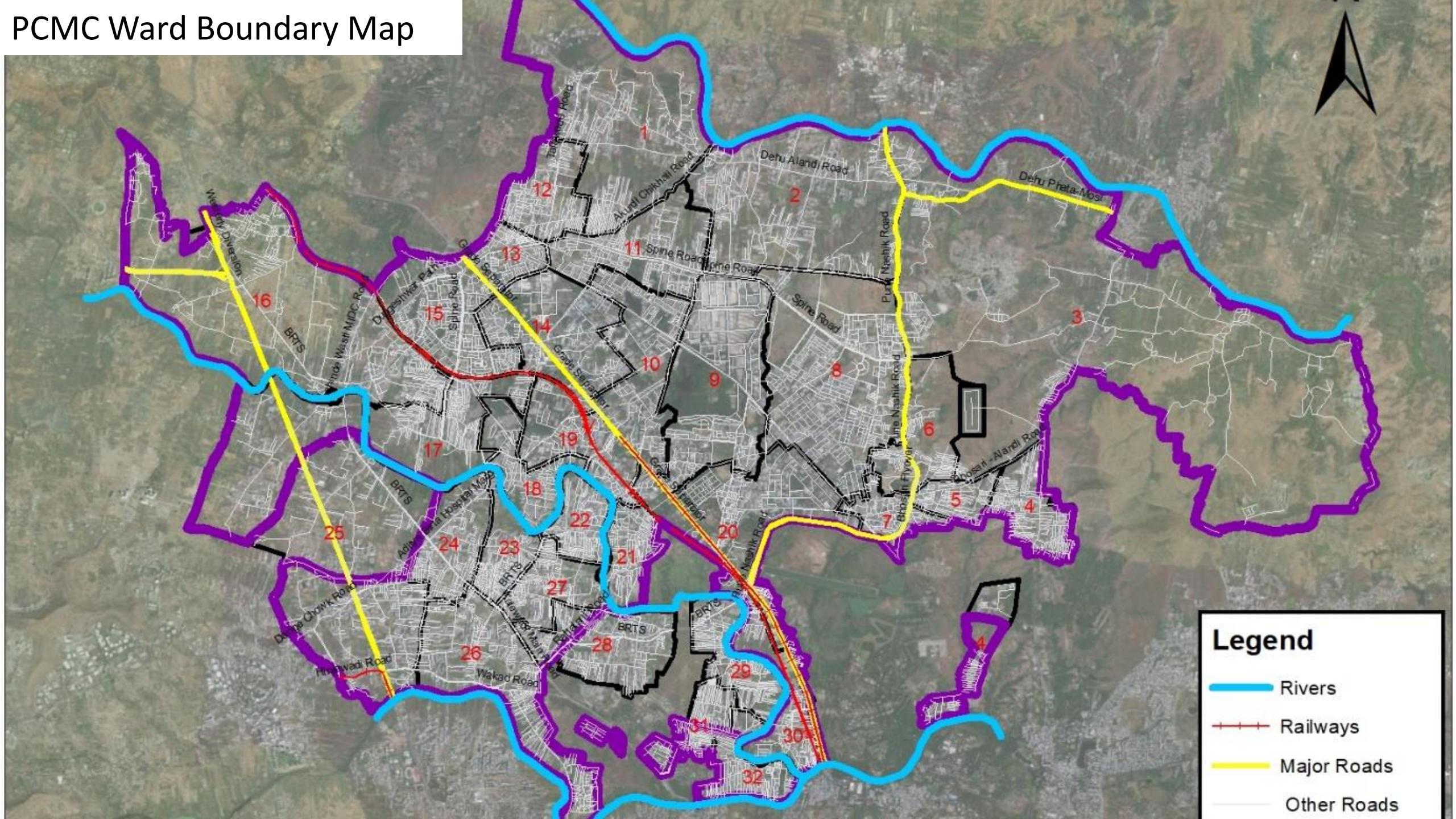The city has experienced exponential growth due to presence of Automobile industries and IT parks

Major transport routes connecting Mumbai and Pune which are 2 largest cities in Maharashtra pass through Pimpri Chinchwad.

As of 2011 India census, Pimpri Chinchwad had a population of 17.29 lakhs.

PCMC Ward Boundary Map

BRTS Operations in PCMC

Traffic Congestion in PCMC

Exponential Vehicular Growth

Traffic Congestion Due to ongoing Construction Work zones

Illegal Parking Resulting in Decreased Carriageway

Vehicular Growth in PCMC

Year	Two wheelers	Auto	Car/LMV	Total
2002	211837	5288	27811	244936
2003	236301	5415	30242	271958
2004	271319	5588	35009	311916
2005	308601	6052	42255	356908
2006	352111	6471	50391	408973
2007	395757	6671	59856	462284
2013	709857	7295	148585	865737
2017	1182935	6252	274668	1436855

Annual Vehicular Growth rate from 2013 to 2017 in PCMC is approximately 13.5%

Part 2

PCMC Parking Policy

Pimpri Chinchwad Municipal Corporation

Public Parking Policy
Pimpri Chinchwad Municipal Corporation 2018

Principle of PCMC Parking Policy

1. The Demand Standards Approach: Parking provisions are expected to meet the localised demand

2. The two-part and Operational Standards Approach: Parking within a premise is set to meet only operational (minimal) levels of demand, which can be taken as the private parking needs of occupants. Other parking is catered to via public-sector off-site parking, often with the help of payment levied on the developer

3. The Capacity Rationing Approach: Standards for whole area or corridor are set (as maximums) considering the road capacity available for newly generated traffic

4. The Area Needs Approach: This approach explicitly seeks to weigh up multiple policy priorities for an area for setting the standard, including traffic demand, management of public spaces and urban design, economic development policies, environmental considerations, site constraints and design considerations, modal balance etc

5. The Modal Split Target approach: This uses parking supply as a tool to modify travel behaviour in favour of non-car options by making parking more difficult or expensive.

The Public Transport accessibility level approach: This aims to set lower standards at destinations for which a high proportion of trips can easily be by public transport, while setting higher standards for destinations less accessible by public transport

The parking rate calculation:

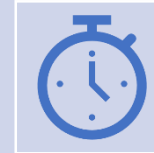$$P = \text{Total Parking Fee} = P = E \times R \times T \times Z$$

The space occupied by the vehicle (E-Equivalent Car Space – ECS)

Fixed Based Price

(R – Rate)

The Parking Demand (Z-Zone Factor)

The Time Spent in parking

(T-Time in Hours)

Parking Rates

- The 'R' parking rate will be Rs 10 / - per hour.
- Until the zoning is finalized by technology, Z will be one for the three zones.

Vehicle	ECS	Zone A	Zone B	Zone C
2 wheeler	0.20	4.00	3.00	2.00
Auto rickshaw	0.60	12.00	9.00	6.00
4 Wheeler	1.00	20.00	15.00	10.00
Tempo	1.00	20.00	15.00	10.00
Mini Bus	1.50	30.00	22.00	15.00
Truck	2.20	66.00	48.00	33.00
Private Bus	3.90	78.00	58.00	39.00

2 Wheeler — 0.2

Auto Rickshaw — 0.6

Car — 1

LCV — 1

Mini Bus — 1.5

Bus — 2.2

Truck — 3.9
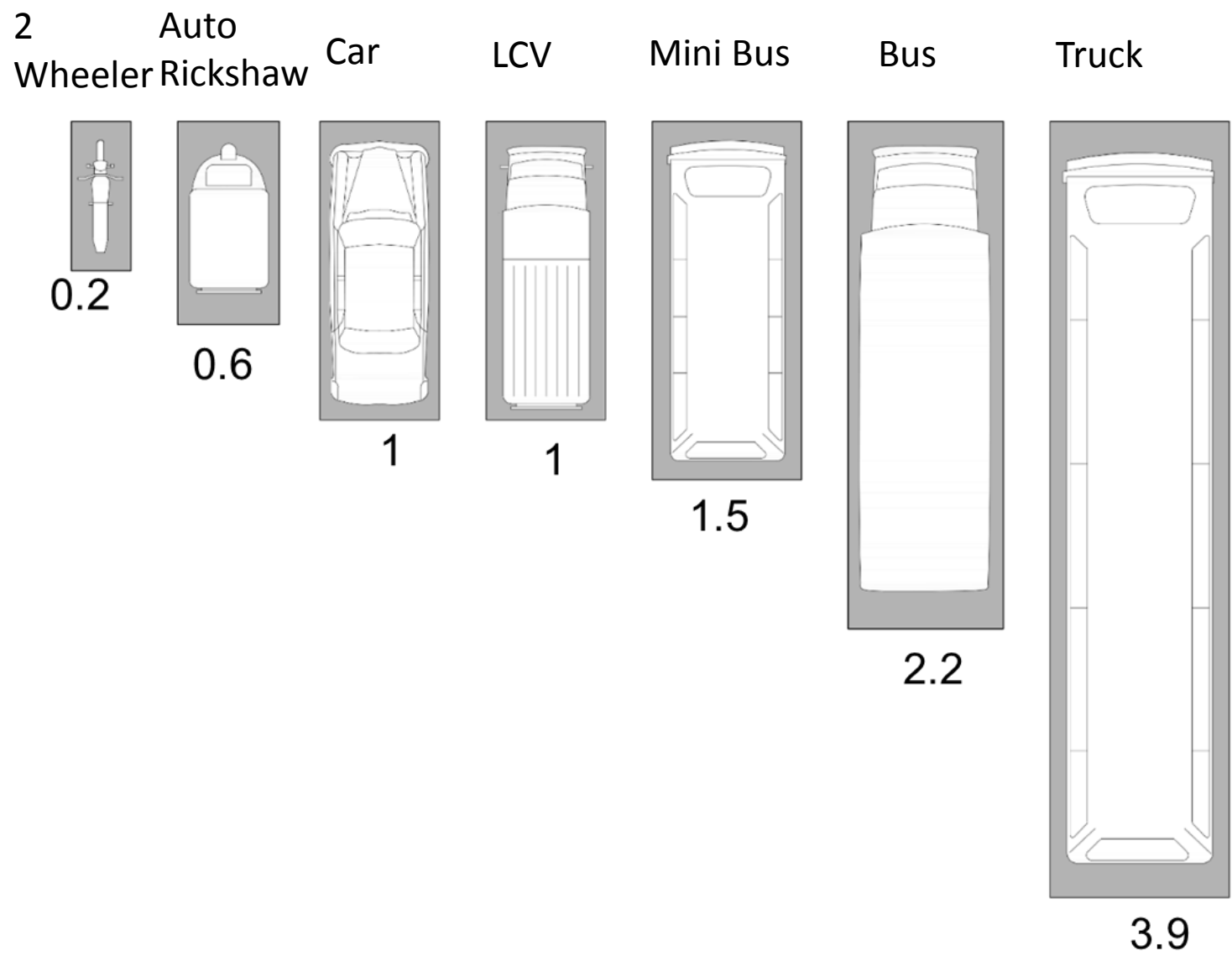
Table 6.2 Equivalent Car Spaces (ECS)

Vehicle Type	ECS
Car/taxi	1.00
Two Wheeler	0.25
Auto Rickshaw	0.50
Bicycle	0.10
Two wheelers	0.25
Trucks/Buses	2.50
Emergency Vehicles	2.50
Rickshaw	0.8

Source: URDPFI Guidelines, MoUD 2014.

