



Draft Report on Parking Master Plan



Gandhinagar Municipal Corporation

September 2023

Table of Contents

1. Introduction: Gandhinagar Parking Masterplan	4
2. Existing Situation Assessment: Parking	5
2.1 Approach, Vision and Objectives of Parking Master Plan.....	11
2.2 Parking Zoning Guidelines	14
2.3 Parking Projectization	31

List of Figures

Figure 1 One street parking with vending hampering pedestrian mobility	5
Figure 2 Compromised pedestrian movement due to on street parking (left), underutilized designated basement parking (right)	6
Figure 3 Vehicle per 1000 population in Gandhinagar city	6
Figure 4 Identified parking spots in Gandhinagar	7
Figure 5 Parking Demand and Supply in Gandhinagar.....	8
Figure 6 On-Street Designated and Undesignated Scenario at Kudasan.	9
Figure 8 Parking Projects: Upgradation of existing parking lots.....	31
Figure 9 Parking Projects: Creation of parking lots.....	31
Figure 10 Parking Project: Signage installation in parking hotspots.....	34
Figure 11 Parking Project: Management and Maintenance of existing parking lots	36

List of Maps

Map 1 Administrative Jurisdiction of Gandhinagar Municipal Corporation ... Error! Bookmark not defined.	
Map 8 Existing parking spots in Gandhinagar.	8
Map 9 Parking masterplan Gandhinagar.....	17
Map 10 Parking zone plan for sector 7 and 11	24
Map 12 Enforcement zones of GMC marshals and traffic police.	28
Map 13 Locations where new parking lots need to be created.	33
Map 14 Parking Project: Installation of signages at public parking lots.....	35

List of Abbreviations

AUDA	Ahmedabad Urban Development Authority
CAGR	Compounded Annual Growth Rate
CATP	Chief Architect and Town Planning
CoV	Certificate of vending
DA-IICT	Dhirubhai Ambani Institute of Information and Communication Technology
DAY-NULM	Deendayal Antyodaya Yojna-National Urban Livelihood Mission
DIMTS	Delhi Integrated Multi-Modal Transit System
DMIC	Delhi-Mumbai Industrial Corridor
DTC	Delhi Transport Corporation
ECS	Equivalent car space
GDCR	Gujarat Development Control Regulations
GIFT	Gujarat International Finance Tec-City
GMC	Gandhinagar Municipal Corporation
GNA	Gandhinagar Notified Area
GNLU	Gujarat National Law University
GPMC	Gujarat Provincial Municipal Corporation
GSCDL	Gandhinagar Smart City Development Limited
GTPUD Act	Gujarat Town Planning and Urban Development Act
GUDA	Gandhinagar Urban Development Authority
GULM	Gujarat Urban Livelihood Mission
IEC	Information, Education, and Communication
IIT-G	Indian Institute of Technology - Gandhinagar
LOR	Letter of Recommendation
MCGM	Municipal Corporation of Greater Mumbai
MFI	Micro-finance Institution
MoHUA	Ministry of Housing and Urban Affairs
MUZ	Multi-Utility Zones
NFSU	National Forensic Science University
NID	National Institute of Design
NIFT	National Institute of Fashion Technology
NULM	National Urban Livelihoods Mission
PDPU	Pt. Deendayal Petroleum University
PM-SVANidhi	Pradhan Mantri Street Vendor's AtmaNirbhar Nidhi
PWD	Public and Works Department
R&B	Road & Buildings Department
RoW	Right of Way
SIR	Special Investment Region
SMC	Surat Municipal Corporation
SOP	Standard Operating Procedures
SUSV	Support to Urban Street Vendor
TPS	Town Planning Schemes
TVC	Town Vending Committee
UDUHD	Urban Development and Urban Housing Department
UMC	Urban Management Consulting Pvt. Ltd.
UMTC	Urban Mass Transit Company
WCD	Women and Child Development

1. Introduction: Gandhinagar Parking Masterplan

Gandhinagar's Parking Master Plan

Gandhinagar, like many other Indian cities, grapples with the widespread issue of disorganized parking. However, being a planned city, Gandhinagar has a unique opportunity to implement well-considered strategies and policies right from its inception to address the concerns. The Gandhinagar Municipal Corporation (GMC) is committed to incorporating effective measures into the city's planning and urban design to ensure the proper organization and regulation of parking activities.

Haphazard parking on sidewalks and unauthorized areas further compounds the problem, obstructing pedestrian movement, contributing to traffic congestion, and compromising pedestrian safety. Addressing their issues and developing appropriate policies and infrastructure for parking activities is essential to foster a more organized and sustainable urban environment.

Structure of Gandhinagar Draft Parking Master Plan

This report on 'Draft Master plan for Parking' presents a framework for optimizing parking supply in the city, ensuring proper infrastructure, enhancing pedestrian accessibility, and creating harmonious urban environment/spaces in the city for the time frame of 15 years. This report comprises of following sections:

- a. **Existing Situation Assessment:** This chapter presents the current parking scenario of the city, including its geospatial mapping (location, number scale, category) and challenges faced. It assesses the impact of these activities on activities in the city such as mobility, safety and urban aesthetics.
- b. **Vision, Approach and Objectives** for developing the master plan: Based on the assessment, a vision is established to organize and manage parking activities, ensuring the safety and convenience of both vendors and pedestrians. Objectives are then defined to achieve this vision, such as the creation of designated vending spaces, the provision of infrastructure, and the formulation of policies and regulations.
- c. **Pay & Park zones** for regulating parking, ensuring efficient use of parking spaces and generating revenue for the city. This can be achieved with the following implementation strategies:
 - Parking zoning guidelines
 - Parking pricing strategy
 - Parking enforcement
 - Tech-enabled Parking management
- d. **Parking projectization** pertaining to the following for an effective regularization of parking:
 - Upgradation of existing parking infrastructure
 - Creation of new parking
 - Parking signage
 - Parking management

2. Existing Situation Assessment: Parking

Gandhinagar, despite being a planned city with partial development, faces significant parking challenges that impact its urban landscape. The city struggles with haphazard and unorganized parking practices, leading to a lack of systematic parking solutions. The demand for parking spaces is particularly high along commercial and institutional areas, which constantly fluctuates based on various factors. Additionally, the underutilization of designated parking spaces exacerbates the problem, as many parking facilities remain unused or are not optimally managed. As a result, vehicles spill over onto the streets, causing congestion and impeding smooth traffic flow. The poor management and enforcement around parking exacerbate the issue, leading to further disorder and inconvenience for residents and visitors alike.

Gandhinagar, like many other cities, struggles with parking challenges that disrupts walkability, mobility, and comfort from the public spaces in particularly streets. The existing parking scenario in the city reflects haphazardly parked vehicles on streets, footpaths, and open spaces, leading to difficulties in walking and mobility. This chaotic parking situation results in congestion and disorder, impacting the overall urban experience. Despite the presence of designated parking spaces, a significant issue arises with their underutilization. Surprisingly, most designated parking spaces remain unused, as on-street parking is preferred by users due to its perceived convenience. This preference for on-street parking further exacerbates the parking challenge. Adding to the complexity, the poor management and enforcement of parking regulations contribute to the problem. Inadequate enforcement measures fail to deter illegal parking practices, aggravating the chaotic parking scenario and hindering the flow of traffic and pedestrians.

Figure 1 One street parking with vending hampering pedestrian mobility



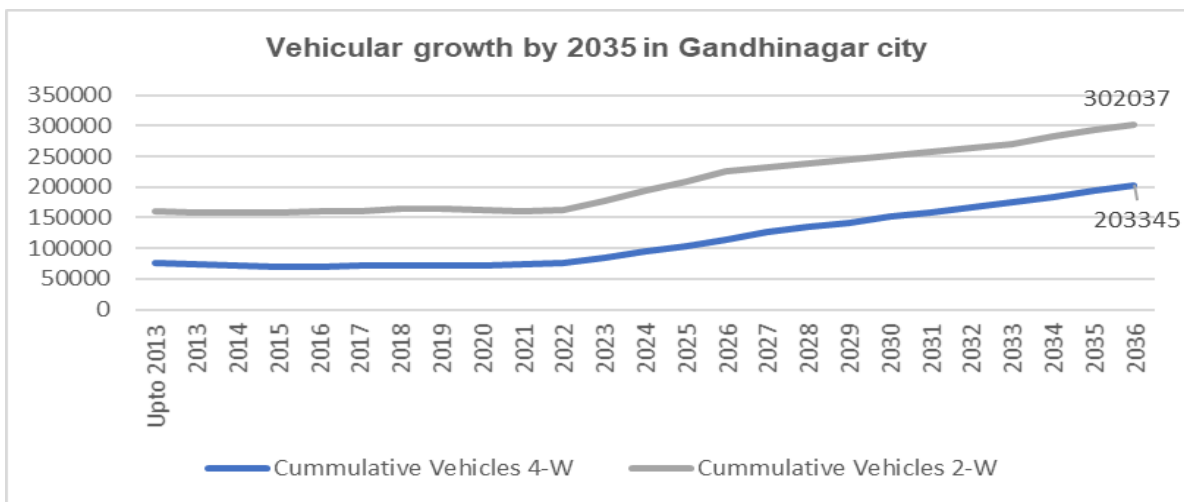
Figure 2 Compromised pedestrian movement due to on street parking (left), underutilized designated basement parking (right)



To have nuanced understanding of parking challenges in the city, GMC with the support of UMC conducted parking demand-supply assessment and citizen perception survey across various locations in the city and findings have been summarized as below:

Challenge 1: Rising parking demand

The city is emerging as a center for administration, education, and commercial development. This rapid urbanization has brought challenges around rise in demand for parking. Private vehicle ownership is on the rise in Gandhinagar, and it is projected that by 2036, the number of vehicles in the city will be equal to its population. Despite the provision of ample parking supply, there is a demand for parking that is putting pressure on public land such as streets and open spaces. The lack of adequate public transportation alternatives has led to a high reliance on private vehicles, with approximately 95% of the population choosing this mode of transportation.



Source: Ministry of Road Transport (<https://vahan.parivahan.gov.in/vahan4dashboard/vahan/view/reportview.xhtml1>)

Figure 3 Vehicle per 1000 population in Gandhinagar city

No. of Vehicles/Year	2022	2036

¹ The growth is calculated assuming that vehicles are scrapped after the life span of 15 years. It is assumed that at least 7% vehicles get scrapped annually in Gandhinagar.

2-Wheeler/1000 population	138	350-400
4-Wheeler/1000 population	65	300-400

Source: Ministry of Road Transport (<https://vahan.parivahan.gov.in/vahan4dashboard/vahan/view/reportview.xhtml>)

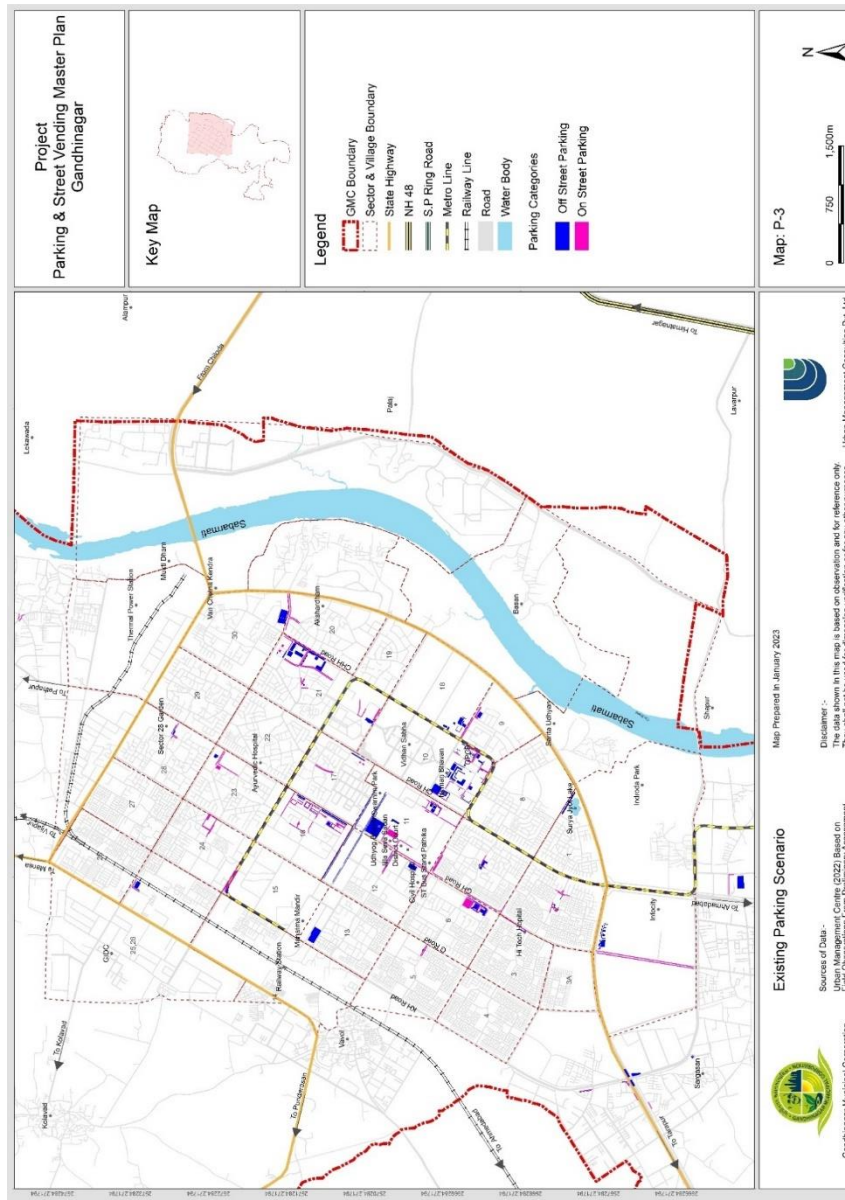
Challenge 2: Perceptual deficit in the parking supply

Despite the availability of private and public parking spaces, they are not being utilized optimally. There are instances where basements remain unused or are not being utilized for parking purposes. This is resulting into vehicles occupying undesignated parking areas such as streets and open grounds. The lack of clear demarcations and signage also exacerbates the haphazard parking situation. Through demand and supply assessments, approximately 200 parking spots across 83 locations have been identified and mapped. It has been observed that the non-designated parking spots often serve as overflow areas for the designated spots, highlighting the need for improved management and enforcement measures. In some cases, the Gandhinagar Municipal Corporation (GMC) is already taking steps to formalize on-street parking arrangements.

Figure 4 Identified parking spots in Gandhinagar

Parking spaces	Off-street parking ²	On-street parking	Designated/allotted
Designated / allotted parking	65	22	87
Undesignated parking	13	79	92
Total	78	101	179

² Off-street parking: Parking occurring on land parcels which are not a part of streets or Right of Way (ROW).



Map 1 Existing parking spots in Gandhinagar.

For the above mapped parking spaces, parking demand and supply are calculated. At present parking supply is ~21,000 ECS³ (including private and public parking). Against this supply, the peak hour vehicular accumulation is estimated to be around ~11,000 ECS. Currently, this accumulation is unrestricted in nature and is distributed within both designated and undesignated spaces which encompasses 65% and 35%, respectively of the total. **The assessment indicates that at present Gandhinagar is supply surplus and current demand (unrestricted) is only half of the total supply.**

Figure 5 Parking Demand and Supply in Gandhinagar

Parking	Supply (ECS)	Designated/allotted
Designated / allotted parking	21,385	7,203

³ Equivalent Car Space (ECS): For the ease of calculation of parking requirements, ECS is used as a measure, which is the equivalent car space equal to parking space required by one car which is equal to 12.5 sq.m.

<i>Off-street parking</i>	13,472	6,125
<i>On-street parking</i>	7,913	1,078
Undesignated parking	0	4,637
<i>Off-street parking</i>		4312
<i>On-street parking</i>		325
Grand Total	21,385	11,840

Figure 6 On-Street Designated and Undesignated Scenario at Kudasan.



Additionally, it is observed that gaps are largely existing in the institutional and commercial areas where the supply is also constrained. When seen at the sector level which is a 1 sq km area, the supply and demand gets aggregated. Parking as seen in Gandhinagar is very local commotion that is generating demand which is in a distance range of 100-150 m of the activity. Hence addressing the parking issue at the city level might lose its purpose as it needs to be made available on sector levels.

Challenge 3: Poor parking management

The lack of effective parking management poses a substantial challenge in both urban and peri-urban areas. Without proper management, the available parking spaces remain under-utilized or misused, leading to congestion, illegal parking, and inefficient use of existing resources. The city broadly retains 5 categories of parking scenarios which are as follows:

1. Locations where designated parking supply is not available
2. Locations where parking is provided but is either insufficient or exhausted during peak hours
3. Locations where parking is provided and underutilized, yet there is a demand in undesignated hotspots near respective locations.
4. Locations where parking supply is more than the demand and there is no undesignated spillover

5. Locations with no supply and undesignated parking demand during peak hours due to vending

Challenge 4: Lack of parking enforcement

Despite the recent creation of designated parking spaces both on-street and off-street, lack of enforcement is leading to arbitrary parking scenario in Gandhinagar. While efforts have been made to address the high parking demand by providing designated parking spaces, there still is a disparity between supply and demand. Most of the designated parking spaces are off-street (64%), whereas the majority of the demand is on-street (55%). The assessment also reveals that only 40% of the off-street designated parking spaces are being utilized effectively. This indicates if GMC strictly enforces a no on-street parking policy, considering the current scenario, it has the potential to resolve parking issues without the need for additional parking spaces. Proper enforcement measures would help optimize the existing parking infrastructure and improve upon the parking challenges being faced.

Challenge 5: Citizen Behavior

Gandhinagar's abundant open and unbuilt land parcels within the city have created a perception of ample parking supply, leading to an unregulated scenario. With vehicles parked haphazardly, this has resulted in disorganized parking, without proper enforcement, this situation is expected to worsen with the increasing number of vehicles, further burdening public lands.

A perception survey revealed that people struggle to distinguish between designated and undesignated parking spaces due to the lack of appropriate signage. Only 18% of surveyed locations had proper parking signage. The current street design in Gandhinagar often misleads drivers, as paved areas outside the carriageway are mistaken as parking spaces because it lacks differentiation among parking, walkways, cycling tracks, and vending spaces.

People easily find parking spaces at any time preferring on-street parking within 50-100 meters of their destination and avoided off-street designated spaces due to a lack of management.

Challenge 6: Poor availability of public transport

Limited public transport options have resulted in a high reliance on private vehicles for commuting. This, coupled with poor parking availability and management, leads to disorderly accumulation of vehicles, congestion, and air pollution. The lack of alternative commuting modes in Gandhinagar has intensified issues such as traffic overcrowding and increasing parking demands.

In conclusion, Gandhinagar faces a myriad of challenges around its parking, including rising private vehicular ownership, unregulated free parking, poor management and enforcement, citizen behavior issues, and limited public transportation options. These challenges result in underutilized spaces, congestion, illegal parking, and environmental degradation.

Addressing these issues is crucial to optimize utilization of existing infrastructure, improve parking management and implement sustainable mobility solutions for a better quality of life in the city.

2.1 Approach, Vision and Objectives of Parking Master Plan

Parking is an essential aspect of building design, encompassing residential, commercial, institutional, transportation, and recreational spaces that generate varying levels of parking demand. Traditionally, cities have approached parking provision by adopting a conventional mindset of "create more parking supply to meet the growing demand." Local authorities have long considered parking as a basic necessity, akin to streets, streetlights, water, and sanitation, and have treated it as a municipal service.

By shifting the focus from supply-centric thinking to thoughtful management, the city aims to reclaim its streets for the people and enhance the overall quality of life. The goal of this master plan is to free up spaces in the public realm meant to be for public use like walking, recreational, landscaping and limit parking only to the provided designated areas.

The visioning process for this parking master plan involved extensive stakeholder consultations at various stages. GMC actively sought input and feedback from a diverse group of stakeholders, including residents, business owners, sector experts, urban planners, and relevant government authorities.

Vision

Vision of the Gandhinagar parking master plan:

"To create a harmonious balance between parking provision and parking management while also enabling the transportation choices of its citizens."

By implementing effective parking management strategies and providing adequate parking facilities, the plan aims to enhance accessibility and convenience for all, fostering a sustainable and efficient transportation system within the city. Through this vision, Gandhinagar seeks to create a city where parking is well-managed, transportation choices are influenced towards more sustainable options, and the overall urban experience is improved for its residents and visitors.