Limitation in PCMC Parking Policy

1 Existing On-street parking rates on the lower side

2 Existing generic Off-street parking rate (25% Less than On-street) does not account for 'area specific' characteristics.
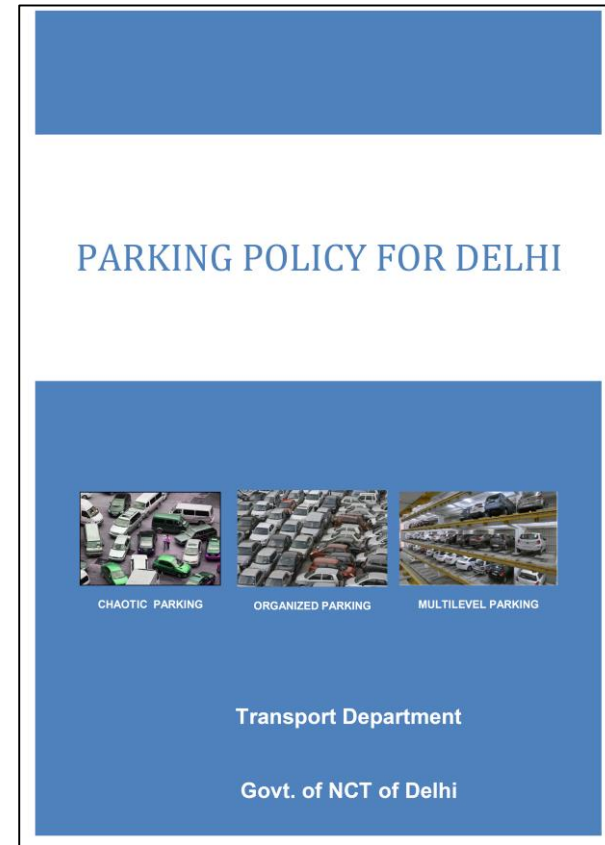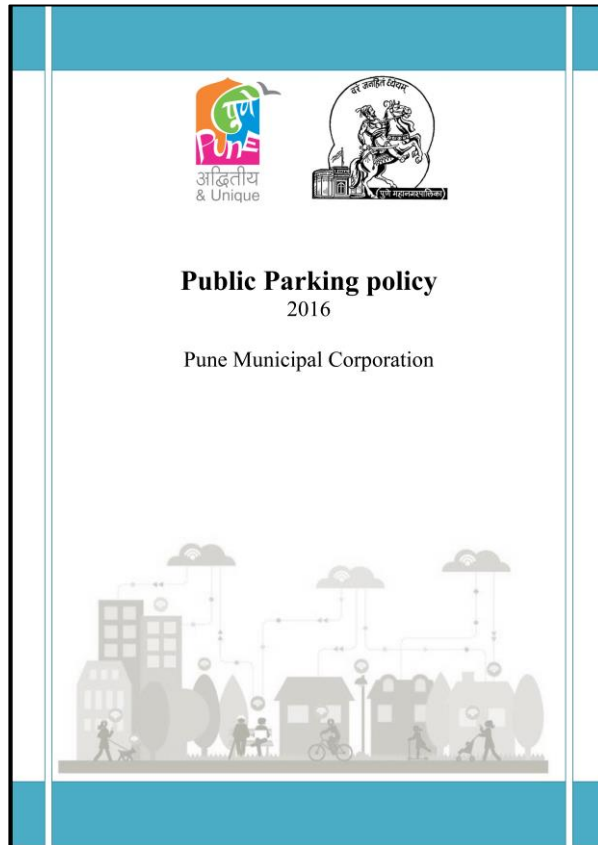
3 Timeline for creation of off-street parking facilities such as surface and MLCPs not included.

4 Incentive for developing private parking lots, to support citywide parking management not included.

Parking Policy Case Studies

Public Parking policy
2016

Pune Municipal Corporation

PARKING POLICY FOR DELHI

CHAOTIC PARKING   ORGANIZED PARKING   MULTILEVEL PARKING

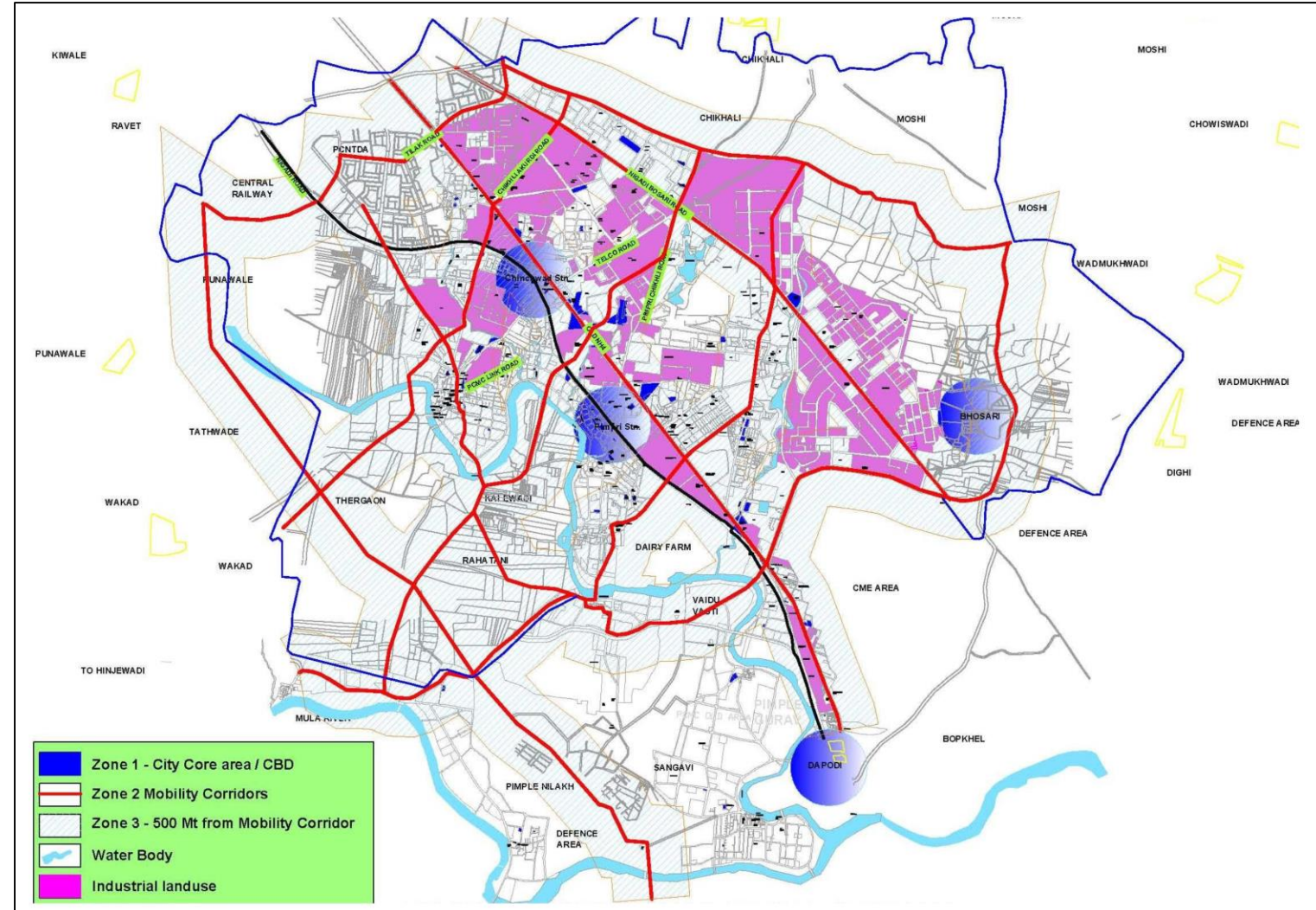Transport Department

Govt. of NCT of Delhi

Recommendation Pune Parking Policy

- For better parking management purposes, the entire city was divided into three zones based on the level of congestion. Namely, Zone A- Central business district area (CBD), Zone B- Mobility corridors and Zone C- Rest of the city.

- Each Zone has separate On Street Parking Values

Parking zones in the city
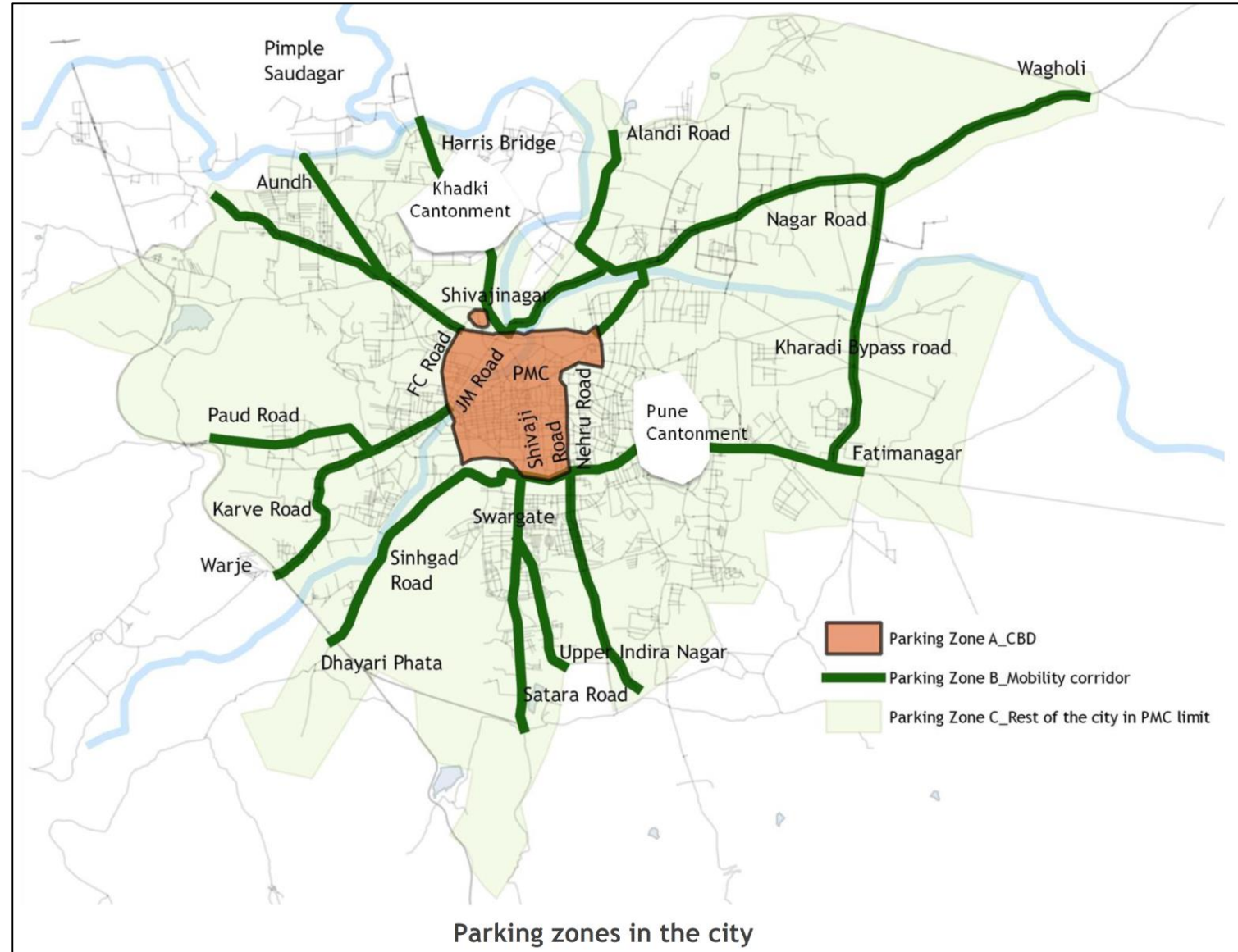
Recommendation Pimpri Chinchwad Parking Policy