Objectives

The following are the objectives of the parking master plan:

1. **To implement effective management:** This objective recognizes the need to create a systematic approach to parking management, ensuring that parking spaces are utilized effectively throughout the city.
2. **To achieve no-free parking:** to transform the existing free parking system into a priced parking model to reflect the true value of parking spaces. This approach encourages responsible parking behavior, optimizes parking utilization, and generates revenue for sustainable parking management and infrastructure improvements.
3. **To limit or reduce parking violations:** This objective focuses on ensuring compliance with parking regulations and minimizing unauthorized or improper parking practices. The aim is to create a safe and organized parking environment that facilitates smooth traffic flow, pedestrian safety, and efficient use of parking spaces.
4. **To reduce parking demand:** The objective aims at decreasing the reliance on private vehicle usage and promoting sustainable modes of transportation. By reducing parking demand, the city can alleviate traffic congestion, improve air quality, enhance accessibility, and create a more livable urban environment.
5. **To provide mobility choices to the citizens:** This objective promotes options such as walking, cycling, and public transportation. By prioritizing public transport, the city aims to

alleviate congestion, reduce dependence on private vehicles, enhance air quality, and improve overall mobility for its residents and visitors. The goal is to offer diverse and sustainable transportation options that encourage people to make informed choices about their mobility needs.

Approach

The approach for the parking master plan in Gandhinagar is guided by the city's parking policy, which prioritizes a management and market-driven approach over conventional methods of simply increasing parking supply to meet rising demand. The policy highlights two key approaches that will be employed to effectively manage parking in the city:

1. **Management Approach:** In contrast to the conventional belief that parking supply and demand should be provided wherever and whenever needed, there is a growing recognition that parking can be effectively managed through various tools and strategies available to the city corporation. These tools include strategic pricing, control or release of parking supply, and intentional regulations that govern parking behavior in different areas of the city. Leveraging these measures, the city can align its parking management efforts with its broader transportation policies and goals. Control or release of parking supply refers to the careful management of available parking spaces, ensuring an appropriate balance between supply and demand in different areas of the city. This can involve measures such as introducing parking restrictions or expanding parking facilities in areas with high demand.
2. **Market Approach:** This is a pricing-based approach which recognizes that parking is not an unlimited resource and that its availability is influenced by the economic value of land. By charging for parking based on market rates, the demand for parking can be influenced, ensuring a more efficient utilization of available parking spaces. This strategy acknowledges that pricing plays a crucial role in influencing travel behavior and encouraging the use of alternative transportation options.

The plan acknowledges the interconnected nature of various factors, such as land use, transportation planning, infrastructure development, and individual behaviors, in shaping the city's parking landscape. By understanding these interdependencies, the approach of this master plan is to strike a balance between providing sufficient parking facilities and implementing efficient management strategies.

Implementation strategies

The plan's implementation strategies aim to strike a balance between parking provision and management. To achieve this, the plan focuses on designating specific no-parking and parking zones within the city to regulate and optimize parking spaces effectively. It also includes the implementation of parking pricing based on supply and demand principles to influence parking behaviour, ensuring efficient utilization of parking resources. Additionally, the plan emphasizes robust parking enforcement measures to maintain order and compliance with parking regulations. Moreover, it aims to enhance the city's mobility infrastructure, particularly public transportation, to reduce the overall demand for parking and encourage citizens to adopt sustainable travel choices, thus contributing to a more sustainable and efficient transportation system for Gandhinagar.

The implementation strategies for the parking masterplan are as follows:

- a. **Parking zoning guidelines:** Specific areas within the city will be identified for either parking or no-parking, establishing parking zones to efficiently regulate and organize parking spaces, promoting optimal utilization. This master plan outline city and area level guidelines on identifying a particular parking, restricted parking or no parking zone.
- b. **Implement parking pricing:** Charging mechanisms based on supply and demand principles will be introduced to manage parking demand and utilization effectively. By aligning parking costs with availability and demand, this strategy aims to influence parking behaviour and encourage turnover, functioning as both a management and enforcement tool.
- c. **Implement parking enforcement:** To ensure orderliness and adherence to parking regulations, effective enforcement measures will be implemented, including monitoring parking violations and taking necessary actions to deter improper parking practices.
- d. **Enhancing mobility infrastructure, including public transportation:** Initiatives will be undertaken to improve and expand public infrastructure around non-mortised mobility including public transport motivating individuals to choose sustainable travel options and reduce overall parking demand.
- e. **Raise awareness among citizens about proper parking behaviour,** encouraging responsible parking practices that contribute to a well-organized and efficient parking system in Gandhinagar.

2.2 Parking Zoning Guidelines

The parking challenges in Gandhinagar revolve around haphazard parking, underutilization of designated spaces, and an abundance of parking supply. Moreover, the local nature of parking has led to a perceptual deficit in the parking supply. To effectively address these challenges, the parking master plan adopts a management and market-driven approach. Zoning is proposed as a key solution, categorizing areas into three zones: no-parking, restricted parking, and pay and park zones. This zoning strategy will facilitate clear and efficient implementation of management measures, including the engagement of pay and park agencies in the designated zones. Additionally, in no-parking areas, stringent enforcement measures can be employed to curb unauthorized parking and maintain orderliness. The proposed zoning approach aims to optimize parking space utilization, streamline enforcement efforts, and ensure a more organized and sustainable parking system in Gandhinagar.

Parking demand in Gandhinagar is highly localized, with concentrations around high-activity areas, such as commercial and institutional zones. Moreover, this demand exhibits a dynamic nature, varying over time. To effectively address this dynamic demand, a zoning strategy has been developed, which recognizes that the zoning itself must be adaptable and flexible. This means that GMC may revise and update the zones based on changing requirements and circumstances.

The goal is not solely focused on creating more parking supply but rather on creating a balance between parking provision and ensuring a safe and accessible urban environment. To develop the zoning guidelines, a preliminary assessment was conducted in association with UMC. This involved mapping parking and traffic hotspots in consultation with the traffic police department. By leveraging this data and analysis, GMC has designed the zoning plan to cater to the specific needs of different areas and enhance overall mobility and accessibility in the city.

The draft parking master plan proposes the following categories of zones to effectively manage parking in Gandhinagar:

No Parking Zones: These areas strictly prohibit parking to ensure public safety and maintain the integrity of public spaces. No parking zones include carriageways, open grounds, and streets where parking could obstruct the overall public realm. Additionally, these zones are designated around important institutions such as the legislative assembly, fire and emergency services, institutes of national security, public health facilities, and primary roads along major public transport nodes like railways and bus stops. Sub-categories within no parking zones include no-stop zones, where vehicles are not allowed to stop or park at entry and exit points of institutions and junctions to maintain smooth traffic flow.

Restricted Parking Zones: These zones manage parking demand by imposing limitations on parking duration and vehicle types. For instance, in residential areas, parking may be free and open to residents, while non-resident vehicles may have restricted parking hours. In commercial areas, specific vehicles like delivery trucks may be allowed to park only during designated times. Enforcing these restrictions helps optimize parking space utilization, reduce congestion, and improve traffic flow.

Pay and Park Zones: In these designated areas, users are required to pay a fee to park their vehicles. These zones are carefully regulated and provide revenue for the city, ensuring efficient use of parking spaces and promoting turnover to accommodate more vehicles.

To further operationalize parking zoning across the city, parking guidelines are developed specific to the scenario of Gandhinagar city which will serve as a framework for the management and regulation of vehicle parking in the area, ensuring the safety of pedestrians and drivers.

Parking Zoning Guidelines

No Parking Zones

Guidelines for deriving at no-parking zones are elaborated herewith:

1. No parking on carriageway of primary roads.
2. No parking or halting is allowed for 25m and 50m at junctions of primary and secondary roads, respectively.
3. No parking zones adjacent to eco-sensitive areas.
Gandhinagar has demarcated forest land on either sides of primary roads. This land is a strict no parking zone. Additionally, a 50m no parking buffer is applied to existing water bodies i.e. river, ponds, lakes and canal.
4. No parking for 250 m radius of entry and exit points of transport hubs such as metro stations, bus depots, and railway stations.
5. No parking on reserved plots designated for recreational activities, open spaces, parks, and gardens serve the purpose of preserving these areas as essential green perforations.
6. No on street parking in a radius of 250 m of existing designated public off-street parking.
7. No parking zones around the important administrative institutes, institutions of national security and public services of emergency like fire services.
8. No stop zone and parking up to 50 m on either side of the entry and exit of hospitals, educational and administrative institutes
9. No parking on railway tracks for a buffer of 30M on railway tracks

Restriction-free parking zones

Restricted parking along secondary and tertiary street

Secondary roads typically in Gandhinagar serve as connectors or access routes to residential and commercial areas which are typically 18-12 m wide. While these streets are being utilized for parking on a regular basis, restricted parking may be designated around commercial areas only for certain hours and through pay and park mechanism. While for residential zone, permit based parking may be proposed. This masterplan proposes permit based parking which may be allowed to the residents, visitors, etc. along the secondary streets.

Pay and Park zones

Pay and park zones along the city shall be created based on the following approach:

1. **All the existing designated public parking shall be converted into pay and park.**
Through this master plan all parking zones shall be eventually converted into pay and park zones to realize that parking is not a free commodity and it must be consumed in accordance with its real value.