- Similar to Pune Parking Policy PCMC has divided parking areas into 4 zones based upon parking demand. Zone A – CBD Area, Zone B – Mobility Corridor, Zone C – 500 M from Mobility Corridor Zone D – Rest of the City

- Each Zone has separate On Street Parking Values

Legend:
- Zone 1 - City Core area / CBD
- Zone 2 Mobility Corridors
- Zone 3 - 500 Mt from Mobility Corridor
- Water Body
- Industrial landuse

Recommendation Delhi Parking Policy

•Parking Space for Visitors-:

- At least 75% of the total parking space/ slots capacity should be kept for short term parking, primarily for shoppers/ visitors and not for long term parking by shopkeepers or office goers.

•Overnight Parking of Commercial Vehicles -:

- Overnight parking of buses, trucks, tourist buses, vans, water tankers, containers, lorries etc. may be allowed only along notified roads during night hours only upon certain payment to local bodies/ PWD to discourage haphazard parking.

Multi-level Car Parking -:

- Construction of multi-level car parking facilities should be considered to cater to high parking demand. There should not be public funding for construction of multi-level parking lots. Such complexes could come up through public-private partnerships in order to limit the impact on the state budget.

Notification of Commercial Streets

- 980 streets notified by MCDs as commercial streets while 2183 streets notified in mixed land use areas without adequate arrangement of parking in those areas leading to parking chaos On -street parking should be allowed only on designated roads against parking charges wherever there is adequate road width on the recommendation of a panel comprising of Traffic Police and other experts.

Parking Policy in Residential Streets and Lanes -:

- Parking controls in residential areas should balance the long-stay parking needs of all households to use street space for accommodating visitors, etc. Only night parking may be allowed on public streets in residential areas that too against parking charges to be decided by local bodies

PCMC On Street Parking Project

Vision of Project

- Most of the parking in Pimpri Chinchwad Municipal corporation is made roadside, The Pimpri Chinchwad Municipal corporation pursues to implement a modern Parking System to improve parking operations, optimise usage of the available parking supply, and enhance the overall functioning of streets in the city. In addition, suitable parking fees can ensure that personal motor vehicle users compensate the city for the use of valuable land on which they park their vehicles.

- The main aim of the project is to implement PCMC parking policy in the field.
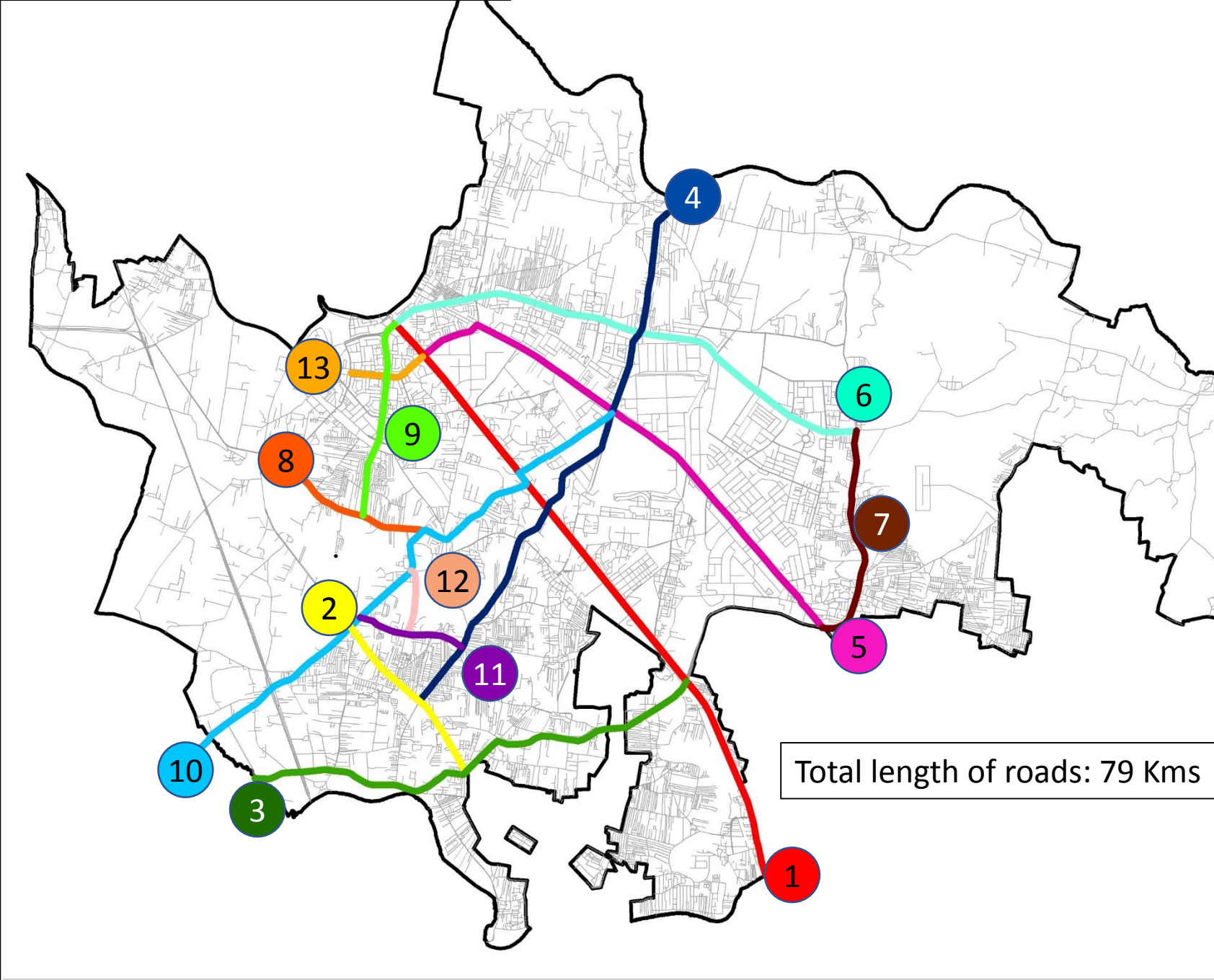
Objective of Project

1	• Understanding parking potential in the city.
2	• To study effect of controlled demand of on street parking.
3	• Evaluation of possible implementation of parking Policy for whole corporation
4	• Tweaking in parking policy based upon result obtained from pilot project.
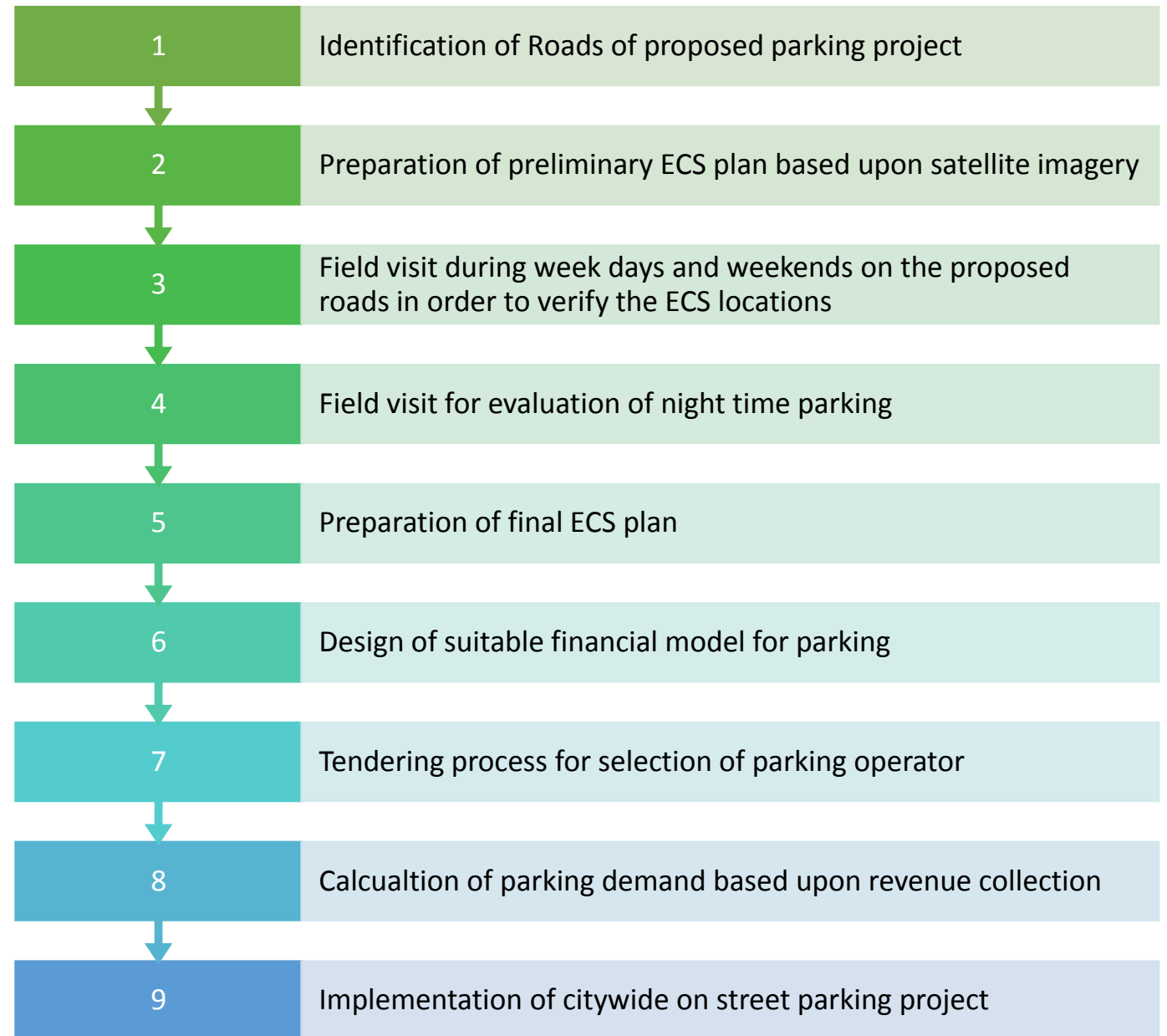
Roads Selected for PCMC Parking