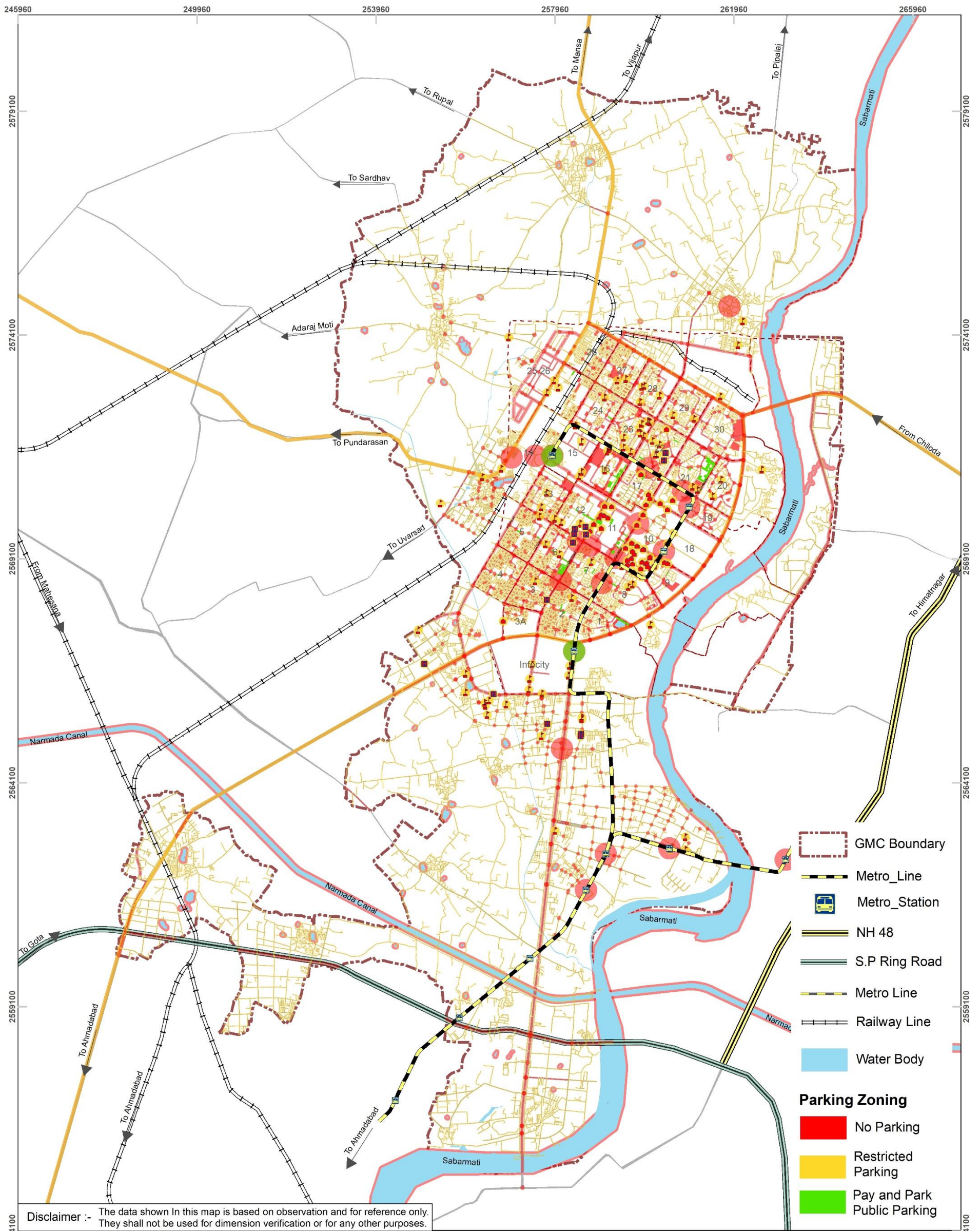
- 2. Create pay and park zones along transport facilities like metro stations (terminus)**
 - a. The city is expanding its connectivity with the neighboring city of Ahmedabad through a metro project. Three upcoming metro stations are proposed within the city to enhance local connectivity. Parking zones are proposed around some of the stations to integrate local public transport needs within.

- 3. Pay and park along major public utility like parks, recreational, health facility and vending activities in the city.**
 - a. Parking spaces may be developed within or around public utility spaces like parks, health facility and major vending clusters which will be created within the building units or in the margin spaces. The parking zones around these shall integrate IPT parking /pick-up and drop-off points, and encourage high turn-around time to promote short term parking

Based on the above guidelines, Gandhinagar's parking master plan is as proposed. Through this parking master plan. The parking zoning guidelines as elaborated above have been spatially translated over the GIS map of Gandhinagar Municipal Corporation (as mentioned below). This masterplan clearly demonstrates no-parking zones, restricted parking zone and restriction free parking zones at macro scale in the city. A total area of **8.7 sq.km is under no parking zone** and **12.5sq.km is under restricted parking zone**. For **restriction free parking zone**, designated parking lots are being regularised which account for an area of **1,00,256 sq.m (5576 ECS)**.

2.2.1 Parking Masterplan

Map 2 Parking masterplan Gandhinagar



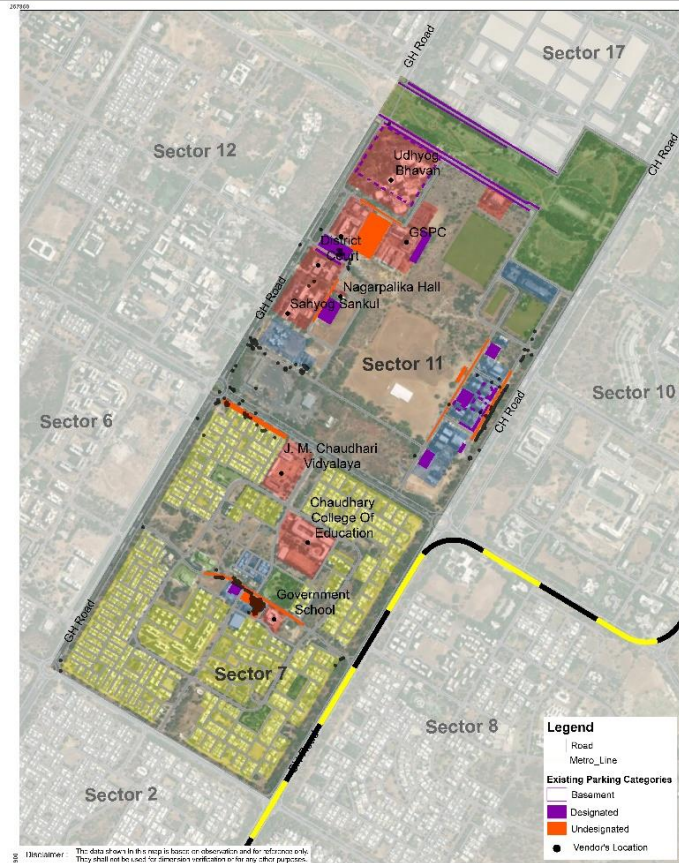
Demonstration of parking zones at sector scale: Sector 7 and 11

To further understand parking zoning guidelines, the micro plan for sector 7 and 11 are developed which has a mix of residential, commercial and institutional land-uses as shown in the following map:

Proposed Land-use of Sector 7 and 11 (as per sector plan, CATP).

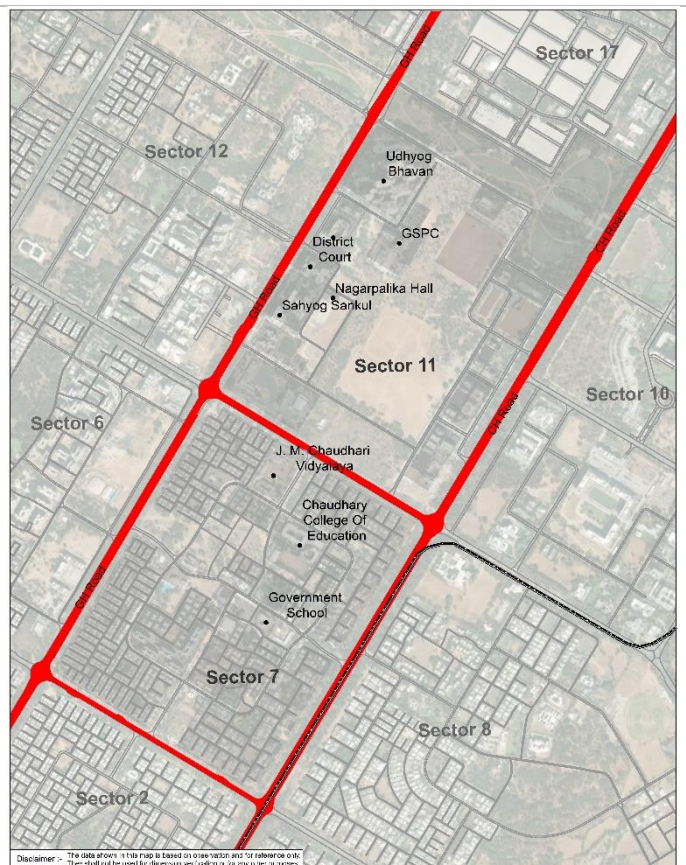


Existing parking scenario (designated and un-designated) in sector 7 and 11.



No parking on carriageways of primary roads.

To prevent traffic congestion and accidents, it is necessary to prohibit parking on primary roads' carriageways. This will help maintain smooth traffic flow and ensure the safety of both drivers and pedestrians. Vehicles parked on carriageways can create obstructions and blockages, leading to delays and potential accidents.



No parking in forest land.

To prevent any harm to the forest ecosystem and preserve the natural habitat, parking is strictly prohibited in forest land areas. This helps to prevent damage to trees, soil erosion, and disturbance to wildlife. In addition, forest land is designated as protected areas, and parking can have a negative impact on their conservation.



No parking in reserved plots.

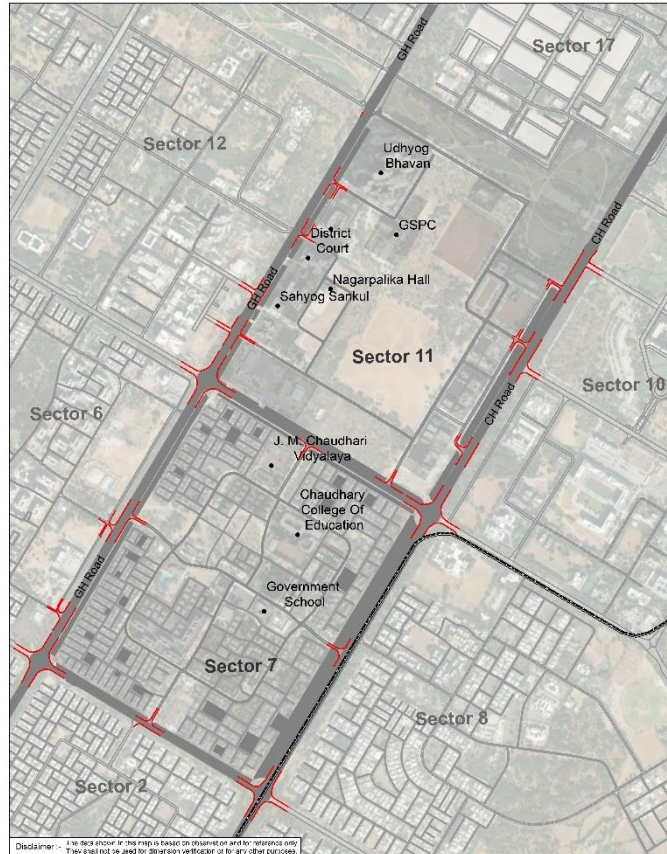
To prevent unauthorized utilization of reserved plots, parking is strictly prohibited in such plots. These plots are usually designated for future development or have specific purposes assigned to them, and allowing parking can hinder their intended usage.