Total length of roads: 79 Kms

Legend

1, Old Mumbai Pune Road

2, Aundh - Ravet Road

3, Wakad - Nashik Phata

4, Kalewadi Phata - Dehu Alandi

5, Telco Road

6, Spine Road

7, Nashik Phata - Moshi

8, Walhekarwadi Road

9, Nigadi - Chikhali

10, KSB Chowk - Shivaji Chowk (MDR 31)

11, Thergaon Link Road

12, Thergaon - Prasundham

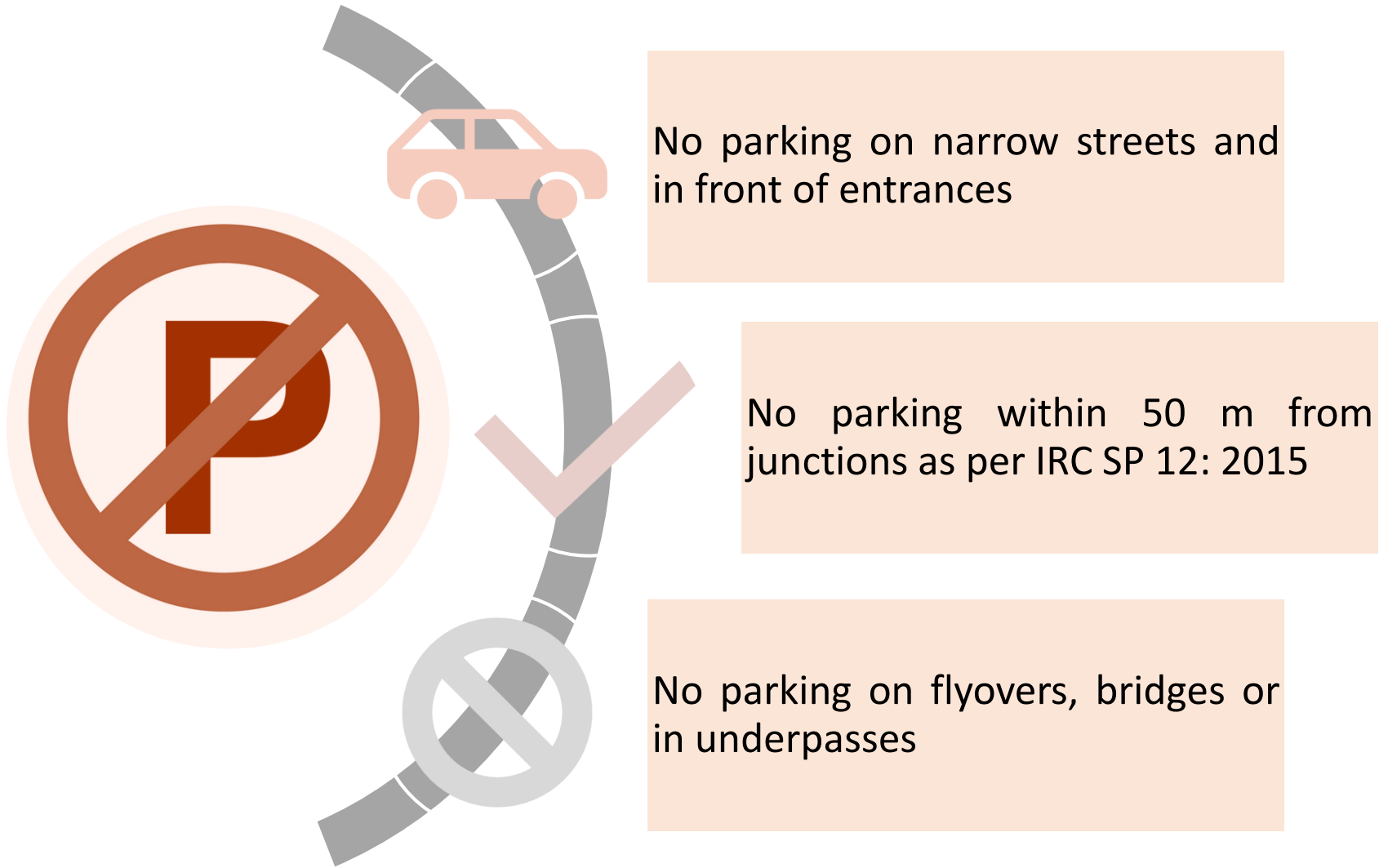13, Tilak Chowk - Big India Chowk

PCMC Roads

PCMC Boundary

Parking will be allowed where at least 2 lanes will be available for traffic movement.

Area currently marked as no parking zone but having adequate road width and parking potential

Minor roads in the vicinity of 100 m from BRTS road

No parking on narrow streets and in front of entrances

No parking within 50 m from junctions as per IRC SP 12: 2015

No parking on flyovers, bridges or in underpasses
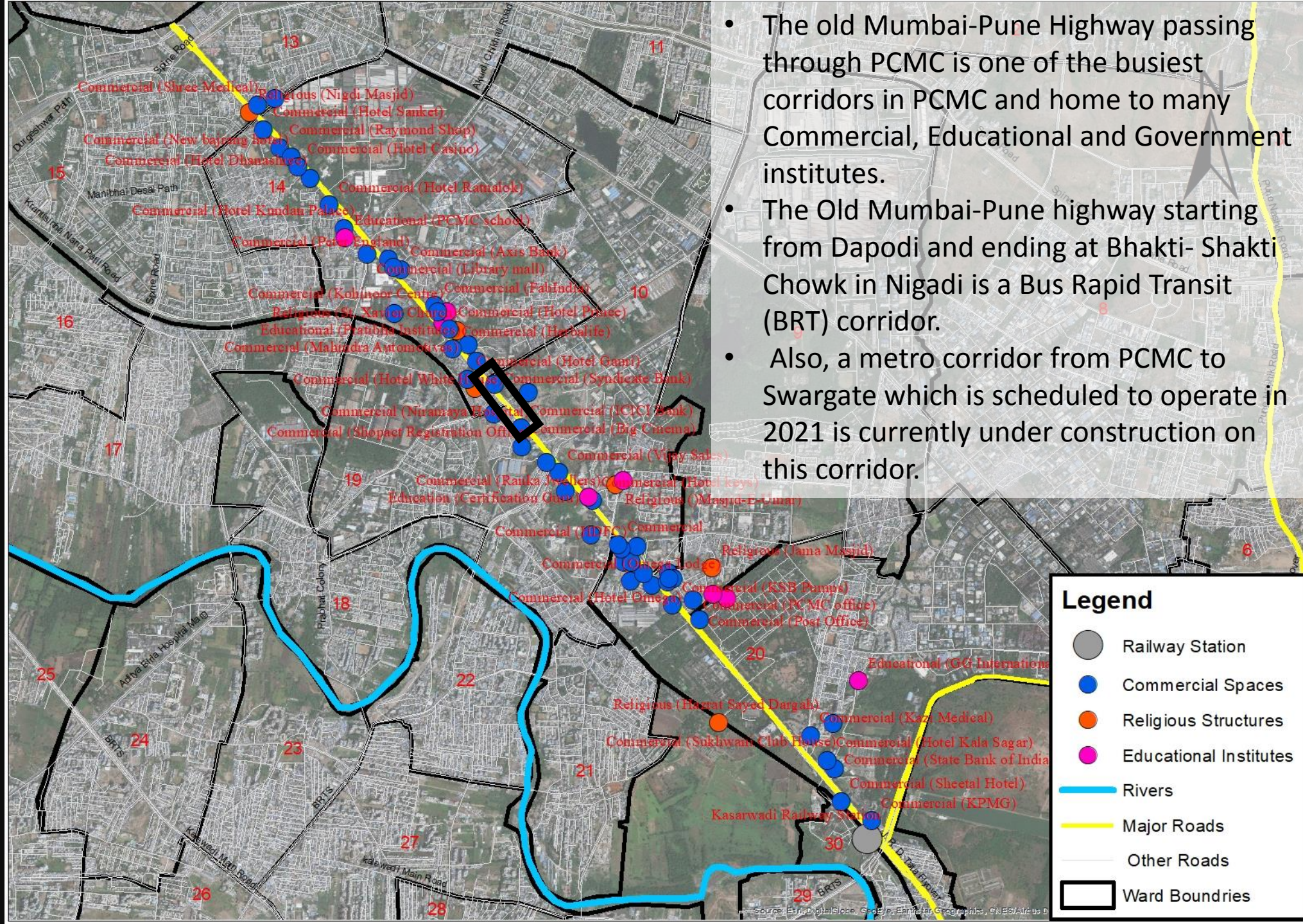
Part 3

Pilot Project of On-Street Parking on Mumbai Pune Road

- The old Mumbai-Pune Highway passing through PCMC is one of the busiest corridors in PCMC and home to many Commercial, Educational and Government institutes.
- The Old Mumbai-Pune highway starting from Dapodi and ending at Bhakti- Shakti Chowk in Nigadi is a Bus Rapid Transit (BRT) corridor.
- Also, a metro corridor from PCMC to Swargate which is scheduled to operate in 2021 is currently under construction on this corridor.

Legend
- Railway Station
- Commercial Spaces
- Religious Structures
- Educational Institutes
- Rivers
- Major Roads
- Other Roads
- Ward Boundries

Pilot On-Street Parking Survey for Old Mumbai- Pune Highway

7-day 24 Hr. On-Street Parking Survey on Old Mumbai Pune Highway between Ambedkar Chowk and Finolex Chowk was carried out from 3/09/2019 to 9/09/2019 to estimate parking demand of the pilot study segment.

Legend:
- Survey Stretch
- Government Building
- Commercial Buildings
- Off-Street Parking Location

Finolex Chowk

Pimpri Chinchwad Municipal Corporation

Off Street Parking (Private)

Commercial Complex

Off Street Parking (PCMC)

Mind Tree Hotel

Ginger Hotel

Ambedkar Chowk

Google Earth

Image © 2019 Maxar Technologies

Details of Ambedkar Chowk to Finolex Chowk Stretch

Total Length Stretch	500 m
Stretch Available Organised for Parking*	264 m
No. of ECS Available for on-street Parking	48
No. of ECS Available for Off-street Parking	40
Total ECS Available	88

* Stretch available for parking excludes 50 m length from Junctions and obstructions such as Gate, Trees etc.
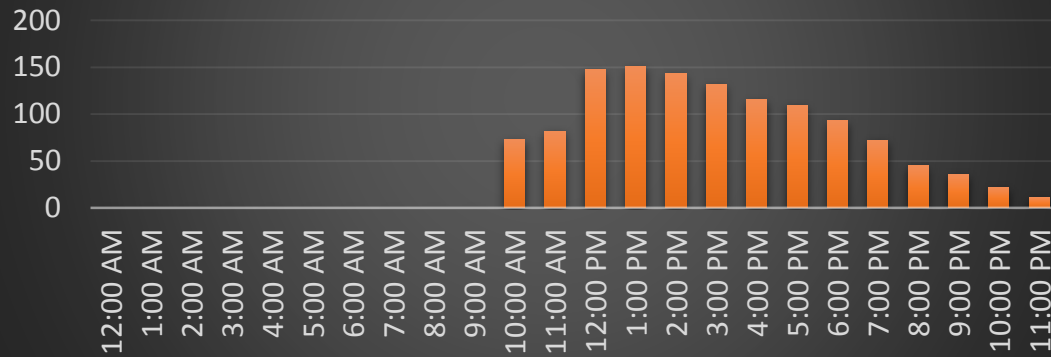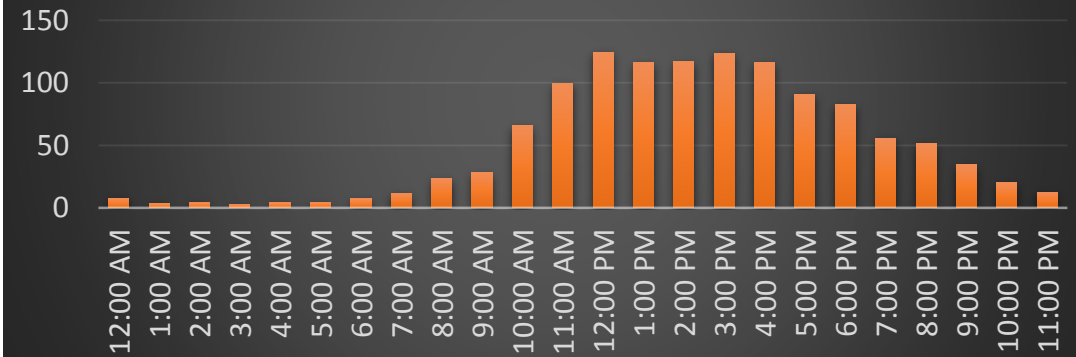
Aerial Images of Pilot Study Area

Hourly Vehicle Accumulation

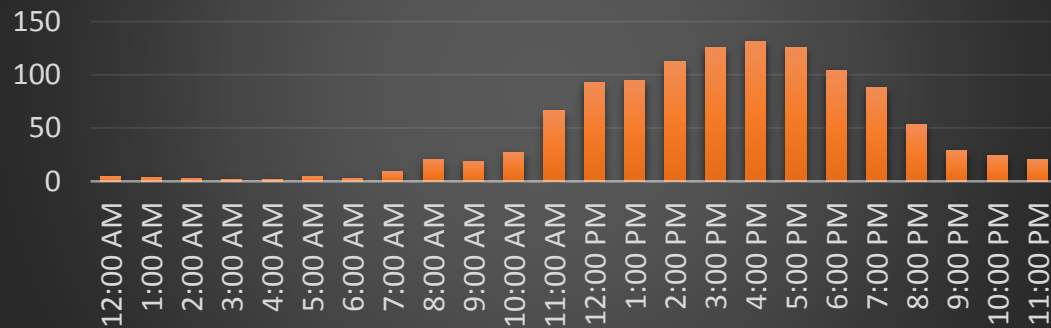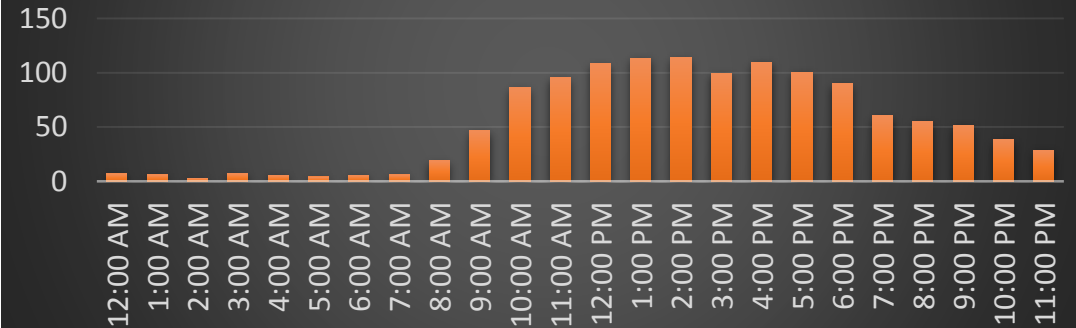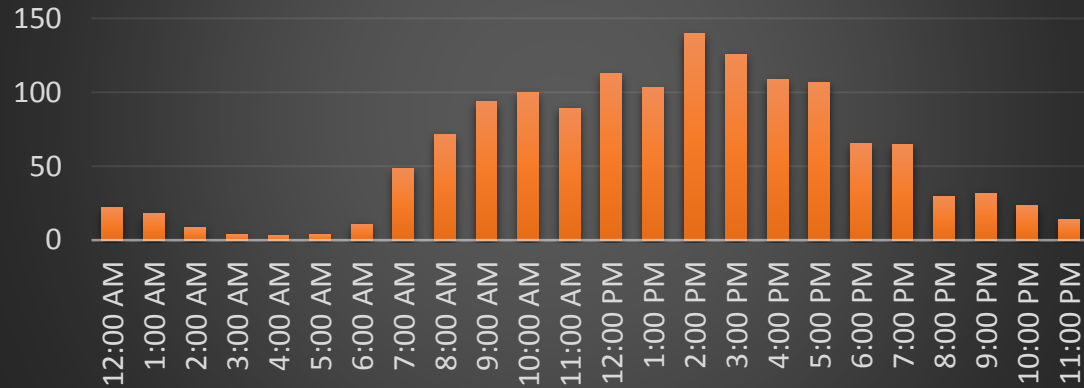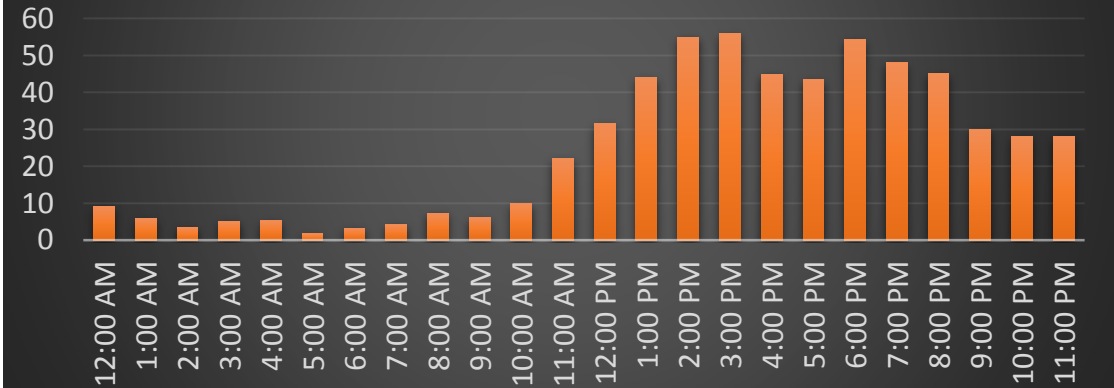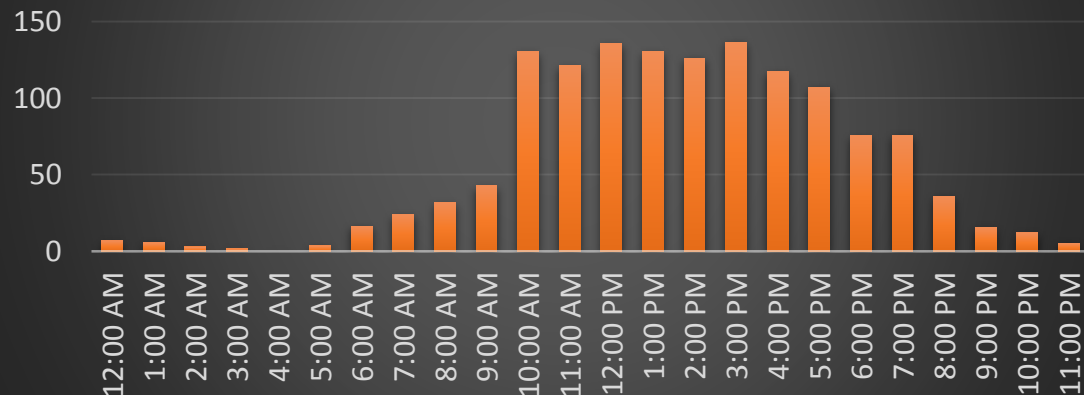ECS Accumulation on 7th September (Saturday)

ECS Accumulation on 8th September (Sunday)


ECS Accumulation on 9th September (Monday)

- ECS accumulation graph shows that maximum ECS accumulation occurs between 11 AM to 4 PM
- Maximum ECS accumulation was observed to be **140** on Saturday 7th September 2019.
- Accumulation graphs shows parking accumulation grows exponentially when any major event occurs in PCMC i.e. General Body Meeting
- As supply of ECS during peak hour is less than demand illegal and haphazard parking was observed in the area.
- This shows dire need of implementation of on street parking project for survey stretch