No Stop Zone on the junctions.

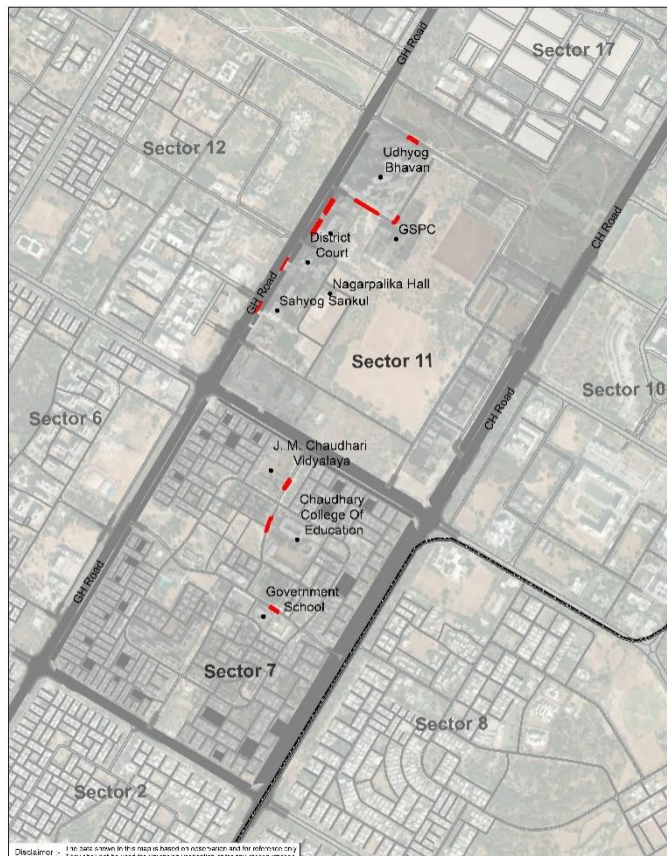
- a) No parking on 50m radius at junctions of primary roads.
- b) No parking on 25m radius at junctions of secondary roads.

A “no stop zone” at junctions refers to a zone where vehicles are not allowed to stop or halt even for a brief duration of time. These zones are being established to prevent accidents and maintain smooth flow of traffic at turnings. By prohibiting vehicles from stopping in these areas, congestion is reduced and the risk of collisions is minimized. In addition, it allows for pedestrians to safely cross the road without any hindrance.



No Stop Zone on 25m either side on entry and exit of institutions.

To ensure the safety of pedestrians, including students, workers, and visitors, during peak hours at entry and exit gates of administrative and educational institutes, a guideline has been introduced. These gates often experience high pedestrian movement, and implementing this guideline will help alleviate the congestion caused by private vehicles. Additionally, it will encourage visitors to opt for alternative modes of transportation.



Restricted Parking on streets with ROW less than 12m.

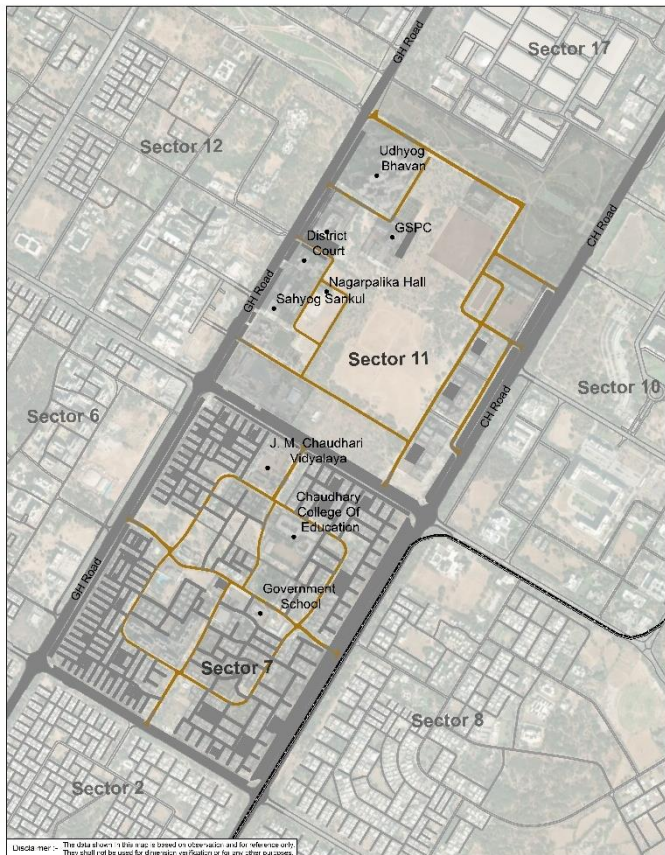
Restricted parking is proposed for streets that have a Right of Way (ROW) of less than 12 meters. This means that parking will only be allowed in designated spaces, and with time and vehicle type restrictions. This is to ensure that traffic flow is not hindered in narrow streets, which can lead to safety hazards and inconvenience for both pedestrians and motorists.



Disclaimer: The data shown in this map is based on observations and for reference only. They shall not be used for dimension verification or for any other purposes.

Restricted Parking on the secondary sectoral roads (12M or above). Unless demarcated on-street parking is provided, the street will be open for parking during 10pm – 7pm.

Restricted parking measures will be implemented on the secondary sectoral roads, which have a width of 12 meters or above. This means that parking will be allowed only in designated areas with specific regulations. The objective is to manage parking effectively and maintain smooth traffic flow on these roads. By implementing restricted parking measures, the city aims to minimize congestion, enhance road safety, and encourage the use of alternative modes of transportation. It ensures that the secondary sectoral roads serve their primary purpose of facilitating the movement of vehicles while minimizing any disruptions caused by unauthorized or haphazard parking.



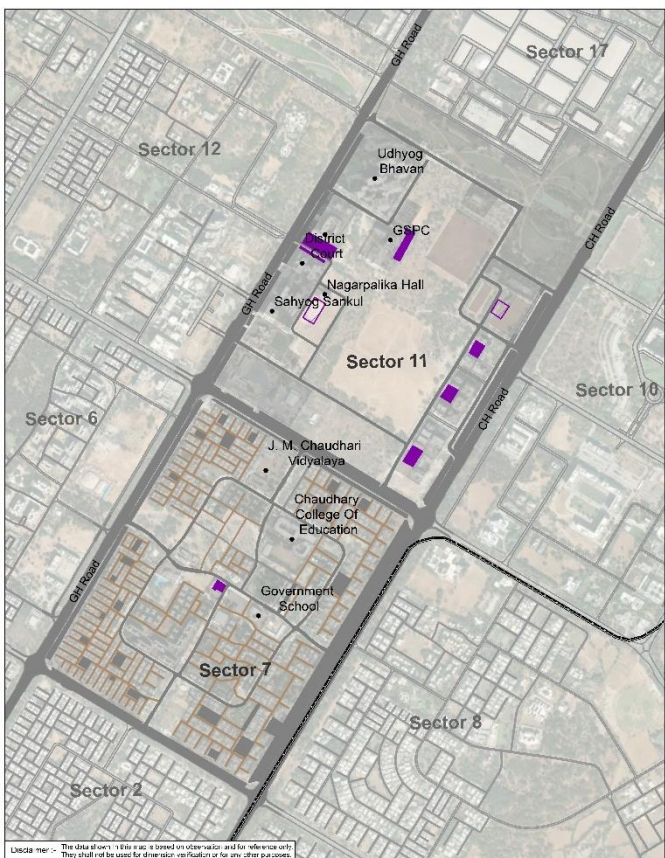
Disclaimer: The data shown in this map is based on observations and for reference only. They shall not be used for dimension verification or for any other purposes.

Recreational (temples and parks) areas may have on street parking in ROW (not carriageway), on the side of premises which does not have any entry or exit. This parking stretch shall be demarcated and is not to be more than 100m in length.

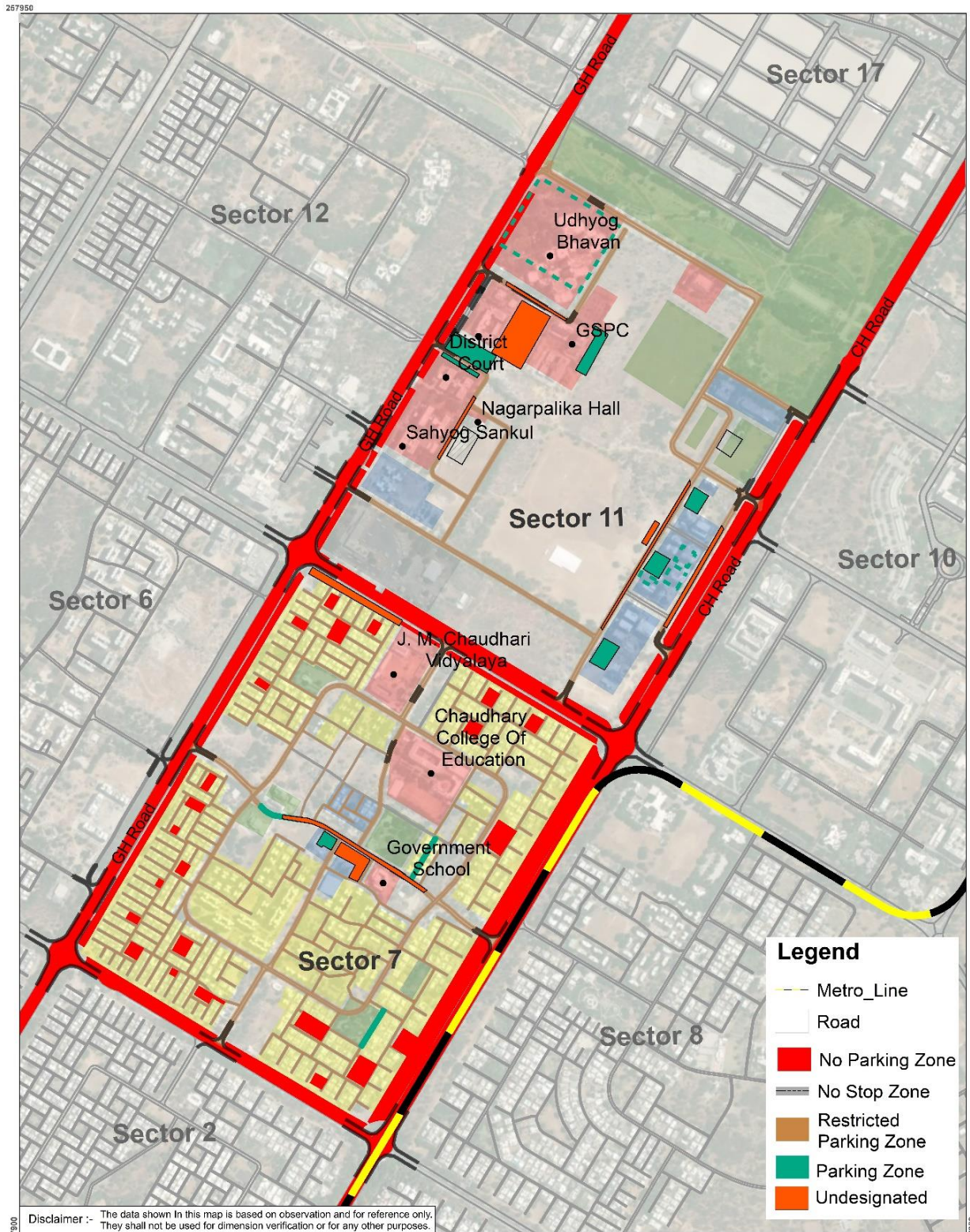
This provision ensures that visitors to these recreational spaces have convenient parking options without obstructing the flow of traffic on the main carriageway. By demarcating and limiting the length of the on-street parking area, the city promotes organized parking practices and preserves the overall accessibility and functionality of the recreational areas.



Parking zones as planned in the parking lots shall be retained.



Map 3 Parking zone plan for sector 7 and 11



Sector 7 and 11 (combined) have a total area of 1.7 sq.km. Based on the above guidelines, **0.5 sq.km** area is under no parking zone and about **20,886 sq.m** area is for restriction free parking. The restriction free parking zones comprise of regularised designated parking lots which collectively account for **629 ECS**.

2.2.2 Parking Enforcement

Parking enforcement and parking management are interlinked and both are vital for successful implementation of parking masterplan. The absence of either component may result in an incomplete strategy. While most enforcement activities lie beyond the jurisdiction of urban local bodies, falling under the purview of the traffic police department as stipulated by the Motor Vehicle Act, it is noteworthy that city police also require collaborative support. The Gujarat Provincial Municipal Corporation (GPMC) Act, 1949 empowers city governments to engage in parking control and enforcement measures, thereby contributing to the overall enhancement of the urban spaces. This strategic approach underscores the delineation of Gandhinagar's parking enforcement plan, which stands as a coordinated effort in partnership with the city's traffic police department.

Parking enforcement encompasses the actions undertaken by authorities to promote adherence to parking rules and discourage unauthorized parking. These measures involve issuing parking penalties, towing vehicles parked in restricted zones, immobilizing vehicles using clamps or wheel locks, and conducting regular patrols of parking areas to ensure compliance with regulations. The purpose of parking enforcement is to ensure equitable and efficient utilization of parking spaces, manage the demand for parking in densely populated areas, and prioritize the safety of pedestrians, cyclists, and other road users.

Based on the existing scenario of parking in the city, GMC plans to implement parking related enforcements through establishment of a traffic cell, deploying traffic marshals and implementing parking enforcements in collaboration with city traffic police department. GMC is cognizant of the actions being taken by other cities of Gujarat and drawing upon its learnings, GMC has developed this action plan around parking enforcement. GMC's parking enforcement plan is as follows:

Action 1: Creating regulatory framework enabling environment for parking enforcement

GMC is to formulate its General Parking Control (Management) and By-Laws, 2018 under Subsection 36 of Section 458 of the Gujarat Provincial Municipal Corporation (GPMC) Act, 1949. GMC must seek approval of the bylaws from their Standing Committee and General Body and then, seek its approval in the State Assembly.

Action 2: Establish a Traffic Cell headed by a Joint Traffic Committee comprising GMC and Traffic Police

The Municipal Commissioner must establish a Traffic Cell within GMC which may be headed by a Joint Traffic Committee with representation from GMC, Gandhinagar Traffic Police and the Gandhinagar Smart City Development Limited (GSCDL). The Traffic Cell must be headed led by a Director – a Class I officer or equivalent, a team of enforcement officers of the level of assistant engineer and a team of Marshals to enforce the parking violations on ground. The Marshals will be working for 8 hours a day. The grade of marshals hired shall be class 4. The marshals will have the following functions:

1. Patrolling and surveillance: Marshals patrol parking zones to identify vehicles that are parked in violation of the designated rules and regulations. They monitor parking areas to ensure compliance and detect any unauthorized parking activities.
2. Issuing citations and fines: When marshals come across vehicles that are parked illegally, they have the authority to issue parking citations or fines. This serves as a

deterrent to discourage unauthorized parking and encourages drivers to adhere to the parking regulations.

3. Towing and removal of vehicles: In cases where vehicles are parked in prohibited areas or pose a safety hazard, marshals may arrange for the towing or removal of such vehicles. This action helps clear congested or restricted areas and ensures compliance with parking rules.
4. Educating the public: Marshals also play a role in educating the public about parking regulations. They may provide guidance, information, and reminders regarding parking zones, timings, and restrictions. This helps raise awareness among drivers and promotes compliance with parking rules.
5. Maintaining traffic flow: By enforcing parking zones, marshals contribute to maintain smooth traffic flow. Illegally parked vehicles can obstruct roads, cause congestion, and impede the movement of other vehicles. By addressing parking violations, a marshal ensures a safer and more efficient transportation system.

Action 3: Develop tools and standard operating procedures (SOP) for the Traffic Cell operations

GMC must develop tools and SOP for operations of the Traffic Cell including the following:

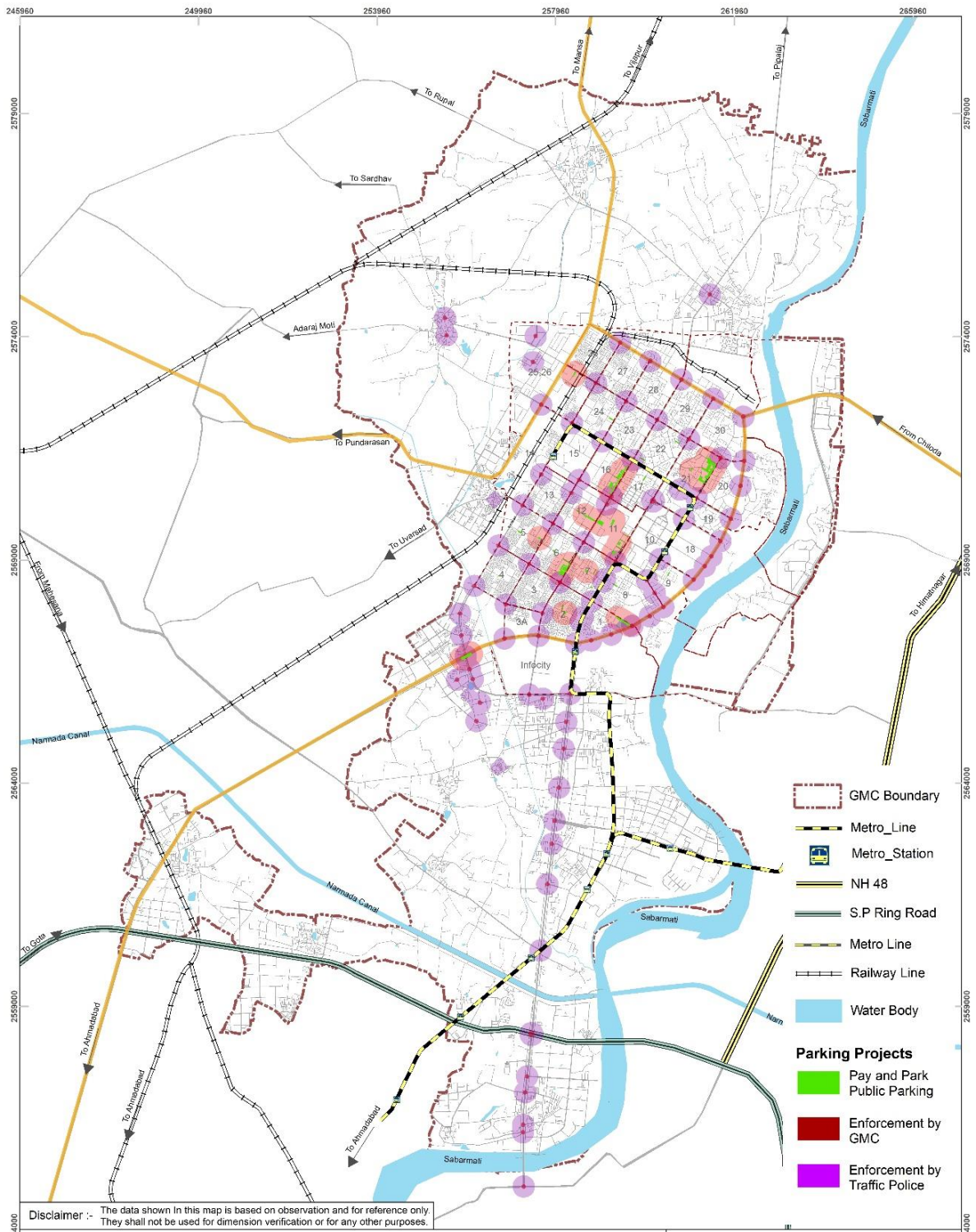
1. Publish parking-related information including parking fee, designated parking locations in the city and parking violation fine information regularly in local media and through road signage as appropriate.
2. Enforce parking including checking parking vehicles in no-parking areas/ parked in a wrongful manner and may clamp/ tow/ fine such vehicles as per the provisions of Motor Vehicles Act, 1988 and other relevant acts.
3. Adopt smart parking solutions for enforcement including use of digital tool/ app to undertake the following. The app must be integrated with the Parivahan Sewa of the Ministry of Roads, Transport and Highways for direct dispatch of violations and be equipped with license plate recognition technology.
 - a. Maintain parking violations and fine collection data
 - b. Document parking violations with pictures/ videos
 - c. Collect fines through cash/ digital payment methods and generate receipts
 - d. Raise towing request with GMC/ Traffic Police/ private operator cranes
4. Develop effective HR and field operations monitoring MIS to ensure the availability of Marshals at the appropriate locations during requisite hours and coordination with the Traffic Police for reinforcements/ augmentation as needed.