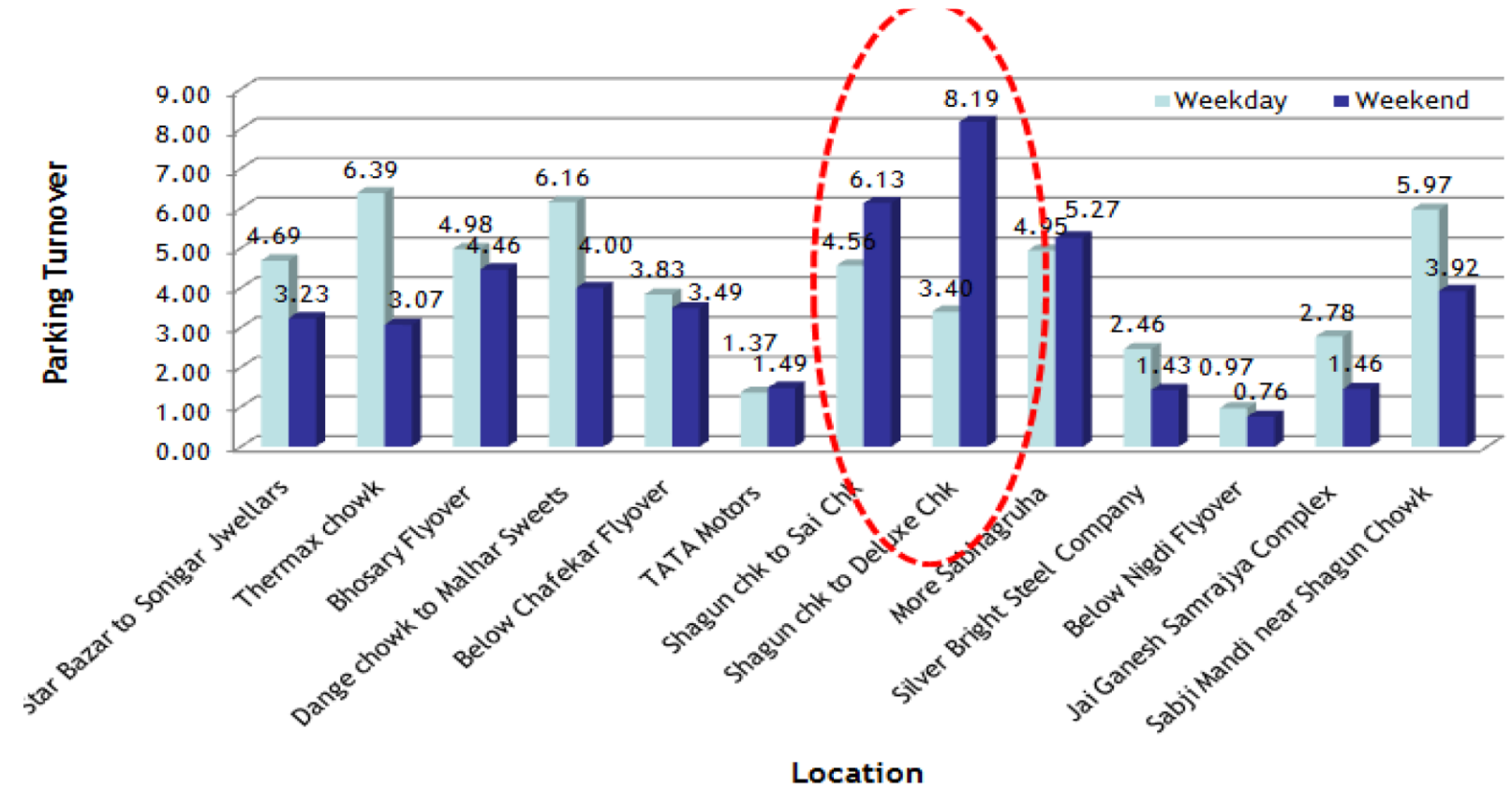# Day Wise Summary of Vehicle Accumulation
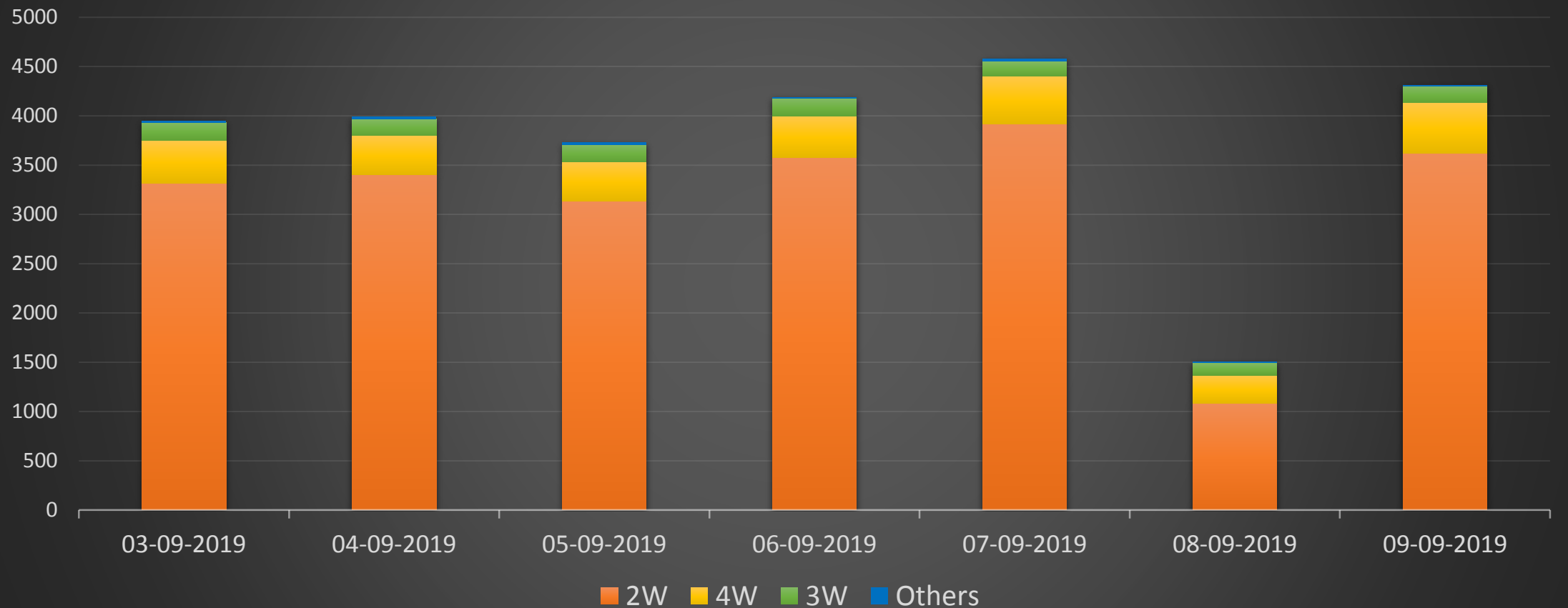
Comparison of daily vehicle accumulation graph shows that highest cumulative no. of parking accumulation no. goes up to 4500 vehicles per day. The heavy no. of parkers in the survey stretch shows need of effective parking solution.

Parking Turnover in other part of City

Source-: Draft Parking Policy and Master Plan for Pimpri- Chinchwad, July 2015

Parking Calculation Based Upon Accumulation Survey

1. Daily Parking Turnover -: It is the ratio of number of vehicles parked in a day to the number of parking bays available

$Parking\ turnover$
$= (Parking\ Volume/No.of\ parking\ bays)$

$$Parking\ Turnover\ =\ 3879/232\ =\ 16.71$$

2. Parking load: It can also be obtained by simply multiplying the number of vehicles occupying the parking area at each time interval with the time interval. It is expressed as vehicle hours / ECS hours

Parameter	2W	4W	3W	Other	Total
Vehicle Counts	3338	412	129	23	3879
Vehicle Hour	3738	462	144	26	4344
ECS Hour	935	462	86	39	1522

3. Average parking duration: It is the ratio of total vehicle hours to the number of vehicles parked.
$Parking\ Duration\ -:\ (Parking\ Load/\ Parking\ Volume)$

$average\ parking\ duration\ for\ the\ stretch$
$$= \frac{4344}{3879}$$
$$= 1.12\ Hours$$

4. Parking index: Parking index is also called occupancy or efficiency. It is defined as the ratio of number of bays occupied in a time duration to the total space available. It gives an aggregate measure of how effectively the parking space is utilized. Parking index can be found out as follows
$Parking\ Index$
$= (Parking\ Volume/\ Parking\ Supply) * 100$

$$Parking\ Index\ =\ (3879/4200) * 100\ =\ 92.35\%$$

Survey conducted by UMTC while preparing draft policy document for PCMC maximum parking turnover in the city was observed in shagun chowk i.e. 8. Turnover ratio for our survey stretch is calculated as 16.71. Because of non availability of marked on-street parking slots, haphazard and illegal parking on the road occurred which resulted in high turnover ratio in survey.

The average parking duration founds out to be 1.12 hours. Which shows that short term parkers are more in number. Hence to have better parking utilization in the area parking duration needs to be limited. Off-street multilevel car parking facilities needs to be provided for long term parking users.

Parking index of the area is observed to be 92.35% which shows that parking utilization in the survey stretch is on higher side and it can be distinguished as high parking area. Hence on street paid parking project will be an effective solution for utilization of parking in the area.

The funds collected from on-street parking project can be utilized for betterment of public transport.

Parking User Survey

Parking user survey was carried out on 3 days, 500 samples were collected throughout the day

Questionnaire Survey for Willingness to Pay for Parking

Survey Stretch	From:Dr. Ambedkar Chowk	To: Holkar Chowk, Pimpri	
mobile No.			Vehicle No.
1	Purpose of Visit		
	Commercial/Shopping		
	Home	?	
	Work Place		
	Other		
2	Mode of Travel		
	4 Wheeler		
	3 Wheeler		
	2 Wheeler		
	Other (Bus/Auto Rickshaw/Cab)		
3	Duration of Parking (Approx. Time Period)		
	0-15 Minutes		
	15-30 Minutes		
	30-60 Minutes		
	More than 60 Minutes		
4	How often do you use parking in a day?		
	1 Time		
	2-4 times		
	5 and more		

Questionnaire Survey for Willingness to Pay for Parking

Survey Stretch	From:Dr. Ambedkar Chowk	To: Holkar Chowk, Pimpri	
mobile No.			Vehicle No.
5	How would you rate the current parking system ?		
	Good		
	Average		
	Poor		
6	Have you ever been late to work because you could not find a spot for parking ?		
	Yes		
	No		
7	How did you go from parking location to your Destination?		
	Walk		
	Bicycle		
	Bus		
	Others		
8	What is the best way to keep you updated about available parking spots?		
	Website		
	Phone (app, text)		
	Digital Boards		
9	How much money you are willing to pay for parking per hour?		
	Motorised 2 Wheeler	Free	
		Rs 5/Hour	
		Rs 6-10/Hour	
		More than per 10/Hour	
	3/4 Wheeler	Free	
		Rs 10/ Hour	
		Rs 11-20/ Hour	
		More than Rs 20/ Hour	

Questionnaire Survey Forms

Form 1

Questionnaire Survey for Willingness to Pay for Parking

Survey Stretch From: Dr. Ambedkar Chowk   To: Holkar Chowk, Pimpri

Name and Mobile No.: Shiva Mane   **Vehicle No.** MH14DE764

Mode of Travel		
4 Wheeler		
3 Wheeler		
2 Wheeler	✓	
Other (Bus/Auto Rickshaw/Cab)		

Purpose of Visit		
Commercial/Shopping		
Home		
Work Place	✓	
Other		

Duration of Parking (Approx. Time Period)		
0-15 Minutes		
15-30 Minutes		
30-60 Minutes		
More than 60 Minutes	✓	

How often do you use parking in a day?		
1 Time		
2-4 times		
5 and more	✓	

How would you rate the current parking system?		
Good		
Average		
Poor	✓	

Have you ever been late to work because you could not find a spot for parking?		
Yes	✓	
No		

How did you go from parking location to your Destination?		
Walk	✓	
Bicycle		
Bus		
Others		