Effective enforcement of parking regulations is vital for the successful implementation of parking management strategies. In the context of Gandhinagar, the absence of enforcement measures has directly or indirectly contributed in existing parking issues. Without proper enforcement, the city is unable to effectively regulate parking practices, leading to congestion, inefficient use of parking spaces, and a negative impact on the overall traffic situation.

As Gandhinagar continues to experience growth in population and urban development, the challenges related to traffic will inevitably increase. Without adequate enforcement, these challenges will escalate, potentially leading to further environmental degradation and a decline in living standards. It is imperative for the city to recognize the significance of parking enforcement as an essential component of comprehensive parking management. In conclusion, without enforcement, parking management efforts in Gandhinagar will be ineffective.

It is crucial for the city to prioritize the establishment of an enforcement system to complement its parking management strategies and ensure a well-functioning transportation network. In Gandhinagar, there are 83 hotspots that have high traffic influx hence high parking demand, particularly in peak hours. Out of these, there are 35 spots which are public parking lots and have high on-street spillover rates. These spots shall be managed by marshals deployed by GMC. Furthermore, the rest of the 48 can be managed either by mobile marshals by GMC or traffic police. Also, since the zoning guidelines suggest to enforce strict rules on junctions. It is mandatory to actively check primary junctions to ensure smooth flow of traffic. The below map depicts the area of surveillance divided amongst GMC and traffic police for enforcement.

Map 4 Enforcement zones of GMC marshals and traffic police.



2.2.3 Tech-Enabled Parking Management

GMC's strategic objective is to enhance its parking management strategies by seamlessly incorporating technology-enabled solutions. This entails the integration of technology with pricing mechanisms, to scale effective parking operations, foster citizen engagement and support to ensure a harmonized and scalable implementation across the city. This systematic approach aims to leverage technology to efficaciously optimize parking management under this master plan.

Various approaches can be implemented to effectively collect parking fees from vehicles. One prominent solution involves the utilization of technology-enabled strategies. By introducing these innovative solutions in public parking areas, it becomes possible to enhance the efficiency and convenience of parking for vehicle owners. Such technological advancements can contribute to the reduction of traffic congestion and create a better user-friendly parking experience.

Implementing tech-enabled strategies can involve the use of smart parking systems that incorporate digital payment methods, such as mobile apps or contactless payment options. These solutions eliminate the need for physical payment collection, streamlining the parking process and minimizing delays. Additionally, advanced technologies like parking sensors and real-time data analytics can assist in optimizing parking space utilization and providing drivers with accurate information about parking availability. These tech-enabled solutions for public parking are further elaborated below:

1. **Mobile parking apps:** these apps allow drivers to find and pay for parking spaces using their smartphones. These apps typically use GPS and real-time data to provide information on available parking spaces, prices, and restrictions. Example for such an application is ParkSmart. It is a mobile app developed by Delhi Integrated Multi-Modal Transit System (DIMTS) that allows drivers to find and book parking spaces in Delhi. The app uses GPS and real-time data to provide information on available parking spaces, prices, and restrictions. It also allows drivers to pay for parking through the app.
2. **Smart parking sensors:** Smart parking sensors use sensors embedded in the pavement or attached to parking meters to detect the presence of vehicles in parking spaces. This information is then used to create a real-time map of available parking spaces. This technology can help drivers find parking spaces more quickly and reduce traffic congestion caused by drivers circling around looking for parking. For instance, one such app being used is IntelliPark, which was developed by Chennai Smart City Limited and uses sensors and cameras to detect the occupancy of parking spaces in real-time. The system uses LED signs to guide drivers to the available parking spots and allows drivers to pay for parking through a mobile app.
3. **License plate recognition systems:** License plate recognition systems use cameras to capture the license plates of parked vehicles and compare them against a database of registered vehicles. This can be used to identify vehicles that are parked illegally or have outstanding parking fines.
4. **Parking guidance systems:** Parking guidance systems use sensors to direct drivers to available parking spaces in real-time through a mobile app. This can help reduce the time it takes for drivers to find parking spaces and reduce congestion caused by drivers searching for parking. For instance, applications such as ParKEZ and Mpark and being used in Bengaluru and Greater Mumbai Municipal Corporations, respectively. The app uses GPS and real-time data to provide information on available parking spaces, prices, and restrictions. It also allows drivers to pay for parking through the app.

5. Automated parking garages: Automated parking garages use robotic systems to park and retrieve vehicles, eliminating the need for drivers to navigate through parking garages and search for spaces. This can help save time, reduce the risk of accidents, and increase the capacity of parking garages.

By embracing these technological advancements, Gandhinagar can revolutionize its parking management system, making it more efficient, customer-oriented, and sustainable. The integration of tech-enabled strategies can not only improve revenue collection but also contribute to a smoother flow of traffic and an enhanced overall parking experience for drivers.

2.3 Parking Projectization

Parking projectization refers to the process of planning, implementing, and managing parking-related initiatives as individual projects. It involves identifying and allocating resources, and establishing timelines to address parking issues and improve parking management. By treating parking as a project, cities can effectively allocate resources, engage stakeholders, and monitor progress to ensure the successful implementation of parking-related initiatives. Whether it's the construction of new parking facilities, implementation of smart parking technologies, or the enforcement of parking regulations, parking projectization helps streamline efforts, enhance coordination, and achieve tangible results in improving parking systems and enhancing urban mobility. In case of Gandhinagar, parking projects pertain to upgradation of existing parking infrastructure, creation of new parking, the installation of signages across the city and parking management initiatives.

2.3.1 Upgradation of Existing Parking Infrastructure

There are several locations identified where existing parking lots shall be upgraded as present conditions hinder citizens from using these parking Lots. These lots are broadly categorized into on-street and off-street parking lots. The upgradation of these existing parking lots is crucial to address the challenges and obstacles that currently hinder their use. Upgrades involve various interventions such as paving, implementing better lighting and enhancing accessibility for better management and convenience. The following table depicts the location, type, nature, and upgradation requirements of the parking lots.

Figure 7 Parking Projects: Upgradation of existing parking lots

S.No.	Projects Identification	Location	Project-Description	Spots	Area	Unit
1	Upgradation of existing off-street parking	Sector-6, 11	Creation of a paved parking space with basic amenities of light, sanitation with a curb stone to demarcate boundary and a ramp for vehicular accessing	2	8362	Sq.M
2	Upgradation of existing on-street parking	Sectors- 21,12,6,16	Demarcated on-street parking with pavements, bollards and with kerbs	10	1350	RMT

2.3.2 Creation of New Parking

As previously stated, parking scenario in Gandhinagar portrays varied scenarios and these were broadly categorized in 5 cases. Case 1 depicted the locations where designated parking supply is not available, case 2 depicted that there is a supply but it is exhausted and case 5 depicted locations with no supply and undesignated parking demand during peak hours due to vending. There are 6 such locations where parking where additional parking is required. Details of these are provided in table below.

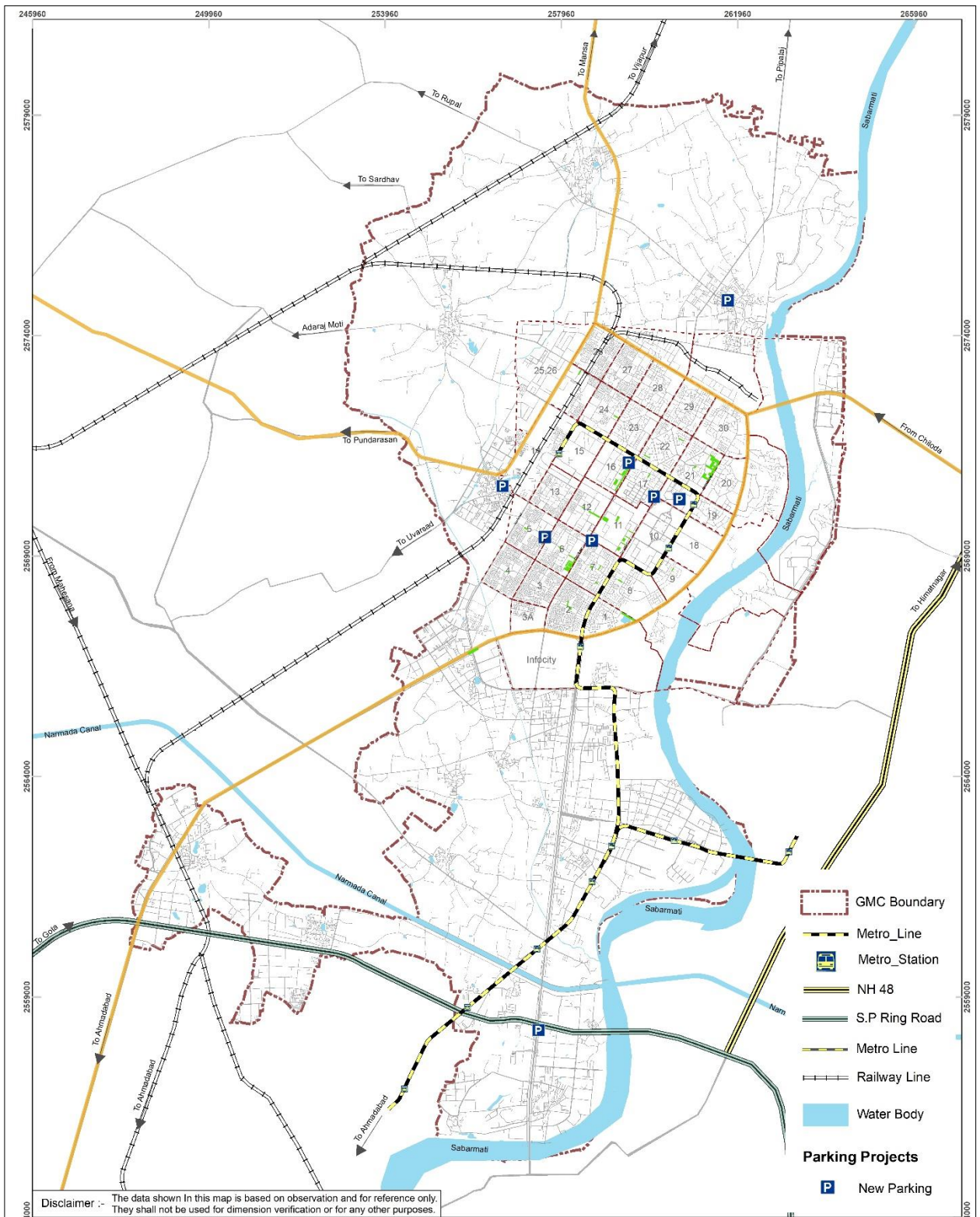
Figure 8 Parking Projects: Creation of parking lots