How much money you are willing to pay for parking per hour?		
Motorised 2 Wheeler	Free	
	Rs 5/Hour	✓
	Rs 6-10/Hour	
	More than per 10/Hour	
3/4 Wheeler	Free	
	Rs 10/ Hour	
	Rs 11-20/ Hour	
	More than Rs 20/ Hour	

Form 2

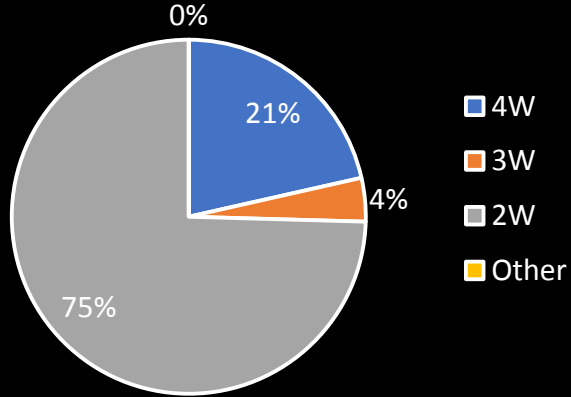**Questionnaire Survey for Willingness to Pay for Parking**

Survey Stretch From: Dr. Ambedkar Chowk   To: Holkar Chowk, Pimpri

Name and Mobile No.: Sohail Pathan 7350847864   **Vehicle No.** MH14FVR53

Mode of Travel		
4 Wheeler		
3 Wheeler		
2 Wheeler	✓	
Other (Bus/Auto Rickshaw/Cab)		

Purpose of Visit		
Commercial/Shopping		
Home		
Work Place	✓	
Other		

Duration of Parking (Approx. Time Period)		
0-15 Minutes		
15-30 Minutes		
30-60 Minutes		
More than 60 Minutes	✓	

How often do you use parking in a day?		
1 Time		
2-4 times		
5 and more	✓	

How would you rate the current parking system?		
Good		
Average		
Poor	✓	

Have you ever been late to work because you could not find a spot for parking?		
Yes	✓	
No		

How did you go from parking location to your Destination?		
Walk	✓	
Bicycle		
Bus		
Others		

How much money you are willing to pay for parking per hour?		
Motorised 2 Wheeler	Free	
	Rs 5/Hour	
	Rs 6-10/Hour	✓
	More than per 10/Hour	
3/4 Wheeler	Free	
	Rs 10/ Hour	
	Rs 11-20/ Hour	
	More than Rs 20/ Hour	

Form 3

Questionnaire Survey for Willingness to Pay for Parking

Stretch From: Dr. Ambedkar Chowk   To: Holkar Chowk, Pimpri

Name: Dipak Jaiswal   **Vehicle No.** MH14HC886

Mode of Travel		
4 Wheeler		
3 Wheeler		
2 Wheeler	✓	
Other (Bus/Auto Rickshaw/Cab)		

Purpose of Visit		
Commercial/Shopping	✓	
Home		
Work Place		
Other		

Duration of Parking (Approx. Time Period)		
0-15 Minutes		
15-30 Minutes	✓	
30-60 Minutes		
More than 60 Minutes		

How often do you use parking in a day?		
1 Time	✓	
2-4 times		
5 and more		

How would you rate the current parking system?		
Good		
Average		
Poor	✓	

Have you ever been late to work because you could not find a spot for parking?		
Yes	✓	
No		

How did you go from parking location to your Destination?		
Walk	✓	
Bicycle		
Bus		
Others		

How much money you are willing to pay for parking per hour?		
Motorised 2 Wheeler	Free	✓
	Rs 5/Hour	
	Rs 6-10/Hour	
	More than per 10/Hour	
3/4 Wheeler	Free	
	Rs 10/ Hour	
	Rs 11-20/ Hour	
	More than Rs 20/ Hour	

Findings of Questionnaire Survey

Parked Vehicle Counts
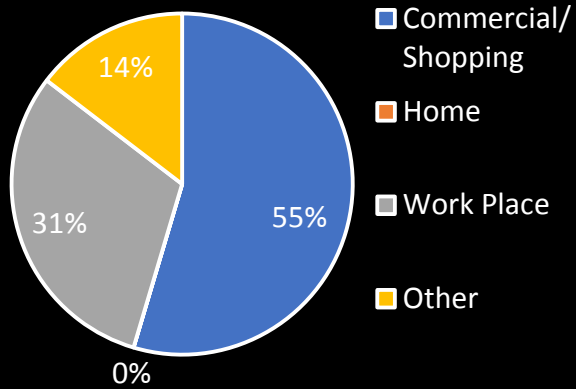
- 4W: 21%
- 3W: 4%
- 2W: 75%
- Other: 0%

Purpose of Visit

- Commercial/Shopping: 55%
- Home: 0%
- Work Place: 31%
- Other: 14%

Willing to Pay for 2W

- Free: 51%
- Rs 5/Hour: 42%
- Rs 6-10/Hour: 7%
- 0%

Duration of Parking

- 0-15 Minute: 48%
- 15-30 Minutes: 23%
- 30-60 Minutes: 9%
- More than 1 Hour: 20%

Frequency of Parking

- 1 time: 37%
- 2-4 Times: 36%
- More than 5 times: 27%

Willing to Pay for 3W/4W

- Free: 45%
- Rs 0-10/Hour: 32%
- Rs 10-20/Hour: 18%
- 5%
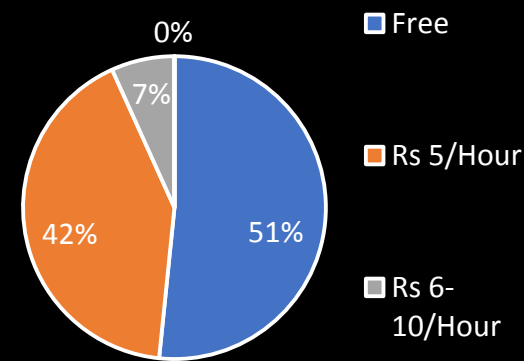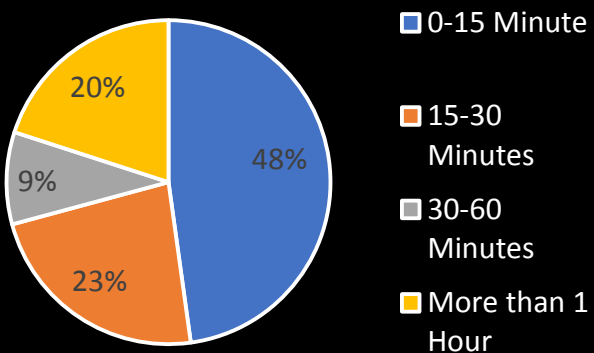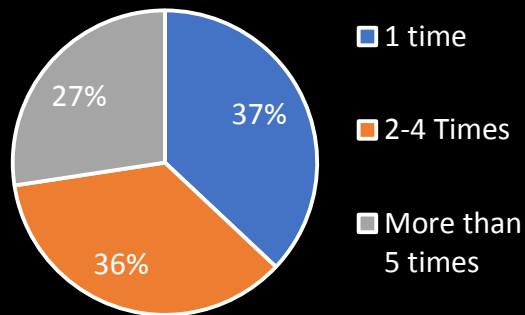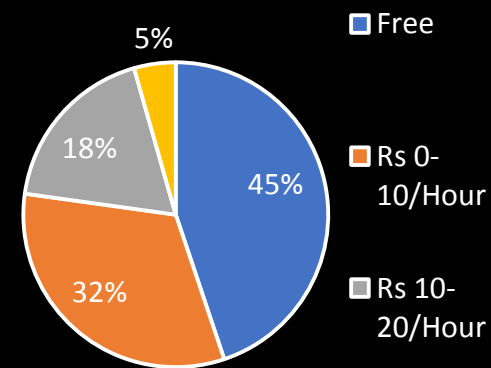
Observations:

- 2 W shows total 75% of parked vehicle count. Hence more no. of on street parking ECS will need to be provided for 2 W parking which is consistent with local RTO data

- 55% shows the reason for their parking is shopping and other commercial purposes followed by work place. For those having workplace off street parking facilities needs to be provided.

- Short term parking of 0 – 15 mins is being highly witnessed i.e. 48%

- Frequency of one time parkers is more in numbers i.e. 37%. Thus to have effective use of parking space, on street parking project will be an effective solution

- Many of the 2W and 4W parking users were against paid on street parking because of lack of availability of parking facility.

Recommendations for Revising the Existing PCMC Parking Policy

1. Implement Smart Parking Project for monitoring.

2. Limit duration of parking in high commercial areas for better utilization of parking space through dynamic pricing.

3. Increase existing parking rates

4. Implement Pick 'n' Drop operations using public transport in Old City (Gaothan) areas to discourage parking

5. Stronger Enforcement through better electronic surveillance

6. Include designated spaces for street vendor facilities

5) For the on-street parking, for first roads, for one car for one ECS, ~~Rs. 10 / hour~~ Rs 20/Hour will be charged, accordingly the parking rates within the city will be as follows;

Vehicle	ECS	Zone A	Zone B	Zone C
Two-Wheeler	~~0.20~~ 0.25	~~04.0~~ 10.0	~~03.0~~ 7.5	~~2.0~~ 5.0
Auto-Rickshaw	0.60	~~12.00~~ 25	~~09.00~~ 20	~~6.00~~ 15
Four-Wheeler	1.00	~~20.00~~ 40	~~15.00~~ 30	~~10.00~~ 20
Tempo	1.00	~~20.00~~ 40	~~15.00~~ 30	~~10.00~~ 20
Mini bus	1.50	~~30.00~~ 60	~~22.00~~ 45	~~15.00~~ 30
Truck	2.20	~~66.00~~ 135	~~48.00~~ 100	~~33.00~~ 70
Private Bus	3.90	~~78.00~~ 160	~~58.00~~ 120	~~39.00~~ 80

Revised Parking Rates Recommended for PCMC Parking Policy

Time Lapse (Saturday 14th September)

Thank You
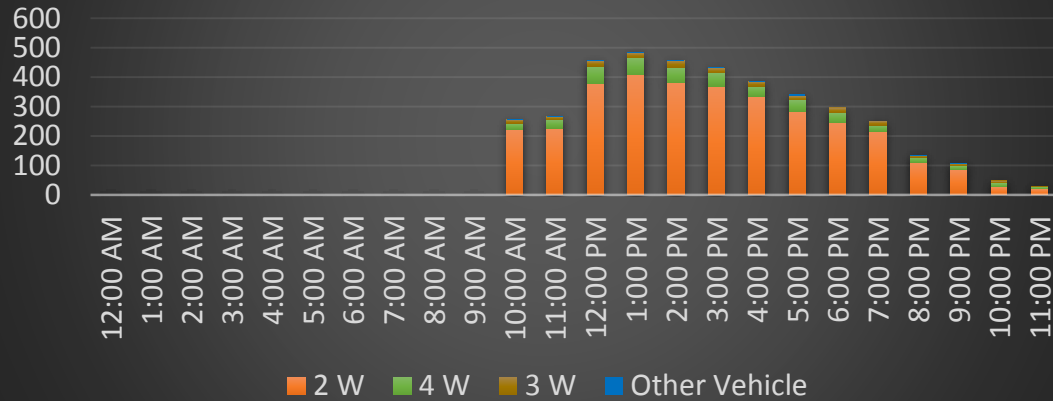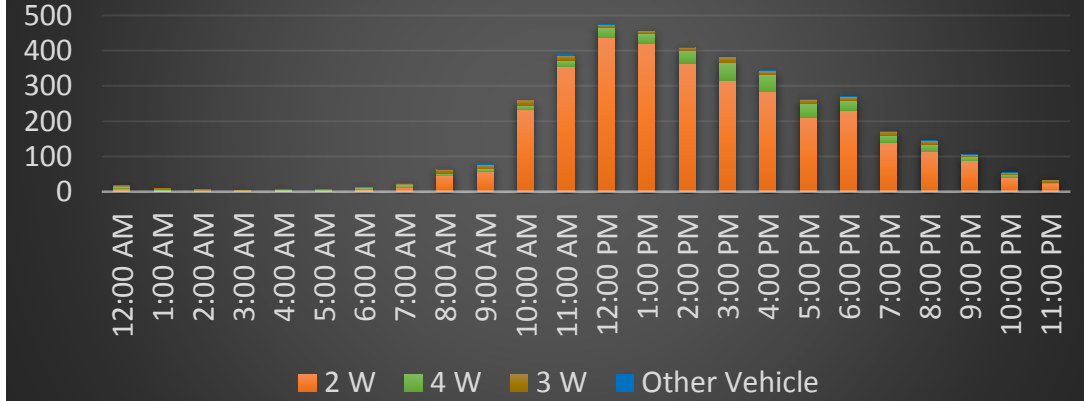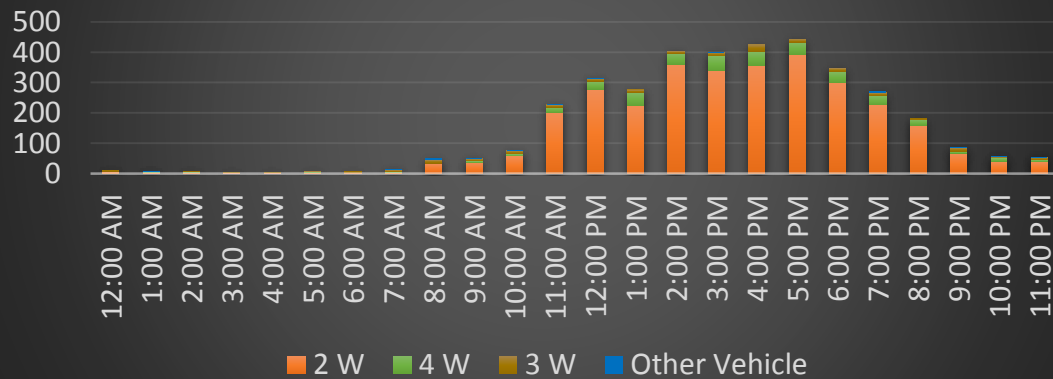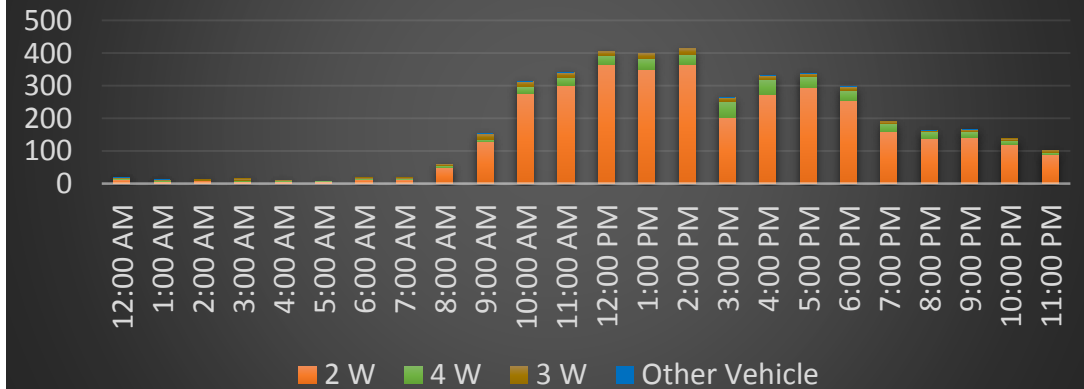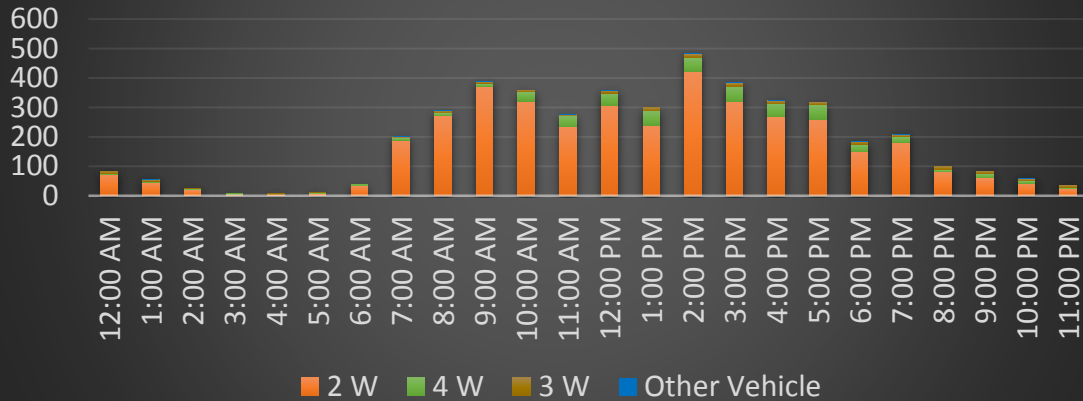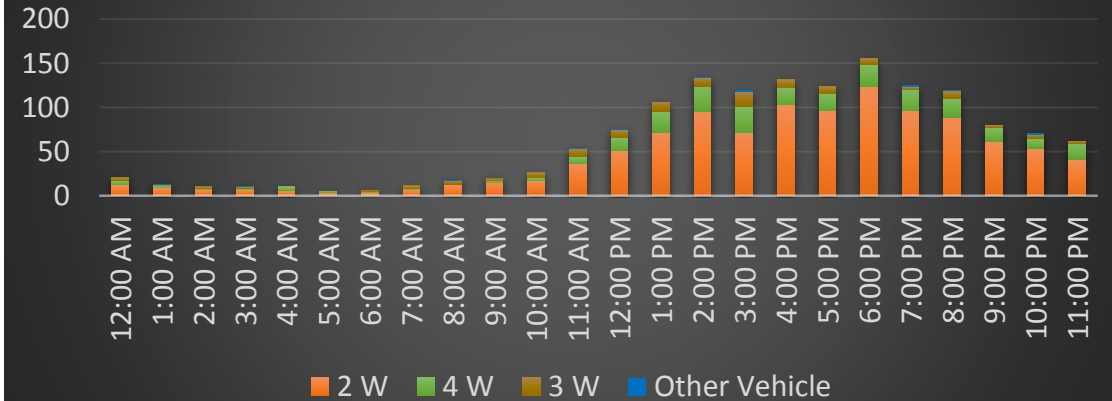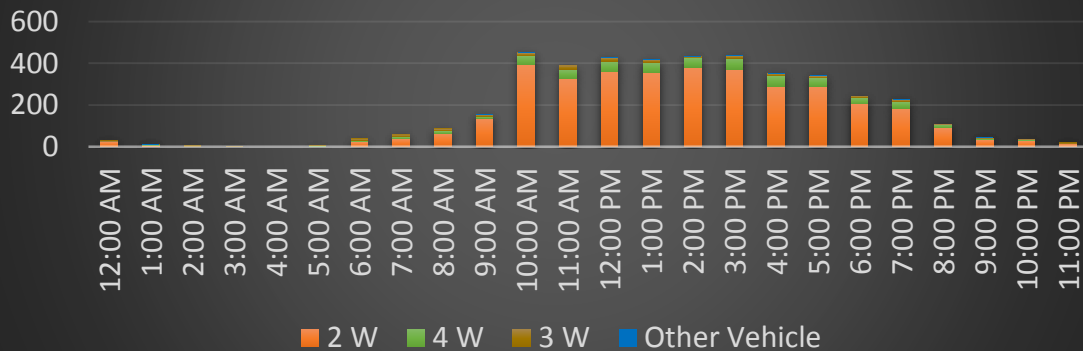
Calculations for Parking Turnover

- No. of Parking ECS Available -: 88 (48 On-Street and 40 Off-Street)

- On Street Parking ECS will be divided as a proportion of vehicles i.e. 75% for 2 Wheelers and 25% for 4 wheelers.

- Out of 48 ECS, 36 ECS will be allocated for 2 Wheelers and 12 for 4 wheelers.

- No. of Parking Bay = (36*5+12+40)=232

- No. of Vehicles parked in one day = 3879

- Parking Turnover = Parking Volume/No. of Parking Bays

$$= 3879/232$$

$$= 16.71$$

Calculation for Parking Load

- A parking study carried out by UMTC within PCMC limits in 2015 concluded that 78% vehicles are parked for less than 1 hour, 10% vehicles are parked for 2 hours, 6% of vehicles are parked for 2 – 4 hours, 5% vehicles are parked for 4 – 8 hours while 1% vehicles are parked for 8 – 12 hours.

- 3879 vehicles were divided into above proportion and of parking duration was taken for parking calculation. Ex. For 2-4 hours parked vehicle, parking duration was assumed as 3 hours.

- Parking Hours =

((3879*0.78*1)+(3879*0.10*1.5)+(3879*0.06*3)+(3879*0.05*6)+ (3879*0.01*10))

= 4344 Vehicle Hours

- This multiplication gives value in Vehicle hours which is then converted into ECS hours

Calculation for Parking Hour Calculation

- Parking Load of Surveyed Stretch = 4344 Vehicle Hours

- Parking Turnover = 3879 Vehicles

- Average Duration = Parking Load/ Parking Volume

  $$= 4344/3879$$

  $$= 1.12 \text{ Hours}$$

Calculation for Parking Index

- Most of the parking was observed during 6 AM to 12 PM.
- Parking Supply = No. of Parking Bays* Parking Supply Hours

$$= 232 * 18$$

$$= 4176 \sim 4200$$

Parking Index = Parking Volume / Parking Supply

$$= 3879/4200$$

$$= 92.35\%$$

Lack of Parking Management

Parking If Not Restricted Then……

- Half KM travel to search parking
- Minimum 30 grams of carbon dioxide emissions
- Fuel wastage of at least 1 rupee
- 1-minute strain
- Parking is free, hence the chances of getting the parking easily reduced by one third
- Due to lack of available parking space information, Wastage of twice the time