S.No.	Sector/ TPS	Projects Location	Description	Requirement (ECS)
-------	-------------	-------------------	-------------	-------------------

1	5	Gujarat Gas	Creation of on-street parking in a raised pavement on a MUZ along the parking zone	18
2	7	Pathika-Ashram Char Rasta	Creation of parking along with vending zone	22
3	16	Chowpatty	On-street / Off-street parking to be provided	25
4	10B	Meena Bazaar	Formation of off-street parking on proposed parking parcel near market	18
5	Pethapur	Fruit and Vegetable Market	Creation of parking along with vending zone	15
6	Vavol	Fruit and Vegetable Market	Creation of parking along with vending zone	10

Following maps show the locations of hotspots where new parking lots are to be created.

Map 5 Locations where new parking lots need to be created.



2.3.3 Parking Signage

Parking signage plays a crucial role in guiding drivers and ensuring efficient use of parking spaces. It serves as a visual communication tool that provides essential information about parking regulations, restrictions, and guidelines. There are various types of parking signage, including:

1. **Regulatory Signs:** These signs indicate parking rules and regulations, such as "No Parking," "Reserved Parking," or "Loading Zone Only." They help enforce parking zoning guidelines.
2. **Informational Signs:** These signs provide useful information to drivers, such as parking hours, time limits, payment methods, and any specific conditions or requirements.
3. **Leading Signs:** These signs guide drivers to different parking areas, entrances, exits, and available spaces within a parking facility. They help optimize traffic flow and reduce confusion.

Parking signage ensures compliance with parking regulations, enhances safety for pedestrians and drivers, and maximizes the utilization of parking spaces. Clear and well-placed signage reduces the chances of parking violations, traffic congestion, and conflicts among drivers. It also improves the overall parking experience for users by providing clear directions and relevant information. Effective parking signage is essential for efficient parking management and contributes to the smooth functioning of public areas, businesses, and public facilities. It helps maintain order, ensures fairness in parking allocation, and promotes a safe and organized parking environment for all.

In Gandhinagar, there are a total number of 32 spots where public parking is provided. At all spots, there shall be at least 1 signage provided which will demarcate the parking zone. This signage shall provide information about the parking prices, timings and restrictions if any. Furthermore, these spots shall have leading signage situated at a radius of 300m - 500m around parking zones. These signages will act as directing signage and 2-4 signage can be provided at each hotspot depending on the size and traffic influx. To ensure that people park in designated parking lots, no parking signage shall be provided in an immediate vicinity outside parking zones and strict enforcement shall be maintained in such areas.

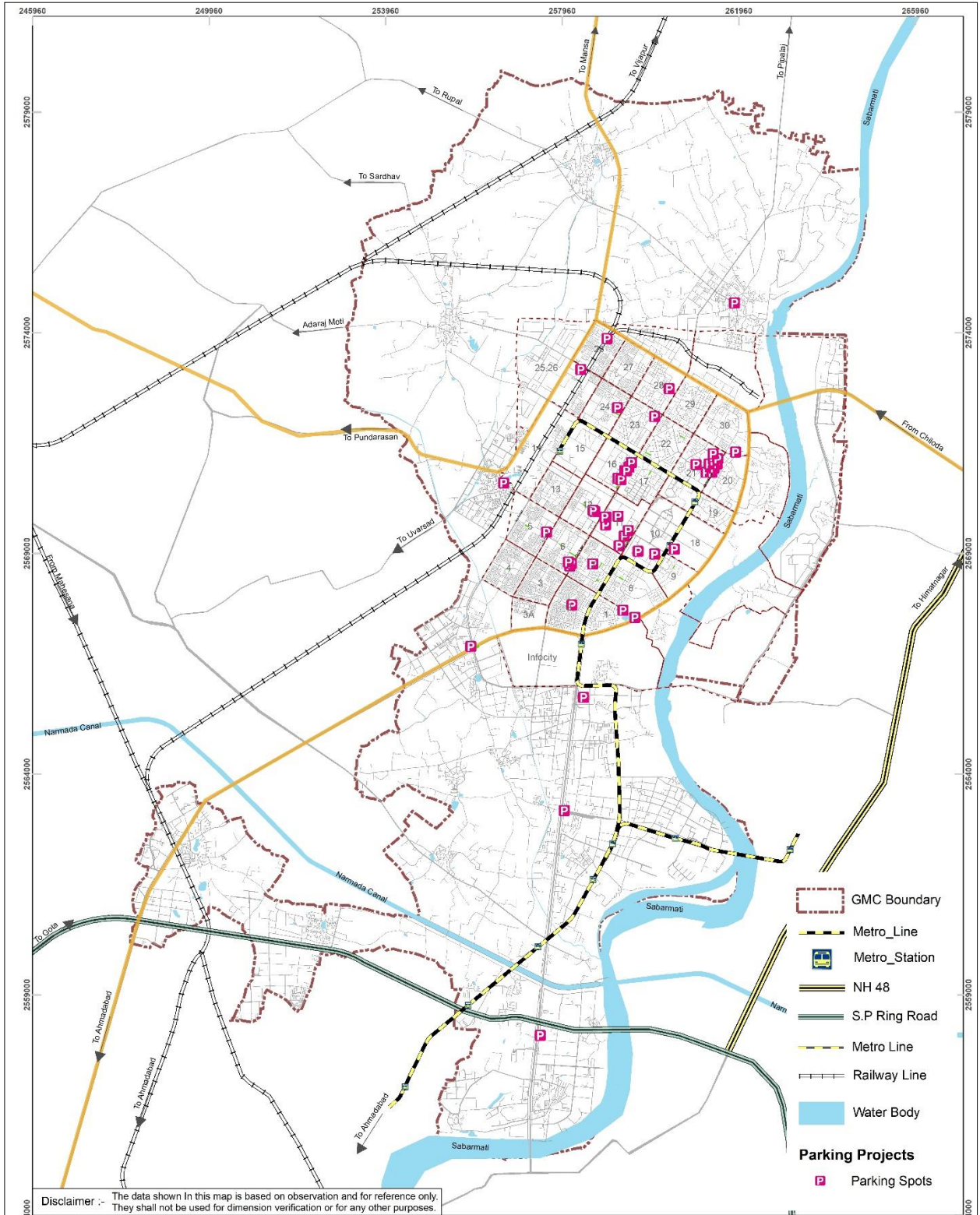
Figure 9 Parking Project: Signage installation in parking hotspots

S.No.	Projects Identification	Location	Project-Description	Number
1	Signage for parking zone (Leading signage)	All Hotspots with high footfall	Installation of leading signage directing towards designated parking in and around 500 m.	96
2	Signage for parking zone (Information-price, time)	All-City	Installation of parking signage indicating the capacity of parking, operational hours, and pricing.	32
3	No Parking signage around hotspots	All-City	Install no parking signage in a 500 m buffer around the undesignated parking hotspots	64
4	Digital Signage	Sectors 6,10, 11,16,24	Installation of digital signages indicating parking demand and hence dynamic parking prices	6

In addition, once parking zoning is well understood by citizens and drivers start portraying an appropriate parking behavior. In that phase, infrastructure can be updated and in

replacement of multiple signages, a digital signage can be installed showing number of parking bays available in parking lots of premium areas such as commercial markets.

Map 6 Parking Project: Installation of signages at public parking lots



2.3.4 Parking Management

In Gandhinagar, all the available public parking spaces shall be maintained and managed. Parking management projects encompass a range of strategies aimed at optimizing parking utilization, ensuring compliance with regulations, and facilitating the collection of parking charges. One crucial aspect of these projects is the demarcation of parking zones, which involves designating specific areas for parking purposes. This demarcation helps create order and structure within the parking system, guiding drivers to appropriate parking spaces and minimizing parking congestion.

Additionally, involves the deployment of parking attendants or guards. These individuals play a vital role in managing the parking facilities, enforcing parking regulations, and assisting drivers with parking-related queries. They monitor the designated parking areas, ensure that vehicles are parked correctly, and address any issues or violations that may arise. By having trained personnel on-site, parking management projects can effectively maintain order, address security concerns, and aid drivers when needed.

Furthermore, these guards will also be responsible for implementing systems and processes for the collection of parking charges. This can include the installation of automated payment machines, mobile payment options, or the deployment of parking attendants who collect fees from parkers. By establishing efficient and reliable payment mechanisms, parking management projects help generate revenue that can be reinvested in the maintenance and improvement of parking facilities.

Overall, parking management projects combine various elements such as the demarcation of parking zones and the deployment of personnel to ensure efficient parking operations. By effectively managing parking spaces, regulating parking behaviour, and collecting charges, these projects contribute to the optimization of parking resources, reduction of congestion, and improvement of overall parking experiences for both drivers and the community.

Figure 10 Parking Project: Management and Maintenance of existing parking lots

S.No.	Projects Identification	Location	Project-Description	Spots	Unit
1	Demarcation	All-City	Painted demarcation on the surface demonstrating parking bays, parking spillover, painting shaft street lights, trees, etc.	32	Nos
2	Guards to manage efficient parking and collect charges	All-City	Deployment of parking attendants to assist parkers and collect parking fees.	32	Nos

Overall, the projectization in the parking master plan underscores the significance of creating and upgrading parking infrastructure, implementing proper signage, and adopting effective parking management strategies. These projects are essential for addressing parking challenges, improving the overall parking experience, and ensuring the equitable and efficient utilization of parking spaces. By prioritizing these initiatives, Gandhinagar can enhance mobility, reduce congestion, and contribute to the development of better quality and livable urban spaces.